KICCE 국제세미나 및 한국아동패널 학술대회

KICCE International Seminar &

Annual Conference of Panel Study on Korean Children

August 10, 2011 8:30 - 18:00

The Korea Chamber of Commerce & Industry, Seoul

Effective Investment in Early Childhood Education and Care

Korea Institute of Child Care and Education

Sponsored by Samsung Welfare Foundation

개 회 사

안녕하십니까? 여러분을 모시고 국제세미나와 한국아동패널 학술대회를 개최하게 된 것을 대단히 기쁘게 생각합니다.

국가인적자원 육성을 위한 육아정책 연구 수행을 목표로 국무총리 산하 국책연구기관으로 육아정책연구소가 설립된 지 어느덧 6년이 되어옵니다. 그동안 본 연구소는 여러분의 기대와 관심 속에 유아교육과 보육의 발전을 위한 합리적인 정책 방안들을 제시함으로써 비약적인 성장을 이루며, 우리나라 육아정책 연구의 허브로서 자리매김하고 있습니다. 이제 육아정책연구소는 한 걸음 더 나아가 국제적 교류 확대와 협력을 통해 세계 수준의 육아정책 연구를 선도하는 중추적 연구기관으로 도약하려 합니다.

세계적인 석학들과 함께하는 이 자리도 그런 노력의 일환으로 준비되었습니다. 노벨 경제학상을 수상하신 시카고 대학의 Heckman 교수님과 런던 버벡 대학의 Melhuish 교수님을 모시고 '조기투자의 효율성 제고'라는 주제로 영유아기의 투자가 지니는 의미를 숙고하려합니다. 투자는 미래를 예측하고 대비하는 지출을 의미합니다. 영유아에 대한 투자는 개인 수준에서는 영유아의 건강한 발달을 돕고, 국가수준에서는 취약계층을 아우르는 영유아 발달 지원 정책을 실천함으로 균형 잡힌 사회, 건강한 사회를 이루기 위한 밑거름이 됩니다. 이 시간 다음세대를 위한 그 투자의 안목을 기를 수 있기를 기대합니다.

육아정책연구소는 정책연구뿐만 아니라 기초연구의 중요성을 인식하고 그 토대를 구축하려 합니다. 이를 위해 우리나라 영유아의 성장과 발달 및 이에 영향을 미치는 다양한 환경 변인을 종단적으로 연구하여 영유아를 위한 육아지원 방안과 정책을 개발할 목적으로 한국아동패널연구를 수행하고 있습니다. 한국아동패널연구는 2006년 모형개발을 시작으로, 2007년 예비조사를 거쳐, 2008년에 태어난 아동 2,078명을 대상으로 1차 조사를 시작하였습니다. 2009년에는 2차년도 조사와 더불어 일부 패널을 대상으로 제1차 심층조사를 실시하였습니다. 2010년에는 3차년도 조사와 함께 2010년에 태어난 아동을 대상으로 횡단적 자료를 구축하였으며, 2011년 현재 4차년도 조사가 진행 중에 있습니다. 이는 한국 아동의 성장과정에 대한 전국적인 자료를 제공함으로써 영유아 연구 및 육아정책 수립에 귀중한 자료로 활용될 것입니다. 앞으로도 한국아동패널이 성공적으로 수행되어 아동발달과 육아지원에 관한 종단연구의 모범적인 틀을 제시할 수 있도록 여러분의 지속적인 관심과 참여를 부탁드립니다.

이 자리를 빛내 주신 여러분들, 특히 귀한 시간을 마련하시어 발표하신 Heckman 교수님과 Melhuish 교수님을 비롯하여, 헝가리, 일본, 싱가포르, 홍콩, 대만, 중국, 말레이시아 등 각 국의 발표자 여러분께 감사드립니다. 바쁘신 일정에도 기꺼이 축사를 허락해주신 정운찬 전 국무총리님, 문용린 전 교육과학기술부 장관님, 진수희 보건복지부 장관님께 깊은 감사의 말씀을 전합니다. 또한 사회를 맡아주시는 여러 교수님들께와 한국아동패널 자료에 관심을 갖고 논문을 작성하여 발표에 참여해주신 연구자분들에게 감사의 뜻을 전합니다. 이 국제세미나를 준비한 본 육아정책연구소의 문무경 박사와 이정림 박사를 비롯한 한국아동패널 연구진, 그리고 연구소 관계자 여러분의 지원에도 감사를 드립니다.

다시 한 번 참석해주신 모든 여러분께 감사드리면서, 아무쪼록 오늘 이 자리가 뜻 깊은 학술토론과 발전의 기회가 될 수 있기를 기대합니다. 감사합니다.

2011년 8월 10일

육아정책연구소 소장 조복희

Program

KICCE International Seminar : Effective Investment in Early Childhood Education and Care

08:30 ~ 09:00	**Registration**
09:00 ~ 09:30	**Opening Ceremony** Welcoming Address : Bokhee Cho (President, KICCE) Congratulatory Remarks : Un-Chan Chung (Former Prime Minister) : Yong-Lin Moon (Former Minister of Education) : Soo Hee Chin (Minister of Health & Welfare)
09:30 ~ 10:30	**Keynote Speech 1** Prof. James Heckman (Nobel Prize Laureate in Economics, University of Chicago, U.S.A.)
10:30 ~ 10:45	**Break**
10:45 ~ 11:45	**Keynote Speech 2** Prof. Edward Melhuish (Birkbeck College, University of London, U.K.)
11:45 ~ 13:30	**Lunch**

Early Childhood Education and Care (ECEC) Policy & Annual Conference of Panel Study on Korean Children (PSKC)

13:30 ~ 14:50	**Session 1** Policy Studies 1 : Integrating Early Childhood Education and Care Policy Studies 2 : Multicultural Issues in Early Childhood Settings Panel Studies 1 : Plan to Childbirth 1 Panel Studies 2 : Father in Child Rearing Panel Studies 3 : Infant Temperament & Parenting
14:50 ~ 15:00	**Break**
15:00 ~ 16:20	**Session 2** Policy Studies 3 : Enhancing Quality in Early Childhood Education and Care Policy Studies 4 : Policy Influences on Reading Education/Fathering Practices Panel Studies 4 : Plan to Childbirth 2 Panel Studies 5 : Infant Development Panel Studies 6 : Infant Temperament & Maternal Parenting Stress
16:20 ~ 16:40	**Break**
16:40 ~ 18:00	**Session 3** Policy Studies 5 : Policy Issues in Selected Countries Panel Studies 7 : Working Mother Panel Studies 8 : Developmental Risk Panel Studies 9 : Parenting Panel Studies 10 : Child Care Support Services
18:00 ~	**Closing**

프로그램

KICCE 국제 세미나 : 조기투자의 효율성 제고

08:30 ~ 09:00 등 록

09:00 ~ 09:30 **개 회 식**

개 회 사: 조복희 (육아정책연구소 소장)
축 사: 정운찬 (전 국무총리, 동반성장위원회 위원장)
문용린 (전 교육부 장관, 서울대학교 교수)
진수희 (보건복지부 장관)

09:30 ~ 10:30 기조강연 **1**

James Heckman (미국 시카고대학 교수, 노벨경제학상 수상자)

10:30 ~ 10:45 휴 식

10:45 ~ 11:45 기조강연 **2**

Edward Melhuish (영국 런던 버벡대학 교수)

11:45 ~ 13:30 오 찬

유아보육교육 정책 & 한국아동패널 학술대회

13:30 ~ 14:50 **Session 1**

정책 연구 1 : 유아교육과 보육의 통합
정책 연구 2 : 육아지원기관의 다문화 이슈
패널 연구 1 : 후속 출산 1
패널 연구 2 : 아버지 변인
패널 연구 3 : 영아기질과 양육

14:50 ~ 15:00 휴 식

15:00 ~ 16:20 **Session 2**

정책 연구 3 : 유아교육과 보육의 질 제고
정책 연구 4 : 읽기 교육에의 정책 영향력/ 아버지 양육 실제
패널 연구 4 : 후속 출산 2
패널 연구 5 : 영아 발달
패널 연구 6 : 영아기질과 어머니 양육스트레스

16:20 ~ 16:40 휴 식

16:40 ~ 18:00 **Session 3**

정책 연구 5 : 말레이시아와 홍콩, 미국의 정책 이슈
패널 연구 7 : 어머니 취업 관련 변인
패널 연구 8 : 발달 위험 요인
패널 연구 9 : 자녀양육행동
패널 연구 10 : 육아지원서비스

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Mugyeong Moon
(Senior Researcher Fellow, Korea Institute of Child Care & Education)

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(Nobel Prize Laureate, Dept. of Economics, University of Chicago, U.S.A.)

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(Dept. of Human Development, Birkbeck College, University of London, U.K.)

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▣ KICCE International Seminar ▣

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KEYNOTE SPEECH 1

The Power of the Early Years: Policies to Foster Human Development

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Nobel Prize Laureate, Professor, Dept. of Economics, University of Chicago, U.S.A.

KEYNOTE SPEECH 2

Early Years Research and Policy Issues

Edward Melhuish
Professor, Dept. of Human Development, Birkbeck College, University of London, U.K.

▣ Early Childhood Education and Care (ECEC) Policy ▣

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Marta Korintus
Director of Research, National Institute for Family and Social Policy, Budapest, Hungary

2. Reflections and Prospection on Integration of ECEC and Recent Policy Development in Taiwan

Jihing Peter Khoo
Professor, Taipei Municipal University, Taiwan

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Riyo Kadota
Professor, Seinan Gakuin University, Japan

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JeeHae Lee
Associate Professor, Troy University, U.S.A.

2. The Influence of Cultural Pluralism and Effective Ways to Meet the Social Relationship Standards in Kindergarten
SoYoung Kang
Associate Professor, Westminster College, Pennsylvania, U.S.A.

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Sum Chee Wah
Director, Education Programmes, Ministry of Education, Singapore
Leong Pik San
Senior Specialist, Pre-School Education, Ministry of Education, Singapore

2. Promoting Professionalism of Early Childhood Care and Education in Japan
KITANO, Sachiko
Professor, Kobe University, Japan

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Liyan Huo
Professor, Beijing Normal University, China

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Guang-Lea Lee
Associate Professor, Old Dominon University
Joanne K. Sullivan
Old Dominon University

2. The Role of Korean Fathers: A Comparison of Korean Fathering Practices in Korea and the United States
Keun Kyu Kim
Assistant Professor, Delaware State University, U.S.A.
Jeayong Chung
Journalist, Korea Broadcasting System (KBS)

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Ng Soo Boon
Head of Assistant Director in Curriculum Development Division, Ministry of Education, Malaysia

2. Three-Year Multi-Stage Study of the Impacts of Hong Kong Pre-primary Education Voucher Scheme
Hui Li
Professor, The University of Hong Kong, Hong Kong, China

3. Early Childhood Teacher Policy: Recruitment, Preparation, and Retention of EC Teachers in the United States
Eun Kyeong Cho
Professor, University of New Hampshire, U.S.A.

▣ Conference of Panel Study on Korean Children (PSKC) ▣

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Sejin Min

Assistant Professor, Dept. of Economics, Dongguk University

2. Work Plan Decisions by Heterogeneous Female Groups Out of Work for Baby Birth

Hyungho Youn

Research Fellow, Seoul Development Institute

Byung In Lim

Associate Professor, Dept. of Economics, Chungbuk National University

3. Discriminant Analysis of Factors Influencing Intention of Additional Childbirth

Eun-Young Choi

Associate Research Fellow, Korea Institute of Child Care and Education

Ye-Jin Yi

Researcher, Korea Institute of Child Care and Education

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Yeon-Seung Lee

Professor, Dept. of Early Childhood Education, Kyungsung University

2. Father Involvement as a Mediator of the Effect of Infant Temperament and Mother Depression on Mother's Parenting Stress

Yoon H. Lee

Assistant Professor,

Dept. of Curriculum, Instruction and Technology in Education, Temple University

KyungOk Lee

Associate Professor, Dept. of Early Childhood Education, Duksung Women's University

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Assistant Professor, Division of Open Major, Sangmyung University

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Eunju Lee

Assistant Professor, Dept. of Social Welfare, Halla University

2. The Infant Temperament Stability and the Mediation Effect of the Maternal Parenting Behavior on the Relationship Between the Temperament and Development of Infant

Jihyeon Han

Adjunct Professor, Dept. of Child Studies, Chonbuk National University

3. Effects of Temperamental Characteristics and Maternal Depression on Social and Cognitive Development in Infants

Yeon Kyung Chee

Research Professor, Dept. of Child Development, Ewha Womans University

Soo Jeong Ha

Graduate Student, Dept. of Child Development, Ewha Womans University

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Mijeong Lee

Associate Professor,

Dept. of Young Child Care, Education & Welfare, Yeoju Institute of Technology

Kyunghwa Kim
Lecturer, Dept. of Child Care and Education, World Cyber College
Juyeon Lee
Lecturer, Dept. of Child Care and Education, World Cyber College

2. Relationship Between the General Characteristics/Parenthood of Working Mothers with One Child and Second Childbirth Plan

Jinwha Lee
Assistant Professor, Dept. of Early Childhood Education, Soongeui Women's College
HaNa Cho
Ph.D. Candidate, Dept. of Early Childhood Education Ewha Womans University
HyeYoon Choi
Graduate Student, Dept. of Early Childhood Education, Ewha Womans University

3. Factors That Affect Additional Childbirth Plan of Households Having One-Year Old Child: Based on the Second-Year Data of PSKC

Namhee Do
Associate Research Fellow, Korea Institute of Child Care and Education
Yohyun Song
Lecturer, Dept. of Child Welfare, Chungbuk National University
Younghye Jung
Researcher, Korea Institute of Child Care and Education

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Professor, Dept. of Early Childhood Education, Kyungwon University
Sukyoung Park
Visiting Professor, Dept. of Early Childhood Education, Wonkwang University

2. Coincidence of Child Rearing According to the Status of Parents' Characteristics Consentience and Child Development Characteristics According to Parents' Coincidence of Child Rearing

Eunyoung Kim
Associate Research Fellow, Korea Institute of Child Care and Education
Sunghee Lee
Ph.D. Candidate, Dept. of Early Childhood Education, Ewha Womans University

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Associate Research Fellow, National Youth Policy Institute

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Dongok Min

Lecturer, Dept. of Child & Family Welfare, University of Ulsan

Hyewon Park (Choi)

Professor, Dept. of Child & Family Welfare, University of Ulsan

2. Mediating Effect of Maternal Parenting Stress on Maternal Depression and Infants' and Toddlers' Temperamental Negative Emotionality

Hee-jung Lee

Assistant Professor, Dept. of Social Welfare, Seoul Social Welfare Graduate University

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EunJin Yeo

Senior Researcher, Child Game Research Center, Duksung Women's University

KyungOk Lee

Associate Professor, Dept. of Early Childhood Education, Duksung Women's University

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Wanjeong Lee

Professor, Division of Consumer & Child Studies, Inha University

Seonglim Lee

Associate Professor, Dept. of Consumer & Family Sciences, Sungkyunkwan University

2. A Study on Determinants of Interrupting Female Workers' Career by a Childbirth and Childcare

Byung In Lim
Associate Professor, Dept. of Economics, Chungbuk National University
Hyungho Youn
Research Fellow, Seoul Development Institute

3. The Determinants of Parental Stress of Working and Non-Working Mothers

Hyegum Kim
Associate Professor, Dept. of Child Care Education, Dongnam Health College

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Kyung Ja Park
Professor, Dept. of Child & Family Studies, Yonsei University
Hyoun Kyoung Kim
Research Scientist, Oregon Social Learning Center
He Sook Kim
Graduate Student, Dept. of Child & Family Studies, Yonsei University

2. Variables Related with Continuity of Infant Developmental Risks: Using 1 Year Longitudinal Data

Meery Lee
Associate Professor,
Dept. of Youth Guidance & Sport Education,Korea National Sport University
Yoolim Shin
Associate Professor, Dept. of Child & Family Studies, The Catholic University of Korea
Jinah Park
Lecturer, Dept. of Child Welfare, Namseoul University

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Sung Hee Nam
Research Coordinator, Center on Intervention for Children and Families,
Case Western Reserve University

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KyungOk Lee
Associate Professor, Dept. of Early Childhood Education, Duksung Women's University
Jungsoo Lee
Researcher, Child Game Research Center, Duksung Women's University
Jiyoung Lee
Researcher, Child Game Research Center, Duksung Women's University

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Byoungbu Baek
Assistant Professor, Dept. of Baird University College, Soongsil University
Yeojung Hwang
Research Professor, Institute of Educational Research, Korea University

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Eunyoung Kim
Lecturer, Dept. of Liberal Arts, Dong-Seoul University
Yeojin Rho
Graduate Student, Dept. of Psychology, Claremont Graduate University

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Eunhye Park
Professor, Dept. of Early Childhood Education, Ewha Womans University

Sunghee Lee
Ph.D. Candidate, Dept. of Early Childhood Education, Ewha Womans University
Eonkyung Kim
Graduate Student, Dept. of Early Childhood Education, Ewha Womans University
Seenyoung Park
Graduate Student, Dept. of Early Childhood Education, Ewha Womans University

2. The Use of Child Care Centers for Infants of Dual-Working Families: A Korean Study

Jaejin Ahn
Assistant Professor, Dept. of Child Welfare & Studies,Sookmyung Women's University
Nary Shin
Assistant Professor, Dept. of Child Welfare, Chungbuk National University

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문무경 (육아정책연구소 선임연구원)

기조 강연 1

The Power of the Early Years: Policies to Foster Human Development

James Heckman (**미국 시카고대학 경제학과 교수, 노벨 경제학상 수상**)

기조 강연 2

Early Years Research and Policy Issues

Edward Melhuish (**영국 런던 버벡대학 인간발달학과 교수**)

▣ 유아 보육교육 정책 ▣

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Marta Korintus

Director of Research, National Institute for Family and Social Policy, Budapest, Hungary

2. 대만 유보통합에 대한 반성과 전망 및 최근 정책발전

Jihing Peter Khoo

Assistant Professor, Taipei Municipal University, Taiwan

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Riyo Kadota

*Associate Professor, Seinan Gakuin University, Japan*Marta Korintus

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JeeHae Lee

Associate Professor, Troy University, U.S.A.

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Associate Professor, Westminster College, Pennsylvania, U.S.A.

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Sum Chee Wah

Director, Education Programmes, Ministry of Education, Singapore

Leong Pik San

Senior Specialist, Pre-School Education, Ministry of Education, Singapore

2. 일본 유아교육과 보육의 전문성 제고

KITANO, Sachiko

Professor, Kobe University, China

3. 교육을 위한 평등한 출발점: 중국의 빈곤퇴치와 유아발달

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Guang-Lea Lee

Associate Professor, Old Dominon University

Joanne K. Sullivan

Old Dominon University

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Keun Kyu Kim

Assistant Professor, Delaware State University, U.S.A.

Jeayong Chung

Journalist, Korea Broadcasting System (KBS)

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Ng Soo Boon

Head of Assistant Director in Curriculum Development Division, Ministry of Education, Malaysia

2. 홍콩 취학 전 교육 바우처 제도의 영향에 대한 3개년 다단계 연구

Hui Li

Assistant Professor, The University of Hong Kong, Hong Kong, China

3. 미국의 취학 전 교사 정책

Eun Kyeong Cho

Assistant Professor, University of New Hampshire, U.S.A.

▣ 한국아동패널 학술대회 ▣

* 발표자 표시

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민세진 (동국대 경제학과 조교수)

2. 이질적인 경력단절 여성 집단의 취업의사에 관한 연구

윤형호* (서울시정개발연구원 연구위원) · 임병인 (충북대 경제학과 부교수)

3. 후속출산 의도에 영향을 미치는 관련 변인 판별분석

최은영* (육아정책연구소 부연구위원) · 이예진 (육아정책연구소 위촉연구원)

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1. 아버지의 자녀양육태도 및 기대치에 대한 인식
이연승 (경성대 유아교육과 교수)

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이윤형 (Temple University 교육학과 조교수) · 이경옥* (덕성여대 유아교육과 부교수)

3. 신세대 부와 모의 자녀가치관, 양육신념, 미래기대관, 책임의식에 대한 의식 차이 분석
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이은주 (한라대 사회복지학과 조교수)

2. 영아 기질의 안정성 탐색 및 영아발달 간의 관계에 있어서 어머니 양육행동의 매개효과
한지현 (전북대 아동학과 겸임교수)

3. 영아의 기질과 어머니의 우울이 영아의 사회·인지발달에 미치는 영향
지연경* (이화여대 대학원 아동학과 연구교수) · 하수정 (이화여대 대학원 아동학과 박사과정)

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이미정* (여주대 보육과 부교수) · 김경화 (세계사이버대 아동보육과 시간강사)
이주연 (세계사이버대 아동보육과 시간강사)

2. 한 자녀 취업모의 일반적 특성 및 부모됨과 둘째 아이 출산계획과의 관계

이진화* (숭의여대 유아교육과 조교수) · 조하나 (이화여대 유아교육과 박사수료)
최혜윤 (이화여대 유아교육과 박사과정)

3. 만 1세 영아가구의 후속출산계획에 영향을 미치는 요인: 한국아동패널 2차년도 자료를 중심으로

도남희* (육아정책연구소 부연구위원) · 송요현 (충북대 아동복지학과 시간강사)
정영혜 (육아정책연구소 위촉연구원)

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정미라 (경원대 유아교육학과 교수) · 박수경* (원광대 유아교육과 초빙교수)

2. 부모의 특성 일치 여부에 따른 양육일치도와 부모의 양육일치도에 따른 자녀의 발달특성

김은영* (육아정책연구소 부연구위원) · 이성희 (이화여대 유아교육과 박사수료)

3. 빈곤 영아의 BMI 연구

신인순 (한국청소년정책연구원 부연구위원)

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민동옥* (울산대 아동가정복지학과 시간강사) · 박혜원 (울산대 아동가정복지학과 교수)

2. 어머니의 우울이 영유아의 기질적 부정적 정서성에 미치는 영향에서 양육스트레스의 매개효과
이희정 (서울사회복지대학원대학교 사회복지학과 조교수)

3. 남녀 영아의 기질, 어머니의 양육스트레스, 양육스타일이 영아 발달에 미치는 영향
여은진* (덕성여대 아동게임연구센터 선임연구원) · 이경옥 (덕성여대 유아교육과 부교수)

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1. 모의 취업 지속 여부가 양육비와 영아발달에 미치는 영향
이완정* (인하대 소비자아동학과 교수) · 이성림* (성균관대 소비자가족학과 부교수)

2. 여성근로자 경력단절 결정요인 분석
임병인 (충북대 경제학과 부교수) · 윤형호* (서울시정개발연구원 연구위원)

3. 영아기 자녀를 둔 취업모와 비취업모의 양육스트레스에 대한 변인 연구
김혜금 (동남보건대 보육과 부교수)

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1. 잠재성장모델을 이용한 어머니의 우울 예측변인과 영아발달 분석
박경자* (연세대 아동가족학과 교수) · 김현경 (Oregon Social Learning Center 연구원)
김희숙 (연세대 아동가족학과 박사과정)

2. 영아기 발달 위험 지속성 관련 개인적 및 환경적 변인

이미리* (한국체육대 청소년지도학과 부교수) · 신유림 (가톨릭대 아동학전공 부교수)
박진아 (남서울대 아동복지학과 전임강사)

3. 발달지체유아를 둔 어머니의 양육스타일에 미치는 변인에 관한 연구

남성희 (Case Western Reserve University, 아동가족중재센터 연구원)

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1. 아버지의 양육협조, 어머니의 양육지식과 어머니의 양육스타일간의 관계: 첫째 자녀를 중심으로 어머니의 양육스트레스 매개효과 분석

이경옥 (덕성여대 유아교육과 부교수) · 이정수 (덕성여대 아동게임연구센터 연구원)
이지영* (덕성여대 아동게임연구센터 연구원)

2. 양육 방식에 대한 부모교육의 효과

백병부* (숭실대 교직과 조교수) · 황여정* (고려대 교육문제연구소 연구교수)

3. 어머니의 음주가 결혼만족도 및 부부갈등에 미치는 영향

김은영* (동서울대 교양과 전임강사) · 노여진 (Claremont Graduate University 박사과정)

패널 연구 10 | 육아지원서비스 423

Session 3 | 사회: 이봉주 (서울대 사회복지학과 교수)

16:40 ~ 18:00 | Seminar Room 5

1. 영유아 교육 및 보육기관 이용계획에 대한 부모 의사결정에 영향을 미치는 변인 분석

박은혜 (이화여대 유아교육과 교수) · 이성희* (이화여대 유아교육과 박사수료)
김언경 (이화여대 유아교육과 박사과정) · 박신영 (이화여대 유아교육과 박사과정)

2. 맞벌이 가구 영아의 보육시설 진입 시기에 영향을 미치는 요인

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The Power of the Early Years: Policies to Foster Human Development

Prof. James Heckman
(Nobel Prize Laureate in Economics, University of Chicago, U.S.A.)



James J. Heckman

James J. Heckman is the Henry Schultz Distinguished Service Professor of Economics at the University of Chicago, where he has served since 1973. In 2000, he won the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel. Heckman directs the Economics Research Center in the Department of Economics and the Center for Social Program Evaluation at the Harris School for Public Policy. In addition, he is a professor of Science and Society in University College Dublin and a senior research fellow at the American Bar Foundation.

His work has been devoted to the development of a scientific basis for economic policy evaluation. He has developed a body of new econometric tools that address these issues. His recent research focuses on inequality, human development and lifecycle skill formation, with a special emphasis on the economics of early childhood. He is currently conducting new social experiments on early childhood interventions and reanalyzing old experiments. He is studying the emergence of the under class in the U.S. and Western Europe. Heckman has published over 280 articles and several books.

Heckman has received numerous awards for his work, including the John Bates Clark Medal in 1983, the Jacob Mincer Award for Lifetime Achievement in 2005, the 2005 and 2007 Dennis Aigner Award for Applied Econometrics from the Journal of Econometrics, the Ulysses Medal from the University College Dublin in 2006, the 2007 Theodore W. Schultz Award from the American Agricultural Economics Association, the Gold Medal of the President of the Italian Republic, awarded by the International Scientific Committee of the Pio ManzúCentre in 2008, and the Distinguished Contributions to Public Policy for Children Award from the Society for Research in Child Development in 2009.

He is also a member of the National Academy of Sciences, USA; a fellow of the American Philosophical Society; the American Academy of Arts and Sciences; the Econometric Society; the Society of Labor Economics; the American Statistical Association; the International Statistical Institute; the American Association for the Advancement of Science; and the National Academy of Education.

SCHOOLS, SKILLS, AND SYNAPSES

JAMES J. HECKMAN*

This paper discusses (a) the role of cognitive and noncognitive ability in shaping adult outcomes, (b) the early emergence of differentials in abilities between children of advantaged families and children of disadvantaged families, (c) the role of families in creating these abilities, (d) adverse trends in American families, and (e) the effectiveness of early interventions in offsetting these trends. Practical issues in the design and implementation of early childhood programs are discussed. (*JEL* A12)

I. INTRODUCTION

American society is polarizing. Proportionately more American youth are graduating from college than ever before. At the same time, American-born youth are graduating from high school at lower rates than 40 years ago.

This paper reviews and interprets these trends. The origins of inequality are examined and policies to alleviate it are analyzed. Families play a powerful role in shaping adult outcomes. The accident of birth is a major source of inequality. Recent research by Cunha and Heckman (2007a, 2008b) shows that about half of the inequality in the present value of lifetime earnings is due to factors determined by age 18. Compared to 50 years ago, relatively more American children are being born into disadvantaged families where investments in children are smaller than in advantaged families. Policies that supplement the child rearing resources available to disadvantaged families reduce inequality and raise productivity.

The argument of this paper is summarized by the following 15 points:

1. Many major economic and social problems such as crime, teenage pregnancy, dropping out of high school, and adverse health conditions are linked to low levels of skill and ability in society.
2. In analyzing policies that foster skills and abilities, society should recognize the multiplicity of human abilities.
3. Currently, public policy in the U.S. focuses on promoting and measuring cognitive ability through IQ and achievement tests. The accountability standards in the No Child Left Behind Act concentrate attention on

ABBREVIATIONS

ACE: Adverse Childhood Experiences
AFQT: Armed Forces Qualification Test
CES: Constant Elasticity of Substitution
GED: General Education Development
NCES: National Center for Educational Statistics
PIAT: Peabody Individual Achievement Test

*This paper was presented as the Presidential Lecture of the Western Economics Association, Seattle, Washington, June 30, 2007. Earlier versions were presented at the U.S. Naval Academy at Annapolis, September, 2006; at Kansas State University, November 2006; and as the 2006 Leigh Lecture, Washington State University, November 2007. The author is Henry Schultz Distinguished Service Professor of Economics at the University of Chicago, Professor of Science and Society, University College Dublin, Senior Research Fellow, American Bar Foundation, and Alfred Cowles Distinguished Visiting Professor, Yale University. This research was supported by the Committee for Economic Development with grants from the Pew Charitable Trusts and the Partnership for America's Economic Success; the JB & MK Pritzker Family Foundation; Susan Thompson Buffett Foundation; Mr. Robert Dugger; NIH R01-HD043411, NSF 97-09-873, NSF SES-0099195, NSF SES-0241858; and support from the American Bar Foundation. The views expressed in this paper are those of the author and not necessarily those of the funders listed here. I thank Pedro Carneiro, Flavio Cunha, Lance Lochner, Paul LaFontaine, Dimitriy Masterov, and Sergio Urzua for helpful collaborations on which this paper is based. Burton Singer has made many helpful comments over the years on this and related work.

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Economic Inquiry
(ISSN 0095-2583)
Vol. 46, No. 3, July 2008, 289 324

doi:10.1111/j.1465-7295.2008.00163.x
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achievement test scores and do not evaluate important noncognitive factors that promote success in school and life.

4. Cognitive abilities are important determinants of socioeconomic success.

5. So are socioemotional skills, physical and mental health, perseverance, attention, motivation, and self confidence. They contribute to performance in society at large and even help determine scores on the very tests that are commonly used to measure cognitive achievement.

6. Ability gaps between the advantaged and disadvantaged open up early in the lives of children.

7. Family environments of young children are major predictors of cognitive and socioemotional abilities, as well as a variety of outcomes such as crime and health.

8. Family environments in the U.S. and many other countries around the world have deteriorated over the past 40 years. A greater proportion of children is being born into disadvantaged families including minorities and immigrant groups. Disadvantage should be measured by the quality of parenting and not necessarily by the resources available to families.

9. Experimental evidence on the positive effects of early interventions on children in disadvantaged families is consistent with a large body of non-experimental evidence showing that the absence of supportive family environments harms child outcomes.

10. If society intervenes early enough, it can improve cognitive and socioemotional abilities and the health of disadvantaged children.

11. Early interventions promote schooling, reduce crime, foster workforce productivity and reduce teenage pregnancy.

12. These interventions are estimated to have high benefit-cost ratios and rates of return.

13. As programs are currently configured, interventions early in the life cycle of disadvantaged children have much higher economic returns than later interventions such as reduced pupil-teacher ratios, public job training, convict rehabilitation programs, adult literacy programs, tuition subsidies, or expenditure on police.

14. Life cycle skill formation is dynamic in nature. Skill begets skill; motivation begets motivation. Motivation cross-fosters skill and skill cross-fosters motivation. If a child is not motivated to learn and engage early on in life, the more likely it is that when the child becomes an adult, he or she will fail in social and economic life. The longer society waits to intervene in the life cycle of a disadvantaged child, the more costly it is to remediate disadvantage.

15. A major refocus of policy is required to capitalize on knowledge about the importance of the early years in creating inequality in America, and in producing skills for the workforce.

The evidence assembled in this paper substantially amends the analysis of *The Bell Curve* by Herrnstein and Murray (1994). Those authors made an important contribution to academic and policy analysis by showing that cognitive ability, as captured by achievement test scores measured in a child's adolescent years, predicts adult socioeconomic success on a variety of dimensions. Heckman, Stixrud, and Urzua (2006) and Borghans, Duckworth, Heckman, and ter Weel (2008) demonstrate that personality factors are also powerfully predictive of socioeconomic success and are as powerful as cognitive abilities in producing many adult outcomes. Achievement tests of the sort used by Herrnstein and Murray reflect both cognitive and noncognitive factors.

The Bell Curve assigned a primary role to genetics in explaining the origins of differences in human cognitive ability and a primary role to cognitive ability in shaping adult outcomes. If cognitive ability is genetically determined and is primary in shaping adult outcomes, public policy towards disadvantaged populations is limited to transfer payments to the less able. Recent research, summarized in this paper, establishes the power of socioemotional abilities and an important role for environment and intervention in creating abilities. The field of epigenetics surveyed in Rutter (2006) demonstrates how genetic expression is strongly influenced by environmental influences and that environmental effects on gene expression can be inherited. Evidence is presented in this paper that high quality early childhood interventions foster abilities and that inequality can be attacked at its source. Early interventions also boost the productivity of the economy.

The plan of this paper is as follows. Section II reviews some evidence on growing polarization in American society. Section III reviews evidence on the importance of cognitive and noncognitive abilities in producing a variety of socioeconomic outcomes. Section IV shows how the abilities that are so powerfully predictive of adult success and failure emerge early in the life of a child. This evidence has important implications for policies designed to alleviate poverty. Section V summarizes the evidence that a greater fraction of American youth is being born and reared in disadvantaged families compared to 50 years ago. It also discusses the question of the best way to measure disadvantage. Section VI reviews evidence on the role of families in producing abilities. Section VII shows the evidence that enriching early environments can partially compensate for the effects of early adversity, and draws general lessons from the recent literature on the optimal timing of investment in disadvantaged children. Section VIII discusses practical issues that arise in designing and implementing early childhood interventions. Section IX concludes. An Appendix presents a more technical and comprehensive version of the discussion about the optimal timing of investment and some additional evidence.

II. GROWING POLARIZATION OF AMERICAN SOCIETY AND ITS IMPLICATIONS FOR PRODUCTIVITY

The high school graduation rate is one barometer of the performance of American society and the skill level of its future workforce. Throughout the first half of the 20th century, each new cohort of Americans was more likely to graduate high school than the preceding one. This upward trend in secondary education increased worker productivity and fueled American economic growth (see Aaronson and Sullivan, 2001, and Delong, Katz, and Goldin 2003).

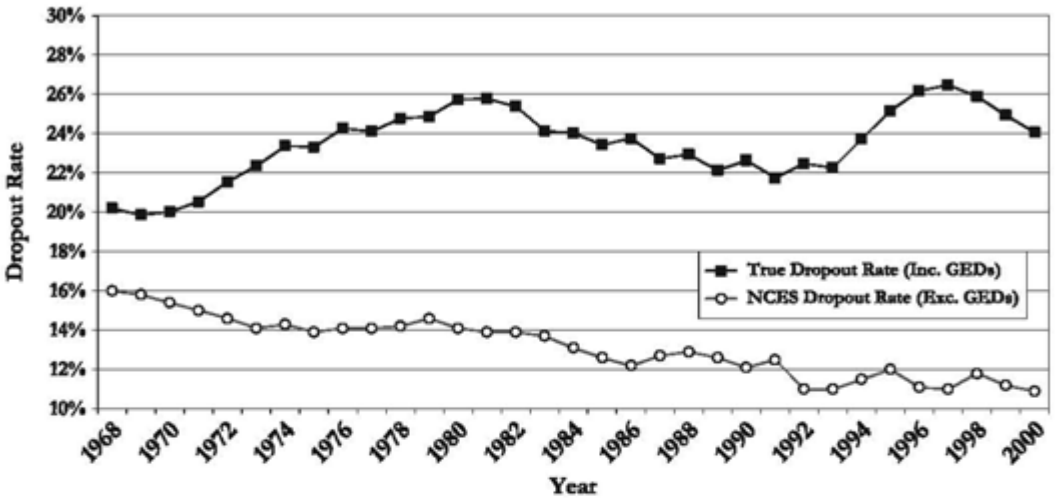
In the past 30 years, growing wage differentials between high school graduates and high school dropouts have increased the economic incentive to graduate from high school. The real wages of high school dropouts have declined since the late 1970s while those of more skilled workers have risen (see Autor, Katz, and Kearney, 2005). Heckman, Lochner, and Todd (2008) show that in recent decades, the internal rate of return to graduating high school compared to dropping out has greatly increased and is now over 50 percent per year.

It is thus surprising and disturbing that, at a time when the premium for skills has increased and the return to graduating high school has risen, the high school dropout rate in America is increasing. This trend is rarely noted in academic or policy discussions. The principal graduation rate issued by the National Center for Educational Statistics (NCES) – widely regarded as the official rate – would suggest that U.S. students responded to the increasing demand for skill by completing high school at increasing rates and that a greater fraction of high school graduates go to college and complete it. According to what many regard as the official high school graduation rate, U.S. schools now graduate nearly 88 percent of students and black graduation rates have converged to those of non-Hispanic whites over the past four decades.

The evidence in Heckman and LaFontaine (2008a) challenges these claims and establishes that the high school dropout rate has *increased* among native-born American children. Using a wide variety of data sources, they estimate U.S. graduation rates. They establish that (1) the U.S. high school graduation rate peaked at around 80 percent in the late 1960s and then declined by 4–5 percentage points. (2) About 65 percent of blacks and Hispanics leave school with a high school diploma. Minority graduation rates are substantially below the rates for non-Hispanic whites. Contrary to claims based on the official statistics, they find no evidence of convergence in minority-majority graduation rates for males over the past 35 years. (3) Exclusion of incarcerated populations from the official statistics substantially biases upward the reported high school graduation rate for black males.

The contrast between the "official" rate and the true rate is demonstrated in Figure 1. The official rate is plotted as the line with circles in Figure 1. The official dropout rate has steadily declined since 1968. However, the dropout rate adjusted for high school dropouts who are exam certified as high school equivalents, but who perform in the labor market at or near the level of high

FIGURE 1
True Dropout Rate vs. NCES Status Dropout Rate, Males and Females 1968–2000



Source: Heckman and LaFontaine (2008a).

school dropouts who do not certify, is very different.[1] The adjusted rate, plotted in the line with dark rectangles, has risen.

The slowdown in the rate of growth of college attendance that has been noted by many scholars is not primarily due to a slowdown in the rate of growth of college attendance among high school graduates.[2] The curve marked "Δ" in Figure 2 shows that the college attendance rate among high school graduates has not slowed down as much as the rate for college attendance. The primary source of the slowdown is the growth in the high school dropout rate (see the curve with the light rectangles). This pattern is mainly due to males. (Compare Figures 3 and 4 which are in a format comparable to Figure 2.) A gap has emerged in the education of men and women. This is another source of the growth of inequality in America. Black female college enrollment is converging to that of white male enrollment. Across all ethnic groups, women are doing better than men.[3] For recent birth cohorts, the gap in college attendance between males and females is roughly ten percent. However, the gap in college attendance given high school graduation is only five percent. Half of the growing gender gap in college attendance documented by Goldin, Katz, and Kuziemko (2006) can be explained by the declining rate of male high school graduation (Heckman and LaFontaine, 2008a).

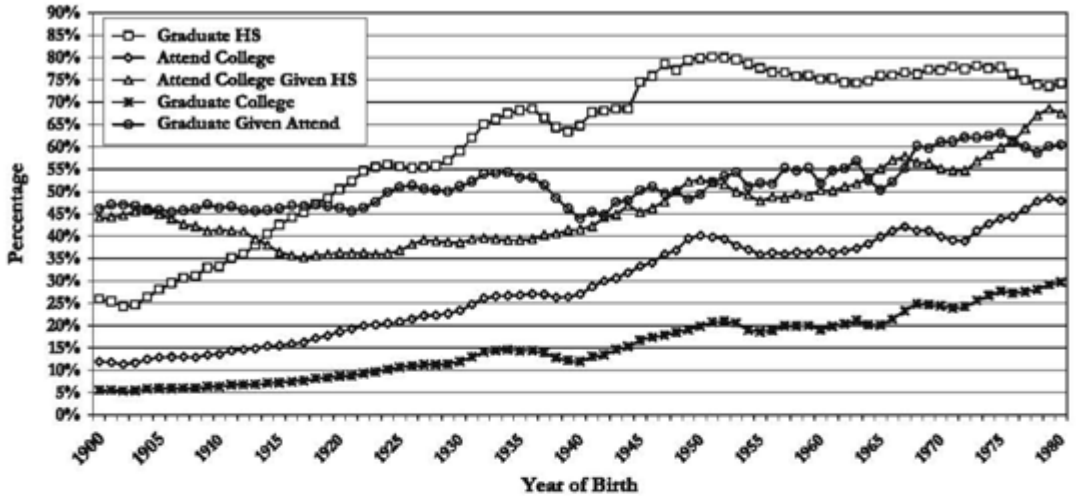
Table 1 performs standard growth accounting, decomposing the change in college graduation into the change due to high school graduation, the change in college attendance given high school graduation, and the change in college graduation given college attendance.

1. The most significant source of bias in the official statistics comes from including GED recipients as high school graduates. "GED" refers to General Education Development. GEDs are high school dropouts who certify as the equivalents of ordinary graduates through passing an exam. Currently 14 percent of all new high school credentials issued each year are to GEDs. In recent years, inclusion of GEDs as high school graduates has biased graduation rates upwards of 7 8 percentage points. A substantial body of scholarship shows that the GED program does not benefit most participants, and that GEDs perform at the level of dropouts in the U.S. labor market (see Cameron and Heckman, 1993; Heckman and LaFontaine, 2006). The GED program conceals major problems in American society. See Heckman and LaFontaine (2008b). For example, a significant portion of the racial convergence in education reported in the official statistics is due to black males obtaining GED credentials in prison. Research by Tyler and Kling (2007) and Tyler and Lofstrom (2008) shows that, when released, prison GEDs earn at the same rate as non-GED prisoners, and the GED does not reduce recidivism.

2. Card and Lemieux (2001) and Ellwood (2001) discuss the slowdown in the rate of growth of college attendance.

3. See Heckman and LaFontaine (2008a).

FIGURE 2
Educational Attainment Decompositions, Males and Females 1900–1980 Birth Cohorts



Source: Heckman and LaFontaine (2008a).

The table shows that in the first half of the 20th century, growth in high school graduation was the driving force behind increased college enrollments. Growth in high school graduation no longer contributes to growth in college attainment for cohorts born after 1950, especially for men. High school graduation as a source of growth in educational attainment diminishes and turns negative for more recent cohorts of Americans. The decline in high school graduation rates since 1970 (for cohorts born after 1950) has flattened college attendance and completion rates and has slowed growth in the skill level of the U.S. workforce

FIGURE 3
Educational Attainment Decompositions, Males 1900–1980 Birth Cohorts



Source: Heckman and LaFontaine (2008a).

FIGURE 4
Educational Attainment Decompositions, Females 1900–1980 Birth Cohorts



Source: Heckman and LaFontaine (2008a).

at a time when the economic return to skill has increased. (See Figure 5.)

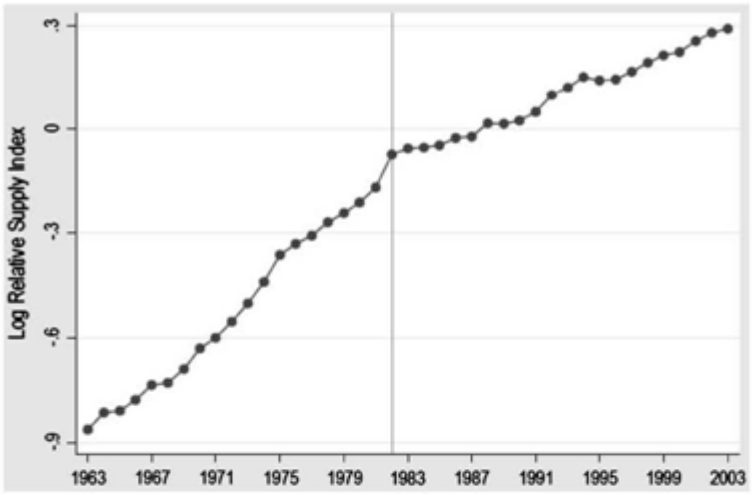
The trends in high school graduation rates reported in Figures 2–4 are for persons born in the United States and exclude immigrants. The recent growth in unskilled migration to the U.S. increases the proportion of unskilled Americans in the workforce apart from the

TABLE 1
Decomposition of the Sources of Change in College Graduation in the Cohorts Born Between 1900 and 1980. Broken Down by Birth Cohorts 1900–1949 vs. Birth Cohorts 1950–1980

Totals Pre- and Post-1950 Cohort	Change in College Graduation Rate Due to Change in High School Graduation Rate	Change in College Graduation Rate Due to Change in College Attendance Given High School Graduation	Change in College Graduation Rate Due to Change in Finishing College Given Enrollment in College	Change Due to Interaction
Overall				
Birth Years 1900 1949	8.99%	3.17%	0.81%	0.92%
% of Total Change	64.71%	22.86%	5.80%	6.63%
Birth Years 1950 1980	−1.47%	6.70%	5.20%	0.03%
% of Total Change	−14.05%	64.02%	49.75%	0.28%
Males				
Birth Years 1900 1949	12.38%	3.81%	0.40%	0.35%
% of Total Change	73.10%	22.49%	2.36%	2.06%
Birth Years 1950 1980	−1.59%	2.90%	0.86%	0.08%
% of Total Change	−70.02%	128.26%	38.14%	3.63%
Females				
Birth Years 1900 1949	7.06%	3.69%	2.19%	0.78%
% of Total Change	51.44%	26.89%	15.98%	5.68%
Birth Years 1950 1980	−0.94%	9.50%	6.20%	0.65%
% of Total Change	−6.13%	61.70%	40.23%	4.20%

Source: Heckman and LaFontaine (2008a).

FIGURE 5
Relative Supply of College Equivalent Labor, 1963–2003 (March CPS)



Source: Autor, Katz, and Kearney (2005).

decline in skills due to a rising high school dropout rate. This trend further reduces the growth in workforce productivity, and promotes inequality in society at large. Estimates by Aaronson and Sullivan (2001) and Delong, Katz, and Goldin (2003) suggest that annual growth in labor productivity has slowed by 0.17 to 0.35 percent per year due to trends that reduce the growth of labor force quality.

A greater percentage of the workforce of tomorrow will come from traditional minority populations where the levels of educational attainment are lower and the rate of growth in the supply of skills for males is smaller. Table 2 taken from Ellwood (2001) shows that in the period 2000–2020, American society will generate less than half of the number of college graduates that it produced in the previous 20 years despite growth in the size of the total population.

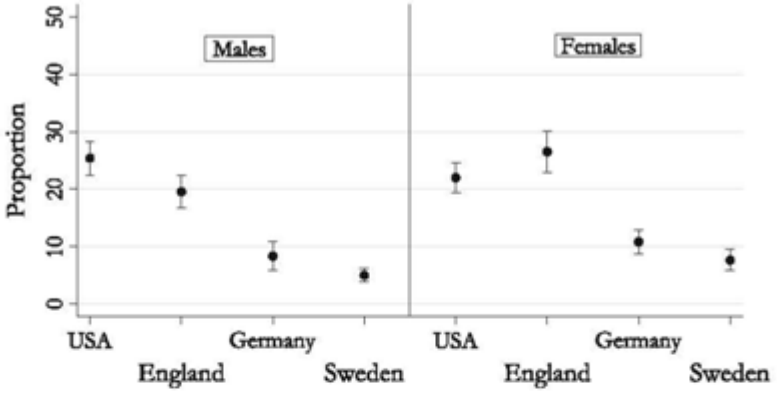
Trends in the production of skills from American high schools coupled with a growing influx of unskilled immigrants have produced more people with low skills in the U.S. Consider the performance of the American workforce on a basic level of literacy. (See

TABLE 2
Educational Characteristics of the Labor Force Aged 25 and Over (1980, 2000, 2020)

Education	Labor Force in 1980	Growth 1980–2000	Labor Force in 2000	Growth 2000–2020	Labor Force in 2020
Less than High School	17.3	−5.3	12.0	0.9	12.9
High School Only	31.5	6.3	37.8	3.8	41.6
Some Schooling					
Beyond High School	13.8	19.1	32.9	6.2	39.1
College Degree or More	17.3	18.5	35.8	7.7	43.5
Total	*79.8*	*38.7*	*118.5*	*18.6*	*137.1*
Precent with College Degree	21.6%		30.2%		31.7%

Source: Ellwood (2001).

FIGURE 6
Percentage of Each Gender Who Perform at Level 1 on the IALS Document Literacy Scale



Note: The scale scores were grouped into five levels of increasing difficulty, with Level 1 representing functional illiteracy. The sample is restricted to adults who are between 16 and 65 years of age at the time of the survey (1994 for the U.S. and Germany, 1996 for the U.K., and 1994 1995 for Sweden). Standard errors are calculated using the methodology described in International Adult Literacy Survey (2002).

Figure 6.) At level 1, depicted in the figure, a person cannot understand the instructions written in a medical prescription. American (and UK) workers perform poorly by this measure both absolutely and in comparison with counterparts in Germany and Sweden. More than 20 percent of American workers do not possess this basic competence.

What forces have produced these low levels and adverse trends? Are the public schools responsible? Can we look to school reform to fix the problem? Are higher college tuition costs to blame? Contrary to widely held views, accounting for the ability of a child at the age college decisions are made, tuition costs and schooling quality explain trivial fractions of the gaps in educational attainment by socioeconomic status.

III. THE IMPORTANCE OF COGNITIVE AND NONCOGNITIVE ABILITIES

Cognitive and noncognitive abilities are important determinants of schooling and socioeconomic success. In the U.S. and many countries around the world, schooling gaps across ethnic and income groups have more to do with ability deficits than family finances in the school-going years. A substantial body of research shows that earnings, employment, labor force experience, college attendance, teenage pregnancy, participation in risky activities, compliance with health protocols, and participation in crime are strongly affected by cognitive and noncognitive abilities.[4] By noncognitive abilities I mean motivation, socioemotional regulation, time preference, personality factors, and the ability to work with others.

American public policy currently focuses on cognitive test scores or "smarts." The No Child Left Behind Act in the U.S. focuses on achievement test scores to measure success or failure in schools. Yet an emerging literature shows that, as is intuitively obvious and commonsensical, much more than smarts is required for success in life. Motivation, sociability (the ability to work with others), the ability to focus on tasks, self-regulation, self esteem, time preference, health and mental health all matter.

The importance of noncognitive skills tends to be underrated in contemporary policy discussions. Only recently have such traits been measured and there are competing measurement systems.[5] Recent evidence shows that the workplace is increasingly oriented towards a greater valuation of the skills

4. See the summary of the evidence in Heckman, Stixrud, and Urzua (2006) and in Borghans, Duckworth, Heckman, and ter Weel (2008).

5. See the discussion in Borghans, Duckworth, Heckman, and ter Weel (2008).

required for social interaction and for sociability.[6,7]

Compelling evidence on the importance of noncognitive skills comes from the GED program (Heckman and LaFontaine, 2008b; Heckman and Rubinstein, 2001). GEDs are dropouts who pass a test to certify that they are equivalent to high school graduates. Participation in the GED program is growing. Currently 14 percent of U.S. high school certificates issued are to GEDs. The GED is successful in terms of measuring performance on tests of scholastic ability.

Heckman, Hsee, and Rubinstein (2001) and Heckman and Rubinstein (2001) show that GED test scores and the test scores of persons who graduate high school but do not go on to college are comparable. Figure 7 displays the distribution of achievement test scores for regular high school graduates who do not go on college (the graph with dark rectangles) and GEDs (the circles). The two distributions are very similar for all ethnic and gender groups. Yet GEDs earn at the rate of high school dropouts (see Heckman and LaFontaine, 2006, 2008b). GEDs are as "smart" as ordinary high school graduates, yet they lack noncognitive skills.[8] The GEDs are the wise guys who cannot finish anything. They quit their jobs and marriages they start at much greater rates than ordinary high school graduates. Most branches of the U.S. military recognize this in their recruiting strategies. Until the recent war in Iraq, the armed forces did not generally accept GEDs because of their poor performance in the military (Laurence, 2008). This and other evidence shows that both cognitive and noncognitive skills matter in a variety of aspects of life.

It is useful to summarize additional evidence on the power of noncognitive skills.[9] Consider the effects of both cognitive and noncognitive skills on many measures of social performance. Heckman, Stixrud, and Urzua (2006) examine the effects of a core set of cognitive and noncognitive factors on a variety of outcomes. Figures 8 and 9, excerpted from their paper, show how the outcome measure written at the base of each figure varies with cognitive and noncognitive skills.[10] For many social outcomes, both cognitive and noncognitive skills are equally predictive in the sense that a one percent increase in either type of ability has roughly equal effects on outcomes across the full distribution of abilities. Figure 8(a) shows that those with low levels of cognitive and noncognitive skills are much more likely to be incarcerated and that an increase in both cognitive and noncognitive skills reduces the probability of teenage pregnancy. For the lowest deciles, the drop off in incarceration with increasing noncognitive ability is greater than it is for cognitive ability. For teenage pregnancy, the drop off in the rate is about the same for both types of skills. Figure 9 shows similar patterns for high schooling dropping out, four year college graduation, daily smoking, and log wages.

Cameron and Heckman (2001) and the papers they cite show that tuition costs explain little of the gap in college going between the affluent and less affluent, between rich and poor, and between majorities and minorities. Controlling for cognitive ability measured at the age college decisions and high school dropout decisions are made, minorities are *more* likely than whites to be at normal grade level in high school. See Table 3. The top row in each panel shows the raw gap in educational attainment for the indicated schooling level. The bottom row shows the gap, adjusting for cognitive ability. The gaps become negative. Tuition costs and family income in the school-going years explain little of the dramatic gaps in high school dropping out across minority and majority groups.[11]

6. See Borghans, ter Weel, and Weinberg (2007).

7. It is plausible that the change in patterns of sectoral output away from manufacturing has harmed males more than females. Females appear to be better endowed with noncognitive skills especially self-control, motivation, agreeableness and the like. The assembly line is a powerful monitoring device that polices expression of unproductive traits such as aggression and noncooperation. As employment on the assembly line declines and employment in the service sector rises, there is less restraint on the unfavorable traits of males and a growth in demand for the favorable traits of females.

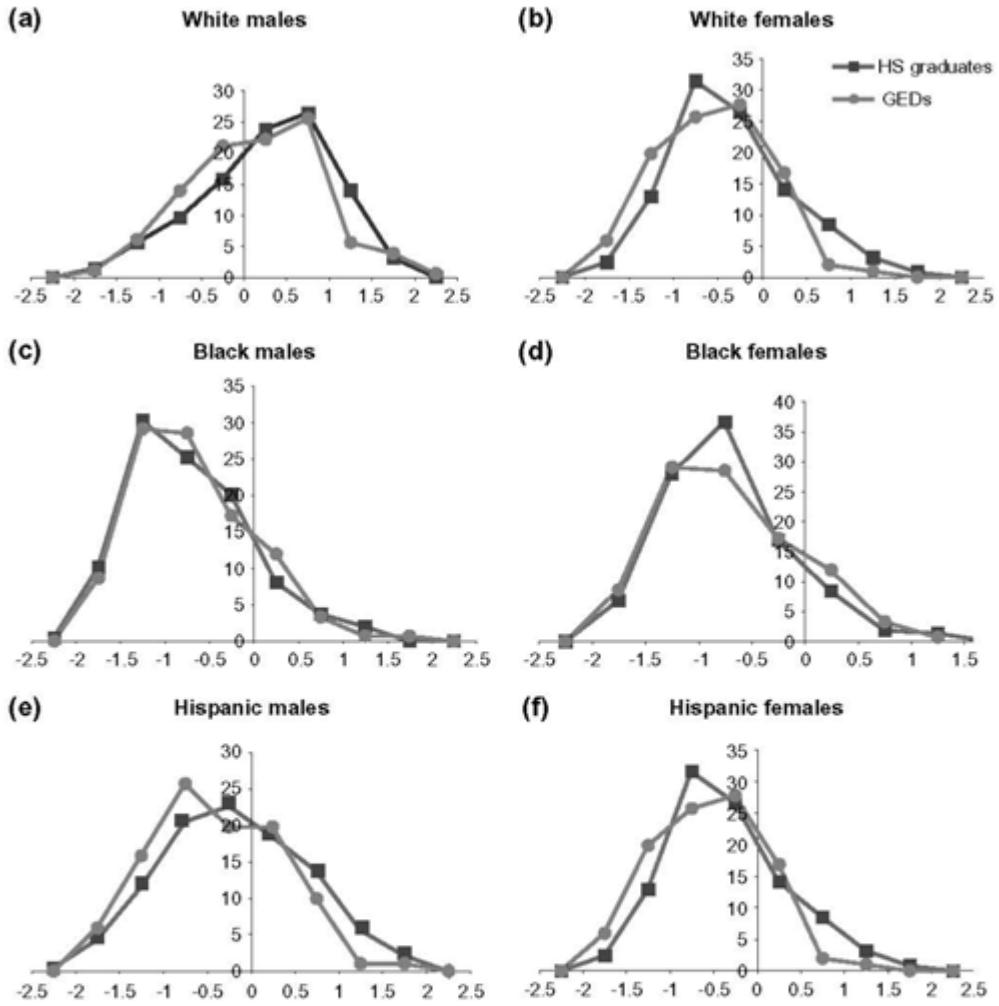
8. Heckman, Stixrud, and Urzua (2006) show that, for males, GEDs have *worse* noncognitive skills than high school dropouts, although they have the cognitive ability of high school graduates who do not go on to college. For females, GED recipients have the same low level of noncognitive skills as dropouts who do not exam certify.

9. Borghans, Duckworth, Heckman, and ter Weel (2008) present an extensive summary of the literature.

10. Heckman, Stixrud, and Urzua (2006) correct for measurement error and reverse causality. In particular, they correct for the effect of schooling on measured cognitive and noncognitive traits.

11. Belley and Lochner (2007) show that family income in the college going years and tuition have become more important in explaining college enrollment in recent years but cognitive ability still plays a dominant role in explaining ethnic and racial gaps. Their sample is younger than samples previously used in the literature.

FIGURE 7
Density of Age Adjusted AFQT Scores for GED Recipients and High School Graduates with Twelve Years of Schooling



Source: Heckman, Hsee, and Rubinstein (2001).

IV. ABILITY GAPS OPEN UP EARLY IN LIFE

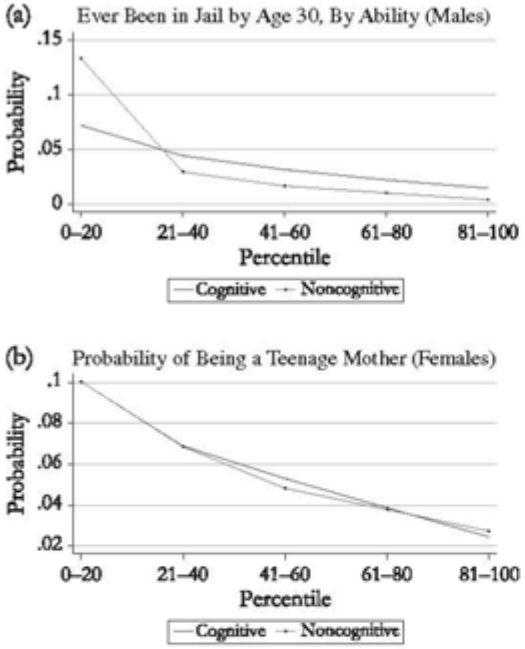
Gaps in the abilities that play an important role in determining diverse outcomes open up very early across socioeconomic groups. Consider the evolution of both cognitive and noncognitive scores over the life of children, stratifying by social background.

Figure 10 shows the gap in cognitive test scores by age of low birth weight children stratified by the mother's education. Gaps in ability emerge early and persist. Most of the gaps at age 18 that help to explain gaps in adult outcomes are present at age five. Schooling plays a minor role in creating or perpetuating gaps. Even though American children go to very different schools, depending on their family backgrounds, test scores are remarkably parallel.

Figure 11(a) plots ranks of math scores by age by income class. The salient feature of this figure, as for Figure 10, is that the gaps in achievement at age 12 are mostly present at age 6, when children enter school. Again, schooling after the second grade plays only

FIGURE 8

Effects of Cognitive and Noncognitive Skills on the Outcomes Indicated in the Table, Measured from Lowest Level to Highest in Percentiles of Skills



Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after integrating out the other ability. For example, the lines with markers show the effect of increasing noncognitive ability after integrating cognitive ability. Source: Heckman, Stixrud, and Urzua (2006).

a minor role in alleviating or creating test score gaps.

A similar pattern appears for socioemotional skills. Figure 12(a) plots ranks on an anti-social score — a measure of behavior problems. In this figure, a high score is an indicator of behavior problems. Gaps by socioeconomic status open up early and persist. High scores (worse behavior problems) are associated with lower socioeconomic status. Again, schools do not account for much of this pattern.

How do these early and persistent differences in abilities arise? Is the difference due to genes as Herrnstein and Murray claimed in *The Bell Curve*? Recall that they used an achievement test score measured in the adolescent years to claim that genes are important determinants of ability. They implicitly claim that compensation for early deficits is not possible. The test score they use has been shown to be caused in part by schooling and family environments (Hansen, Heckman, and Mullen, 2004; Neal and Johnson, 1996). In Section VII, I summarize the experimental evidence that test scores and adult achievement can be improved by high quality interventions.

Evidence from epigenetics suggests that the genes vs. environment distinction that is so much in vogue in popular discussions of the origins of inequality is obsolete, as is the practice of additively partitioning outcomes due to "nature" and "nurture" that is common in many papers in economics. An extensive recent literature suggests that gene-environment interactions are central to explaining human and animal development. Rutter (2006) provides an accessible introduction to this literature.[12]

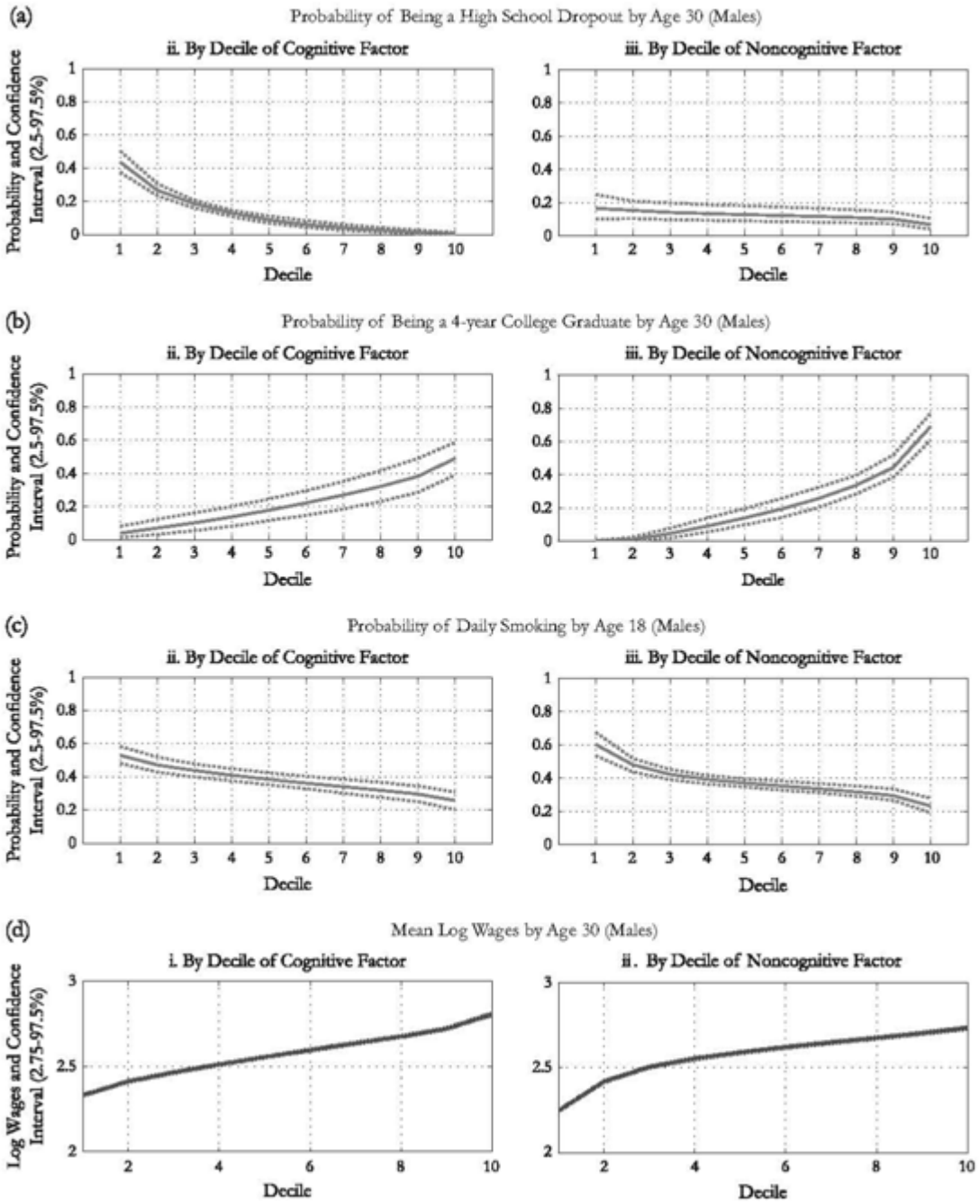
For example, recent work by Caspi, Williams, Kim-Cohen et al. (2007) shows that children's intellectual development is influenced by both genetic and environmental factors. Breast-fed children attain higher IQ scores than non-breast fed children. This relationship is moderated by a gene (FADS2) that controls fatty acid pathways. Fraga, Ballestar, Paz et al. (2005) show how monozygotic (identical) twins are affected by life experience that substantially differentiates the genetic expression of adult twins.[13] Caspi, Sugden, Moffitt et al. (2003) show that one gene (a serotonin transporter 5-HTT) moderates the influence of stressful life events on depression. Caspi, McClay, Moffitt et al. (2002) show that the impact of growing up in a harsh or abusive environment on adult antisocial behavior depends on the absence of a particular variant of the MAOA gene. Cole, Hawkley, Arevalo et al. (2007) show the effect of social environments (isolation) on gene expression that moderates adverse health outcomes. Turkheimer, Haley, Waldron et al. (2003) find a powerful role of environment in determining heritability of IQ.

12. A special issue of *Twin Research and Human Genetics* (2007) edited by Jennifer Harris provides numerous concrete examples.

13. See Champagne, Weaver, Diorio et al.(2006).

FIGURE 9

Effects of Cognitive and Noncognitive Skills on the Outcomes Indicated in the Table, Measured from Lowest Level to Highest in Percentiles of the Skills



Notes: The data are simulated from the estimates of the model and our NLSY79 sample. We use the standard convention that higher deciles are associated with higher values of the variable. The confidence intervals are computed using bootstrapping (50 draws). Source: Heckman, Stixrud, and Urzua (2006).

TABLE 3
Ability Explains Schooling Gaps. (The gap is the difference in the fraction attaining the indicated schooling status)

	White-Black Gap	White-Hispanic Gap
Complete Grade 9 or More by Age 15		
Actual White-Minority Gap	.16 (.02)	.21 (.02)
Ability Adjusted Gap	−.10 (.03)	−.02 (.07)
High School Completion Gap		
Actual White-Minority Gap	.06 (.01)	.14 (.02)
Ability Adjusted Gap	−.14 (.03)	−.12 (.04)
College Entry Probabilities given High School Completion		
Actual White-Minority Gap	.11 (.02)	.07 (.02)
Ability Adjusted Gap	−.14 (.02)	−.14 (.04)
Population College Entry Gap (Unconditional on HS Completion)		
Actual White-Minority Gap	.12 (.02)	.14 (.02)
Ability Adjusted Gap	−.16 (.03)	−.15 (.04)

Source: Cameron and Heckman (2001). Standard errors are in parentheses.

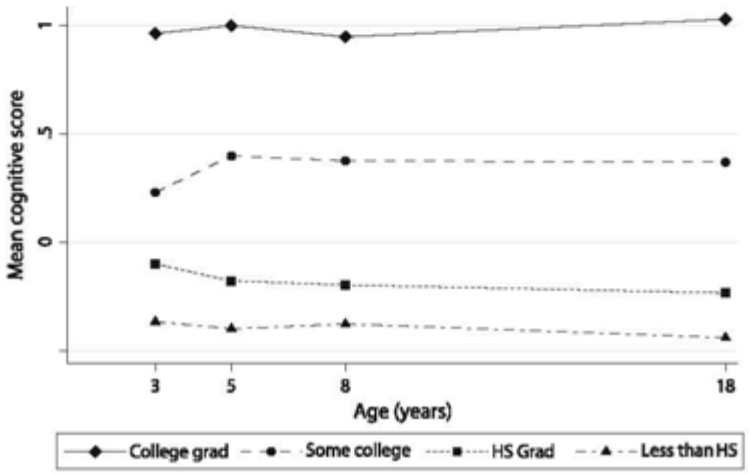
Research on animals by Champagne and Curley (2005) and Champagne, Weaver, Diorio et al. (2006) shows that environmental effects are inherited across generations, and that early environmental influences are especially important. Suomi (1999, 2003) reports parallel findings on genetic moderation of environmental influences for rhesus monkeys that have 95 percent of human genes.

When one controls for early family background factors (mother's education and ability) using regression analysis, the gaps shown in Figures 11(a) and 12(a) greatly diminish. See Figures 11(b) and 12(b), respectively. While such regression adjustments cannot establish causality, a causal interpretation of this evidence is supported by the experimental evidence discussed in Section VII.

V. THE DECLINE OF THE AMERICAN FAMILY AND THE RISE OF SOCIAL PROBLEMS

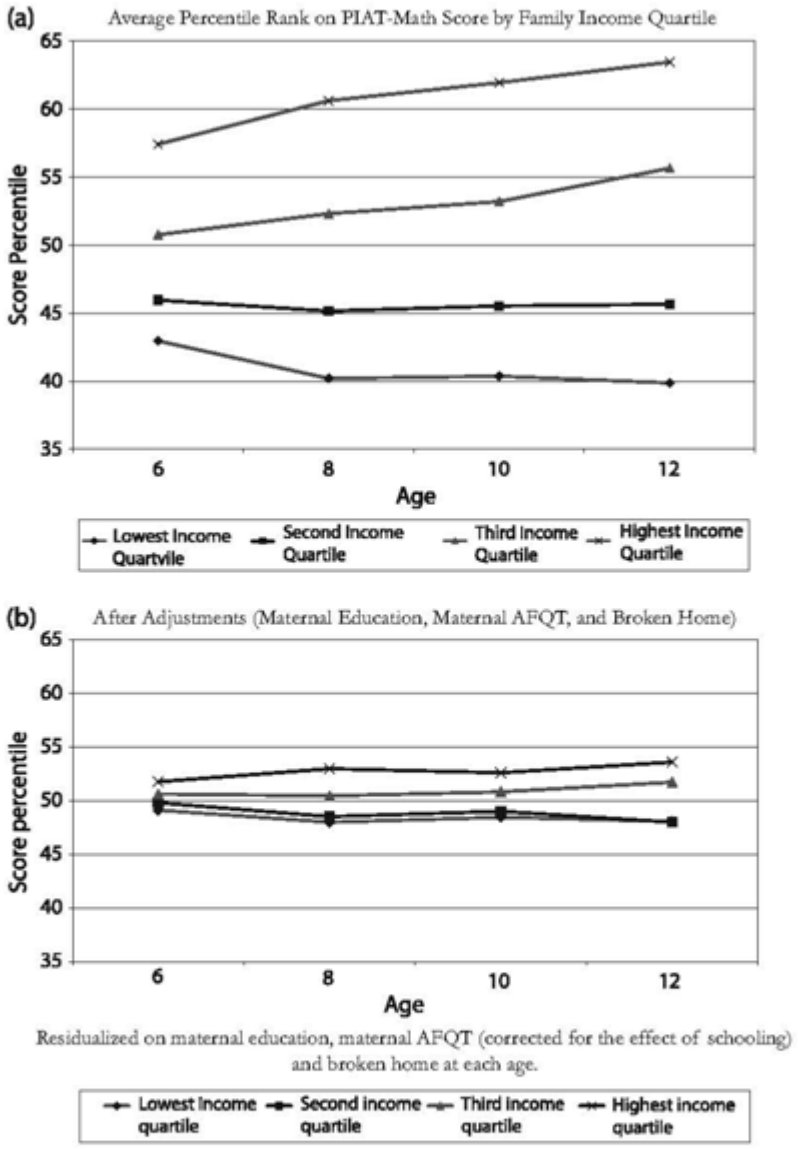
The evidence on the importance of family factors in explaining ability gaps is a source of concern because a greater proportion of American children is being born into disadvantaged families. A divide is opening up in American society. Those born into disadvantaged environments are receiving relatively less stimulation and fewer resources to promote child development than those born into more advantaged families. Figure 13(a) shows the dramatic rise in the proportion of children living in single parent families. The greatest

FIGURE 10
Trend in Mean Cognitive Score by Maternal Education. IHDP Study



Note: Using all observations and assuming that data are missing at random.
Source: Brooks-Gunn, Cunha, Duncan, Heckman, and Sojourner (2006).

FIGURE 11
Evolution by Age of Average Percentile Ranks on the PIAT Math Score by Family Income Status: Adjusted and Unadjusted

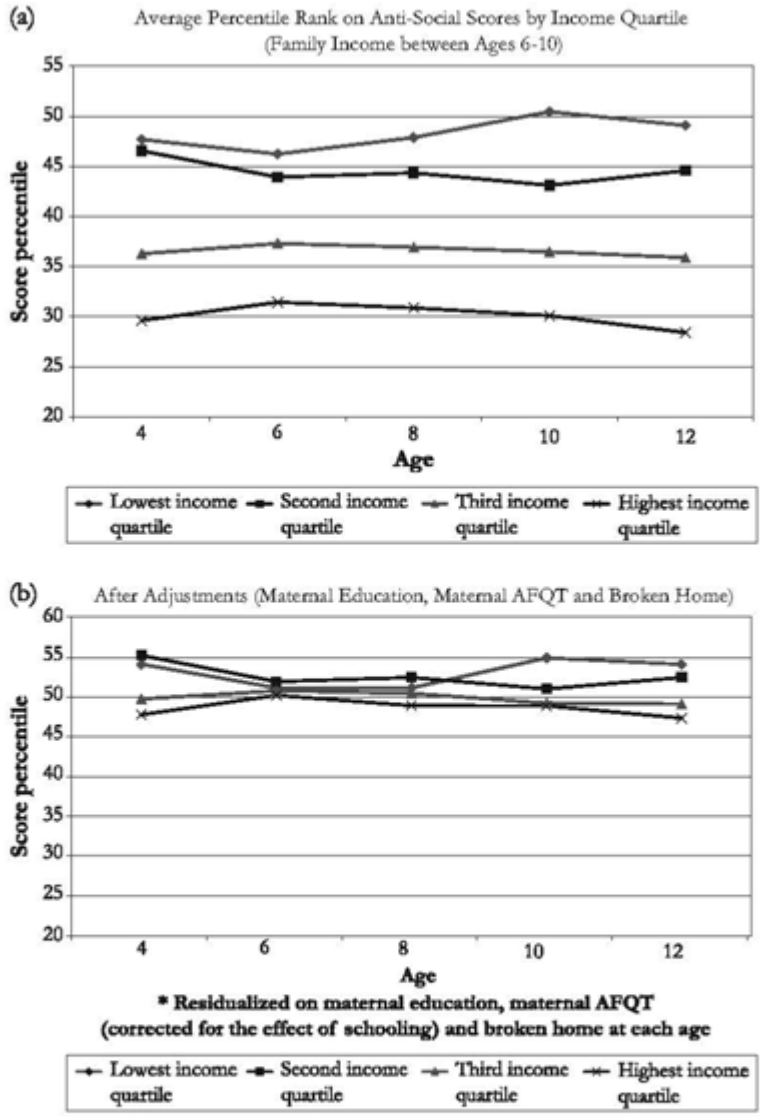


Source: Carneiro and Heckman (2003), but reformatted.

contributor to this growth is the percent living in families with never married mothers. (See the top category.) Such families are much less likely to invest in their children (Moon, 2008). Figure 13(b) shows that the percentage of all children less than age 5 with a never married mother is over 25% for children born into families with dropout mothers. Figure 13(c) shows that this phenomenon is especially pronounced for African-American families.

A gap has emerged between the environments of children of more educated women and the environments of children of less educated women. More educated women are

FIGURE 12
Evolution by Age of Average Percentile Rank on Behavioral Problems Index (BPI) by Family Income Status: Adjusted and Unadjusted



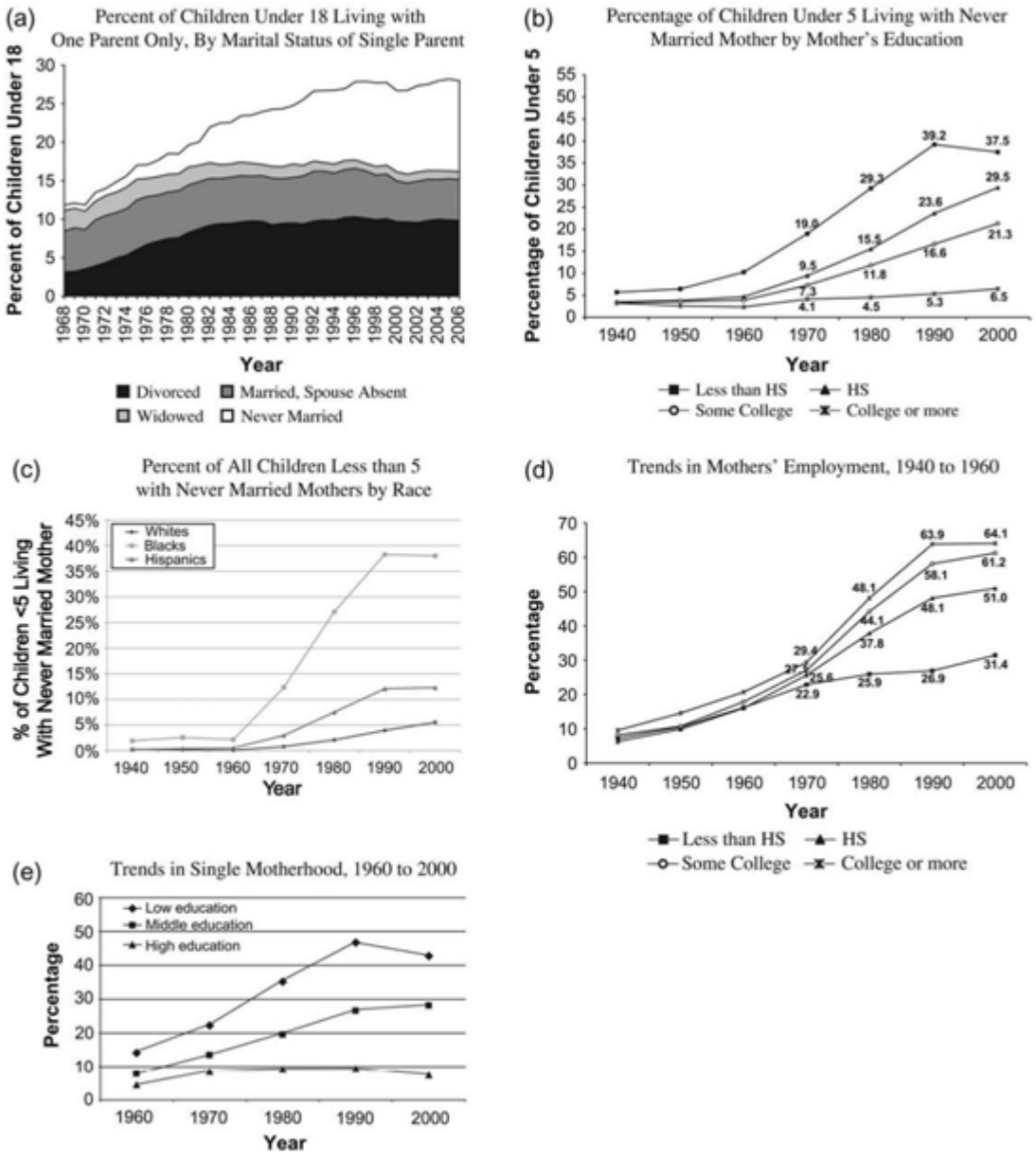
Source: Carneiro and Heckman (2003), reformatted.

having their children later after they have completed their education and have a steady flow of resources from their own income and that of their spouses (McLanahan, 2004).

More educated women are working disproportionately more than less educated women.[14] Fewer than ten percent of the more educated women bear children out of wedlock. (See Figures 13(d) and 13(e), respectively.) In educated families, fathers' involvement with children has increased over the past 30 years (McLanahan, 2004). More educated women marry later, have more resources, fewer children, and provide much richer child rearing environments that produce dramatic

14. See McLanahan (2004).

FIGURE 13
Alternative Measures of the Percentage of Children at Risk and a Measure of Trends in Single Motherhood



Source: Figure 13(a) is from Heckman and LaFontaine (2008b). Figures 13(b) and 13(c) are from Heckman and LaFontaine (2008b). 13(d) Employment is defined as working at least 27 weeks per year for 15 hours per week. PUMS (1960 2000). 13(e) Single motherhood is defined as not being married or not living with a spouse. PUMS (1960 2000).

differences in child vocabulary and intellectual performance. (See Huttenlocher, Haight, Bryk et al., 1991, Huttenlocher, Vasilyeva, Waterfall et al., 2007 and Hart and Risley, 1992, 1995.) These advantages are especially pronounced for children of two parent stable

marriages.[15] Children of such marriages appear to be at a major advantage compared to children from other unions.

A comprehensive survey by Bianchi, Robinson, and Milkie (2006) of the evidence from time diary studies shows that college-educated mothers devote more time to child rearing than less-educated mothers, especially in child enrichment activities. They spend more time reading to children and less time watching television with their children. College-educated mothers spend more time in child care.[16]

In the words of McLanahan (2004), children from different family backgrounds face "diverging destinies." While more educated women are working more, their families are more stable and the mothers in these families are also devoting more time to child development activities than less educated women. Children in affluent homes are bathed in financial and cognitive resources. Those in less advantaged circumstances are much less likely to receive cognitive and socioemotional stimulation and other family resources. The family environments of single parent homes compared to intact families are much less favorable for investment in children. See Table 4, taken from McLanahan (2004). The patterns of single motherhood, employment, and age at first birth of the child by mother's educational status are found in many countries around the world (see McLanahan, 2004).

Adverse backgrounds produce much greater risk for the persons involved and their children (Felitti and Anda, 2005; Krein and Beller, 1988; McLanahan and Sandefur, 1994). An emerging literature establishes the lower quality of the early environments of children born to less educated mothers and especially teenage mothers and their consequences for adult outcomes.[17] Both family structure and age of the mother appear to play a role (Francesconi, 2007). Fetal alcohol ingestion alone, which is more frequent with teenage and less educated mothers, appears to have substantial deleterious consequences on adult outcomes. (See Nilsson, 2008; Streissguth, 2007; Zhang, Sliwowska, and Weinberg, 2005.)[18]

TABLE 4
Risk Factors Among Less-Educated Families, by Parents' Relationship Status

	Relationship Status		
Risk Factor	**Married**	**Cohabiting**	**Single**
Mothers' Health			
Depression	10.2	15.0[a]	14.9[a]
Prenatal drug use	1.0	6.3[a]	8.8[a,b]
Prenatal smoking	10.4	25.5[a]	25.9[a]
Fathers' Health			
Substance abuse	4.3	4.1[a]	7.6[a,b]
Disability	5.8	7.5[a]	6.6
Violence	2.0	3.5	6.1[a,b]
Incarceration	12.2	31.6[a]	39.2[a,b]
Family structure			
Father has a child with other partner	19.0	33.5[a]	44.1[a,b]
Mother has a child with other partner	21.6	40.8[a]	41.5[a]
Father not smoking	7.8	19.5[a]	39.2[a,b]
Income/needs ratio	2.28	1.46[a]	1.13[a,b]
Disrupt by age 1	8.9	30.9[a]	65.1[a,b]
Disrupt by age 3	16.9	47.6[a]	78.2[a,b]
Quality of mothering			
Child was breast-fed	62.4	47.5[a]	38.9[a,b]
Nonpunitive interaction	4.79	4.48[a]	4.29[a,b]
Language stimulation	9.29	9.06[a]	9.03[a]

Source: McLanahan (2004). Author's calculations, using data from the Fragile Families and Child Wellbeing Study.

Note: The sample is limited to mothers with a high school degree or less. [a]Different from married at $p < .05$. [b]Different from cohabiting at $p < .05$.

The available evidence from psychology and sociology suggests that the conventional measures of family disadvantage used by many social scientists to study child outcomes, such as "broken home" or family income, are very crude proxies for the real determinants of child outcomes (Harris, Brown, and Bifulco, 1986; Mayer, 1997;

15. See McLanahan (2008).

16. The evidence for *growing* differentials of child investment by education and social class of the parent is less clear.

17. See Francesconi (2007); Hunt (2006); Levine, Pollack, and Comfort (2001).

18. Some evidence (e.g., Krein and Beller, 1988) suggests that adverse early childhood environments differentially harm boys. Given the growth in the percentage of all births to children in adverse environments, this is one possible channel that explains emerging educational gaps between men and women. Much further research is required to confirm this conjecture. In evolutionary biology (see, e.g., Wells, 2000, and Trivers and Willard, 1973), a theory has been developed that explains the greater vulnerability of males to adverse early environments.

Rutter, 1971). Presence of a father can be a negative factor if he shows antisocial tendencies (Jaffee, Caspi, Moffitt et al., 2005). A substantial body of evidence suggests that a major determinant of child disadvantage is the quality of the nurturing environment rather than just financial resources available or presence or absence of parents (see Rutter, 2006). This evidence is supported by the evidence on the effects of early parenting enrichment programs summarized in Section VII.

Strengthening the observation that conventional measures of childhood adversity are inaccurate is a study by Costello, Compton, Keeler et al. (2003). An American Indian population enriched by the opening of a casino showed substantial improvements in baseline measures of disruptive behavior of their children. The beneficial effects of the intervention were mediated by changes within the family. Parental supervision of children improved and there was greater parental engagement. In this natural experiment, income improved parenting, but it was parenting that reduced disruptive behavior. A proper measure of disadvantage would account for parenting inputs. However, time series data on parenting are limited. This evidence raises a serious policy question. Should one target income or should one target parenting? The successful early intervention programs discussed in Section VII target parenting. However, targeting parenting raises difficult political and cultural issues that are discussed in Section IX.

Adverse trends in family environments raise an environmental version of concerns about the quality of the future population analogous to the concerns expressed by the eugenics movement a century ago. Then the concern was expressed that "genetically inferior" populations were breeding at a higher rate and diluting population quality. Since genetics was assumed to be beyond the control of intervention, the eugenicists forecast a dim future for the human race.

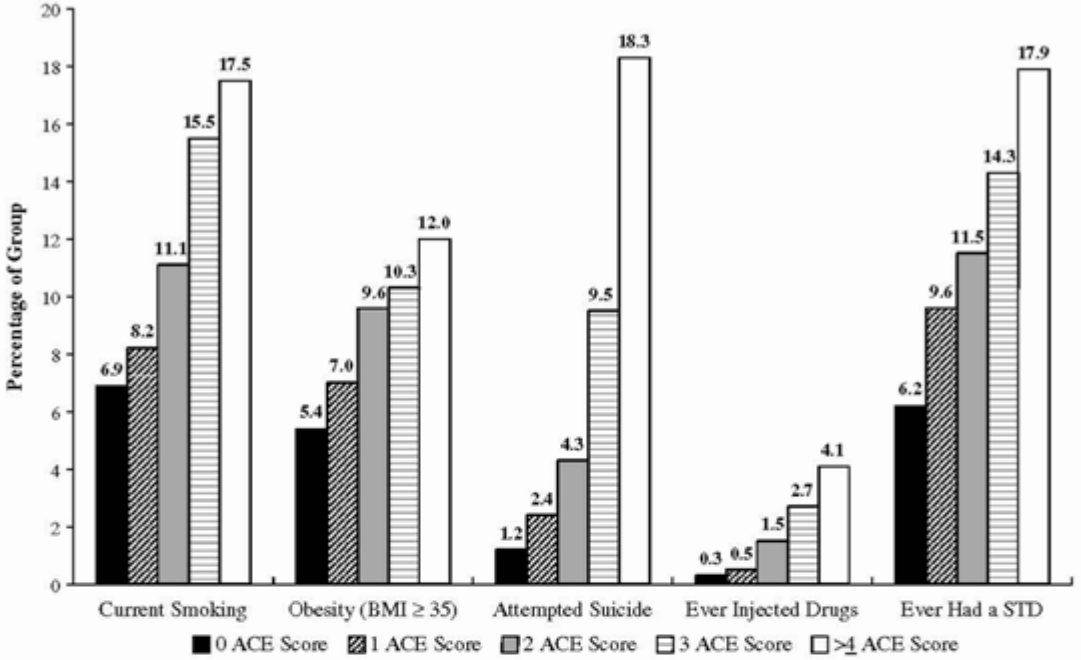
Recent evidence suggests that early *environments* play a powerful role in shaping adult outcomes. Disproportionately more American children are growing up in adverse environments and this will have adverse consequences for American society. The good news in all of this is that environments can be enhanced to promote the quality of children in ways that were thought impossible under the traditional view of genetic determination. The recent literature suggests that early environments powerfully affect genetic expression, and that society need not passively watch its own decline. Policy can matter. Before turning to the evidence, I bolster the case made in this section.

VI. ADDITIONAL EVIDENCE ON THE CONSEQUENCES OF ADVERSE EARLY CIRCUMSTANCES ON CHILD AND ADULT OUTCOMES

Many scholars, including Plato (1991, reprinted) and Freud (1935, reprinted), have discussed the importance of early childhood environments on adult outcomes. Felitti and Anda (2005) and Anda (2006) present some empirical support for Freud, Plato, and the numerous thinkers who have stressed the importance of the early years. They use retrospective data to examine the effects of adverse childhood experiences on health and human development over the lifespans of 17,337 participants. The cohorts they analyze are born as early as the 1900s. Their studies show the long-term effects of adverse early childhood environments. They have not yet established exact neural or genetic mechanisms, nor do they demonstrate what aspects of early trauma or adverse environments affect child outcomes. Their use of recall data on adversity in childhood is potentially very problematic. Nonetheless, their evidence is strongly suggestive of an important role for early family factors in determining child outcomes that is consistent with a large body of evidence from a variety of literatures.

Felitti and Anda (2005) and Anda (2006) define Adverse Childhood Experiences (ACE) as experiences in childhood or adolescence such as abuse and neglect, and growing up with domestic violence. Their studies based on ACE show that adverse childhood life experiences are correlated with adult disease burden and medical care costs; reduced well-being; increased depression and suicide rates; alcoholism and drug use; poor job performance and disability; social function; and impaired performance of subsequent generations. They compute a score (the ACE score) based on the extent of adverse childhood circumstances. The higher the score, the worse the childhood environment. Two out of three adults experience at least one category of ACE and 11% experience five or more. Their results are striking. Figure 14 shows the adult consequences of adverse childhood experiences.

FIGURE 14
Adult Health Risks by Adverse Childhood Experience (ACE) Score



Source: Anda (2006).

This evidence is bolstered by a large body of research in developmental psychology (Watt, Ayoub, Bradley et al., 2008). Lack of input during early child development results in abnormal development of the brain. The abnormal development is in those brain systems which sense, perceive, process, "interpret" and "act on" information related to that specific sensory deprivation.

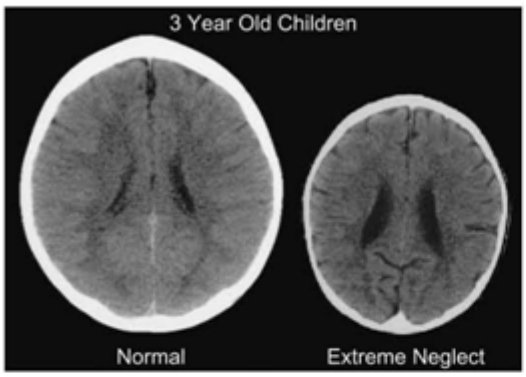
Studies of Romanian infants show the importance of the early years. A perverse natural experiment, described in detail in Cunha, Heckman, Lochner et al. (2006), placed many Romanian children in state run orphanages at birth. Conditions in the orphanages were atrocious. Children received minimal social and intellectual stimulation. They were adopted out at different ages (length of exposure).[19] Children raised in these institutions demonstrated cognitive delays, serious impairments in social behavior, and abnormal sensitivity to stress. Young children adopted out of institutional care often have persisting cognitive, socioemotional, and health problems.[20]

The somatosensory bath of early childhood provides the major sensory cues responsible for organizing key areas in the brain. Absent these sensory experiences, abnormal development results. This is vividly illustrated in the smaller head size compared to normal children, enlarged ventricles and cortical atrophy found in neglected three-year-olds. (See Figure 15.) The later the Romanian orphans were adopted out, the poorer their recovery on average, although there are important variations among the children which are related to the quality of orphanages and adopted home environments. See Smyke, Koga, Johnson et al. (2007) for comprehensive discussions of these issues.

19. See Rutter and the English and Romanian Adoptees Study Team (1998) and Smyke, Koga, Johnson et al. (2007).

20. Rutter, Kreppner, Connor, and English and Romanian Adoptees Study Team (2001) discuss the wide variability in the recovery rates among infants. The general rule is that the longer the exposure to adverse environments, the harder it is to remediate through adoption, at least on average. The more adverse the early environment, the worse the outcome.

FIGURE 15
Abnormal Brain Development Following Sensory Neglect in Early Childhood



Note: These images illustrate the negative impact of neglect on the developing brain. The scan on the left is an image from a healthy three-year-old with an average head size (50thpercentile). The image on the right is from a three-year-old child suffering from severe sensory-deprivation neglect. This child's brain is significantly smaller than average (3rd percentile) and has enlarged ventricles and cortical atrophy. Source: Perry (2004).

VII. ENRICHING EARLY ENVIRONMENTS CAN PARTIALLY COMPENSATE FOR EARLY ADVERSITY

Experiments that enrich the early environments of disadvantaged children demonstrate causal effects of early environments on adolescent and adult outcomes and provide powerful evidence against the genetic determinism of Herrnstein and Murray (1994). Enhancements of family environments improve child outcomes and affect both cognitive and noncognitive skills. Noncognitive skills — personality factors, motivation and the like — are an important channel of improvement.

The most reliable data come from experiments that substantially enrich the early environments of children living in low-income families. Two of these investigations, the Perry Preschool Program and the Abecedarian Program, are very informative for the purposes of this discussion because they use a random assignment design and collect long-term follow-up data.

These longitudinal studies demonstrate substantial positive effects of early environmental enrichment on a range of cognitive and noncognitive skills, schooling achievement, job performance, and social behaviors, long after the interventions ended. Data from Olds' Nurse Family Partnership Program (2008) and from non-controlled assessments of Head Start and the Chicago Child-Parent Centers programs confirm these findings.[21]

The Perry Program was an intensive preschool program that was administered to 58 disadvantaged black children in Ypsilanti, Michigan between 1962 and 1967. The treatment consisted of a daily 2.5-hour classroom session on weekday mornings and a weekly 90-minute home visit by the teacher on weekday afternoons. The length of each preschool year was 30 weeks. The control and treatment groups have been followed through age 40.

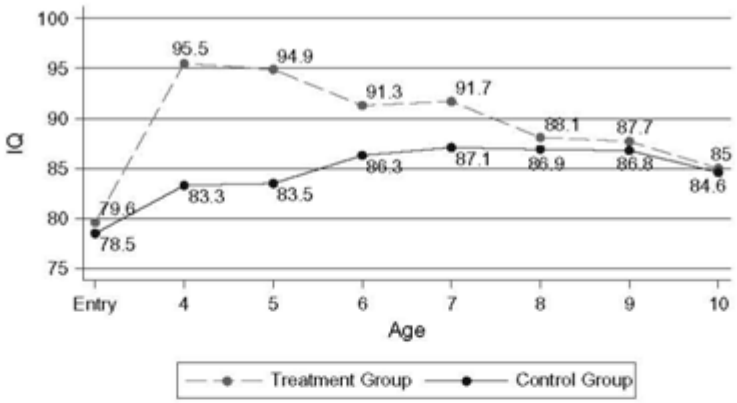
The Abecedarian Program studied 111 disadvantaged children, born between 1972 and 1977, whose families scored high on a risk index. The mean age at entry was 4.4 months. The program was a year-round, full-day intervention that continued through age 8. The children were followed through age 21, and an age 30 follow-up study is in preparation.

In both the Perry and Abecedarian Programs there was a consistent pattern of successful outcomes for treatment group members compared with control group members.[22] For the Perry Program, an initial increase in IQ disappeared gradually over 4 years following the intervention. Such IQ fadeouts have been observed in other studies. Figure 16 shows that the initial surge in IQ for treatment group members fades out by age ten. Heckman, Malofeeva, Pinto, and Savelyev (2008) establish that Perry operates primarily through improving noncognitive traits. These improvements explain the treatment effects graphed in Figure 17. Even though their IQs are not higher, the Perry treatment group does better on achievement tests at age 14 than the controls. (See the second set of bar charts in Figure 17(a).)

Positive effects of these interventions were also documented for a wide range of social behaviors, even though IQ is not any higher. At the oldest ages tested (Perry: 40 yrs; Abecedarian: 21 yrs), individuals scored higher on achievement tests, attained higher levels of education, required less special education, earned higher wages, were more likely to own a home, and were less likely to go on welfare or be incarcerated than controls. Intervening at an early enough age might even raise the IQ of participants. In the more intensive, earlier starting,

21. See Cunha, Heckman, Lochner et al. (2006) for a detailed discussion of these programs.
22. See Cunha, Heckman, Lochner et al. (2006).

FIGURE 16
Perry Preschool Program: IQ, by Age and Treatment Group



Source: Perry Preschool Program. IQ measured on the Stanford Binet Intelligence Scale (Terman and Merrill, 1960). Test was administered at program entry and each of the ages indicated.

Abecedarian program, IQ gains were found that last into early adulthood.

An estimated rate of return (the return per dollar of cost) to the Perry Program is around 10%.[23] This high rate of return is higher than standard returns on stock market equity (5.8%) and suggests that society at large can benefit substantially from such interventions. These are underestimates of the rate of return because they ignore the economic returns to health and mental health. Cunha, Heckman, Lochner, and Masterov (2006) present a comprehensive survey of the early intervention programs.

Several observations about the evidence from the intervention studies and nonexperimental longitudinal studies are relevant. Skills beget skills and capabilities foster future capabilities. All capabilities are built on a foundation of capacities that are developed earlier. Early mastery of a range of cognitive, social, and emotional competencies makes learning at later ages more efficient and therefore easier and more likely to continue.

As currently configured, public job training programs, adult literacy services, prisoner rehabilitation programs, and education programs for disadvantaged adults produce low economic returns.[24] Moreover, for studies in which later intervention showed some benefits, the performance of disadvantaged children was still behind the performance of children who experienced earlier interventions in the preschool years. If the base is weak, the return to later investment is low.

The advantages gained from effective early interventions are best sustained when they are followed by continued high quality learning experiences. The technology of skill formation developed in Cunha and Heckman (2007b) and Heckman (2007) shows that the returns on school investment are higher for persons with higher ability, where ability is formed in the early years. Figure 18(a) shows the return to a marginal increase in investment at different stages of the life cycle starting from a position of low but equal initial investment at all ages.[25] Figure 18(b) is explained below.

Due to dynamic complementarity, or synergy, early investments must be followed by later investments if maximum value is to be realized. The Appendix to this paper presents a formal derivation of this curve and the associated optimal investment strategy. It draws on the analyses of Cunha and Heckman (2007b), Heckman (2007) and Cunha, Heckman, Lochner et al. (2006). One unusual feature of early interventions that is stressed in Cunha and Heckman (2007b) and Heckman

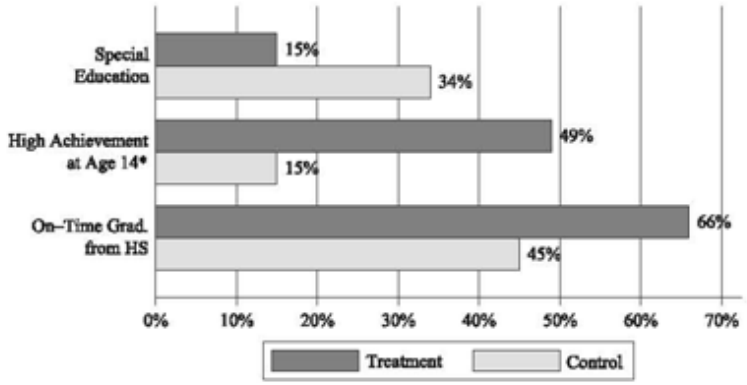
23. See Heckman, Moon, Pinto, and Yavitz (2007).

24. See Cunha, Heckman, Lochner, and Masterov (2006) and Heckman and Lochner (2000) for evidence on the returns to adolescent interventions for disadvantaged youth.

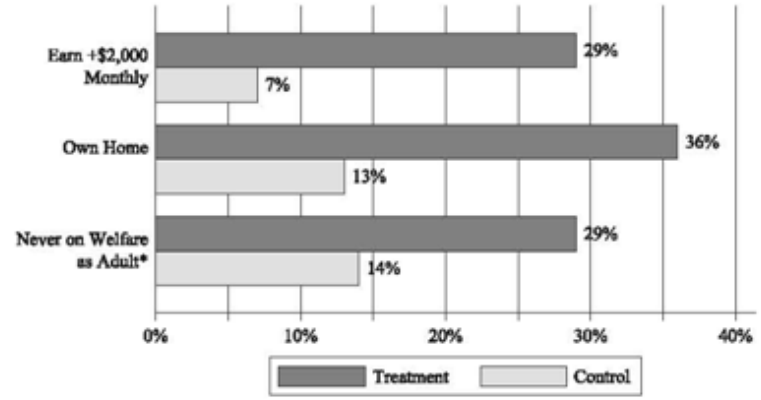
25. The curve is not an equilibrium schedule. It is a return to a unit of investment at each age assuming an initial low and equal investment at all ages that is below the final equilibrium level at each age. The equilibrium investment policy would allocate more resources to the early years and less to later years.

FIGURE 17
Perry Preschool Program

(a) Educational Effects, by Treatment Group. *High Achievement Defined as Performance at or above the Lowest 10th Percentile on the California Achievement Test (1970). Source: Barnett (2004)



(b) Economic Effects through Age 40, by Treatment Group. Source: Barnett (2004)



(c) Arrests Per Person before Age 40, by Treatment Group. Juvenile arrestas are defined as arrests prior to age 19. Source: Barnett (2004)

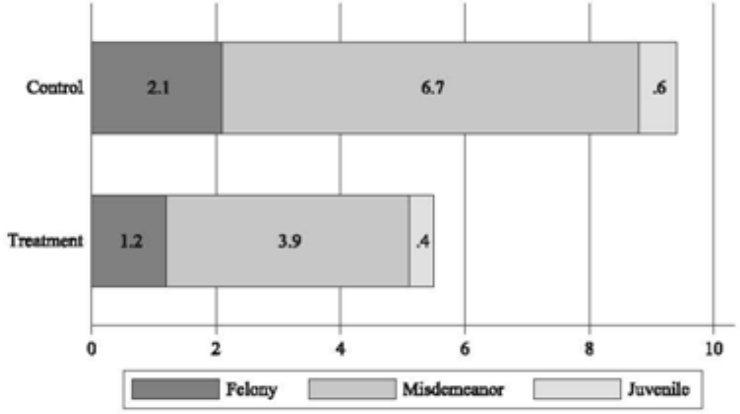
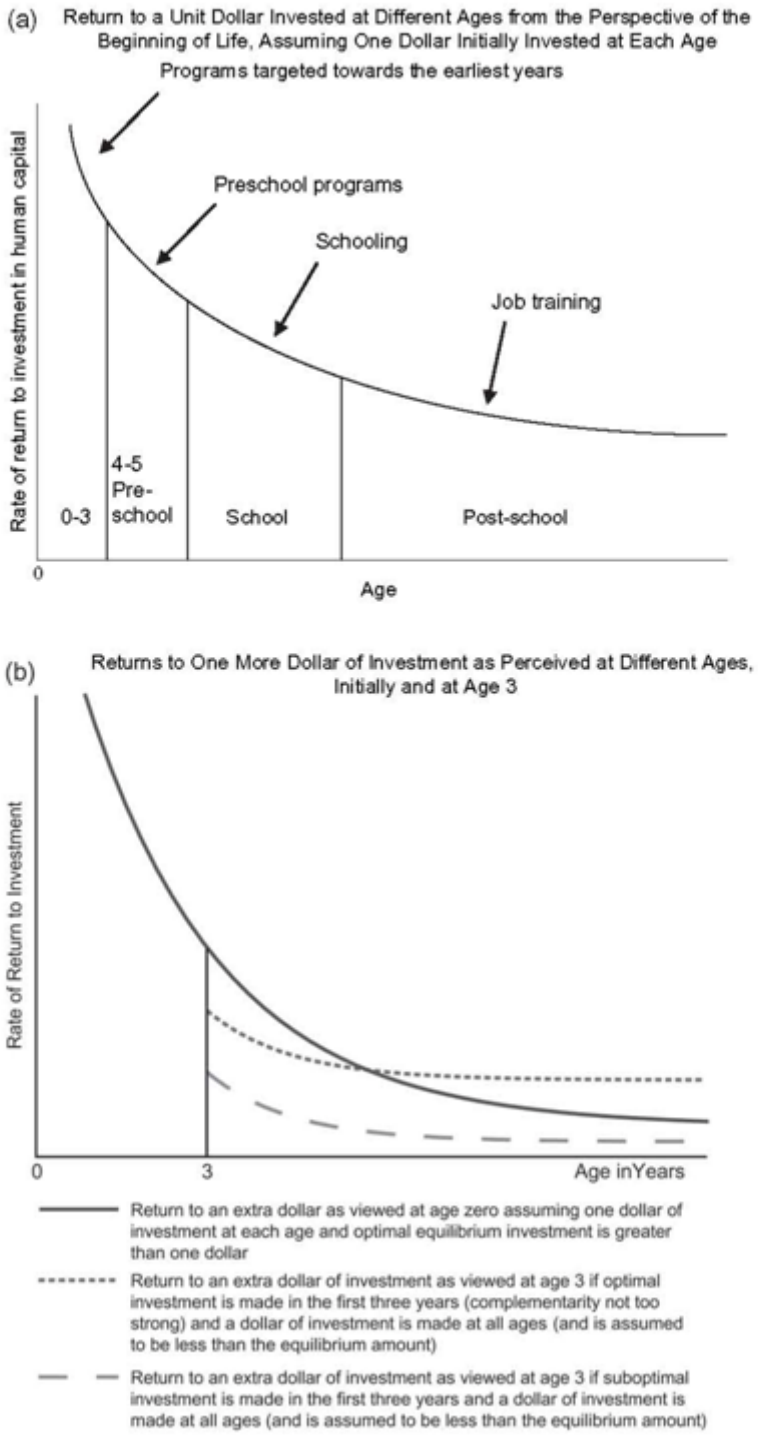


FIGURE 18
Returns to a Unit Dollar Invested



and Masterov (2007) is that the traditional equity-efficiency tradeoff that plagues most policies is absent. Early interventions promote economic efficiency and reduce lifetime inequality. Remedial interventions for disadvantaged adolescents who do not receive a strong initial foundation of skills face an equity-efficiency tradeoff. They are difficult to justify on the grounds of economic efficiency and generally have low rates of return.

Cunha and Heckman (2008a) and Cunha, Heckman, and Schennach (2007) estimate technologies of skill formation to understand how the skills of children evolve in response to (1) the stock of skills children have already accumulated; (2) the investments made by their parents; and (3) the stock of skills accumulated by the parents themselves. In the text, I sketch the framework. It is formally developed in the Appendix.

Let C_t be the stock of cognitive skill of the child at age t. N_t is the stock of noncognitive skill of the child at age t. I_t is the parental investment at age t. C_M is mother's cognitive skill. N_M is mother's noncognitive skill.

Cunha, Heckman, and Schennach (2007) and Cunha and Heckman (2008a) estimate two equations. One is a technology for the production of cognitive skills:

$$C_{t+1} = F_{C,t}(N_t, C_t, I_t, C_M, N_M).$$

Another equation is a technology for the production of noncognitive skills:

$$N_{t+1} = F_{N,t}(N_t, C_t, I_t, C_M, N_M).$$

The framework developed in the Appendix includes health as a third output of the developmental process.

Cunha, Heckman, and Schennach (2007) estimate the elasticity of substitution parameters for inputs at different periods that govern the trade-off of investment between the early years and the later years. They find much stronger yields of investment in the early years, supporting the shape of the curve displayed in Figure 18(a). Different stages of the life cycle are sensitive periods for different outcomes. Sensitive periods for cognitive skills come early in life. Sensitive periods for noncognitive skills come later in the life of the child.[26]

26. See Cunha and Heckman (2008a).

Figure 18(b) repeats the curve of Figure 18(a) on a different scale and shows the return to an extra dollar of investment at *age three* under two different scenarios. In the first scenario (depicted by the tightly-spaced dashed line), optimal investment up to age three is assumed to have been made. An additional dollar is invested at each age after age three and the return to the next dollar after that is computed. At age three, the curve starts below the curve 18(a) that is determined at age zero because substantial investment is assumed to have been made at age three. This is a manifestation of diminishing returns. After age three, the return eventually is greater than the initial curve for Figure 18(a) because of dynamic complementarity. The higher skill base at three enhances the productivity of later investment.[27]

The third curve (the curve with wider dashes) depicts a case with suboptimal investment in the years zero to three. Assuming that a dollar is initially invested in each year after age three, the return to the next dollar is less than the return viewed prospectively. When the initial base is substantially compromised, so are the returns to later investment.[28]

Table 5 presents a simulation of the model of Cunha, Heckman, and Schennach (2007), developed in Cunha and Heckman (2006). It considers a population of disadvantaged children with low levels of skills as measured at ages four to six. The investments they receive place them at the bottom decile of the overall population ability distribution. Their mothers are also at the bottom decile of the distribution of maternal endowments. For the outcomes listed in the first column, the baseline (no treatment) performance is presented in the second column "Baseline." These outcomes are those of the Perry control group.

Using an empirically determined technology, Cunha and Heckman (2006) simulate an intervention that moves children from the bottom decile of family resources to the seventh decile (from the bottom) in terms of their family environments. This produces the outcomes displayed in the third column of the table. This intervention essentially

27. The curve is drawn assuming moderate dynamic complementarity. In principle, the interval between age three and the crossing age could be made arbitrarily small.

28. Many different configurations of the age 3 investment curve are possible depending on the extent of diminishing returns within a period and the strength of dynamic complementarity of investments over time.

TABLE 5

Comparison of Different Investment Strategies. Disadvantaged Children are in first decile in the distribution of cognitive and noncognitive skills at age 6. Mothers are in first decile in the distribution of cognitive and noncognitive skills at ages 14–21

Outcome	Baseline	Changing early conditions: changing investment from the 1st to 7th decile of the overall distribution of early investment	Adolescent intervention: moving investments at last transition from 1st to 9th decile of overall investment	Changing initial conditions and performing a balanced intervention using the resources of the adolescent intervention
High School Graduation	0.4109	0.6579	0.6391	0.9135
Enrollment in College	0.0448	0.1264	0.1165	0.3755
Conviction	0.2276	0.1710	0.1773	0.1083
Probation	0.2152	0.1487	0.1562	0.0815
Welfare	0.1767	0.0905	0.0968	0.0259
			35 50% more costly*	

Source: Cunha and Heckman (2006). *This is the range produced from a two standard deviation confidence interval.

produces the outcomes for the Perry treatment group (see Schweinhart, Montie, Xiang, Barnett, Belfield, and Nores 2005). The fourth column of Table 5 is a later adolescent intervention that also causes children to achieve Perry outcomes. To achieve Perry results in this fashion requires 35–50 percent *more* investment costs in present value terms discounted back to ages three to six (the age of the initial intervention). Family resources must be moved from the bottom decile to the ninth decile to achieve with later interventions what can be achieved with earlier interventions.

It is possible to remediate rather than to intervene early, but it is also much more costly. The outcomes displayed in the final column of the table result from allocating the resources spent in the adolescent intervention more smoothly over the life cycle of the child. Such interventions front load investment in the early years, following the logic of Figure 18(a) and the model developed in the Appendix. Relatively more investment is spent in the early years, but early investments are supported by later investments. Suppose that the resources required to produce Perry outcomes solely from adolescent interventions are spread more smoothly over the life cycle using an optimal investment strategy. This causes Perry-like children to attain middle class outcomes as is shown in the final column of numbers.

The evidence summarized in this paper supports the economic efficiency of early initial investment that is sustained. The optimal policy is to invest relatively more in the early years. But early investment must be followed up to be effective. This is a consequence of dynamic complementarity. See Cunha and Heckman (2007b) and the Appendix. Later remediation for early disadvantage is possible but to attain what is accomplished by early investment is much more costly. If society intervenes too late and individuals are at too low a level of skill, later investment can be economically inefficient. Middle class children receive massive doses of early enriched environments. Children from disadvantaged environments do not.

VIII. PRACTICAL ISSUES IN IMPLEMENTING EARLY CHILDHOOD PROGRAMS

A variety of practical issues arise in implementing early childhood programs. I discuss them in turn.

- *Who should be targeted?* The returns to early childhood programs are the highest for disadvantaged children who do not receive substantial amounts of parental investment in the early years. The proper measure of disadvantage is not necessarily family poverty or parental education. The available evidence suggests that the quality of *parenting* is the

important scarce resource. The quality of parenting is not always closely linked to family income or parental education. Measures of risky family environments should be developed that facilitate efficient targeting.

• *With what programs?* Programs that target the early years seem to have the greatest promise. The Nurse Family Partnership Program (Olds, 2002), the Abecedarian Program and the Perry Program have been evaluated and show high returns. Programs with home visits affect the lives of the parents and create a permanent change in the home environment that supports the child after center-based interventions end. Programs that build character and motivation that do not focus exclusively on cognition appear to be the most effective.

• *Who should provide the programs?* In designing any early childhood program that aims to improve the cognitive and socioemotional skills of disadvantaged children, it is important to respect the sanctity of early family life and to respect cultural diversity. The goal of early childhood programs is to create a base of productive skills and traits for disadvantaged children living in culturally diverse settings. By engaging private industry and other social groups that draw in private resources, create community support, and represent diverse points of view, effective and culturally sensitive programs can be created.

• *Who should pay for them?* One could make the programs universal to avoid stigmatization. Universal programs would be much more expensive and create the possibility of deadweight losses whereby public programs displace private investments by families. One solution to these problems is to make the programs universal but to offer a sliding fee schedule by family income to avoid deadweight losses.

• *Will the programs achieve high levels of compliance?* It is important to recognize potential problems with program compliance. Many successful programs change the values and motivations of the child. Some of these changes may run counter to the values of parents. There may be serious tension between the needs of the child and the acceptance of interventions by the parent. Developing culturally diverse programs will help avoid such tension. One cannot assume that there will be no conflict between the values of society as it seeks to develop the potential of the child and the values of the family, although the extent of such conflict is not yet known.

IX. SUMMARY

America has a growing skills problem. One consequence of this skills problem is rising inequality and polarization of society. A greater fraction of young Americans is graduating from college. At the same time, a greater fraction is dropping out of high school. Another consequence of the skills problem is the slowdown in growth of the productivity of the workplace. In designing policies to combat inequality, it is important to recognize that about 50% of the variance in inequality in lifetime earnings is determined by age 18. The family plays a powerful role in shaping adult outcomes that is not fully appreciated by current American policies.

Current social policy directed toward children focuses on improving cognition. Yet more than smarts is required for success in life. Gaps in both cognitive and noncognitive skills between the advantaged and the disadvantaged emerge early and can be traced in part to adverse early environments. A greater percentage of U.S. children is being born into adverse environments.

The problems of rising inequality and diminished productivity growth are not due mainly to defects in public schools or to high college tuition rates. Late remediation strategies designed to compensate for early disadvantage such as job training programs, high school classroom size reductions, GED programs, convict rehabilitation programs, and adult literacy programs are not effective, at least as currently constituted. Remediation in the adolescent years can repair the damage of adverse early environments, but it is costly. There is no equity-efficiency tradeoff for programs targeted toward the early years of the lives of disadvantaged children. There is a substantial equity-efficiency tradeoff for programs targeted toward the adolescent years of disadvantaged youth. Social policy should be directed toward the malleable early years.

A proper measure of disadvantage would be based on the quality of the parenting environment. Any proposed programs should respect the primacy of the family. Policy proposals should be culturally sensitive and recognize the diversity of values in American society. Effective strategies would engage the private

sector to mobilize resources and produce a menu of programs from which parents can choose.

APPENDIX: SOME FACTS ABOUT HUMAN DEVELOPMENT AND A SIMPLE MODEL THAT SUMMARIZES THE EVIDENCE

Any analysis of human development must reckon with nine facts. The first fact is that *ability matters*. Many empirical studies document that cognitive ability is a powerful determinant of wages, schooling, participation in crime and success in many aspects of social and economic life (Heckman, 1995; Heckman, Stixrud, and Urzua, 2006; Murnane, Willett, and Levy, 1995) including health (Auld and Sidhu, 2005).

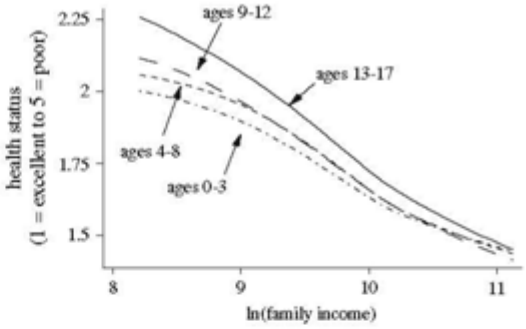
Second, *abilities are multiple in nature*. Noncognitive abilities (perseverance, motivation, time preference, risk aversion, self-esteem, self-control, preference for leisure) have direct effects on wages (controlling for schooling), schooling, teenage pregnancy, smoking, crime, performance on achievement tests, and many other aspects of social and economic life (Borghans, Duckworth, Heckman, and ter Weel, 2008; Bowles, Gintis, and Osborne, 2001; Heckman, Stixrud, and Urzua, 2006). They affect health choices (see the evidence on time preference and health in Grossman, 2000). Social and emotional factors affect adult health (Ryff and Singer, 2005).

Third, *the nature versus nurture distinction, while traditional, is obsolete*. The modern literature on epigenetic expression and gene-environment interactions teaches us that the sharp distinction between acquired skills and ability featured in the early human capital literature is not tenable (Gluckman and Hanson, 2005; Pray, 2004; Rutter, 2006). Additive "nature" and "nurture" models, while traditional and still used in many studies of heritability and family influence in economics, mischaracterize gene-environment interactions. Recent analyses in economics that break the "causes" of birthweight into environmental and genetic components ignore the lessons of the recent literature. Genes and environment cannot be meaningfully parsed by traditional linear models that assign unique variances to each component. Abilities are produced, and gene expression is governed by environmental conditions (Rutter, 2006; Rutter, Moffitt, and Caspi, 2006). Behaviors and abilities have both a genetic and an acquired character. Measured abilities are the outcome of environmental influences, including *in utero* experiences, and also have genetic components.

The literature on fetal programming emphasizes the importance of the environment in causing gene expression that gives rise to susceptibility to different diseases, abilities, and personality characteristics. See Gluckman and Hanson (2005) for evidence on gene expression for disease and Rutter (2006) and Rutter, Moffitt, and Caspi (2006) for evidence on environmental determinants of psychopathology and cognition. Some adverse early effects are more easily compensated than other effects. The concepts of remediation and resilience play prominent roles in economic and psychological analyses but are not featured in current discussions in health economics.[29]

29. See, however, Curtis and Cicchetti (2003) and Charney (2004) for analyses of biological and psychobiological mechanisms for resilience.

FIGURE A.1
Health and Income for Children and Adults, U.S. National Health Interview Survey 1986 1995



Source: Case, Lubotsky, and Paxson (2002).

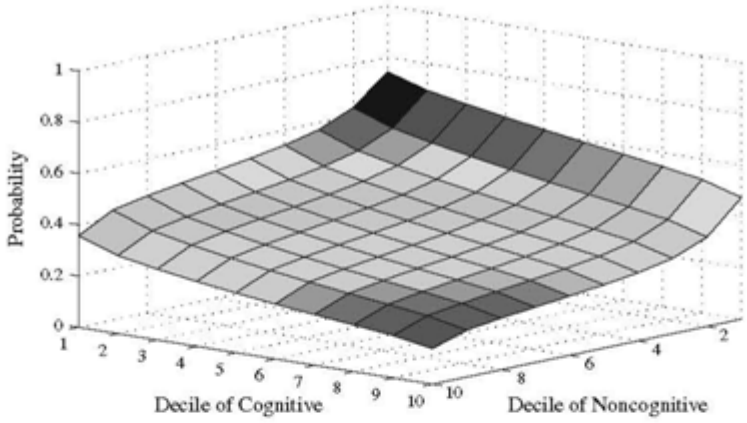
Fourth, *ability gaps between individuals and across socioeconomic groups open up at early ages, for both cognitive and noncognitive skills. So do gaps in health status.* We have illustrated this in the text of the paper. See Cunha and Heckman (2007b) and their appendices for much further evidence on this point. Cunha, Heckman, Lochner, and Masterov (2006) present numerous graphs showing the early divergence of child cognitive and noncognitive skills by age across children of parents with different socioeconomic status which supplement Figures 10, 11 and 12 in the text. Levels of child cognitive and noncognitive skills are highly correlated with family background factors like parental education and maternal ability, which, when statistically controlled for, largely eliminate these gaps (Carneiro and Heckman, 2003; Cunha, Heckman, Lochner, and Masterov, 2006). Currie (2006) presents parallel evidence on child health. Case, Lubotsky, and Paxson (2002) show that family income gradients in child health status emerge early and widen with age (see Figure A.1).[30] Experimental interventions with long-term follow-up confirm that changing the resources available to disadvantaged children improves adult outcomes on a number of dimensions. See the studies surveyed in Cunha, Heckman, Lochner, and Masterov (2006) and Blau and Currie (2006).

Fifth, *for both animal and human species, there is compelling evidence of critical and sensitive periods in development.* Some skills or traits are more readily acquired at certain stages of childhood than other traits (Knudsen, Heckman, Cameron, and Shonkoff (2006). For example, on average, if a second language is learned before age 12, the child speaks it without an accent (Newport, 1990). If syntax and grammar are not acquired early on, they appear to be very difficult to learn later on in life (Pinker, 1994). A child born with a cataract on the eye will be blind for life if the cataract is not removed within the first year of life.

Different types of abilities appear to be manipulable at different ages. See the evidence summarized in Borghans, Duckworth, Heckman et al. (2008). IQ scores become stable by age 10 or so, suggesting a sensitive period for their formation below age 10. There is evidence that adolescent interven-

30. Notice that a high "*y*" value is associated with *lower* health status on their graph.

FIGURE A.2
Probability of Daily Smoking by Age 18, Males by Decile of Cognitive and Noncognitive Factor



Note: The highest decile of cognitive and noncognitive ability is "10." "1" is the lowest decile.
Source: Heckman, Stixrud, and Urzua (2006).

tions can affect noncognitive skills (Cunha, Heckman, Lochner,and Masterov, 2006). This evidence is supported by the neuroscience that establishes the malleability of the prefrontal cortex into the early 20s (Dahl, 2004). This is the region of the brain that governs emotion and self-regulation. Rutter (2006) and Rutter, Moffitt, and Caspi (2006) present comprehensive summaries of age-dependent epigenetic and other gene-environment interactions for psychopathology including aggression. Nagin and Tremblay (1999) show that early aggression predicts adult levels of criminality and violence. Barker and his coauthors show the powerful influence of the mother's health, as determined by her lifetime experiences on child outcomes.

On average, the later remediation is given to a disadvantaged child, the less effective it is. A study by O'Connor, Rutter, Beckett, et al. (2000) and their coauthors examined adopted Romanian infants reared in severely deprived orphanage environments before their adoption. As noted in the text, the later an orphan was rescued from the social and emotional isolation of the orphanage, the lower was his or her later cognitive performance. Secondary school classroom remediation programs designed to combat early cognitive deficits have a poor track record.

At historically funded levels, public job training programs and adult literacy and educational programs, like the GED, that attempt to remediate years of educational and emotional neglect among disadvantaged individuals, have a low economic return and produce meager effects for most persons. Much evidence suggests that returns to adolescent education for the most disadvantaged and less able are lower than the returns for the more advantaged (Carneiro and Heckman, 2003; Carneiro, Heckman, and Vytlacil, 2006; Meghir and Palme, 2001).

The available evidence suggests that, for many skills and human capabilities, later intervention for disadvantage may be possible, but that it is much more costly than early remediation to achieve a given level of adult performance (Cunha and Heckman, 2006). Barker and coauthors document that if intervention is administered in the first year of birth after the fetal stage, compensation for undernutrition can produce *greater* risk for later diabetes and heart disease (Eriksson, Forsen, Tuomilehto et al., 2001).[31,32]

Sixth, *despite the low returns to interventions targeted toward disadvantaged adolescents, the empirical literature shows high economic returns for remedial investments in young disadvantaged children*. See Barnett (2004), the evidence in Cunha, Heckman, Lochner, and Masterov (2006) and the papers they cite. This finding is a consequence of dynamic complementarity and self-productivity captured by the technology described in the next section. The evidence for interventions in low birth weight children suggests that early intervention can be effective (Brooks-Gunn, Cunha, Duncan et al., 2006). Olds (2002) documents that perinatal interventions that reduce fetal exposure to alcohol and nicotine have substantial long-term effects on cognition, socioemotional skills and on health and have high economic returns.

Seventh, *if early investment in disadvantaged children is not followed up by later investment, its effect at later ages is lessened*. Investments at different stages of the life cycle are complementary and require follow-up to be effective (Cunha and Heckman, 2006; 2007b).

Eighth, *the effects of credit constraints on a child's adult outcomes depend on the age at which they bind for the child's family*. Recent research summarized in Carneiro and Heckman (2002; 2003); Cunha, Heckman, Lochner, and Masterov (2006) demonstrates the quantitative insignificance of family credit constraints in a child's college-going years in explaining a child's enrollment in college. Controlling for cognitive ability, under policies currently in place in American society, family income during a child's

31. Barker and coauthors only investigate compensation in the first year after birth.

32. To date, the health economics literature has not systematically studied the effectiveness of remediation for adverse early environments, although it evaluates the efficacy of treatments of diseases that may be influenced by adverse early environments.

college-going years plays only a minor role in determining socioeconomic differences in college participation, although much public policy is predicated on precisely the opposite point of view. As noted in the text, controlling for ability, minorities are *more likely* to attend college than others despite their lower family incomes (see Cameron and Heckman, 2001, and the references they cite). Augmenting family income or reducing college tuition at the stage of the life cycle when a child goes to college does not go far in compensating for low levels of early investment. It is the shortfall in adolescent abilities and motivations that account for minority college enrollment gaps. The gaps in health status by income evident in Figure A.1 likely diminish once early environmental factors are controlled for, but this remains to be rigorously established.

Credit constraints operating in the *early* years have lasting effects on adult ability and schooling outcomes (Dahl and Lochner, 2005; Duncan, Kalil, and Ziol-Guest, 2007; Duncan and Brooks-Gunn, 1997; Morris, Duncan, and Clark-Kauffman, 2005). Evidence on the persistent effects of early malnutrition *in utero* and in the early years on adult health is consistent with this evidence (Fogel, 1997; 2004; Gluckman and Hanson, 2005).

Ninth, *socioemotional (noncognitive) skills foster cognitive skills and are an important product of successful families and successful interventions in disadvantaged families. They also promote healthy behaviors*. Emotionally nurturing environments produce more capable learners. The Perry Preschool Program, which was evaluated by random assignment, did not boost participant adult IQ but enhanced the performance of participants on a number of dimensions, including scores on achievement tests, employment, and reduced participation in a variety of social pathologies. See Schweinhart, Montie, Xiang, et al. (2005) and the figures and tables on the Perry program posted at the website for Cunha and Heckman (2007b).

Perseverance and motivation are also important factors in explaining compliance with medical protocols. A large body of evidence suggests that a person's mood and attitudes as well as his social environment account, in part, for the ability of persons to ward off and overcome various diseases and to age gracefully (Ryff and Singer, 2005). The evidence that personality traits affect educational attainment (Heckman, Stixrud, and Urzua, 2006) helps to explain how education, as a proxy, helps reduce disease gradients by socioeconomic class, as reported by Smith (2007). Figure A.2 shows how greater cognitive and noncognitive skills reduce participation in smoking, a major health hazard (Heckman, Stixrud, and Urzua, 2006).

A Model of Investment in Human Capabilities

A model of capability formation unifies this evidence. Agents are assumed to possess a vector of capabilities at each age including pure cognitive abilities (e.g. IQ), noncognitive abilities (patience, self control, temperament, risk aversion, time preference), and health stocks. Health stocks include propensities for mortality and morbidity, including infant mortality. All capabilities are produced by investment, environment, and genes. These capabilities are used with different weights in different tasks in the labor market and in social life more generally.[33]

33. Cunha, Heckman, Lochner, and Masterov (2006) propose a model of comparative advantage in occupational choice to supplement their model of skill formation.

The capability formation process is governed by a multistage technology. Each stage corresponds to a period in the life cycle of a child. While the recent child development literature in economics recognizes stages of development (Cunha and Heckman, 2007b; Cunha, Heckman, Lochner, and Masterov, 2006), the early literature on the economics of child development and the current literature on the economics of health do not (Becker and Tomes, 1986; Grossman, 2000). In the developmental approach, inputs or investments at each stage produce outputs at the next stage. Qualitatively different inputs can be used at different stages and the technologies can be different at different stages of child development.

The investment model used by Grossman (1972; 2000) focuses on adult investments in health where time and its opportunity cost play important roles. For investments in childhood health, parents make decisions and child opportunity costs are less relevant (Cunha and Heckman, 2007b). The outputs at each stage in our technology are the changes in capability at that stage. Some stages of the technology may be more productive in producing some capabilities than other stages, and some inputs may be more productive at some stages than at other stages. The stages that are more effective in producing certain capabilities are called "sensitive periods" for the acquisition of those capabilities. If one stage alone is effective in producing a capability, it is called a "critical period" for that capability. See Cunha and Heckman (2007b).

The capabilities produced at one stage augment the capabilities attained at later stages. This effect is termed *self-productivity*. It embodies the ideas that capabilities are self-reinforcing and cross-fertilizing and that the effects of investment persist. For example, emotional security fosters child exploration and more vigorous learning of cognitive skills. This has been found in animal species (Cameron, 2004; Meaney, 2001; Suomi, 1999) and in humans (see Duncan, Dowsett, Claessens et al, 2007; Raver, Garner, and Smith-Donald, 2007), interpreting the ability of a child to pay attention as a socioemotional skill. A higher stock of cognitive skill in one period raises the stock of next period cognitive skills. Higher levels of self-regulation and conscientiousness reduce health risks and avoid accidents. Higher levels of health promote learning. A second key feature of capability formation is *dynamic complementarity*. Capabilities produced at one stage of the life cycle raise the productivity of investment at subsequent stages. In a multistage technology, complementarity implies that levels of investments in capabilities at different ages bolster each other. They are synergistic. Complementarity also implies that early investment should be followed up by later investment in order for the early investment to be productive. Together, dynamic complementarity and self-productivity produce multiplier effects which are the mechanisms through which capabilities beget capabilities. This dynamic process can account for the emergence of socioeconomic differentials in health documented by Smith (2007) and Case, Lubotsky, and Paxson (2002).

Dynamic complementarity and self-productivity imply an equity-efficiency trade-off for late child investments but not for early investments (Cunha and Heckman, 2007b). These features of the technology of capability formation have consequences for the design and evaluation of public policies toward families. In particular, they show why the returns to late childhood investment and remediation for young adolescents from disadvantaged backgrounds are so low for many investments, while the returns to early

investment in children from disadvantaged environments are so high.

Cunha and Heckman (2007b) and Carneiro, Cunha, and Heckman (2003) formalize these concepts in an overlapping generations model. There is evidence on intergenerational linkages in health, personality, and skill formation (Bowles, Gintis, and Osborne Groves, 2005; Carneiro, Cunha, and Heckman, 2003; Currie, 2006). Consider a household which consists of an adult parent and his/her child. Take parental stocks of skills as given. In a proper overlapping generations model, as developed in Carneiro, Cunha, and Heckman (2003) and the website for Cunha and Heckman (2007b), investment in parents is modeled, explaining the intergenerational transmission of health, personality, and cognition.

Altruistic parents invest in their children. Let I_t denote parental investments in child capabilities when the child is t years-old, where $t = 1, 2, \ldots, T$. The first stage can be *in utero* investment. The output of the investment process is a skill vector. The parent is assumed to fully control the investments in the skills of the child, whereas in reality, as a child matures, he gains control over the investment process.[34] Thus, children with greater emotional skills and conscientiousness are less likely to be involved in risky teenage activities (see Figure A.2 and the evidence in Heckman, Stixrud, and Urzua, 2006). These capabilities create a platform of adult capabilities and preferences which affect adult choices. Government inputs (e.g., publicly provided schooling) can be modeled as a component of I_t. It would be desirable to merge the model of parental investment with the model of adult investment, but that is beyond the scope of this Appendix.

At conception, the child receives genetic and environmental initial conditions θ_1. As documented by Gluckman and Hanson (2005) and Rutter (2006), gene expression is triggered by environmental conditions. Let h denote parental capabilities (e.g., IQ, genes, education, income, etc.). These are products of their own parents' investments and genes. At each stage t, let θ_t denote the vector of capabilities. The technology of capability production when the child is t years old is

$$\theta_{t+1} = f_t(h, \theta_t, I_t), \tag{1}$$

for $t = 1, 2, \ldots, T$.[35] More investment produces more capability $\left(\frac{\partial f_t(h, \theta_t, I_t)}{\partial I_t} > 0\right)$.

Substituting in (1) for θ_t, $\theta_{t-1}, \ldots$, repeatedly, one can rewrite the stock of capabilities at stage $t + 1$, θ_{t+1}, as a function of all past investments:

$$\theta_{t+1} = m_t(h, \theta_1, I_1, \ldots, I_t), t = 1, \ldots, T. \tag{2}$$

Dynamic complementarity arises when $\partial^2 f_t(h, \theta_t, I_t)/\partial\theta_t \partial I_t > 0$, i.e., when stocks of capabilities acquired by period t 1 (θ_t) make investment in period t (I_t) more productive. Such complementarity explains why returns to educational investments are higher at later stages of the child's life cycle for more able, more healthy, and more motivated children (those with higher θ_t). Students with greater early capabilities (cognitive, noncognitive, and health) are more efficient in later learning of both cognitive and noncognitive skills and in acquiring stocks of health capital. The evidence from the early intervention literature suggests that the enriched early preschool environments provided by the Abecedarian, Perry and CPC interventions promote greater efficiency in learning in school and reduce problem behaviors (Blau and Currie, 2006; Cunha, Heckman, Lochner, and Masterov, 2006). Enriched early environments produce healthier babies (Bhargava, 2008; Gluckman and Hanson, 2005).

Self-productivity arises when $\partial f_t(h, \theta_t, I_t)/\partial\theta_t > 0$, i.e., when higher levels of capabilities in one period create higher levels of capabilities in the next period. For capability vectors, this includes own and cross effects. The joint effects of self-productivity and dynamic complementarity help to explain the high productivity of investment in disadvantaged young children but the lower return to investment in disadvantaged adolescent children for whom the stock of capabilities is low and hence the complementarity effect is lower.

This technology explains the evidence that the ability of the child to pay attention affects subsequent academic achievement. Healthier children are better learners (Currie, 2006). This technology also captures the critical and sensitive periods in humans and animals documented for a number of aspects of development (Knudsen, Heckman, Cameron, and Shonkoff, 2006).

Suppose for analytical simplicity that there are two stages of childhood, ($T = 2$). In reality, there are many stages in childhood, including preconception and *in utero* stages. Assume for expositional simplicity that θ_1, I_1, I_2 are scalars.[36] The adult stock of capability, h' ($= \theta_3$), is a function of parental characteristics, initial conditions and investments during childhood I_1 and I_2:

$$h' = m_2(h, \theta_1, I_1, I_2). \tag{3}$$

The conventional literature in economics (Becker and Tomes, 1986) assumes only one period of childhood when it addresses childhood at all. It does not distinguish between early investment and late investment. A general technology that captures a variety of interesting special cases of (3) is a CES production function

$$h' = m_2(h, \theta_1, [\gamma(I_1)^{\phi} + (1-\gamma)(I_2)^{\phi}]^{1/\phi}) \tag{4}$$

for $\phi \leq 1$ and $0 \leq \gamma \leq 1$, where ϕ is a measure of how well late inputs substitute for early inputs. $1/(1 \quad \phi)$ is called an elasticity of substitution. When $\phi = 1$, I_1 and I_2 are perfect substitutes. When $\phi = \quad \infty$, I_1 and I_2 are perfect complements. The parameter ϕ governs how easy it is to compensate for low levels of stage 1 investment in producing later adult capability. See the analysis of this model in Cunha and Heckman (2007b); Cunha, Heckman, Lochner, and Masterov (2006). The two polar cases of perfect substitutes and perfect complements are worth exploring in greater detail.

Case 1

Assume $\phi = 1$:

$$h = \gamma I_1 + (1-\gamma) I_2.$$

34. A sketch of such a model is discussed in Carneiro, Cunha, and Heckman (2003).

35. For analytical convenience, f_t is assumed to be strictly increasing in I_t. I further assume strict concavity in I_t and twice continuous differentiability in all of its arguments.

36. Cunha, Heckman, Lochner, and Masterov (2006) analyze the vector case. See also the supporting material on the website for Cunha and Heckman (2007b).

This extreme case states that remediation is always possible. However, it may not be cost effective. This technology is at odds with the evidence from neuroscience, developmental psychology, and economics, summarized in the first section of this Appendix. The polar opposite case is discussed next.

Case 2

Assume $\phi \to -\infty$:

$$h = \min\{I_1, I_2\}.$$

In this case, if investments in period one are very low, no remediation is possible. Adult human capital (and consequently adult success) is defined in the first period of the life of an individual.

More generally, when ϕ is small, low levels of early investment I_1 are not easily remediated by later investment I_2. The other face of CES complementarity is that when ϕ is small, high early investment should be followed with high late investment if the early investment is to be harvested. In the extreme case when $\phi \to -\infty$, (4) converges to a model of perfect complements. This technology explains why returns to education are low in the adolescent years for disadvantaged (low h, low I_1, low θ_2) adolescents but are high in the early years. Without the proper foundation for learning (high levels of θ_2) in technology (1), adolescent interventions have low returns. Bad initial conditions that create physical and mental impairments produce persistently less healthy adults (Barker, 1998; Eriksson, Forsen, Tuomilehto, Osmond, and Barker, 2001; Gluckman and Hanson, 2005).

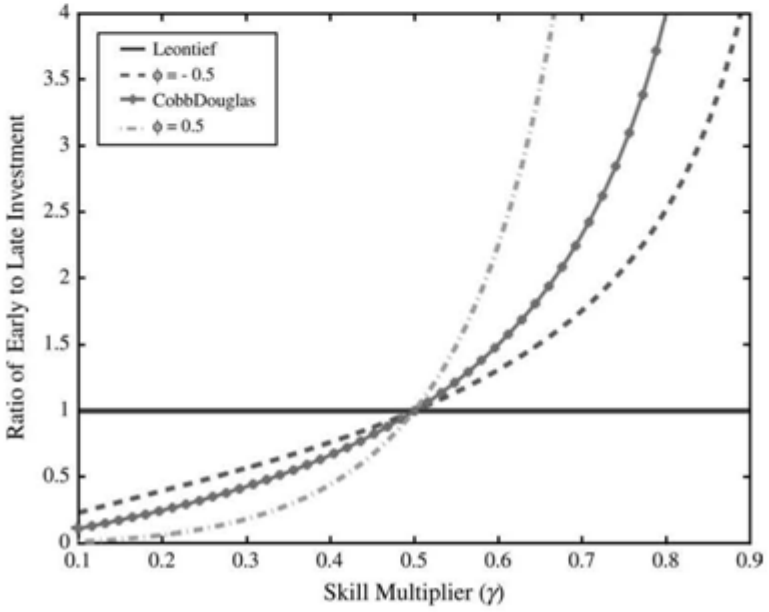
The CES share parameter γ is a *capability multiplier*. It captures the productivity of early investment not only in directly boosting h' (through self-productivity) but also in raising the productivity of I_2 by increasing θ_2 through first-period investments. Thus I_1 directly increases θ_2 which in turn affects the productivity of I_2 in forming h'. γ captures the net effect of I_1 on h' through both self-productivity and direct complementarity. In a multiperiod model, the multiplier could vary across stages. The capability multiplier helps to explain why capabilities foster capabilities.

The Optimal Lifecycle Profile of Capability Investments

Using technology (4), Cunha and Heckman (2007b) determine how the ratio of early to late investments varies as a function of ϕ and γ as a consequence of parental choices under different market arrangements concerning lending and borrowing. It is fruitful to review their analysis of the case without binding credit constraints.

When $\phi = 1$, so early and late investment are perfect CES substitutes, it is always possible to remediate early disadvantage. However, it is not always economically feasible to do so. Assume that the price of early investment is \$1/(1 + r), where r is the interest rate and 1/(1 + r) is a discount factor. The amount

FIGURE A.3
Ratio of Early to Late Investment in Human Capital as a Function of the Skill Multiplier for Different Values of Complementarity



Note: Assumes $r = 0$. Source: Cunha, Heckman, Lochner et al. (2006).

of human capital (including health capital) produced from one unit of I_1 is γ, while $\$(1+r)$ of I_2 produces $(1+r)(1-\gamma)$ units of human capital. Two forces act in opposite directions. High productivity of initial investment (as captured by the skill multiplier γ) drives the parent toward making early investments. The interest rate drives the parent to invest late. It is optimal to invest early if

$$\gamma > (1-\gamma)(1+r).$$

Epidemiologists are prone to neglect the costs of remediation when they demonstrate its possibilities.

As $\phi \to -\infty$, the optimal investment strategy sets $I_1 = I_2$. In this case, investment in the young is essential. However, later investment is needed to harvest early investment. On efficiency grounds, early disadvantages should be perpetuated, and compensatory investments at later ages are economically inefficient. In the general case where $\infty < \phi < 1$, the optimal ratio of early to late investment is

$$\frac{I_1}{I_2} = \left[\frac{\gamma}{(1-\gamma)(1+\gamma)}\right]^{\frac{1}{1-\phi}}. \tag{5}$$

Figure A.3 plots the ratio of early to late investment as a function of the skill multiplier γ under different values of the complementarity parameter ϕ, assuming $r = 0$.

When CES complementarity is high, the skill multiplier γ plays a limited role in shaping the optimal ratio of early to late investment. High early investment should be followed by high late investment. As the degree of CES complementarity decreases, the role of the capability multiplier increases, and the higher the multiplier, the more investment should be concentrated in the early ages. Cunha and Heckman (2007b) analyze the effects of alternative credit market arrangements on optimal investment.

Cognitive, Noncognitive and Health Formation

This framework readily accommodates capability vectors. Child development is not just about cognitive skill formation although a lot of public policy analysis focuses solely on cognitive test scores to the exclusion of physical health and personality factors. Let θ_t denote the vector of capabilities, i.e., cognitive skills, noncognitive skills, and health capabilities: $\theta_t = (\theta_t^C, \theta_t^N, \theta_t^H)$. Let I_t denote the vector of investment in cognitive, noncognitive, and health capabilities: $I_t = (I_t^C, I_t^N, I_t^H)$. Use $h = (h^C, h^N, h^H)$ to denote parental cognitive, noncognitive, and health capabilities. At each stage t, one can define a recursive technology for cognitive skills $(k = C)$, noncognitive skills, $(k = N)$, and health $(k = H)$:

$$\theta_{t+1}^k = f_t^k(\theta_t^C, \theta_t^N, \theta_t^H, I_t^k, h^C, h^N, h^H), k \in \{C, N, H\}. \tag{6}$$

Technology (6) allows for cross-productivity effects: cognitive skills may affect the accumulation of noncognitive skills and vice versa. Health capabilities facilitate the accumulation of cognitive and noncognitive skills. These technologies also allow for critical and sensitive periods to differ across different capability investments. Cognitive and noncognitive skills and health capabilities determine costs of effort, time preference, and risk aversion parameters. By investment choices, parents shape preferences that govern the choices of children in a variety of dimensions.

Accounting for preference formation explains the success of many early childhood programs targeted to disadvantaged children which do not permanently raise IQ, but which permanently boost social performance.[37] Conscientiousness, farsightedness, and persistence, as well as other personality features, affect participation in risky activities, including smoking (Borghans, Duckworth, Heckman, and ter Weel, 2008; Heckman, Stixrud, and Urzua, 2006).

Estimating the Technology: Accounting for the Proxy Nature of Inputs and Outputs

Cunha and Heckman (2008a) and Cunha, Heckman, and Schennach (2007) estimate versions of technology (6) and show that many of the proxies for investment and outcomes that are used in the child development and health literatures are only crude proxies for the true variables they proxy. Systematically accounting for measurement error greatly affects estimates of technologies of skill formation and other behavioral relationships. Smoking is an error-laden proxy for noncognitive skill (Heckman, Stixrud, and Urzua, 2006). Many papers in health economics rely on smoking (and other behaviors) as proxies for time preference (see the survey in Grossman, 2000). The empirical literature on child development suggests that accounting for the proxy nature of smoking and adjusting for measurement error will improve the explanatory power and interpretability of the estimates of time preference on health choices.

Summary of the Appendix

Simple economic models show the importance of accounting for early and late investments and for examining the technological possibilities and economic costs of late remediation for early environmental influence. Frameworks that account for the proxy nature of the measurements of inputs and outputs hold much promise, both in health economics and in the economics of child development.

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Early Years Research and Policy Issues

Prof. Edward Melhuish
(Birkbeck College, University of London, U.K.)



Edward C. Melhuish

Edward C. Melhuish is a professor of Human Development at Birkbeck, University of London. He is one of the world's leading scholars in the field of early child education and care. Since January 2001 he has been the executive director of the National Evaluation of Sure Start for infants of low-income UK families in advisory bodies under the British Prime Minister. In addition, he has acted as advisor of early childhood education area under the OECD and child education and child rights area under the UN in overseas. He is also a very excellent researcher in related research fields and is an internationally renowned scholar.

His research interests are in understanding cognitive, social and communicative development in childhood particularly environmental influences through the use of longitudinal studies. Other interests include pre-school care and education; parenting; and the linking of child development and social policy.

Recent major research subjects of Edward Melhuish are early childhood care policy impact on the overall child development and family. He has performed studies on longitudinal effects of qualitative national early intervention program. In addition, he has conducted international collaborative research with OECD countries such as the U.S and Sweden.

Professor Melhuish has been a referee for many academic journals such as Journal of Child Psychology and Psychiatry, Child Development. In addition, he has served as an editor in several journals which are listed in SSCI and internationally renowned in the field of social science.

Moreover, he was invited to Korea twice in 2007 and 2008 by Korea Department of Health and Human Service. He has given several invited keynote speaker on related-research and policy in Korea. he has a lot of interests about the child education in Korea.

Professor Melhuish was invited an International Scholar at the Department of Child and Family Studies in Kyunghee University. He has performed international collaborative research involved in related-organization of child care and parenting in the UK and Korea.

Early Years Research and Policy Issues

Edward Melhuish
University of London

Social & economic context

By 2050 the EU working population will decrease by 50million while the elderly will grow by 50%. Similar situations in most industrialized countries. Economic sustainability will require maximizing the capacity of the workforce. The skills for good outcomes are rising and changing, And there is still great inequality of opportunity. Both cognitive and non-cognitive skills are critical. How can these be improved for the population?

Why should we focus on the early years? One reason is the accumulation of evidence that indicates that child experience in the early years has profound consequences for later life. There are now many studies that present a consistent picture indicating that adversity in early life, such as frequently accompanies child poverty, is linked to: poor adult mental and physical health, adult mortality, anti-social and criminal behaviour, substance abuse and poor literacy and academic achievement.

To quote two well known social scientists

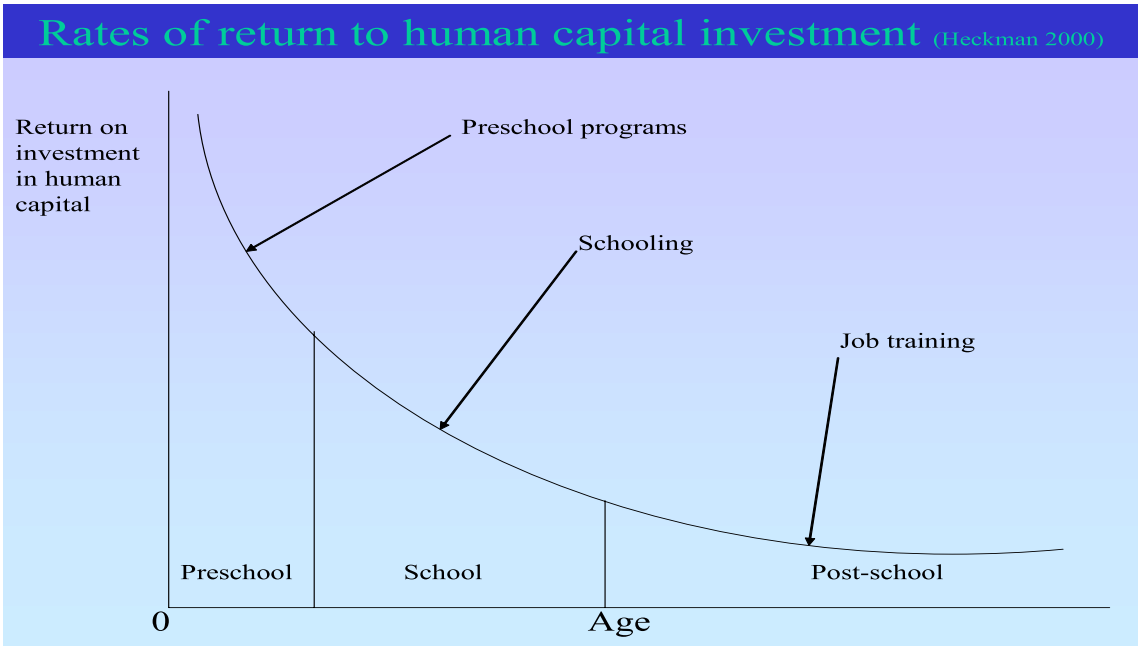
Esping-Anderson (2004)

"If the race is already halfway run even before children begin school, then we clearly need to examine what happens in the earliest years."

And the Nobel prize winning economist James Heckman (Heckman and Wax, 2004)

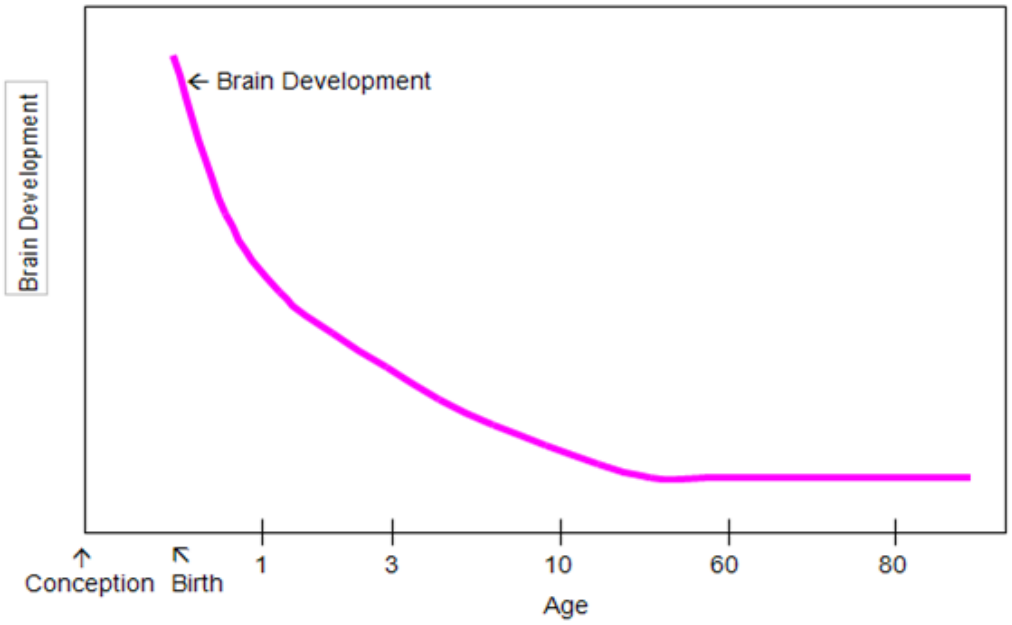
"Like it or not, the most important mental and behavioural patterns, once established, are difficult to change once children enter school."

Heckman has analysed data from many different studies and produced a graph showing the relationship between investment and the return to investment for interventions at different stages of the life cycle, and clearly interventions in the early years are the most cost-effective. Heckman has analysed data from many different studies and produced a group showing the relationship between investment and the return to investment for different stages of the life cycle.

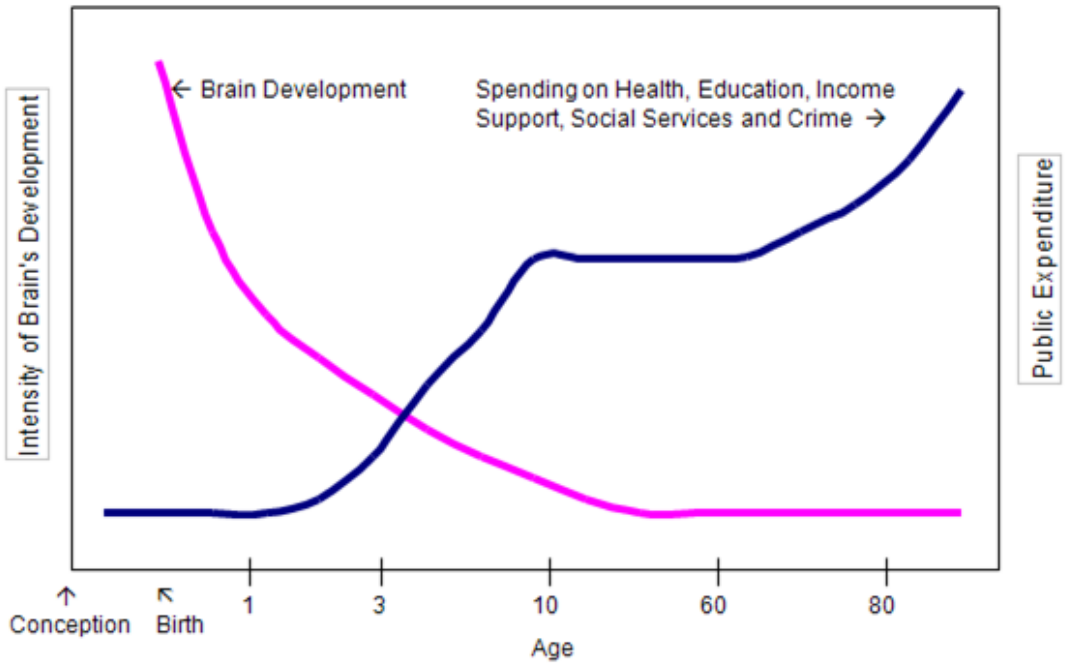


The graph clearly shows that the return on investment is much higher in the preschool years than in the school years, which is higher than for the post-school years; ie investment in the early years makes sound economic sense.

There is reason why Heckman's graph is the shape it is. If we look at the rate of brain development this is what we see



The rate of brain development is higher the younger the child and falls off rapidly with age. However if we now insert how most countries have traditionally invested in different stages of the life cycle this is what we see



Clearly the traditional patterns of spending are exactly the opposite than that making most sense from what we know about brain development. This clearly indicates a need to change social policy to increase investment in the early years.

There is a wealth of data from life course studies linking adversity in early life to:

- poor literacy and educational attainment
- anti-social and criminal behaviour
- substance abuse
- poor mental and physical health
- adult mortality

In Early Years research there are 2 major strategies
1. Intervention with disadvantaged groups
2. For general population

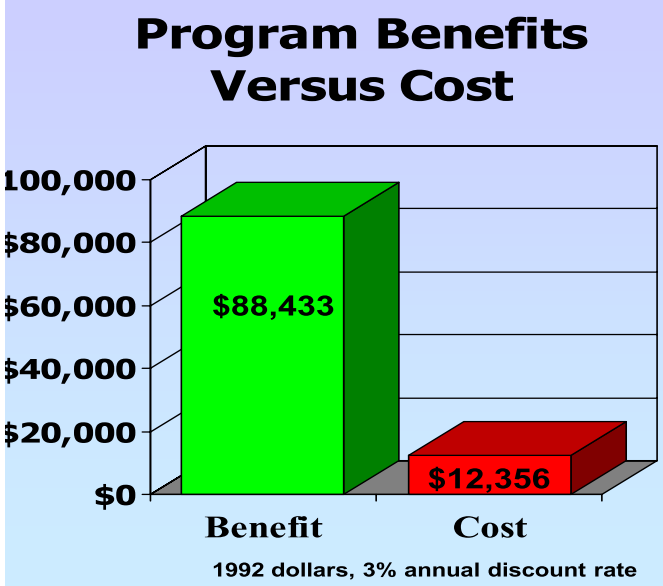
The intervention strategy can be illustrated by this quote from a UK politician
"If people keep falling off a cliff, don't worry about where you put the ambulance at the bottom. Build a fence at the top and stop them falling off in the first place."

In considering the evidence there are a number of studies that indicate intervention in the early years would have definite benefits. For example the Perry Preschool Project, the Abecedarian Project, the Chicago Child-Parent Centers have shown the possible benefits of high quality preschool education years for disadvantaged African-American children, and that the value of the benefits are far greater than the cost of preschool. These American studies clearly demonstrate benefits of Early Childhood Education and Care (ECEC) for disadvantaged children. Also they indicate that it can make good economic sense for society. However they do not tell us about the value of ECEC for the general population. In The UK Sure Start has shown the possible benefits of an integrated approach to early years services for disadvantaged children.

Perry Preschool Study
(Schweinhart, Barnes & Weikart, 1993)

- 123 young African-American children, living in extreme poverty and at risk of school failure
- Randomly assigned at ages 3 and 4 to program and no-program groups
- Daily High/Scope classes with planned learning activities and weekly home visits to families

Return on investment



Return on th
dollar
invested
$7.16

When they were 40+years the cost-benefit ratio was 15:1.

Abecedarian Project

111 African-American disadvantaged children randomly assigned at age 3 months to:

- High quality centre-based provision

  (day-care and preschool)

- Control group:

  - Both groups followed into adulthood

Abecedarian Project

Results up to age 21 years

- Intervention group showed

- Higher cognitive development from 18 months on
- Greater social competence in preschool
- Better school achievement
- More college attendance
- Delayed child bearing
- Better employment
- Less smoking and drug use
- **Cost – benefit - Savings 2.5 times costs**

Reynolds, A.J. (2011) – Chicago-Parent Centers

• Disadvantaged children who start preschool at age 3 or 4 years had consistent benefits in later life compared to children starting preschool at a later age.

• Male children especially benefit in later life from preschool as do children of high school dropouts.

• Children starting preschool earlier have at age 28

•higher rates of educational status,

•higher income and

•lower rates of substance abuse.

UK, Sure Start

UK government influenced by early years research set up Sure Start

- Targeted - 20% most disadvantaged areas
- 0-5 year olds
- Universal in area - All families in area served
- Locally controlled

1

Changes to Sure Start as a result of evidence

1. Early findings - Sure Start having mixed effects

2. EPPE showed that integrated Children's Centres were particularly effective:

ACTION: the government decided to transform Sure Start Programmes into Children's Centres.

From 2006 all became Children's Centres:
With a more clearly specified set of services and guidelines.

What happened next, 2008

3 year olds

- **5 outcomes indicated beneficial effects for SSLPs.**
  - child positive social behaviour (cooperation, sharing, empathy)
  - Child self-regulation (perseverance, self-control)
  - Parenting Risk Index (observer rating + parent-report)
  - home learning environment
  - total service use
- **In addition there were better results in SSLPs for:**
  - child immunisations
  - child accidents

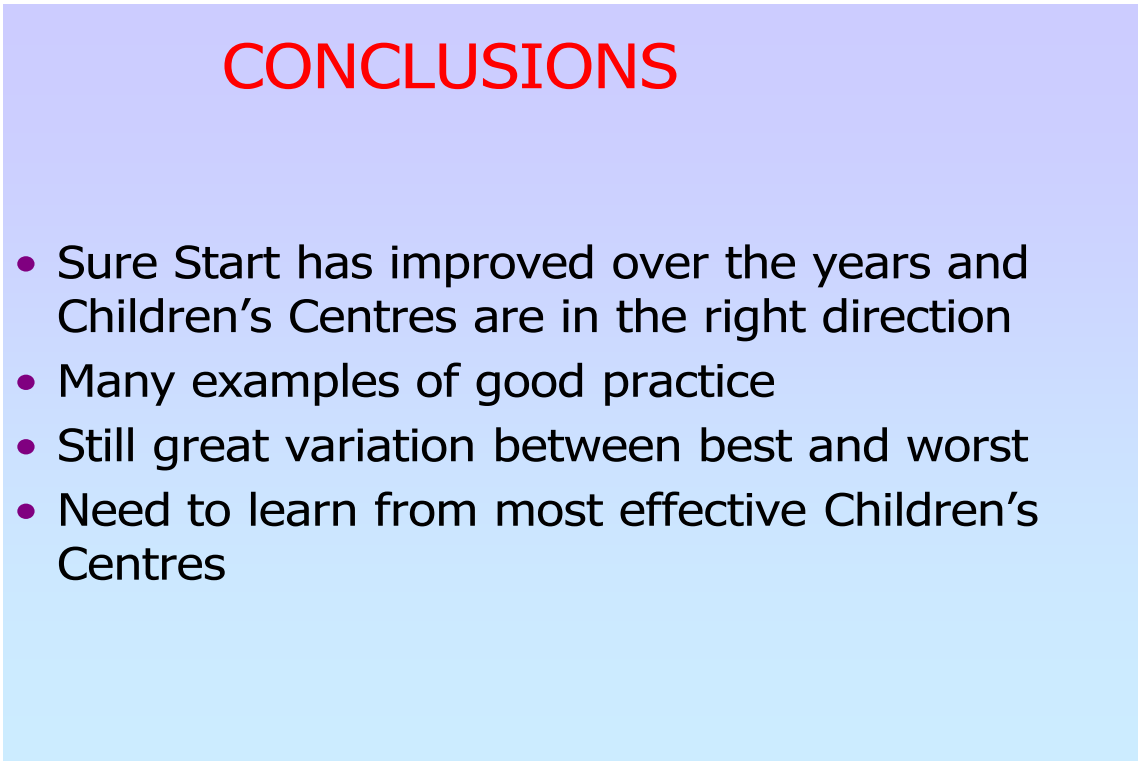
But these 2 outcomes might be influenced by timing effects

Impact of Sure Start when children are 5 years old

Mothers in Sure Start areas reported:
- greater life satisfaction,
- less harsh discipline
- a less chaotic home and a
- more stimulating home learning environment (HLE)
- *but more depressive symptoms*

Children had:
- Lower BMIs – less overweight
- Better general health

Families had:
- a greater decrease in workless status from ***9 months to 5 years*** of age



General Population Studies

So far we have talked about disadvantaged populations. What about the general population?

There has been much other research on ECEC and child development. A review of this research has been provided online by Melhuish (2004). In making conclusions from the evidence on ECEC, we need to distinguish between results for 0-3 years where the evidence is mixed with some studies indicating benefits of early childcare, some indicating negative effects and some studies indicating no effects at all. Whereas for children over 3 years the evidence of benefits for children is very clear and there are almost universal benefits for children associated with the various forms of group-based ECEC (*e.g.* playgroups, day care centres, nursery schools) attended by children from 3 years upwards. Also the benefits increase the greater the quality of ECEC (*i.e.* how well the centres serve children's developmental needs). The discrepant results for studies of ECEC for children 0-3 years probably reflects different effects for different populations, different ages, different types of children as well as differing qualities of childcare for differing settings and differing populations.

Non-intervention studies – General population

NICHD Study of Early Child Care in USA

Effective Preschool & Primary Education – EPPE
3000 children followed from age 3 in England

Effective Preschool Provision in Northern Ireland - EPPNI

NICHD Study of Early Child Care in USA

Early Child Care has Benefits and Risks

- **Higher quality child care linked to**
  - ➢better pre-academic skills
  - ➢better language skills
- **Experience in child care centres linked to**
  - ➢better language skills
  - ➢more problem behaviors
- **More hours in child care centres linked to**
  - ➢more problem behaviors—aggression, disobedience

EPPE and EPPNI projects

The EPPNI and EPPE projects are the first large-scale longitudinal studies in Europe to investigate the effects of different kinds of preschool provision for the general population, and to relate experience in preschool centres to child development. These projects are summarised below.

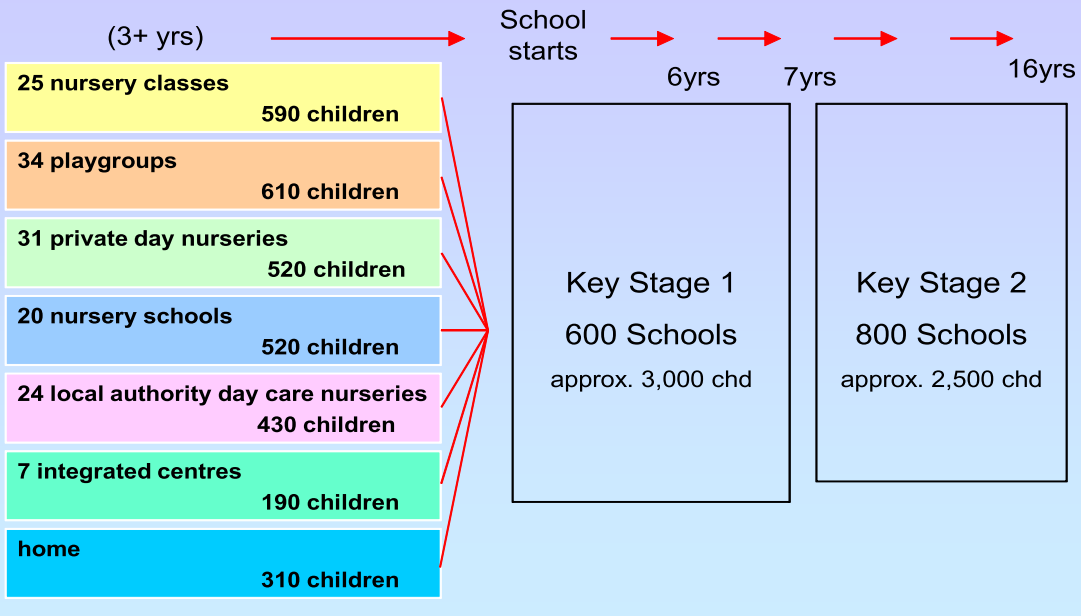
Effective Preschool and Primary Education (EPPE) - England

Effective Pre-School and Primary Education
EPPE



Kathy Sylva – University of Oxford
Pam Sammons – University of Oxford
Iram Siraj- Blatchford – Institute of Education, University of London
Brenda Taggart – Institute of Education, University of London
Edward Melhuish – Birkbeck, University of London

EPPE STUDY



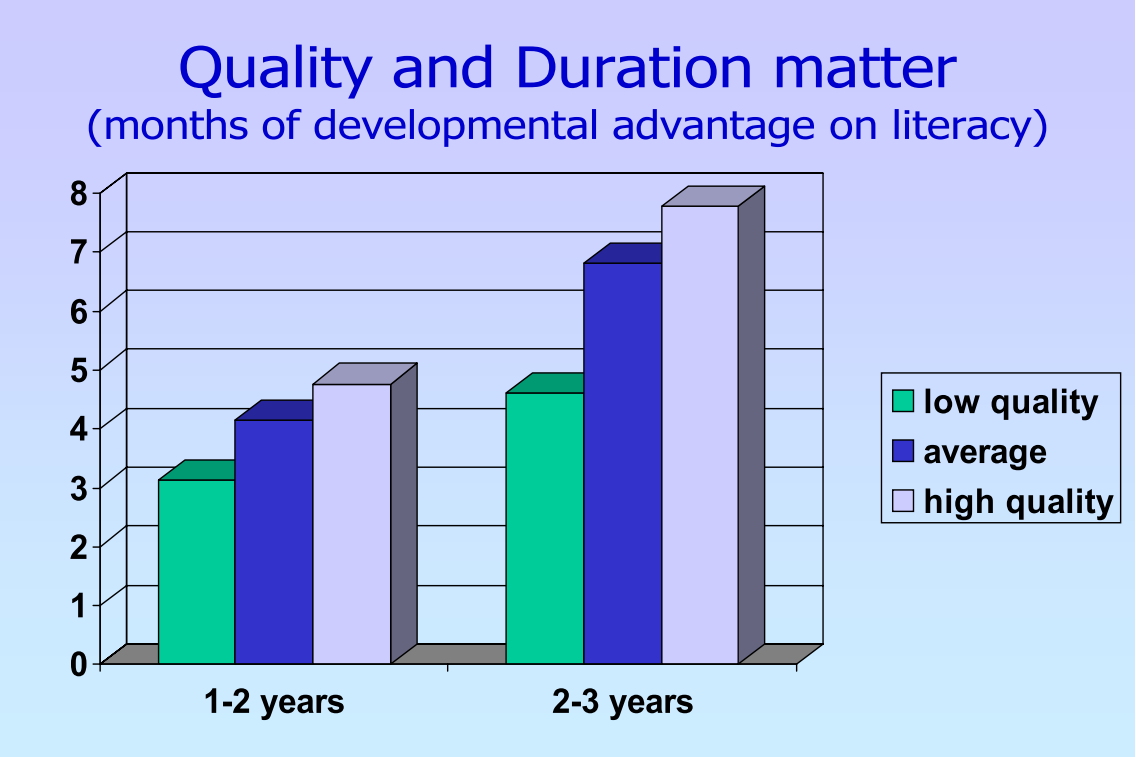
The EPPE Project has addressed the question of the longer-term impact of preschool provision. Preschool provision includes group-based provision such as playgroups, day care centres, nursery classes, nursery schools, and integrated children's centres. This longitudinal study of 3000 children has also the effects of various child, family and home characteristics upon child development.

Children whose first language was not English, who had low birth weight, or who had 3 or more siblings, and boys, all did worse on cognitive development. Parent education and social class were also important influences upon child development and children from poor families did worse.

After allowing for all the effects of background factors the question remained:

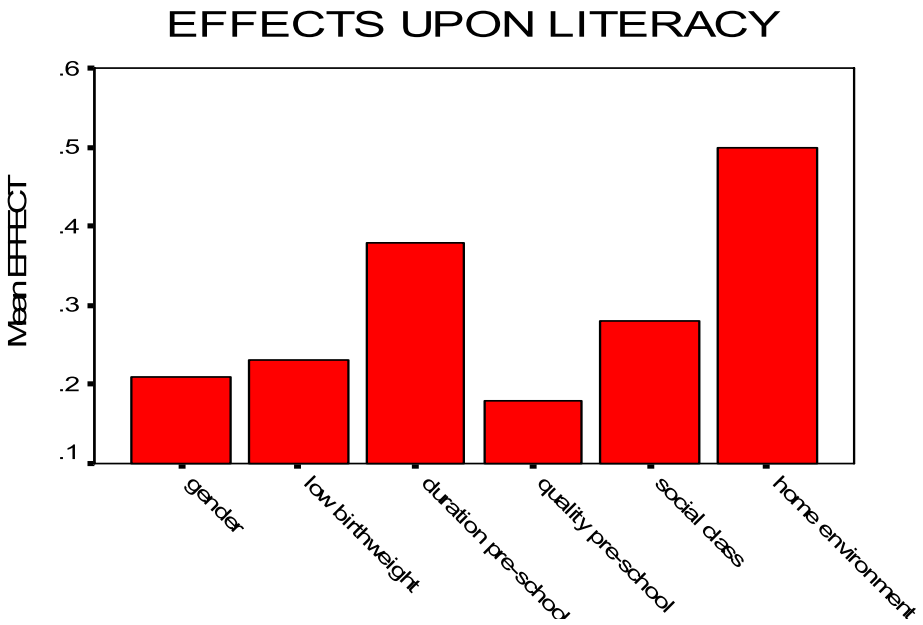
Does attending a preschool centre matter?

On measures of language, literacy and numeracy the preschool group did better. average the benefit of preschool was 0.2 of a standard deviation above that of the no-preschool group. As well as measuring the effect of preschool overall, we had extensive data on the quality of the preschool environments from direct observation and also of the amount of time that the child had attended preschool.



We found that both quality and duration of preschool were important. Where children had been to preschool for a longer duration e.g. 2 rather than 1 year, benefits were greater. Also for any period of preschool, 1, 2 or 3 years, the effects for high quality preschool were greater than average quality, which were greater than for low quality preschool. The benefits of preschool were also evident for social development, and the quality and duration of preschool also affected children's social development.

Effects of child, home, and pre-school compared



The strongest effect of all was for the Home Leaning Environment. Where the child had more frequent opportunities for learning activities in the home, the child did better on all aspects of child development. These effects were after taking account of all other child parent and home characteristics. We summarise these findings by the saying

"What parents do is more important than who parents are".

This reflects the fact that the Home Learning Environment had a more powerful effect upon child development than parents" education or social class.

Home Learning Environment

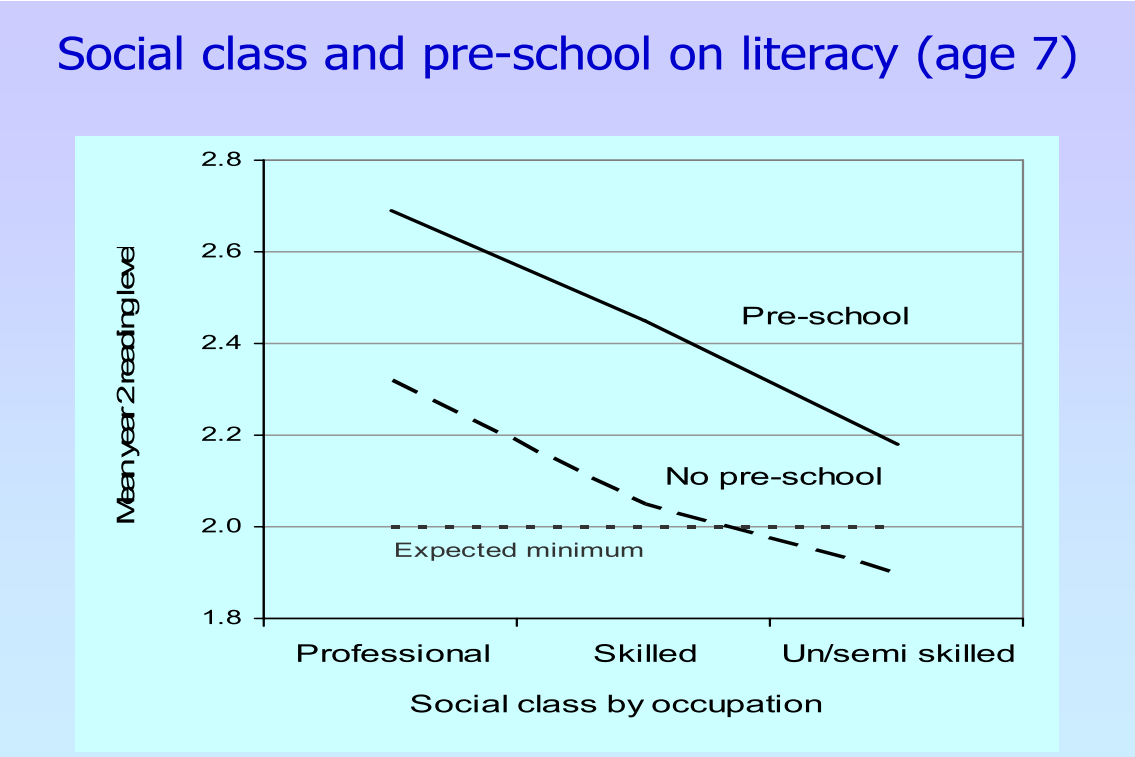
Parents were asked about learning and play activities in the home. An index of the home learning environment (HLE) was constructed. There were seven types of home learning activities. These were:

- Reading
- Painting and drawing
- Playing/ teaching with numbers /shapes
- Library visits
- Playing/ teaching the alphabet or letters
- Playing with letters or numbers
- Playing/teaching of songs/ nursery rhymes

Each activity was rated on a scale 0–7 where 0 is not occurring and 7 is occurring very frequently. These ratings were then combined to form the Home Learning Environment index (HLE) (Melhuish et.al. (2001).

Preschool effects for primary school attainment

After children had been at school for 2 years we collected more information on their development. The benefits of preschool were still apparent and also the benefits of better quality preschool and longer duration of preschool. After 3 years of school all children in England take National Assessments in reading, mathematics and science. We used these data to see if the effects of preschool persisted.



For all social class groups the effect of preschool was clear, and similar for all groups. However there is a minimum level of attainment that is expected of all children. While all social class groups who received preschool education were, on average, above the minimum level, for the disadvantaged group (unskilled or unemployed) children scored, on average, **below the expected minimum** if they had not had preschool education. This indicates that the consequences of not having preschool are particularly important for disadvantaged children.

The EPPE study was able to identify the most effective preschools that produced the most developmental benefit for children. We undertook case studies of the most effective and average preschools to investigate what processes were associated with particularly effective preschools. In these case studies the researchers did not know which preschools had been identified from the quantitative analyses as effective or ineffective. These case studies identified 5 areas that were particularly important.

1. Quality of adult-child verbal interaction.
2. Staff knowledge and understanding of the curriculum.
3. Staff knowledge of how children learn.
4. Adult skills in helping children resolve conflicts.
5. Helping parents to support children learning at home.

In order to continue to investigate children's development we thought that it was important to be

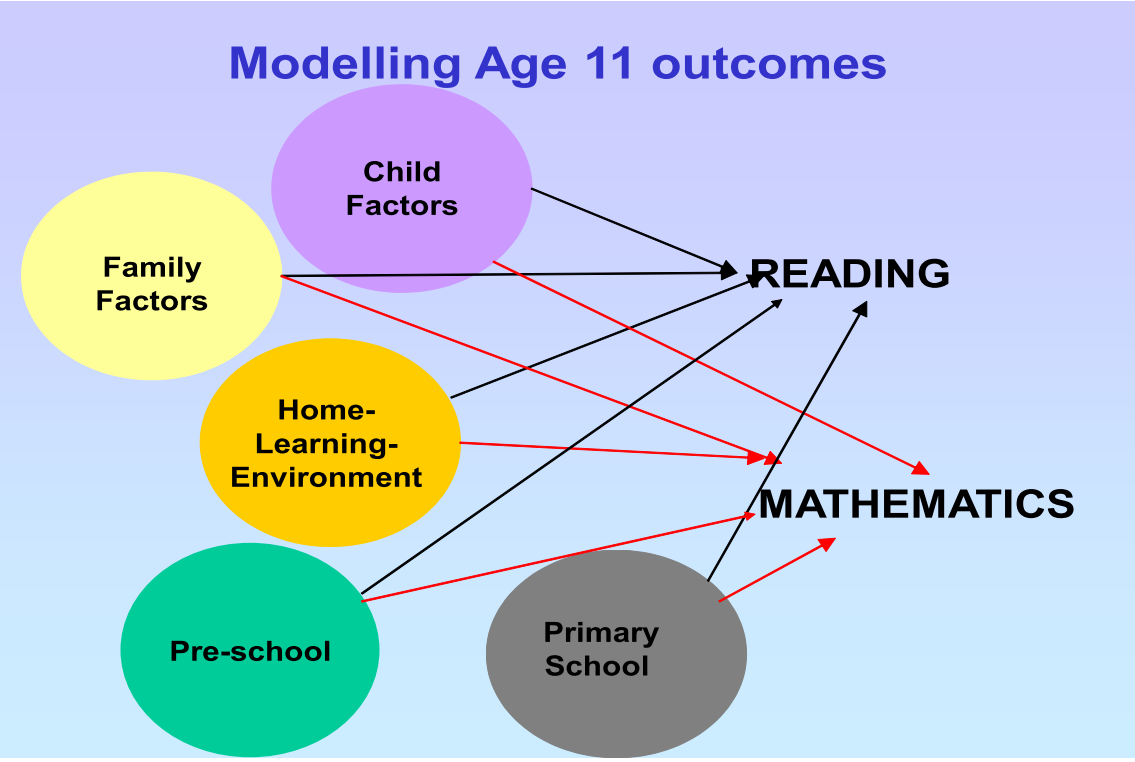
able to take account of the effects of the primary school upon the children in the study. Therefore we devised a way to measure the effectiveness of primary schools.

In England all children take a National Assessment in reading, mathematics and science at age 7 and age 11. This data existed for over 600,000 children a year in over 15,000 primary schools.

We were able to analyse child progress from age 7 to age 11 in literacy, mathematics and science as a function of child characteristics and the area characteristics of where the child lived. Using this multi-level analysis we were able to measure the effectiveness of each primary school in England, for 3 successive years.

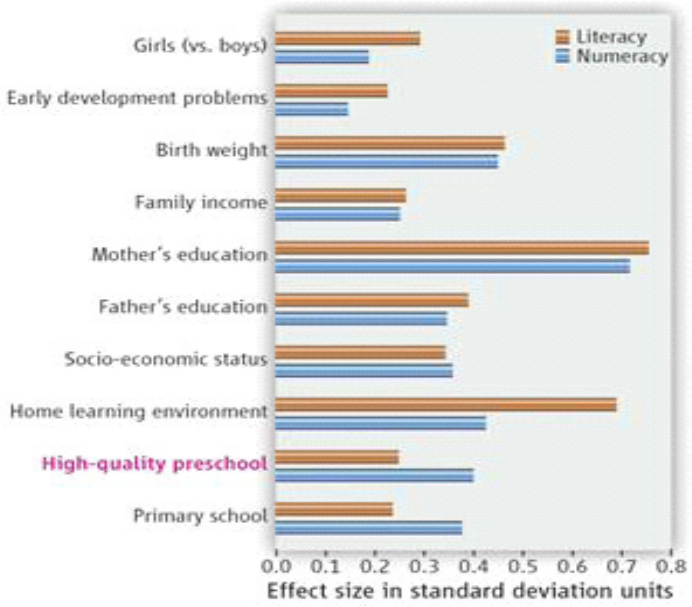
We had schools where children did better than expected, - effective schools and schools where children did worse than expected – ineffective schools. Also the effectiveness of a school could be analysed for children of different levels of ability. We found that being in an effective school had a bigger influence on low ability pupils than for high ability pupils.

Once we had these measures of school effectiveness we could analyse children's development in terms of child, family, home learning environment, preschool and school factors.



We estimated the contribution of a range of demographic factors and preschool and school factors to children's educational attainment and social development. Social class, mother's education, family income and the Home Learning Environment (measured at age 3-4) are powerful influences upon child attainment. However preschool effectiveness and primary school effectiveness are important influences and are similar in their importance and account for about half as much variance as home factors. Similar results emerge for literacy and numeracy. However the home-related factors are stronger for literacy than for numeracy, and the preschool and school factors are stronger for numeracy than for literacy.

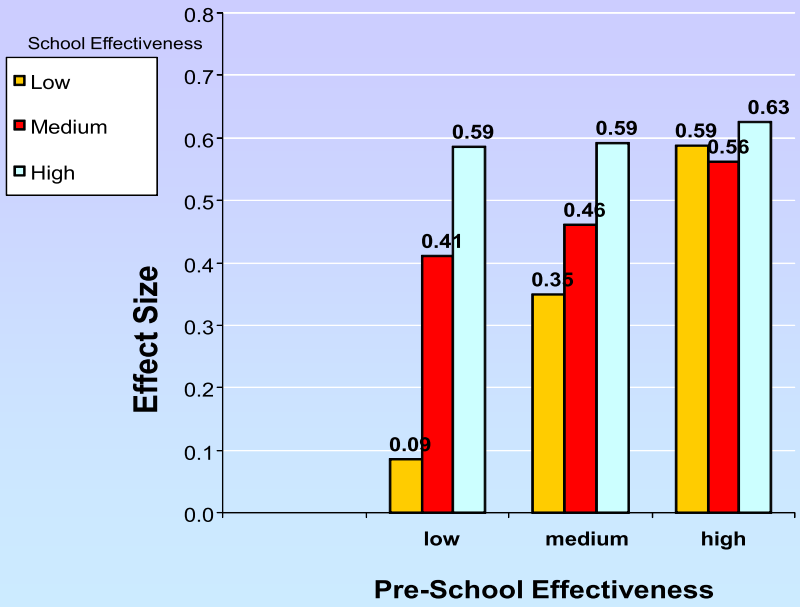
Effects upon Age 11 literacy and numeracy



The effects of 18 months of preschool are similar in size to 6 years of primary school.

There also appear to be interactions between the effects of some of these predictor variables. For example preschool and primary school effects appear to interact. We analysed the effects of different combinations of preschool and school.

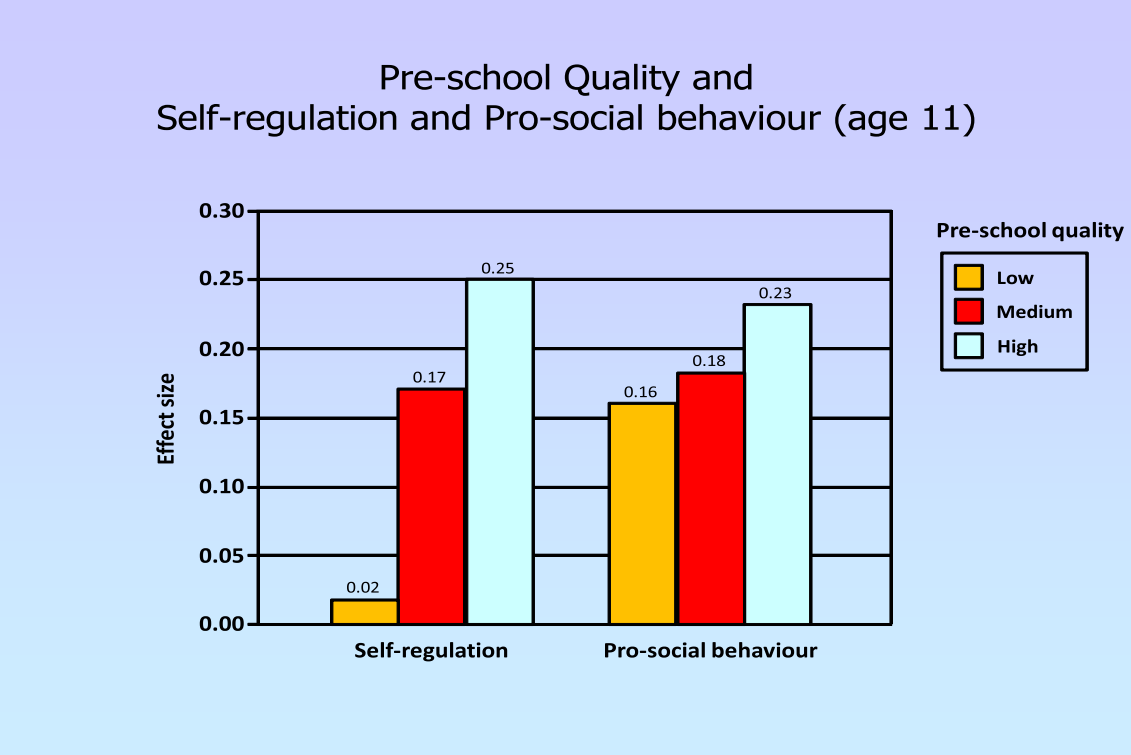
Combined Impact of Pre- and Primary School - Maths



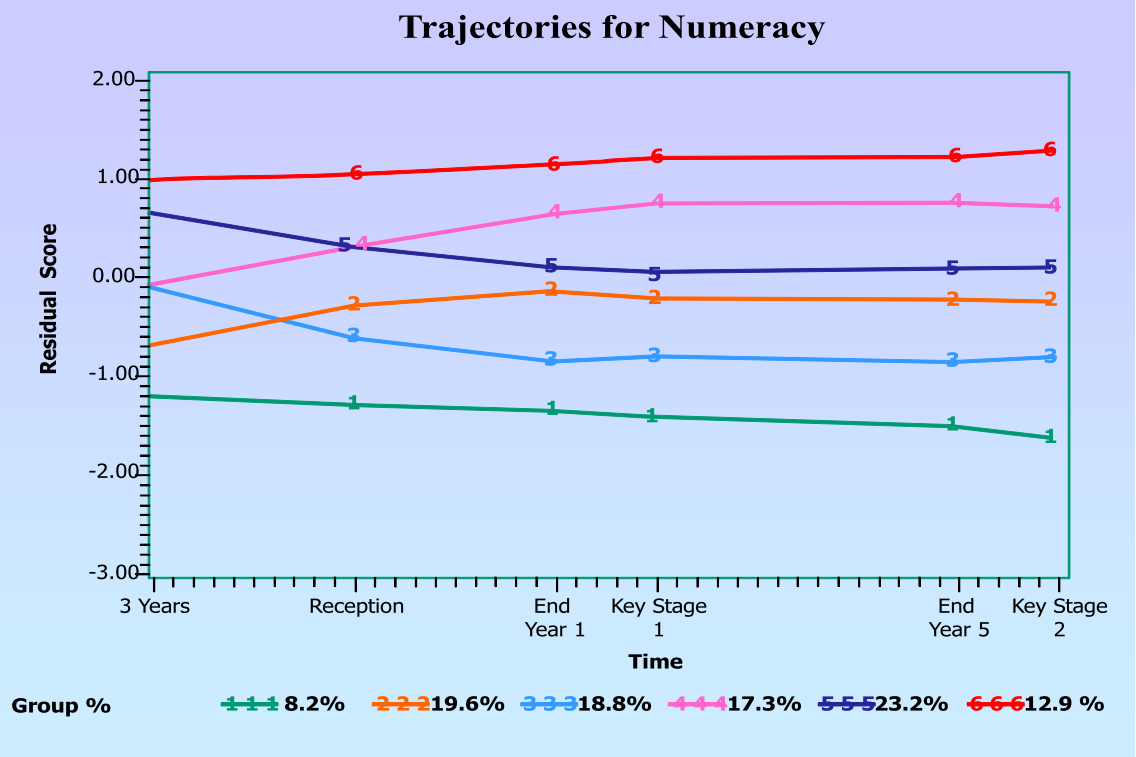
Reference Group: No Pre-School and low Primary School Effectiveness

For children who went to a low quality preschool; as is shown by the differences in effects for low medium and high effective school. For children who went to a medium quality preschool, the effectiveness of the primary school is still important but less than for children who went to a low quality preschool. However for children who went to a high quality preschool the effects are very similar for each level of primary school effectiveness, with children attending low effective school attaining similarly to those who went to high effective schools. This indicated that preschool quality is very important and can protect children from the consequences of less effective primary schools (Melhuish *et al*., 2008; Sylva *et al*., 2010).

Also preschool quality affected social development at 11 and 14 years of age, many years after leaving preschool



We were able to analyse the main patterns of developmental trajectory for the 3000 children in the study.



It is noticeable that very little change takes place after 5 years of age.

Effective Preschool Provision in Northern Ireland (EPPNI)

The EPPNI project is a longitudinal study that has investigated the development of children between the ages of 3 and 11 years. It is a parallel study to EPPE in England. In EPPNI 683 children were randomly recruited from 80 preschool centres randomly selected in Northern Ireland. In order to examine the impact of no preschool provision, 151 children without preschool experience were recruited from the primary schools later attended by EPPNI children. The progress and development of the children has been followed from age 3 until the end of primary school (age 11) After allowing for the effects of background variables preschool experience was related to age 11 performance in English and mathematics. High quality preschools show consistent effects that are reflected not only in improved attainment in English and mathematics, but also improved progress in mathematics over the primary school years. Children who attended high quality preschools were 2.4 times more likely in English, and 3.4 times more likely in mathematics, to attain the highest level than children without preschool experience (Melhuish *et al*., 2010a). Overall the results support those of EPPE.

Summary

In summary there are 3 key elements of a child"s environment for educational success.

1. Good Home Learning Environment
2. Good preschools
3. Good primary schools.

Other things being equal, those children with all 3 will outperform children with 2 who will outperform children with 1 who will outperform children with 0.

Conclusions

1. From age 2 all children will benefit from preschool education.
2. The quality of preschool matters.
3. The duration of preschool matters in the early school years.
4. Part-time preschool has equal benefit to full-time.
5. For medium and high quality preschool the benefit persist until at least the end of primary school.
6. High quality preschool can protect a child from consequences of attending low effective school.

In the UK similar effects of quality of preschool have been found for disadvantage samples also (Melhuish *et al*., 2010b). In addition, Goodman and Sianesi (2005) found that preschool education leads to better educational attainment at age 7. Although these effects diminished in size, they remained significant up to age 16. In adulthood, preschool experience was associated with an increased probability of obtaining qualifications, of being employed, and a 3-4% wage gain at 33.

Research in other parts of the world also supports the importance of preschool education for children's later educational attainment. In the US the Early Childhood Longitudinal Study, a nationally representative sample of children who entered kindergarten in 1998, was used by Magnuson, Meyers, Ruhm and Waldfogel (2004), who found that pre-kindergarten (preschool) increases mathematics and reading skills at kindergarten entry. Other US research also finds benefits for children from preschool education (Gormley, Phillips and Gayer, 2008).

Europe :

In France, free school provision was made available to children aged 3 years during the 1960's and 1970's – this produced a huge increase in preschool attendance.

- Analysis showed preschool:
- leads to higher income in later life
- reduces socio-economic inequalities - children from less advantaged backgrounds benefit more from preschool than those from advantaged backgrounds.

Switzerland has also expanded the age of children starting preschool. The impact of this expansion: - improved the children's intergenerational education mobility - was especially more beneficial for children from disadvantaged backgrounds.

Similarly, Norway expanded preschool education for 3-6 year olds during the 1970's and found children attending preschool had higher educational levels and better job outcomes later in life.

Benefits of preschool have also been evident in Asia and South America. Aboud (2006) found that preschool boosted primary school achievement in Bangladesh, with similar results reported for ten countries by Montie, Xiang and Schweinhart (2006). Other recent research also compares children having preschool experience versus none. Berlinski, Galiani and Manacorda (2007) used administrative data in research in Uruguay. A period of expansion of preschool in the 1990's allowed this study to compare a) siblings with and without preschool and b) regions that varied in speed of preschool expansion. Controlling for background characteristics, both comparisons indicated clear benefits of preschool for school performance in primary and secondary school. Similarly Berlinski, Galiani and Gertler (2006) used the expansion of the preschool education in Argentina in the 1990"s to explore amongst regions the covariation of changes in school performance with increases in preschool education.

Many studies agree that high preschool quality is critical to success. Research from the US and UK suggest higher quality preschools provide greater long term benefits. By age 11, children

attending high quality preschools outperformed those who did not. Low quality pre-schooling does not have any beneficial effects on children.

These findings are important to preschools as an intervention strategy.

- In the US, some argue that government funded preschool programs are of poor quality.
- Children attending these programs gain little cognitive advances.
- Others argue that public funded low quality programs narrow the gap between advantaged and less advantaged children by less than 5%.
- The gap could be narrowed by 50% if the quality of the programs were improved.

PISA results for 2009

15-year-olds who had attended pre-school were on average a year ahead of those who had not.

Also, PISA results suggest that pre-school participation is strongly associated with reading at age 15 in countries that

1. have sought to improve the quality of pre-school education
2. provide more inclusive access to pre-school education.

PISA 2009 - the relationship between
pre-school and performance at age 15 is strongest when

1. larger % of population can use pre-school
2. pre-school is for more months
3. pre-school has smaller pupil-to-teacher ratios
4. more in spent per child in pre-school

OECD report on PISA results

"The bottom line: Widening access to pre-primary education can improve both overall performance and equity by reducing socio-economic disparities among students, if extending coverage does not compromise quality."

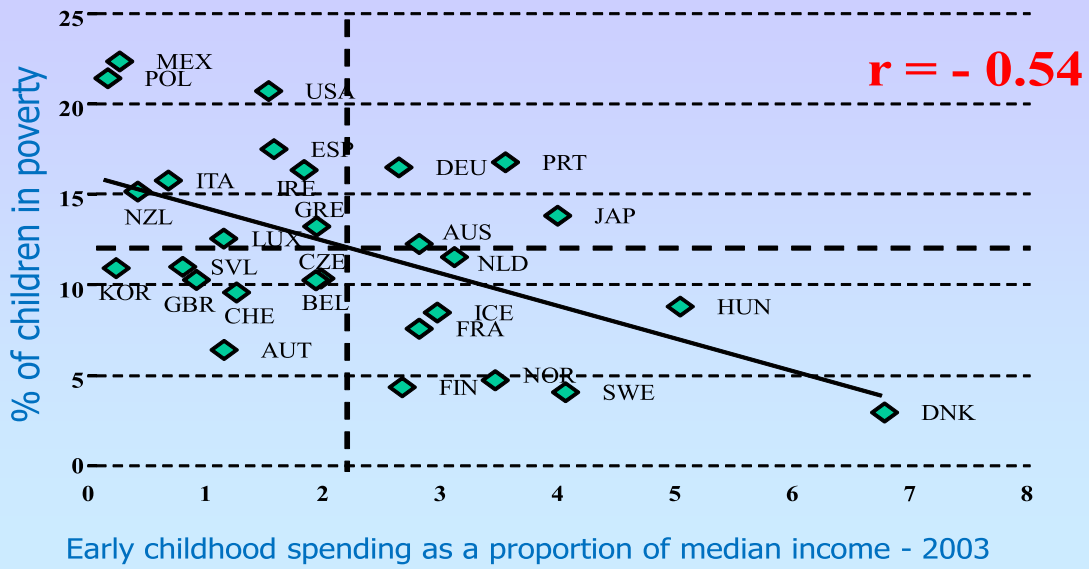
Some governments are realising- Good quality pre-school is an essential component of the infrastructure for sustained economic development

Head US Federal Reserve- Ben Bernanke, 2011

"No economy can succeed without a high-quality workforce, particularly in an age of globalization and technical change. Cost-effective schooling crucial to building a better workforce, but they are only part of the story. ***Research increasingly has shown the benefits of early childhood education and efforts to promote the lifelong acquisition of skills for both individuals and the economy as a whole. The payoffs of early childhood programs can be especially high.*** *"*

There is a relationship between countries spending on early childhood and child poverty rates.

Early childhood spending is linked with lower poverty rates



Such evidence has fuelled an increasing interest in the provision of preschool education for all children as a means of advancing the school readiness and later attainment of children (Zigler, Gilliam and Jones, 2006), and it has been argued that the longer term benefits far outweigh the costs involved, particularly for disadvantaged groups (Heckman 2006). Some authors argue that preschool

experience is critical for children's future competence, coping skills, health, and success in the labour market, and consequently the social and economic health of the nation (*e.g*. McCain and Mustard, 1999). In a technologically sophisticated world a population's educational attainment is likely to be increasingly important for a nation's economic development. The EPPE and EPPNI studies show the factors that can influence such attainment. The effects associated with various child and family background variables are very similar to those frequently reported in other studies. In addition preschool education, particularly high quality preschool education, is important.

Integrating Early Childhood Education and Care

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1. Integration or Controlled Market in a Split System: The Future of ECEC Policy in Hungary

   Marta Korintus *(Director of Research, National Institute for Family and Social Policy, Budapest, Hungary)*

2. Reflections and Prospection on Integration of ECEC and Recent Policy Development in Taiwan

   Jihing Peter Khoo *(Assistant Professor, Taipei Municipal University, Taiwan)*

3. Issues and Challenges Towards the New ECEC System for Child and Family in Japan

   Riyo Kadota *(Associate Professor, Seinan Gakuin University, Japan)*

Integration or Controlled Market in a Split System: The Future of ECEC Policy in Hungary

Marta Korintus
National Institute for Family and Social Policy, Budapest, Hungary

Hungary is one of the former socialist countries in Central and Eastern Europe, which became a Republic in 1989 and joined the European Union in 2004. The population is about 10 million. Its capital, Budapest, has 2 million people but the rest of the population , lives is small towns and villages. As the rest of countries in Europe, Hungary is struggling with an aging population, which situation is worsened by the high rate of inactive people (those who are pensioners and those who retired early; who are classified as disabled; women who stay at home, etc.). Unemployment is about 10%, with a shortage of job opportunities and with a sizable group of people with very low or no education. Numerous measures constitute the family policy, which has been taking over most of the tasks of social policy. The effects of the family support system (including childcare leaves and allowances) on alleviating poverty are sizable: child poverty can be decreased from 48% to 20% according to the data of the Hungarian Statistical Office. Legislation requires local authorities to provide a comprehensive system of services for children, including health, welfare and education. However, the implementation is uneven, many municipalities in more disadvantaged areas of the country just do not have the finances to ensure these.

Early Childhood Education and Care (ECEC) has been an issue for some time in Europe. It has been acknowledged that good quality services play a crucial role in supporting young children's development and well being, and in enhancing social cohesion by breaking the cycle of disadvantages and laying the foundation for lifelong learning. Research firmly supports that ECEC can compensate for disadvantage and vulnerability, regardless of underlying factors such as poverty, gender, race/ethnicity or religion. Neuroscience has proved the importance of the early years in the child's life when significant and critical development of the brain takes place. These developments occur especially during the first three years of life, when important neuronal connections take place (or not take place). Early childhood is a sensitive period characterized by many major changes in physical, cognitive, emotional and social development. What happens during these years has an overall influence that can last throughout life. Positive experience can lay the foundation of successful development and learning. However, young children are highly vulnerable: exposure to poor care, deprivation, under-nutrition, neglect and violence impact negatively on and damage the child. There has been a huge increase in the attention being given across Europe to the policies and services required to facilitate women's employment and create a work-life balance, and therefore, to leave policies and services for young children. This interest is driven by the need for higher women's employment rates and the related need for a better work-life balance for parents.

The first UNESCO World Conference on Early Childhood Education and Care held in Moscow in September 2010 emphasized the benefits of investing in services for young children in health and nutrition, learning and reducing social inequalities. The Nobel-winning economist James Heckman demonstrated that investment returns in ECEC are greater than those of other areas of education.

There is also a growing awareness of multiple needs of children and families. More attention has been paid lately to policies and services facilitating women's employment and creating a work-life balance. During the past fifty years in the EU, one of the largest changes was the flow of women into employment but their family duties mostly remained the same. The new generation of husbands and fathers take a much greater share of household chores, but flexible work arrangement, parental leave and ECEC arrangements for children are all needed to ease the burden. One of the big issues is though that in spite of the EU emphasis on cohesive society and social inclusion, these services

often reproduce inequalities through unequal access and through practices that do not take into account diversity. There is clearly a need for universal programs that are inclusive and help poor, vulnerable, disabled and minority children to reach their potentials. There is a growing acknowledgement that governments have to take a leading role.

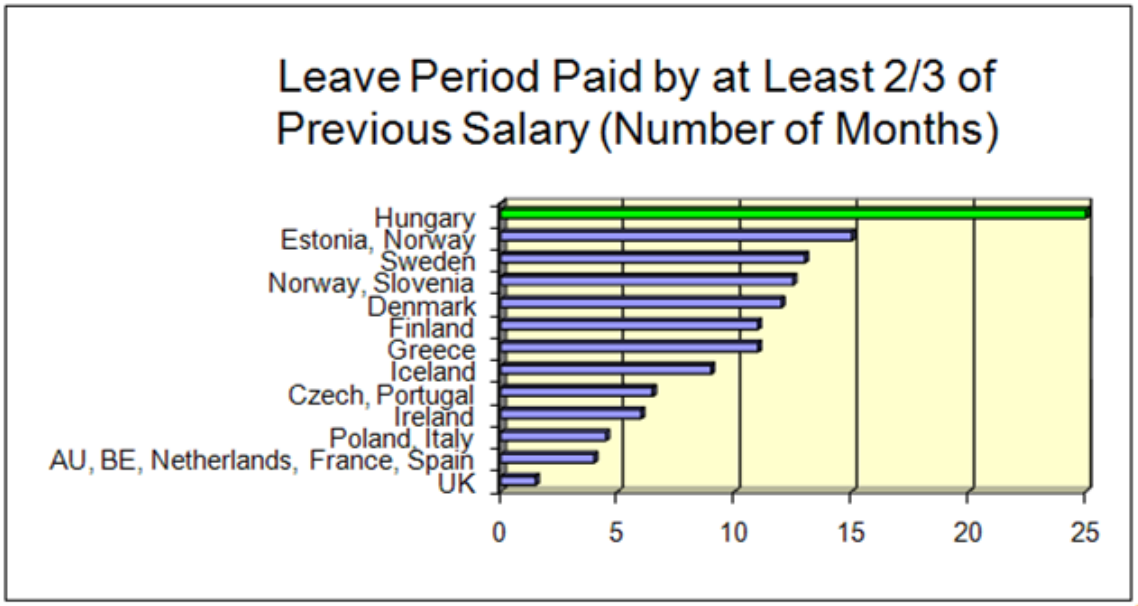
The level of services for this age group is low in most countries of the world. As we know, Education for All (EFA) goal 1 has not been achieved and the Barcelona targets of having at least 33% of children under 3 enrolled are not met by many countries in Europe. There are many reasons:

1. There is less policy focus on this age group compared to older children
2. The belief that raising children under 3 at home is best is evident in many countries. Usually the countries where this view prevails are the ones with the lowest level of services for the youngest children.
3. In some cases there is a generous availability of paid childcare leaves (including maternity, paternity and parental leaves) – for example for 3 years in HU, CZ - which might be covering the need for services.
4. Or, only a limited public budget and/or support are available for organized services.
5. Good, relevant decisions are based on evidence. Absence of reliable data might mislead or block decision making. And we know that data is often missing or not focused and unreliable.

In Hungary, the issues emerging in the EU are also relevant but with some different emphases. In spite of the growing educational level of young women, the awareness of the problems due to their low employment rate is growing. But there are not enough job opportunities, not enough ECEC places for children under the age of 3, and it is not easy for those who take up parental leave to return to work. The ratio of children living in poverty and with some kind of disadvantages is high. Their situation can be improved by enrolling them to good quality public ECEC services, which can support their healthy development. So, in view of this: is our split system of services a problem or not?

Balancing work and family life is a problem to be solved by families but it is also a policy issue and a political subject. The availability and length of childcare leaves, eligibility criteria the level and take up of available financial support, access to ECEC services and the possibilities, difficulties and/or flexibility of return to the labor market all influence parental decisions but create a different mix of conditions in the EU Member States.

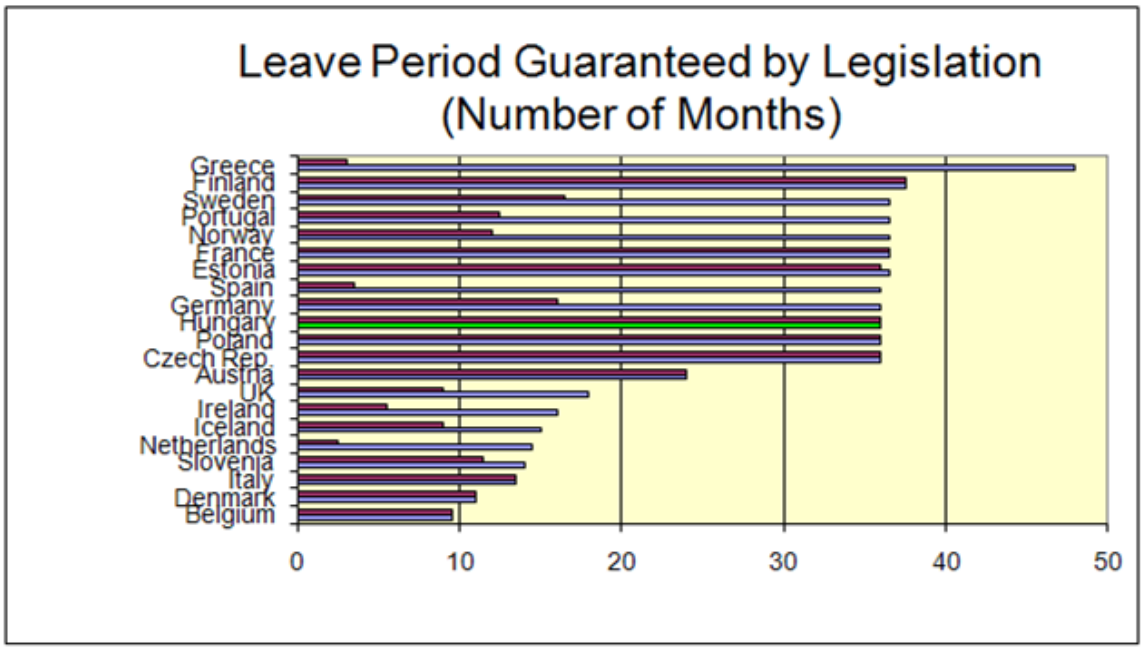
The EU requires member states to provide two types of leave to parents of young children: Maternity leave, which is a health and welfare measure for mothers and Parental leave, to enable fathers and mothers to care for their children younger than 3 years of age. The minimum standard set for maternity leave is 20 weeks, and it is 4 months for parental leave. Parental leave was extended from 3 to 4 months by an EU Council Directive in 2010. There is no requirement to provide so called paternity leave, which is available only for fathers. However, these directives do not limit countries in legislating longer leave entitlements and/or the availability and criteria for financial benefits. There is no consensus about the necessary length and availability of leave, the level of related payments or the optimal ratio of leave and access to ECEC services. Views vary on this. The two extremes are represented by those who argue for a shorter but well-paid leave period and those who argue for a long leave to enable mothers to stay home to ensure the child's development. In practice, there are large variations among countries in length, payment and flexibility off leaves.



This graph provides a summary of leave policies in 21 countries by showing for each the number of months of leave (Maternity, Paternity and Parental together) with benefits replacing 2/3 or more of earnings. Countries can be divided into 3 groups:

1. Countries providing earnings-related leave of 9 months or more
2. Countries providing 4 ½ to 6 ½ months
3. Countries providing 4 or less months.

Usually, these payments come from some form of insurance fund financed by contributions from employers and often employees.



This other graph shows how many months of leave altogether are available for parents. The total length includes Maternity, Paternity and Parental leaves. The red bars indicate the number of months with some level of payment. The majority of countries (12) provide leave longer than 25

months. But if we look at the period covered with some payment, it can be seen that most of the countries (11) provide it only for 12 months or less. The biggest gap is in Greece (in the public sector), Norway and Spain. That is, unpaid leave is available for a long period without any matching benefits.

Childcare leaves and benefits in Hungary include:

Maternity leave (TGYÁS): 24 weeks: up to four weeks before birth. Only mothers are entitled to take it. Funding is 70% of average daily earnings, with no ceiling on payments.

Parental leave for both parents

There are two types of parental leave and benefit: (1) for insured parents (who had the required number of days spent in employment before the birth of the child to be eligible), Gyermekgondozasi dij, GYED; (2) for non-insured parents, Gyermekgondozasi segely, GYES; Both are family entitlements except for GYED up to the child's first birthday, which is an entitlement only for mothers.

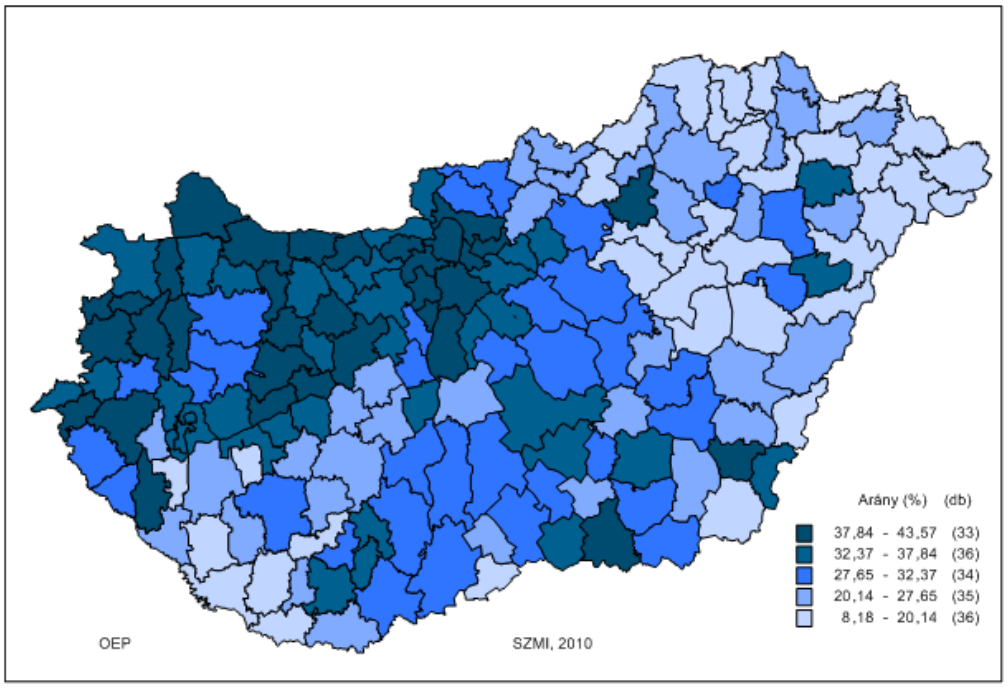
The length of leave for GYED is from the end of the Maternity leave period until the child's second birthday, for insured parents. The funding for it is 70 per cent of earnings, up to a ceiling (of 70 per cent of twice the minimum daily wage).

Length of leave for GYES is different for the two elements:

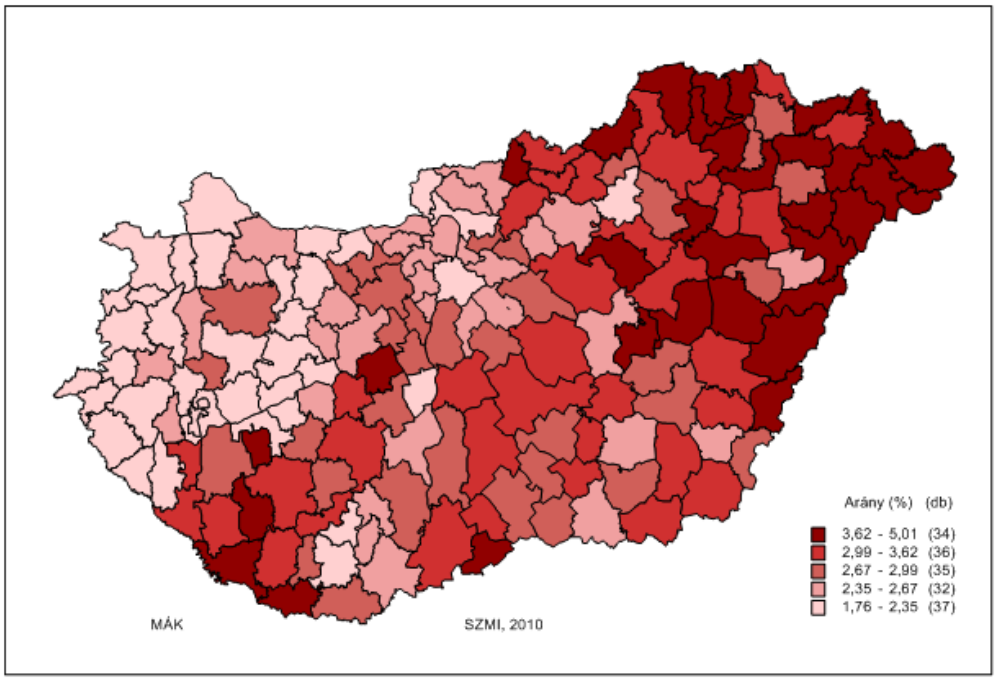
a. From the end of GYED (child's second birthday) until the child's third birthday, for insured parents and
b. From birth until the child's third birthday for parents not insured.

Funding is a flat-rate benefit equal to the amount of the minimum old-age pension.

Paternity leave with full salary is five days, to be taken during the first two months of the child's life.



This map shows the ratio of parents with children under the age of three taking up the leave available for insured parents (GYED). The darker areas show the higher ratios. These mostly coincide with those parts of the country where there are more and better job opportunities.



This other corresponding map shows the ratio of parents with children under 3, who take up GYES, the kind of parental leave available for those who did not have a job or did not spend enough time in employment before the birth of the child. The darker areas indicate the higher take up. These clearly relate to the more disadvantaged areas of Hungary. Therefore, childcare statistics on the take up of the different elements of parental leave indicate a close relationship with the social and economic status of micro-regions in Hungary.

There is a defined relationship between leave policies and ECEC services.

1. Some countries have developed a long period of leave up to 3 years of age as an alternative for providing services (e.g. Czech Republic, Hungary, Poland, Slovakia). These are the long leave and low level services countries.
2. In Denmark, Norway and Sweden a universal entitlement for children to publicly funded ECEC service begins at the end of a period of well-paid Parental leave lasting about 1 year. That is, access to services is introduced as leave ends. In Finland, a 3 year long leave entitlement exist alongside a universal entitlement to a place in a ECEC service for all children from birth.
3. In other countries there is a gap between the end of leave and availability of ECEC services, that is, the two systems are not integrated.

As documented by OECD and other statistics, access to ECEC services for children under the age of 3 varies a lot among countries. The average enrolment rate for this age group in Europe is the lowest in the Czech Republic, Slovakia, Lithuania, Latvia, Poland and Hungary. The highest rate is shown for Denmark and the Netherlands.

However, the reported access rates should be treated with caution. The system of services is different across countries, resulting in different definitions, content and pedagogical approaches. Without the numbers of hours attended access rates mask important variations. For instance, the Netherlands and the UK statistics indicate 45% and 33% overall attendance rates respectively, but only 4% and 5% when the data refers only to those children who spend 30 or more hours a week in ECEC, whereas in Denmark the overwhelming majority of children spend their full day in services.

The average enrolment rate of children between 3 and 6 years of age is much higher in all countries. According to the OECD data, only Ireland, Poland, Turkey, Greece and Switzerland have

less than 50% of this age group in ECEC services.

The system of children's services in Hungary is split. Policy responsibility for ECEC services come under one Ministry (Ministry of National Resources) but childcare for children under the age of 3 comes under the Secretariat responsible for social welfare (including child protection), whereas the Secretariat for Education has responsibility for the early education and care of children between the ages of 3-7, as the first stage of public education (kindergarten). Schooling age in Hungary is 6. Nurseries and kindergartens are both public centers providing full time care and education. These have a holistic approach covering developmental, health and educational needs of children. Families pay only the cost of meals, but those in need have free or reduced priced meals. During the period covered by parental leaves (= 3 years), the majority of children are at home with a parent - mostly the mother. However, this cannot be taken for granted as a parental choice, since there are neither nurseries nor job opportunities in many parts of the country. Licensed family day care and home childcare are also included in the legislation as basic services to be provided for families with young children. Family day care is the form of childcare when someone cares for other people's children in her own home. A family day care provider can look after maximum five children between the ages of 0-14. Licensing regimes vary according to the type of service, and are based on the criteria set in legislation for the different services. Local authorities are the issuing agents. The ratio of private (non-profit and for profit) providers is about 5% only both for kindergartens and nurseries, the rest are public services.

Hungary has national standards both for nurseries and for kindergartens, which cover basic principles of care and education, minimum criteria for the environment, staffing, health and safety requirements and necessary documentation. These regulations aim to have a core standard, while providing enough flexibility for institutions to shape their service to meet local needs. The approach to work with children, called, pedagogy, is practice-oriented, dealing with issues of supporting the process of becoming autonomous and independent, the tasks and role of practitioners related to children's play and other activities, relationship with families, introducing/inducing children to the centre, communication between workers and children, nursery tales and poems, etc. Nursery workers, as well as kindergarten pedagogues believe that the "most possible time should be left for playing". Nevertheless, there is some difference in approach that reflects the characteristics of the two age groups. While nursery workers give priority to "teaching the children how to do everyday tasks and become self-reliant and autonomous", kindergarten pedagogues also emphasize "passing on cultural values and preparation for school".

Most of the children under the age of 3 are cared for at home by the mother, due to the availability of extended maternal and parental leaves. Non-parental childcare for children between the ages of 20 weeks to 3 years is provided almost entirely in nurseries. Those children whose development is assessed to be lagging behind can stay until they are 4 years old, and those with disabilities, up to age 6. In 2009, there were 26687 nursery places, providing for 34694 children, for about 10-11% of the age group. As the data indicate, the number of children admitted was higher, than the places nurseries are licensed for, thus the utilization rate was high. The name of workers in nurseries has been "childcare worker", meaning a person looking after / taking care of children. Since this year, they are called „young child pedagogues. There were 6026 childcare workers in 2009. The professional qualification has been on upper medium level for childcare workers but the BA level was introduced 2 years ago.

Most of the children between the ages of 3 and 6 are enrolled in kindergartens. Access is almost universal, covering about 90% of the age group. Kindergarten attendance is compulsory for 5 year-olds. In 2009, there were 363064 kindergarten places, providing for 328545 children, for about. As the statistics show, the number of children admitted was lower, than the number of places. The name of workers in kindergartens is "kindergarten pedagogue". There were 30000 kindergarten pedagogues in 2009. The professional qualification has been on BA level for a long time now.

In all countries of the world, challenges seem to be more numerous than the issues: One of these is related to accepting that families and children have multiple needs, therefore have to have choices.

And not only choices but also the opportunity to become involved, to participate and to exercise their rights. Developing a comprehensive system of services is a huge challenge in itself, whether we talk about integrated or split systems. In an integrated or unitary system government responsibility, relevant legislation, regulation, access and funding are similar for all services. In a split system responsibilities are divided between ministries - most often by the age of children – often causing difficulties of coordination. Having the responsibility for service delivery devolved to different levels of government can also pose difficulties in setting up a coordinated effort. Challenges are evident not only in terms of responsibilities but also in terms of questions related to the function of services. It is often the subject of debates whether they are education or care services, or both. Or means of family support or perhaps merely facilitate women's employment. A wide range of rationales exists, and there are many types of arguments that drive ECEC policy.

In many countries private provision for under 3s predominates, including services offered by for-profit and nonprofit providers alike. According to the report by the Network of Experts on the Social Sciences of Education and Training (NESSE) private for-profit services are very variable but tend to offer the lowest quality services … and may contribute to social stratification. In countries with higher levels of services for children the public sector is the major provider. Eg. Denmark, Finland and Sweden. However, it should be kept in mind that long term commitment and involvement by the state might change with elections as seen in some of the former socialist countries since the transition. Some of these countries also witnessed a boom in private services to fill in the gaps in the municipality provision (CZ).

Challenges in Hungary are closely related to the need of increasing women's labor market participation. Creating more job opportunities and facilitating women's return requires a major effort both from the government and the municipalities. There is a shortage of jobs in general, and there are not enough services for under 3s. Increasing access to ECEC services, considering the coordination and/or integration of the systems, or re-organizing and creating a unified system that would combine all ECEC services and perhaps parental leaves were questions to be thought about.

Hungary was an example of split systems in the UNESCO study and it was envisaged as a possible scenario that Hungary might move towards integration. Workers in the services and professionals having different levels of involvement in ECEC service provision generally agree that an integrated system should be achieved in the long term. There have been some debates but as there is no political will to proceed in this direction, these debates do not have a strong effect.

There are arguments for and against integration and creating a unified system. Those in favor cite the interest of the child, the importance of taking a child's perspective and the need for continuity and consistency in what happens to children. All these are important to provide the best circumstances to support their development. There have been some steps taken in this direction. The pedagogical approach is similar in the services both for children younger than 3 and for those older than 3. The National Curriculum for each services applies the same approach and principles. On the administrative level, an integrated and a unified system is easier to manage, easier to understand and easier to predict. Those who are against integration argue that most - if not all – childcare workers should achieve the BA level qualification before merging the auspices of ECEC services. Otherwise, those working with children younger than 3, will be considered as unqualified in the education system, and will therefore be in a very disadvantageous position even though about 90% of the present workforce is qualified on the upper medium level in the present system. Therefore, the labor market position and the achievable work related conditions such as the level of earnings would be unfavorable for them. The present political climate does not favor this move.

The government is keen to re-organize social services – which include services for children under 3 – and to introduce a market-oriented approach. The idea is to take away the responsibility for service provision from municipalities as this has not proved to be effective since 1989, and to introduce a controlled childcare market with considerable involvement form the state, as an

alternative to municipal service provision. Kindergartens cannot be part of such a system because education is free and is a public duty. On the other hand, services for children younger than 3 cannot move into the education system because the cost would be too high. The thinking has been shaped by the fact that we have traditionally had a split system for more than 120 years.

Based on the 18th paragraph of the Convention on the Rights of the Child (CRC), the signing countries are supposed to do everything necessary to ensure the rights to services – that is to pass legislation to provide protection and care needed to ensure the well-being for children of working parents. Some countries already provide services for all children. DK already took the first step in 1964. As I mentioned earlier, work-life balance is a concern already. However, the NESSE report elaborates that „mothers' labor force participation may be enhanced by the provision of good ECCE services but a comprehensive package of support to reconcile work and family life – including good parental leave and flexible working arrangements – encourages higher participation, as well as contributes to child well-being." More recently the view seems to gain support that it may be better in the interest of the child and the mother to offer leave during the first year of life and use services after that period. eg. Iceland, Sweden, Slovenia. Policies on leave and ECCE should be coordinated but this rarely happens. Usually the leave ends, and there is no ECCE entitlement, in spite of all the emphasis laid on increasing the labor market participation of women. Change in focus and extending the focus of childcare to meeting multiple needs of children and families has been taking place for a number of years now: from economic or health to child welfare, education, child development. These moves do not mean that earlier emphases are not valid any more but allow for other aspects to come into light and demonstrate that ECEC contributes to an equitable society and combating exclusion. Breaking the uniformity of services and introducing new types of services has been the approach of former socialist countries (e.g. HU) where the standard center-based provision was diversified (or colored, if you like) by family day care, home childcare service, parenting programs, mother-toddler groups, toy libraries, etc.

The thinking about families and children also changed, there are today many programs that are based on partnership with parents (Step by Step programs in the CEE region) and which enable disadvantaged groups to participate in childcare. Working with children having all kinds of disadvantages inclusively was the focus, for example, of the recent EU funded Working for Inclusion project coordinated by Children in Scotland and involving partners from several countries. Addressing poverty by ECEC and supporting those services that enroll disadvantaged/Roma children is required by legislation in some places (HU legislation and Sure Start). Workforce issues have also been addressed for a long time by now: higher level of education, a salary comparable to that of teachers', reasonable working conditions of staff and the support they receive are key factors for ensuring quality. It is true, definitions of quality vary but there is evidence to show that good quality services focus on pedagogy. Recently integrated systems for under 3s and older children often come under education. Most of these approaches are acknowledged and used in Hungary as well, but only to an extent that fits the split system.

Reflections and Prospection on Integration of ECEC and Recent Policy Development in Taiwan

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Factors Affecting Child Care Services

Female Workforce

The female labor force participation rate is one of the key factors that affect child care services and development of ECEC policies. Simply saying, if a woman with pre-school age children chooses to enter the labor market, she has to face the problem of employment and child care. Therefore, the demand for child care services will be enlarged, with increased female labor force participation rate.

As can be seen in Table 1, in the past three decades in Taiwan, the labor force participation rate of women aged 25-44 rose to 76.51 from 41.62, increased by nearly 35%. More women enter the labor market is almost an inevitable trend in the contemporary modern society. As a matter of fact, a woman in the labor force is not only a personal actualization for herself, but also has a positive effect on family finances and social economic development.

For these reasons, reconciling work and family issues has attracted widespread international concern, Taiwan is no exception. A number of papers related to this subject have been published, including those studied by local researchers as well as reports translated from different languages. A variety of solutions have been consistently suggested, among them are parental leave, flexible working hours, universal approach to child care, enhancing care and education quality, etc.

Birth Rate

Birth rate is another factor affecting child care services and development of ECEC policies. From the viewpoint of childcare market, it is not difficult to understand, the high birth rate will generate a stronger market demand for child care services. In contrast, declining birth rates would also make childcare market shrink.

In Taiwan, a rapid downward trend has emerged in the annual number of newborns; as shown in table 1, the figures of newborns almost decrease every year. In 1980, there was about 375,500 newborns, after 20 years (in 2000), the number dropped to 292,700, decreased by 22.0%. During the same period, the fertility rate dropped to 1.68 from 2.52. In the past decade, such situation not only failed to restore but became more serious, the number of births decreased almost every year. By 2010 numbers of newborn and the birth rate have dropped to 157,300 and 1.01, compared to the year 2000, down 46.3% and .67, respectively.

Table 1
Population, Number of Newborns, Birth Rate and Labor Force Participation Rate of Women Aged 25-44 with The Years

Years	Total Population	AGE (0-2)	AGE (2-6)	AGE (6-12)	AGE (0-12)	0-12 by Total %	N of Newborns	Birth Rate	Women in work
2010	**23,162.1**	**352.2**	**820.5**	**1,538.8**	**2,978.9**	**12.9**	**157.3**	**1.01**	**76.51**
2009	23,119.8	381.4	839.5	1,587.4	3,131.6	13.5	182.5	1.03	75.58
2008	23,037.0	393.0	860.8	1,682.8	3,259.0	14.1	187.6	1.05	74.83
2005	**22,770.4**	**413.6**	**1,037.1**	**1,843.5**	**3,620.7**	**15.9**	**195.3**	**1.12**	**70.62**
2000	**22,276.7**	**575.2**	**1,238.9**	**1,937.0**	**4,092.8**	**18.4**	**292.7**	**1.68**	**64.52**
1995	21,357.4	623.8	1,302.4	1,969.7	4,272.4	20.0	303.0	1.78	60.35
1990	**20,401.3**	**639.6**	**1,318.5**	**2,364.1**	**4,724.1**	**23.1**	**324.0**	**1.81**	**55.43**
1985	19,313.8	678.9	1,594.8	2,352.1	4,984.9	25.8	314.4	1.88	56.07
1980	**17,866.0**	**785.7**	**1,577.5**	**2,222.1**	**4,971.0**	**27.8**	**375.5**	**2.52**	**41.62**
1975	16,223.1	694.5	1,481.9	NA	NA	NA	338.8	NA	NA

Note. (Population Unit: thousand); "NA" = number not available. Women in work: Labor force participation rate of women aged 25-44.

Table 1 also lists some relevant statistics in the past decades, including total population as well as number of children at different age levels. These statistics indicates, the total population maintains increased, nevertheless, it appears to slow down in recent years. On the other side, the number of children at all age levels is dropping without exception.

Besides, we can also get the point from the table that female labor force participation rate and birth rate are negatively correlated. This statistics relationship may be suggested that only from the perspective of demand to interpret child care service market may not be sufficient, especially when two affecting forces conflict with each other. Adopting perspectives other than market approach and taking into account more factors may help us understand better of child care service functioning.

For instance, two well-known international organizations, OECD and UNESCO, had reviewed and published the implementation experiences of ECEC policy in selected countries, not long ago. These national reports indicated that through appropriate public investment in early childhood education and child care services would create a “woman- or family-friendly environment”, and that will become one of the most effective ways to maintain women's labor force participation and to raise birthrates.

ECEC Policy Reflections: Taiwan at a Turning Point in

Moreover, it is worth mentioning that the crisis of declining birth rate may in tune create an opportunity for policymakers and stakeholders to reconsider how to make young couples willing to have children, and what is the right way to build a proper child care system. Taiwan has currently in such a case, unfortunately or fortunately.

The situation of birthrate dropping had aroused great concern to the Taiwanese government authorities. In January this year, President Ma Ying-jeou publicly expressed that birthrate related crises have threatened our country in many aspects, even reached the national security level; thus, he instructed relevant government departments to organize an across-agency team, committed to deliberating the effective countermeasures.

For this reason, the issues related to public child care service have been fermenting since the beginning of this year. Research and conference grants on this topic have increased significantly; under the RDEC[1)]

1) The Research, Development and Evaluation Commission, Executive Yuan

sponsorship, the author is carrying out a research project related to public policy of childcare services[2].

At this time, the development of ECEC policy in Taiwan appears to stand at a crossroads, pondering ways to take the next step; right, or left or a third way. The issues under discussion range from the fundamental political ideologies to specific standards of operation in child care services. Such as the following questions have been debated several rounds in different occasions.

1. Should the government expand public investment in child care services; if so, public funding should inject into demand-side or supply-side or distribution by both sides?
2. Should the government share with parents the childcare cost, if so, in what proportions and through which way of subsidies?
3. What kinds of approaches used to enlarge child care service provisions– market, public service, or public-private partnerships, would be better in terms of cost-effectiveness and feasibility?
4. What levels of standards should be set to improve child care qualities, including qualification of teachers and caregivers, maximal size of a class, child-adult ratio, etc.?

Background Information of ECEC Services in Taiwan

Similar to many countries in the world, the early childhood education and child care service in Taiwan have been managing by two separate government departments, since very long time ago. Preschool education and childcare are respectively under the auspices of education and welfare authorities; however, due to the Early Childhood Education and Care Act has been enacted, the administration of ECEC will be adjusted in 2012.

Auspices and Provision of Preschool Education

The Ministry of Education (MOE) is in charge of preschool education, which providing early learning experiences for children “4 to 6-year-old” (compulsory school started from age 6 to 15). Kindergarten is a single type of education service in school system, regulated by《Kindergarten Education Act》(first promulgated in 1981) and its associated sub-laws.

In Japanese colonial era (1895-1945) as well as in the early period of ROC (KMT) government relocated to Taiwan (1949-1954), only few of ECEC facilities had been established. Before 1970, Taiwan was virtually an agricultural society; only double-income families and wealthy families may have the need or ability (affordability) to use ECEC service. For your reference, table 2 presents the statistics of kindergarten, nursery, and children attendances by public/private sector with the years.

Public Kindergarten

Past and present alike, almost all public kindergartens were attached to common elementary schools; a few were attached to experimental elementary schools of teachers colleges. Before 1962, public kindergartens established by elemental schools had government budget support from compulsory education funds; however, preschool children did not entitled to receive free education. Parents paid a tuition fee, which is formulated by the County or City government to compensate part of the budget, for example, the percentage of 40 or 60. This case can be interpreted as the government and parents share the ECEC cost.

This way of doing was prohibited in 1962. Consequently, all public kindergartens attached to elementary schools must be self-sufficient. Since then, a large number of public kindergartens closed, those still open requiring parents to fully share the running cost. In a sense, public kindergartens here are similar to “not for-profit” public-private partnerships ECEC centers, operational

2) In order to alleviate financial burden of family on childcare, this study aims to assess the feasibility of increasing non -profit child care service supply by subsidies, or through government investment, using bulk purchasing approach to obtain private sector child care services, and then provided to families at fair price.

cost is fully and evenly shared by parents, the district authorities invest only space and existing facility. The fees paid by parents may also be defined as a "fair price".

In 1986, a new policy was proposed, attached a simple slogan to remind its objectives, "to establish at least one public kindergarten at each township, and one public nursery center at each village". The government budget support was resumed along with this project. However, public kindergartens and nursery centers are not free of charge; parents pay a flat rate stipulated by the city or county administrations, usually a partial of the cost. In this case, the public investment includes providing space, facility, and a subsidy (shares the remaining sum).

Following the implementation of this policy, number of public kindergartens began to increase. As shown in table 2, for instance, the figure was about 160 in 1985, rose to 700 in 1990, and then expanded to 1230 in 2000. By 2010, it was about 1560 public kindergartens; and until now still maintained growth.

Nevertheless, if we focus on the child's enrollment in 2000 and 2010, we found that an increase of 330 public kindergartens (1,560－1,230) did not bring a corresponding increase in attendances of children, on the contrary, reduced 1,400 children (73,400－72,000). According to Kindergarten Education Act, a classroom can enroll up to 30 children. Even if the increase of 330 public kindergartens are only one class, should be increased at least 9900 (30×330) number of children. Therefore, the total difference is 11,300; "simple" cost benefit calculation.

What this means, for example, it is by no means parents cannot afford, as opposite to "for-profit" private kindergartens, public kindergartens charge less. Some local investigations indicated, public kindergartens were better than its private opponents in many aspects, including the percentage of qualified teachers, salary and welfare of employees, appropriateness of curriculum and instruction, etc., but service hours were shorter and could not meet the needs of parents.

The description above may help us understand a brief history of public kindergarten and its related problems in Taiwan. Should we increase public kindergarten investment? Definitely we need to find a way to improve its weakness, before we invest. On the other hand, currently there are about 40 "not for-profit" public-private partnerships child care centers; they have the strengths of public and private kindergartens, perhaps this is an alternative to public investment in Taiwan.

Table 2

Numbers of Kindergarten, Nursery, and Children Attendances by Public/Private Sector with the Years

Years	Numbers of kindergarten, nursery, children attendances										
	Kindergarten					Nursery					G total
	Publ	C	Priv	C	STC	Publ	C	Priv	C	STC	Children
2010	15.6	**72.0**	17.2	111.9	183.9	2.9	59.5	35.4	174.2	233.7	417.6
2009	15.5	73.0	16.0	109.1	182.1	3.1	63.2	35.8	174.4	237.6	419.7
2008	15.4	73.3	16.5	112.3	185.6	3.1	62.9	37.0	173.5	236.5	422.1
2005	14.7	69.2	18.8	155.0	224.2	3.5	80.8	39.6	209.4	290.2	414.4
2000	**12.3**	**73.4**	**19.2**	**169.7**	**243.1**	**3.9**	**106.7**	**29.6**	**203.0**	**309.6**	**552.7**
1995	8.8	55.5	17.0	184.8	240.3	24.0	120.2	12.6	109.4	229.6	469.9
1990	**7.0**	47.4	18.0	189.9	237.3	24.0	NA	13.4	NA	238.7	476.0
1985	**1.6**	17.9	20.5	216.8	234.7	40.5	NA	12.0	NA	230.5	465.2
1980	4.0	44.9	7.8	133.3	178.2	22.0	NA	7.3	NA	185.4	**363.6**
1975	2.7	29.3	4.9	88.6	117.9	12.6	NA	4.7	NA	106.4	224.3
1970	2.2	25.6	3.5	66.4	92.0	7.4	NA	1.8	NA	63.6	**155.6**
1965	2.0	24.1	3.5	54.7	78.8	1.6	NA	1.7	NA	34.7	113.5
1960	**3.5**	35.9	3.2	43.8	79.7	NA	NA	NA	NA	NA	NA
1955	3.0	28.5	1.2	17.9	46.4	NA	NA	NA	NA	NA	NA

Note. Unit of kindergarten and nursery: hundred; Unit of children attendances: thousand. *C* = Children; STC = subtotal of children; NA = number not available.

Child Care Services: Auspices and Types of Services

Child Welfare Bureau (CBI) of Ministry of the Interior (MOI) is responsible for all types of child care services, which taking care children from "1 month to 12-year-old". Child care services are divided into in-home and center based child care, all of them are regulated by 《Children and Youth Welfare Act (CYWA)》 and its authorized sub-laws.[3)]

In-Home Child Care

In-home child care includes a babysitter (nanny/child minder) who is employed by a parent and offering babysitting services in child's home, or a babysitter provides babysitting services at her own home. The latter is so called "Family child care home", it usually serves two or three infants and toddlers (0 to 2-year-old), however, it can also take care preschoolers and school-age children.

In order to improve the quality and the implementation of community-based nanny's childcare, the Child Welfare Bureau has been initiating a "community babysitter guidance system" project since 2001. Up to August 2011, a total of 62 "community babysitter guidance system" have been established across the country. The major function of the system is to provide basic and follow-up training for nannies; it also plays the role as a referral and resource center.

An optional "Babysitter Technician License" policy was made in 1995; a licensed babysitter is required to have a junior high school diploma, 80 hours (in 2005, it was revised to 126 hours) nanny training certificate, and pass the technicians test. The first professional technicians test for babysitter was held in 1998. According to CBI statistics, by 2010, there are 82,460 licensed babysitters.

Center Based Child Care

There are three types of center based child care facilities, including:

1. Infant center (crèche), serving children from 1month up to 2 years old, can be established alone or attached to a nursery, according to current regulations. The demand for infant care is strong, lots of infant centers are filled to capacity, and some of them have a long waiting list. In 2006 there were 111 independent set infant centers, serving 1,626 young children; by 2010, the establishment of infant centers in the market was enlarged to 169, and the attendance of young children increased to 3,254, showing a rising trend.
2. Nursery center serve children from 2 to 6 years old, some of them also provide infant and/or school-age child care (after school) services. The same with Kindergartens, history of nursery centers can be traced back to the Japanese colonial era. In the period around 1960, in order to assist the farmer family to take care of the child during harvest busy season, In 1955, Taiwan government initiated a economic combined welfare policy, "harvest busy child care project"; also enacted the first "regulations for the establishment of nursery center" same year. The harvest busy nursery center was seasonal in nature, sites using local community centers, meeting house, or school empty classroom.

This policy received very positive response, by1956 almost every village has a space for harvest busy child care in. Beginning from 1962 to 1971, under the financial assistance of UNICFF (UN International Children's Emergency Fund), each county had established a "rural demonstration nursery" to help seasonally harvest busy nurseries transformed into long-term village nurseries. According to Taiwan Province[4)] official reports, in 1987 there were 2,828 village nurseries, enrolled

3) CYWA sub-laws relevant to child care services include Permit and management regulations for the establishment of private child & juvenile welfare institutes, Standards for establishing child and juvenile welfare institutes, and The Regulations Governing Qualifications and Trainings of Professional Staffs of Child and Juvenile Welfare Institutes, etc.

131,000 children. In 1986, the government initiated a “public nurseries establishment policy”, more than100 large nurseries had been built in the following years, a number of village nurseries were merged into As shown in table 2, number of public nurseries dropped sharply during 1985 to 2000.

3. School-age child care center, also called after school child care, taking care children 6 years old and up, can be established alone or attached to a nursery. It emerged into Taiwan society after 1985, according to statistics published in 2004, more than 60% of them were established in urban areas. It was until 2002, The Children's Bureau officially classified after school child care as a welfare services institutes and put it into statistics (a total of 1,015 centers, serving 40,309 school-age children). By 2010, there were 824 after school child care centers, 35,521 attendances of children.

Integration of ECEC in Taiwan: Brief History and Some Comments

Recently, one of Taiwan's significant ECEC policy making achievements is to complete the legislation of《Early Childhood Education and Care Act》. The first ever《ECEC Act》in the history of Taiwan was passed by “Legislative Yuan” on (1) 10th of June, 2011, officially enacted by our president on (2) 29th of June, 2011, and will be in effect from (3) the first day of January 2012.

Integration of early childhood education and care has been promoting since the middle of 1990s. This issue has caused great attention in many parts of the world, made tons of paper, and hundreds of meetings and conferences. Just in Taiwan, this saying is not over exaggerated; because ECEC integration here has its own history, the policy making process lasting for more than a decade.

Several terms and abbreviations have been proposed to represent “the integration of early childhood education and child care services” (this is the way I choose to write). For instance, “ECEC” stands for education and care; it may put more emphasis on education. In contrast, “ECCE” Early Childhood Care and Education, or “ECCD” Early Childhood Care for Development, gives priority to care, meaning care should be the basis of development and education. The word “educare” combines or unified education and care together, explicitly convey the message of integration.

The following paragraphs provide a brief history of Taiwan’s ECEC policy development. In 1998, the former prime minister of Executive Yuan Xiao Wan-chang openly instructed Education and Welfare administration should cooperatively develop a suitable project to integrate kindergarten and nursery. The first “ECEC integrated project (draft)”, in 2000, proposed a “split model” by enrollment age, nursery 0-3, kindergarten 3-6. It was rejected by the top officer of Education.

In the end of 2000, under DPP Administration, MOE set up the “early education policy consultant group” resumed ECEC integration policy making. In 2001, the “ECEC integration promotion committee” was established set, Ministers of MOE and MOI as co-convener; three policy study group was organized under the committee[5] to carry out necessary and related studies. In the end of 2002, “the ECEC integrated policy planning report (draft)” was released, a numbers of consultation and public hearing meetings were held.

In 1995, set up “the ECEC integration project Advisory Committee” with 7 working groups dealt related affairs, including legalization group which was responsible for preparing the ECEC Act (Early Childhood Education and Care Act draft)[6], which is decided to regulate and all types of ECEC services for 0-12 children. In 2006, the draft version for public hearing was ready. After that, a major adjustment was made, the name of Act changed to "Children Education and Care Act (Draft)". In 2007, it was approved by Executive Yuan, and officially sent to Legislative Yuan for deliberation. The full text has 8 chapters, 71 provisions. It was not on the agenda for that legislative session.

In 2009, through all the necessary administration procedure, "Children Education and Care Act

4) This term is no longer in use, following the government restructuring 1998.

5) The author was invited as a member of the committee, and as the convener of long term planning group.

6) The author was one of the members in legalization group.

(Draft)" was again sent to Legislative Yuan for deliberation. The full text has 8 chapters, 69 provisions. Quite a few activities of political actions emerged, in favor or oppose this legislation. In short, the "Early Childhood Education and Care Act" passed, having 8 chapters, 60 provisions; however, it returned to the original point, only unifying kindergarten and nursery in Education Department.

Some of the government officials, lawmakers, or other relevant persons have openly, and proudly, said that enacted the ECEC Act should be the most significant event in Taiwan's early childhood education history. Honestly I would agree with them in a little part, with more than a little disappointment and worry. A few words, advocating integration, left me deeply impressed: 「children do not distinguish their needs based on which agencies run which services – neither should we.」 It inspires me to ponder the true meaning and category of integration, providing a foundation for clarifying and defining concept and scope of the policy.

Should integrated policy deal with two systems as a whole (early childhood education and child care services), rather than two institutions (kindergarten and nursery), each belongs to one of the systems. Should we stand in the child and parents' position put their interests in priority. In my observation, public officials, providers, teachers, and care givers have much concern on themselves, rather than on the child and parents. Reform is an endless way, I believe future will adjust the success we think today; Taiwan will face the challenges of integration of "early childhood education and child care services" again in the near future.

Issues and Challenges Towards the New ECEC System for Child and Family in Japan

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Like Korea, we have been struggling a low birth rate for last decades. Like some other countries, we are now facing a critical period for busting up economies. Like many other countries, we are longing for establishing a solid ECEC system. In this particular paper, although it's not passed cabinet and nothing has been determined yet, I will share the most updated political reforms discussed about launching a new ECEC system in Japan briefly and I would argue issues and challenges observed through this reforming process.

1. What is a New ECEC System for Child and Family?

On July 29th 2011, the Cabinet Office adopted the interim guidelines of a "New ECEC System for Child and Family (here after the New System)". A fundamental idea underlying this New System is to create a new social structure for children and family (i.e., While parents shall have primary interest and responsibility their children's education and care, both parents and children shall be also supported by a whole society -"Children are hopes in our society and driving forces for our future"). That is, the New System does not directly refer to a comprehensive ECEC institutes so-called "Kodomo-en itself (tentative name, literal meaning is "Children's Garden", hereafter "Kodomo-en"), rather it implies a solid social reform. Other agenda contained in the New System are unifying financial operation, sharing of expenses by stakeholders, transferring authorizations to local communities, providing diverse ECEC services, and implementing work-life-balance system.

2. What is a New ECEC System Called "Kodomo-en"?

The interim guidelines suggest that in order to provide and ensure optimal living environments for all children, we shall promote the idea of unifying existing kindergarten and childcare centers and create "Kodomo-en". The government aims that through implementing this idea, we shall

- Provide high quality comprehensive "school education" and "care" for young children
- Increase numbers of "care" settings and solve a shortage of childcare centers for children waiting to be served, and
- Enrich child-raring support for all family.

In this section, brief descriptions of "Kodomo-en" are illustrated.

Types of "Kodomo-en"

"Kodomo-en" fundamentally serves children aged 0 through 5 (before entering elementary school), however, if institutes (so-called Kindergarten-based) prefer to engage upper 3 year-old sector, it is granted (see Table 1).

Table 1
Types of "Kodomo-en"

	"Kodomo-en" (motived by "Kodomo-en" guidelines)		
Type	Kindergarten-based	Comprehensive	Childcare center-based
Age	Either 0-5 yrs or 3-5yrs	0-5 yrs	Either 0-2 yrs or 0-5 yrs
Ordinance	New Comprehensive Guidelines & School Education Law	New Comprehensive Guidelines	New Comprehensive Guidelines & Child Welfare Act

"Kodomo-en" Guidelines

The idea should be driven by "Kodomo-en" guidelines which states principles for educating/caring child and supporting family and specified guidelines for "Kodomo-en" to follow. In the government plans of action, to ensure school education for all young children before formal schooling, existing childcare centers who serve 0-5 years-old children transfer to comprehensive “Kodomo-en” by fixed interval.

Responsible Body

Responsible body for "Kodomo-en" is municipal offices fundamentally. Based on "Basic Guidelines" proclaimed by the government, each municipal offices coordinate and organize the New System protocol which meets their needs, interests, and concerns. In order to become "Kodomo-en", each institute (either kindergartens, childcare centers, etc.) should be appointed by their prefectural/province offices (except cities designated by ordinance). To be designated, they have to clear minimum standards to sustain quality of practices. What giving rise to public censure is this implementation allows anyone (either stock corporation, NPO, etc.) who are interested in can enter this ECEC circle. While it can contribute to increase a number of ECEC institutes and solve a shortage of settings for child and family, how to ensure quality of practices should be taken into consideration as well as quantity of institutes.

Provision for Child and Family

As for provisions for child and family, each eligible child receives an allowance from municipal offices and pay tuition to "Kodomo-en". The tuition is fixed rate and sets an upper limit. "Kodomo-en" is also provided costs from their municipal office. Each child and family shall find their institutes and contract with "Kodomo-en" by themselves. "Kodomo-en" shall oblige compliance except justifiable grounds which are as follows:

- No vacancy
- More applications than capacity
  ("Kodomo-en" must present criterion for selection and carrying out selection)
- Other specified conditions

If they have a difficulty to find "Kodomo-en" by themselves, their municipal office should give a guidance and a help to support family.

Others

To meet their serving family and local society's needs, "Kodomo-en" could offer "early morning care", "late night care", and "weekend/holiday care" which can be charged extra fee. "Sick child care" is provided by municipal office.

3. Arguments: Issues and Challenges Toward the New ECEC System

The following points will be discussed in the presentation:

(1) What types of services is to provide education and care?

- How can we identify education and care as a matter of service is my first argument point. It might be related to an issue of meanings of profit and ideas of investment.

(2) Ensuring a high quality of education/care for ALL children?

- When we state "for all children," it must mean ALL children without any exception. Why is it difficult for us to meet the needs for ALL children? What action can be taken?

(3) Making better for whom?

- Easier for stakeholders? Rather complex and confuse? Better for all children? How should we know it functions well?

(4) Linking other educational systems or standing alone?

- Globally, the ECEC system is not compulsory but voluntary. What does this mean to us? Where the ECEC systems should be located in the circle of education?

Multicultural Issues in Early Childhood Settings

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1. What is it like to be an Immigrant Teacher in the U.S. Schools? The Challenges They Face

   JeeHae Lee *(Associate Professor, Troy University, U.S.A.)*

2. The Influence of Cultural Pluralism and Effective Ways to Meet the Social Relationship Standards in Kindergarten

   SoYoung Kang *(Associate Professor, Westminster College, Pennsylvania, U.S.A.)*

What is it like to be an Immigrant Teacher in the U.S. Schools? The Challenges They Face

JeeHae Lee
Troy University

The purpose of this study is to examine the lived experiences of a multilingual and multicultural immigrant teacher in a Pre-Kindergarten classroom as she works as a certified teacher in the U.S. public school. A phenomenological research methodology was used as a philosophical approach for this study. This study found that the immigrant teacher experienced sociocultural challenges due to the cultural differences, prejudices, and her lack of cultural capital of the host society. The study concludes with implications for early childhood policy with regard to the visa process and credentialing process that concerns immigrant teachers in a Pre-Kindergarten educational setting.

In spite of the increasing need for more teachers from similar cultural and linguistic backgrounds with English language learners in the U.S. schools, there has been little research on immigrant teachers (Gordon, 2000; Hwang, Baek, & Vrongistinos, 2005; Omi & Winant, 1994; Subedi, 2008). The lack of understanding about immigrant teachers often contributes to the prejudice and discrimination against these teachers in the U.S. schools (Ozbarlas, 2008; Yee, 2008). To fill this gap in research literature, the researcher conducted a research study of an immigrant teacher in order to understand the challenges she faced in the U.S. public schools.

The main focus of the study is to gain understanding of the challenges the immigrant teacher faces in the U.S. public schools. This aspect of the experiences of an immigrant teacher was examined through phenomenological interviews.

The main research question in this study is "What is it like for an immigrant teacher to meet the challenges she faces in the U.S. schools?"

Research Method

A phenomenological research methodology was used as a philosophical approach for this study. Phenomenology can be defined as the study of structures of human experience or consciousness. The phenomenon of this study is how an immigrant teacher finds herself in the situation where she faces challenges in the U.S. public school.

Research Contexts and Participant

For research procedures and methods the researcher followed the suggestions made by well-known phenomenological researchers, such as van Manen (1990) and Dahlberg, Dahlberg, and Nystrom (2008).

The immigrant teacher met the following criteria that the researcher set for the participant selection: born outside the United States; speaking English as a second or foreign language; receiving formal education from K-12 in her mother country, came to the United States as an adult; experienced a credentialing process; currently working as a full-time and certified Pre-Kindergarten teacher in the U.S. public schools.

The participant, Mares, is from the Republic of Colombia and satisfies the aforementioned criteria. Mares has been living in the United States for 20 years and married a man from her home country. She is 43 years old and has no children. She has been teaching for 7 years in the United States and obtained her bachelor's degree in Early Childhood Education from her home country. She is currently teaching Pre-Kindergarten students as a lead classroom teacher

Data Collection

Data for this study were collected from phenomenological interviews and bridling journal entries.

Phenomenological interviews. The interviews were semi-structured, and the interview questions were used as guidelines and did not exclude the participant's interest. All interviews were audio-taped and carefully analyzed. The list of questions that guided the researcher during the conversational interviews, is as follows; 1) Tell me about your life in your native country before you came to the United States, 2) Tell me why and how you became an immigrant teacher in the U.S. public school system, 3) Discuss the teaching experiences in the U.S. schools.

Bridling journal entries. Phenomenological researchers such as Dahlberg, Dahlberg, and Nystrom (2008), suggested bridling as a necessary part of phenomenological study, which was defined as a process in which the researcher took an open stance, scrutinized his or her involvement with the phenomenon, and continually reflected upon how meanings "come to be" (p. 16) in the research. During the initial phase of the bridling journal entry, the researcher explored her pre-understandings of the challenges that an immigrant teacher might have and how she might meet her challenges as much as possible. As data were collected and analyzed, the researcher created a system to bridle. A bridling journal entry was written and dated after each data collection event. After each interview, it was transcribed and the researcher recorded her learning from the transcript. Then these new understandings were compared to and contrasted with the initial bridling statement. By doing so, the researcher was able to see the differences and similarities between these two documents and interrogate her assumptions and pre-understandings about the investigated phenomenon.

Data Analysis

Whole-part-whole analysis. The researcher used the whole-part-whole analysis, which was advocated by Dahlberg, Dahlberg, and Nystrom (2008), Vagle (2010) and Van Manen (1990). Table 2 shows a brief summary of this whole-part-whole analysis conducted.

Table 2
Whole-Part-Whole Analysis Conducted

Phase	Guidelines	Specific notes
I. Holistic reading of entire text	· Read the entire data collection and did not make any interpretive notes · Got reacquainted with the data	
Ⅱ. First read of data	· Used highlighting approach	· Highlighted meaningful statements and phrases · Briefly described them on the margin · Wrote comments/questions on the margin
	· Used the bridling journal to explicate my thoughts.	
Ⅲ. Follow-Up questions	· Reviewed margin notes in order to generate follow-up questions. · Conducted follow up interviews to clarify meanings important in describing the phenomenon	
Ⅳ. Second read of data	· Used highlighting approach	· Articulated the meanings based on my highlighted markings and margin notes. · Follow up with participant
	· Created a separate document for each participant	· Moved each highlighted statement to a new document and made sure to contain all of the potential parts that might contribute to answer my research questions

Table 2
Whole-Part-Whole Analysis Conducted (continued)

Phase	Guidelines	Specific notes
V. Third read of data	· Highlighting approach	· Articulated my analytic thoughts about each highlighted markings and continued this process with each participant's interviews and bridling journal
	· Read across each participant's data and looked for patterns	
	· Gave preliminary titles to patterns and added to deleted analytic thoughts	
	· Saw each pattern of meaning in relation to the whole	

Findings

Sociocultural Challenges

The challenges with regard to the immigrant teacher's lived experiences resulted from two contributing strands, including systemic (e.g., visa process) and cultural differences (e.g., acculturation and language barrier) as well as lack of cultural capital and isolation from colleagues.

Visa process. Mares had to go through the visa process when she came to the United States in order to be considered for a teaching position. Mares described the visa process as painful, time consuming, and expensive. The regulations, procedures, time, and expense for the visa process were set by the U.S. government, and the immigrant teacher had no control. The possible reasons why some of the U.S. public schools do not sponsor a work visa (H-1B) for immigrant teacher applicants, may be due to responsibilities and risks they take on when hiring foreign teacher candidates such as 1) high demands of filing a lot of legal documents for a public inspection and collaboration with the Department of Labor (DOL); 2) legal processes that is time consuming and not time sensitive to the school schedule; 3) some hidden costs and risks when school districts sponsor the work visa. As a result, the responsibility to get a work visa (H-1B) is left entirely on the shoulders of immigrant teachers. Thus, the visa process plays a significant role as a systemic gate-keeper against the immigrant teacher candidates when they try to enter the U.S. public school system. This hurdle can position immigrant teachers as disentitled (see Fleras & Elliot, 1999; Henry, Tator, Mattis, & Rees, 1995) to be a teacher in the United States for their lack of proper visa status.

Cultural differences. Mares also experienced challenges because of the differences in educational beliefs and practices between the U.S. schools and her home country. In Bascia's (1996) study of immigrant teachers' experiences in their teaching careers in Canada, the author described that each participant in the study expressed "a sense of cultural dissonance and a struggle to come to terms with the cultural worlds they knew" (p. 7). Mares faced similar challenges. Growing up in a school environment where the teacher's authority was greatly respected by parents and students, Mares noticed students' disrespectful behaviors towards her when she started teaching in the U.S. public schools.

Although several studies (Britzman, 1986; Bullough, 1989) suggested that teacher education courses or professional learning had little effect on the teacher's prior beliefs, the findings of this study suggested otherwise, especially when it came to the instructional method. For example, Mares, who came from a country where children already knew letters, letter sound, numbers, and colors before they entered Pre-Kindergarten, kept the same expectation for her students in the U.S. schools. However, after the professional learning session on the State standards and curriculum of Pre-Kindergarten, Mares immediately adjusted the level of her expectations and delivered instructions appropriate for her students in the U.S. school. As this example indicates, teacher education courses

and professional learning seem to have a significant effect on the immigrant teacher's reconsideration for her prior beliefs and her practices in U.S. schools.

Acculturation. Different cultural beliefs and practices led Mares to an acculturation process in which she adopted the norms and practices of the U.S. public school culture. During the process of acculturation, Mares not only developed a new teacher identity by redefining her teacher role in a new cultural context, but also negotiated different perspectives of the teacher's role, status, and instructional methods (Kamler, Reid, & Santoro, 1999) in order to fit into the U.S. school system.

Language barrier. Many researchers (Bascia, 1996; Flores, 2001;Myles, Cheng & Wang, 2006; Phillion, 2003) pointed out that language has always been viewed as a main barrier among the challenges confronted by immigrant teachers. There is a finding from this study that contradicts the currently believed idea about the correlation between the length of exposure to the dominant discourses and an immigrant teacher's internalization of the dominant discourses. Hodge (2005) claimed that when immigrant teachers are repeatedly exposed to the dominant discourses that they are not the holders of the right English for a certain period of time, immigrant teachers internalize such discourses and start doubting their teaching and linguistic competence. However, Mares did not demonstrate such negation of a professional identity. For example, she observed a remarkable development among her Pre-Kindergarten students in the end of school year in spite of her Spanish accent. Mares seemed to consider her students' academic progress and performance as a better indicator for her competence in teaching instead of internalizing dominant discourses focusing on the language itself.

Lack of cultural capital. Mares experienced challenges because of her lack of cultural capital. The cultural capital in this study means cultural knowledge and social skills possessed by people in the U.S. mainstream culture (Bourdieu, 1986). Considering that school teachers are positioned as key players who transmit cultural capital and educate students to dominant social norms, dominant discourses privilege people from the mainstream culture for their possession of cultural capital and marginalize immigrant teachers because of their minority status in the host society. Mares experienced challenges because of her lack of cultural capital. For example, coming from Colombia where teachers could openly discuss and express their thoughts about almost all issues regarding their children, Mares unintentionally made American parents upset when she attempted to frankly share her thoughts with the parents as she had been used to do so with parents in Colombia. She had a conflict with one of her students' parents after she called the parent's son "a liar" when the boy accused Mares of something that she did not do in the classroom. Her principal reprimanded Mares that she should not call a student a liar in front of the student's parent and asked Mares to apologize the parent for it. This is an example of how Mares's lack of cultural capital, which was, in this case, her lack of cultural knowledge about what was acceptable or unacceptable to say to a parent about her child, could cause a conflict and became a challenge for Mares.

Isolation from colleagues. The immigrant teacher also experienced challenges when she was isolated from colleagues in the school. There are several researchers (Henry, Tator, Mattis, & Rees, 1995) who studied about immigrant teachers' social isolation and separation in the school building. Considering the fact that immigrant teachers make up only 2.5 percent (Afolabi & Eads, 2009) of the teacher workforce in the State, it is not surprising that the participant of the study found herself being the only immigrant teacher in the school building or sometimes even in the entire school district. In a study of 125 pre-service teachers in the United States, Hadaway, Florez, Larke, and Wiseman (1993) found that most of these pre-service teachers reported few personal experiences in culturally diverse settings. Many of them expressed their fears about teaching students from a culture different from their own (Association of Teacher Educators, 1991; Hadaway, Florez, Larke, & Wiseman, 1992). If these teachers feel uncomfortable about teaching students from culturally and linguistically diverse backgrounds, they can also feel the same about immigrant teachers in the school building.

Discussions and Implications

This study concludes with implications for early childhood policy with regard to the visa process and credentialing process that concerns immigrant teachers in a Pre-School educational setting.

As the researcher searched information regarding a work visa (H-1B) for immigrant teacher candidates, she began to learn that the teacher education programs admission process and the public school hiring process conflict with each other regarding the work visa. In order to be a certified teacher in the U.S. public school system, the immigrant teacher candidates must meet all requirements (e.g., completing required coursework and student teaching, passing the teacher certification exams, possessing a valid work visa). The problem is that the teacher education programs at the universities do not give admission to the immigrant applicants unless they have obtained the visa that allows them to work in the United States. This system is not workable for immigrants who want to be a teacher in the U.S. public school systems. No matter how hard they try to meet the requirements and follow the rules of the system of the host society to be a school teacher, they cannot reach their dreams because the system is inherently designed to make the immigrant teacher candidates fail in the end.

This systemic barrier should be lifted for the sake of both the U.S. school system and the immigrant teacher candidates. The U.S. public schools will continue to have more students from culturally and linguistically diverse backgrounds, and will therefore continue to need teachers from diverse backgrounds similar to their students. With the current system that the United States offers to immigrant teacher candidates, however, there will be the loss of many qualified teachers who can contribute to solving the teacher shortage problem and improving learning experiences of students from diverse cultural and linguistic backgrounds.

The lived experiences of a Pre-Kindergarten immigrant teacher are shared in this study with its focus on the challenges she faced. This study attempted to promote our understanding of the lived experiences of an immigrant teacher. Through this understanding, the researcher hopes that the readers can see that although an immigrant teacher looks and sounds different from teachers born and raised in the United States, the immigrant teacher is a competent professional who enriches the lives of students and deserves our respect and appreciation.

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The Influence of Cultural Pluralism and Effective Ways to Meet the Social Relationship Standards in Kindergarten

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In recent years, the wave of multiculturalism has hit Korea, and the influence of cultural pluralism has changed many aspects of people's life including the education for children. One of the standards in Kindergarten addresses the importance of social relationship, and it is becoming more critical for teachers to help students to successfully meet the criteria as the diversity is impacting the structure of the family, school, and community.

The perception of multiculturalism in Korea has changed rapidly due to the increasing number of international/interracial marriages and its impact on the family, education, and social structure. Koreans are facing a critical turning point and realized that the negligence of the children from a multicultural family will lead to severe problems in the society. The schools focus on supporting cultural inclusion by making adjustment to the curriculum and providing culturally appropriate learning environment.

Korean government has added some new social policies related to multiculturalism that can assist specifically the school age children and their family who share different cultures. Additionally, the schools endeavor to educate volunteers who can help these students at school and at their home. The schools are working towards reestablishing their curriculum and pedagogy as well. Nonetheless, the problem still remains as the focus is mostly on 'assimilation' instead of much on respecting individual differences/identities and valuing cultural pluralism. It is essential to move away from the ethnocentrism towards valuing the cultural differences whether it is related to the race, ethnicity, class, gender, language, religion, age or exceptionalities including the disabilities and the gifted. In a way, it is moving from the melting pot to the salad bowl or from *jook* (Korean porridge) to *bibimbap* (Kang, 2009). The metaphor of melting pot or *jook* indicates the importance of acculturation or assimilation and focuses on mixing everything together to make it into one common product, whereas the salad bowl or *bibimbap* signifies the essential aspect of valuing the uniqueness of each ingredient and respecting the individuality. As the influence of cultural pluralism is also impacting the standards in kindergarten curriculum, the view of interpreting the social relationship criteria has changed to meet the needs of the children. Consequently, the role of school and teacher should be reexamined along with how caring is defined.

The View of Multiculturalists

According to Banks (1993), multiculturalists believe that education should be reformed to give more attention to the experiences of people of color and of women. To work successfully with students from diverse cultural, ethnic, and language backgrounds, teachers should be knowledgeable about the cultural characteristics of their students. He also believes that diversity enriches a society in terms of providing individuals with more opportunities to experience other cultures and helping them to become more fulfilled individuals (Banks, 2006).

The cultural pluralists, opposed to the assimilationists, assume that "the cultures of students of color are not disadvantaged, deviant, or deficient; rather, they are well ordered and highly structured but different from each other and from the mainstream, dominant culture" (p114, Smitherman, 1999). The cultural pluralists also assume that students of color have some unique learning characteristics, and assert that viewing minority groups as inferior that is related to the cultural deficit model has been associated with the perpetuation of institutional racism (Baratz & Baratz, 1970). As this model

invites teachers to encourage students to adopt predominant cultural norms instead of respecting unique cultural practices, it has a serious impact on educational practices (Banks, 2006). Thus, the cultural pluralists suggest that the school curriculum and teaching strategies should be revised to be more consistent with the cultural, cognitive, and learning characteristics of students (Boykin, 2000; Gay, 2000; Lee, 2001). It is clear that the pluralists or multiculturalists value the cultural difference model whereas the as similationists use a deficit model (Delpit, 1995; Lee, 2001; Suárez-Orozco & Suárez-Orozco, 2001).

Teachers should be more receptive to students' various perspectives by acknowledging 'pluralism' and 'qualified truth' instead of 'absolute truth'. According to qualified relativists such as Thayer-Bacon (2003), "the construction of knowledge is social, interactive, flexible, and on-going" (p. 113), and we have to recognize our limitations and think that we could be wrong. Thayer-Bacon argues that "(e)pistemological fallibilism entails (e)pistemological pluralism" (p. 49). In addition to this, she argues that "democratic communities always-in-the-making are what protect us from fears of vulgar relativism, as we openly argue and discuss and debate our concerns within our own communities as well as among other communities, even communities we can only imagine" (p. 49). Overall, Thayer-Bacon places emphasis on "the social negotiating process that inquiry must go through, to help us settle our doubts and satisfactorily end our inquiry" (p. 72).

With the perspective of pluralist or multiculturalist in mind, it is acknowledged that the school should value and reflect cultural diversity. However, as Banks (2006) mentions, "it should not promote the practices and beliefs of any cultural group that contradict the core democratic values of the United States" (p. 326). His point is that the pluralism must take place within the context of national unity.

Cultural Pluralism in Korea

In recent years, there was a change that shaped the composition of Korean population. There are several reasons that follow, such as having many migrant workers from China, Bangladesh, Nepal, Myanmar, Thailand, the Philippines, Indonesia, Sri Lanka, Pakistan, Vietnam, Mongolia, Russia, Nigeria, and Ghana, and also due to the increased number of international/interracial marriages.

Most foreign brides are from China, Southeast Asia, especially from Vietnam and the Philippines. Nearly one of every seven marriages in Korea, about 14%, was between a Korean and foreign national (the Korean National Statistical Office, 2005). Sometimes the marriages of Korean males with women from the neighboring countries were pre-arranged with women who come to live in Korea without speaking the language or knowing the culture (Uhn, 2007; Kim 2008; Kang, 2006). This has impacted the structure of the family, and caused some problems such as their children's confusion on the identity, communication, and even the dropout from school as those children struggle with various barriers such as the language, culture, inclusion, or the feeling of being accepted by the peers or the community that is related to the sense of belonging.

Kindergarten Standards and Cultural Inclusion

Due to the problems caused by the social change in relation with multiculturalism, Korean kindergartens began to focus on supporting inclusion for all, and adapted the curriculum that could be beneficial for both the students who are considered as 'pure Koreans', and the minority especially the children who were born through interracial marriages. The schools try to create a culturally appropriate learning environment not only by simply modifying the curriculum, but also by adding various cultural events such as inviting guest speakers from other countries to share about their cultures and differences.

As both National Association for the Education of Young Children (NAEYC) and the Korean Kindergarten Curriculum standards include a section on the relationship/social relationship, it is clear that "…to encourage each child's sense of individual worth and belonging as part of a community

and to foster each child's ability to contribute as a responsible community member" (www.naeyc.org) or "to help young children develop knowledge and value of self, learn to cooperate with others, and take interest in and adapt to the surrounding environment" (Proclamation of the Ministry of Education and Human Resources Development, 2007) is critical.

Through building collaborative relationships with each child's family, especially children from diverse backgrounds tend to do better in school. It was proved that the students excel more and display more positive attitude when families are involved in their children's education regardless of socioeconomic status, cultural background, or the parents' own educational opportunities or achievement (p. 193, Huerta, 2009).

There are many effective instructional approaches that could help teachers to use in order to enrich students' learning in terms of cultural inclusion, and addressing the social relationship standards. James Banks (2001) focuses specifically on developing a multicultural curriculum. He defines four approaches and they could be applicable to Korean Kindergarten classrooms.

1. Contributions approach: the study of heroes, food, festival
2. Additive approach: "special" week or a month
3. Transformation approach: the entire Eurocentric nature of the curriculum is changed and students are taught to view events from diverse ethnic and cultural perspectives
4. Social action: students make decisions on important social issues and take actions to help solve them

Another method to assist students to learn about the aspect of social relationship could be practiced through applying problem-posing method of education instead of the banking concept of education (Freire, 1970). When teachers use problem-posing method, students will experience the power balance or shared power between the teacher and the students in their classroom. Students can learn that everyone can help each other to become better knowers. Teachers' understanding of the qualified truth instead of the absolute truth could lead them to avoid the stereotypes, help students to think creatively, and reach their whole potential which would be a positive growth.

In addition, teachers should not hesitate to use culturally relevant instructional materials. Students should be exposed to the cultural diversity constantly in a natural manner, not only during a special guest's visit. Look around the classroom and think about how much of the cultural diversity is displayed on the wall. How can you set up a classroom that reflects various learning styles? Check the classroom library and see whether there are any culturally relevant books on the shelves. How about the toys or the lunch menu? Reflecting culture in the curriculum could take place anywhere or anytime during child's learning but it is more relevant for younger children to be exposed to cultural pluralism and learn how to respect individual's differences before they build any prejudice or generalization on other cultures through the eyes of the adults or the media.

Understanding Identity

According to Foucault (1980), "the individual is not a pregiven entity which is seized on by the exercise of power. The individual, with his identity and characteristics, is the product of a relation of power exercised over bodies, multiplicities, movements, desires, forces" (p. 73). Since people are constantly influenced by their context, it is important to understand the context of the people in order to understand their identities.

Another aspect of identity that we need to consider is about the possibility of people having multiple identities. The fact is that everyone has multiple identities and it is natural when one makes the important distinction between personal and social identity. One does not necessarily have to possess a single identity, but rather these multiple identities will help people to adapt to different settings more easily with flexibility. Also, we need to focus both on 'the given identity' and 'the formed identity.' The given identity can be something one was born with, which people have no

choice of whereas the formed identity is one that has been developed after birth, by oneself as well by people around that person (Kang, 2006).

Social Beings

As social beings, we learn from each other constantly by interacting and socializing. This explains the importance of a relational (e)pistemology. As Thayer-Bacon (1998) mentions, "as social beings, people grow and develop, learn a language and culture, and form a sense of self, all through their relationship with others. We need each other to be better thinkers" (p. 38). She tells us that our lives are surrounded with relationships with others and these relationships directly affect our abilities to become knowers since we develop a sense of "self" through our relationships with others, and we need a sense of self to become potential knowers.

Because students spend a large amount of time in school, it serves as the major institution other than the family for maintaining and perpetuating the culture (Ornstein and Levine, 2006). The school does not only supply the tools necessary for survival but also ensures the transmission of knowledge and values to future generations. Ornstein and Levine (2006) also explain that "schools uphold and pass on the society's values, beliefs, and norms (rules of behavior), not only in lesson subject matter but also through the very structure and operation of the educational system" (p. 289).

Conclusion

Human beings are socially constructed and constantly influence one another in constructing knowledge. Since we live in the world with people, not by ourselves, we need to learn how to live together in a more pleasant environment where everyone can be valued and respected. In order to build positive and healthy relationships with people, it is essential for us to learn how to care for each other effectively. When the topic comes to care theory, many people tend to believe there is a universal caring. This is when people see caring in the majority setting and take that majority view to be the norm. It is problematic if people try to apply what is considered as the norm to everyone else including ones who do not belong to that setting. The one-caring should be more open to the voice of marginalized people who are neglected. It is important that we learn how to care for people differently, not in the same way. Since everybody is unique, treating people the same way will actually end up discriminating against people. Instead of thinking that the world is a melting pot, we need to see it as a salad bowl, where we see each ingredient or individual more distinctively rather than just mixing them together and seeing them as one. That is what we need to do for care theory as well. However, if we only focus on differentiating, people would not have anything in common. In other words, we also need to see what we have in common along with what we have in difference.

As the diversity in Korea rapidly increases, the classroom can be full of students sharing different backgrounds of culture, race, gender, class, religion, and other variables. Having diverse students and understanding them will be another challenge for teachers, and the teachers' role in educating children to live and work together respectfully is becoming more critical. Culturally relevant teachers also should not be hesitant to utilize students' culture as a vehicle for learning (Ladson-Billings,1995). By understanding the cultural pluralism and the importance of social relationship in this era, the schools including kindergartens can certainly create a healthy classroom for all the students.

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Enhancing Quality in Early Childhood Education and Care

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1. A Strong Start for Every Child: Enhancing Quality of Pre-school Education in Singapore

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3. A Fair Starting Point for Education: Anti-Poverty and the Early Child Development in China-Case Study and Policy Consideration

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A Strong Start for Every Child: Enhancing Quality of Pre-School Education in Singapore

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The early childhood education landscape in Singapore is a diverse one where parents can choose from a variety of pre-school curriculum approaches and programmes according to their preferences and needs. Under the existing policy framework, pre-school education is not compulsory and is provided entirely by the private and community sector. Today, almost every child attends pre-school for at least a year before starting formal school at Primary One. To achieve desired educational outcomes, the Singapore government focuses on enhancing the quality of early childhood development through strategies aimed at raising teacher capacity, improving programme and centre quality, and increasing affordability. In addition, the Education Ministry in partnership with community agencies has put in place support measures targeted at children from disadvantaged backgrounds. This paper aims to discuss the approach and strategies adopted in promoting quality pre-school education by the Singapore Government from 2007 to 2010. Preliminary effects of the current efforts and areas for further enhancement will also be discussed.

Singapore is a small and culturally diverse city-state in South East Asia that has a total land area of 712 square kilometers[1]. As Singapore has no natural resources other than its people, she is dependent on an educated workforce to drive its economic development. Hence, it is not surprising that education is particularly valued in Singapore.

In a relatively short history of 46 years since independence, the government has sought to maximise Singapore's economic potential by focusing on and investing in the formal education system catering for all from the age of 7. Pre-school education (PSE) before the primary years has traditionally been left to the private sector, resulting in a diverse spread of pre-school programmes that cater to the different needs of children as well as the different preferences and expectations of parents.

Overview of the Pre-School Education System in Singapore

PSE in Singapore refers to a formalized three-year pre-school education programme for children aged 4 to 6 years: the Nursery, Kindergarten 1 (K1) and Kindergarten 2 (K2) levels respectively. PSE in Singapore is not compulsory and is provided for by kindergartens and child care centres. All pre-schools are run by the private sector, including community foundations, religious, social and business organizations, with a variety of pre-school programmes using different curriculum approaches and models.

Kindergartens are registered with the Ministry of Education (MOE) and regulated under the Education Act (1958) while child care centres are licensed by the Ministry of Community Development, Youth and Sports (MCYS) and regulated under the Child Care Act (1988). Child care centres also provide infant and toddler care for children from 2 months to 3 years old.

Philosophy on and Approach to Pre-school Education

In Singapore, the family is the basic unit of society and plays a central role in the upbringing of children. The Government supports the family's primary responsibility for education by facilitating a variety of early childhood care and education (ECCE) models and operators for parents to choose

1) Singapore Department of Statistics, 2010

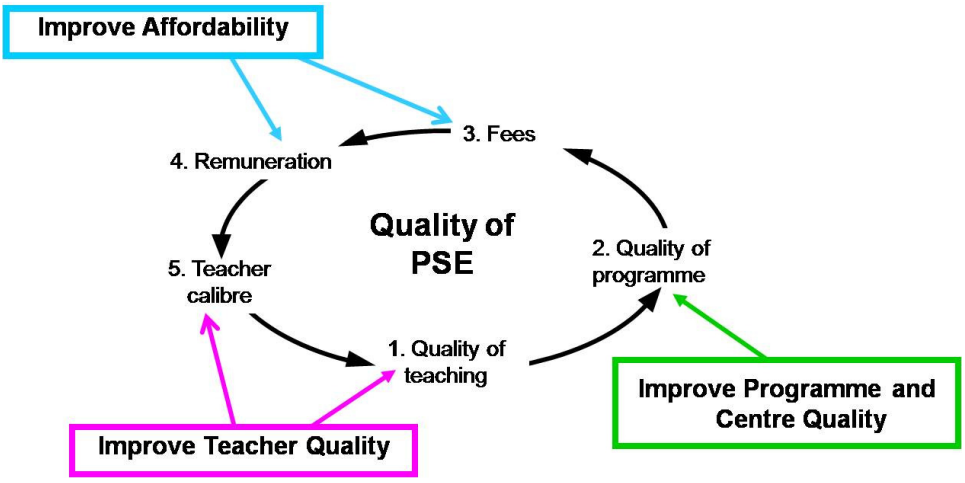
from, and providing targeted government assistance for affordable PSE.

The early years are crucial for children's development and PSE lays a strong foundation for children to become life-long learners. The government recognises that it is important to ensure that PSE programmes are appropriate for and remain adaptable to the needs of pre-school children. They should not become mere extensions of the formal school system, whereby early childhood years become overly structured and focused on preparing children for primary school.

Even though PSE is not compulsory and is provided entirely by the private sector, almost all Singaporean children attend at least 1 year of pre-school currently. With the high attendance for PSE, the government's approach is to ensure that high quality PSE is accessible to all children by setting broad guidelines to ensure a baseline of programme quality and to achieve the desired educational goals.

Key Strategies to Enhance the Quality of Pre-school Education

In the last review of PSE in 2007, key levers for raising the quality of PSE within the existing framework of community and private provision were identified. Key strategies focused on improving teacher quality, quality of pre-school programmes and centres, as well as improving the affordability of quality PSE.



Improving Teacher Quality

With pre-schools being run by the private sector, there is little impetus for the operators to invest in raising teacher capacity, and this is evident in the image of pre-school teachers, their poor remuneration and working conditions.

In recognition of the fact that teacher quality is critical to enhancing the quality of PSE, the government has focused on raising the calibre of teachers joining the pre-school sector. Since January 2009, the minimum academic and professional qualification requirements of pre-school teachers have been raised and pre-school teachers are now required to have at least a diploma in ECCE. To further raise teacher calibre, measures have been put in place to attract mid-career and fresh university and polytechnic graduates, for instance, introducing an accelerated diploma course and providing financial incentives. As a result of these initiatives, a majority of the teachers have attained the raised standards of minimum qualifications and a small number of more capable teachers have been recruited.

To oversee the quality standards of pre-school teacher training provided by the various privately-run training agencies, the Pre-school Qualification Accreditation Committee (PQAC) was jointly set up by MOE and MCYS in 2001. The Committee ascertains that courses conducted by privately-run

teacher training agencies meet the prescribed standards. These include the course content of training programmes, modes of assessment, trainer qualifications, training facilities, and resources. The latest revision of the PQAC standards, implemented in 2009, has added greater rigour to the accreditation framework of pre-school teacher training programmes.

Scholarships, teaching awards, and bursaries are offered to teachers and principals to encourage them to undergo diploma and degree courses in early childhood education (ECE). In addition, MOE provides continual professional development opportunities by organising and conducting workshops, seminars and conferences on curriculum planning, pedagogical principles, as well as leadership and management knowledge and skills. To further develop the early childhood workforce, awards are presented to outstanding teachers to acknowledge and honour their contribution towards the development of our young children. Through this award, it is hoped to identify and build up a pool of teacher mentors to develop teaching expertise in the pre-school sector.

Improving Programme and Centre Quality

As PSE in Singapore operates on a decentralised model, the quality of programmes offered is uneven. In order to encourage pre-schools to improve the quality of their management and programmes, the government has put in place several measures designed to boost standards and develop peaks of excellence.

One key initiative is the implementation of the Singapore Pre-school Accreditation Framework (SPARK) in January 2011. This enables kindergartens and child care centres to participate in voluntary quality assurance and accreditation through external assessment. Through this quality assurance exercise, pre-schools can examine their structures, processes and outcomes, address the gaps and work towards improving the quality of their education programmes and overall administration.

To ensure at least a baseline of programme quality, MOE continues to develop and provide curriculum resources to support pre-schools in designing and implementing quality programmes for their children. In addition, to promote a culture of innovation and experimentation, grants are given to encourage pre-schools to try out new ideas that will have an impact on the quality of teaching and learning, pupil development, and school management.

Improving Affordability

The government recognises that it is crucial to ensure that children from disadvantaged backgrounds have access to and benefit from more education opportunities. Hence, teacher salary subsidies are provided to pre-schools that cater mainly to children from lower-income households. This helps to keep fees affordable while allowing pre-schools to attract and retain better-qualified staff and implement better quality programmes. Financial assistance is also made available to low-income families to help them pay for school fees as well as the initial expenses of sending their children to pre-school.

Recognising the importance of PSE, MOE, MCYS and community-based organizations conduct an outreach to lower-income families to encourage them to send their children to pre-school. To further increase pre-school participation, MOE has been working with primary schools since 2007, to identify children who do not attend pre-school at the point of registration for Primary 1. These efforts are bearing fruit as the pre-school participation rate for Singapore citizens has increased from 95% in 2006 to 99% in 2010, making it one of the highest in the world, even though PSE is not compulsory in Singapore.

Children from lower income families also tend to lack opportunities for listening to and speaking the English Language, which is the medium of instruction in schools. MOE has put in place strategies such as the Focused Language Assistance in Reading (FLAiR) programme that provide additional support to children who have difficulties with English. These efforts at leveling up opportunities in the pre-school sector have helped to improve the learning outcomes of children as

indicated by the reduction in the percentage of children requiring learning support at Primary 1 over the past five years.

Moving Forward

Since 2001, the government has made incremental steps to raise the quality, affordability and accessibility of PSE in Singapore. Although efforts and investments in PSE have yielded improvements in uplifting the sector, some gaps remain to be addressed.

Teacher quality continues to be a concern. There is still scope to examine how pre-school operators can be supported to attract and retain better trained and qualified teachers and to raise the professionalism of teachers. Data from the external assessment of pre-schools have surfaced curriculum and pedagogy as weaker areas, suggesting unevenness in classroom practices. There is thus a need to look into the training of teachers and trainers to deepen their understanding of the curriculum framework and how to translate the framework into quality classroom interactions. In addition, the depth of local expertise in ECE has been largely stagnant over the years. This shortage of higher qualified trainers is a limitation to efforts in raising teacher quality.

As pre-schools embark on the accreditation journey, there is a need to continue to create platforms for sharing of good practices as well as to support the pre-schools in putting in place quality improvement processes.

Promoting Professionalism of Early Childhood Care and Education in Japan

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Recently, growing attention has been paid to early childhood care and education in Japan, too. Neuroscience has confirmed and explained that providing the professional care and education in the early years of life is critical from many aspects of children's development. Current rapid changes in Japanese society and family resulted in new needs for early childhood care and education. A lot of measures have been introduced in order to increase the birth rate and to support working parents. Considering the increasing scientific knowledge and rationale, there is no convincing reason for belittling and spending less on early childhood care and education than on schools for older children. However, the field seems to be in a chaos in Japan.

The amount of the Japanese government's expenditure for young children (age 5) is only 1/6 of those of the older children. The understanding of what good quality early childhood education means among the ECE professions, has not become widely known by public. For example, the understanding of the importance of free play activities and respect for children's self-motivated play activities, which is common among ECCE professionals, is not well known either general public. Some parents and other people believe that early intervention and teaching of a lot of knowledge and skills with the teachers' directions are important. On the other hand, some people think that teachers for young children are just taking care of their children in order not to be hurt and keep peace among children. The professionalization of our field is still a critical issue. The understanding of the reflective professionalism of young children's teachers is still not in general, in Japan.

In this presentation, I would like to introduce three current policy issues in ECCE in Japan, (1) preparing more ECCE services through integration, (2) elementary school transition programs, and (3) family involvement. Then I would like to give recommendations and suggestions for promoting our field in a united way in Asia.

1. A New System Toward the Integration of Early Childhood Care and Education

One of the obstacles for promoting early childhood care and education in Japan was the sectionalism among ministries. I believe that we should avoid such compartmentalization and consider ECCE as a whole rather than separate issue. However, until recently, the diverse system of regulations formed a barrier. There are a lot of children who cannot attend day care centers because of the lack of the capacity, however, at the same time, there are a lot of kindergartens with vacancies, being under-enrolled. In some areas, there are some districts where an overpopulated day care centers stands right next to a kindergarten with vacancies.

The first issue regarding the integration of the system is the need to increase the number of the institutions. Although the Japanese government has been working hard to reduce the number of children on waiting lists for day care centers, the problem has not been solved, yet. There were 48,356 children on waiting lists for day care centers and 87.7% (42,410) of them were younger than 3 years old; and 54.4 % were in Tokyo and 17 big cities (out of which Tokyo its represented by 23.8%(11,499)) (MHWL 2011).

This problem should also be considered from the children's perspectives, with special regard to their rights. Not all children and parents have the right to choose an institution for their children freely as Japanese day care centers only take children whose parents are (both) working. So children under the age of 3 have no choice but to go to day care centers if either of their parents is not working. The Japanese government started to promote family day care and play centers but I think we have to see the research results on quality evaluation among ECE providers by UK (Sylva, et al

2010) and other countries.

Access is also an issue as mostly capacity is the main concern when accessibility should also be examined. As the number of children is decreasing in the countryside of Japan, some children have to take a 3 hours bus ride daily to attend the ECCE institutions. In Japan, there is no public system to support children in the countryside, although there are such examples such countries as New Zealand where there have a correspondence education and the system of networks.

It seems that the decision about the integration has been made, however, there is still a lot of discussion about it. The new integrated institution will be regulated in both the School Education Act and the Child Welfare Law. The new integrated institution might be expected to match the requirements for both Kindergarten and Day Care Center. In addition, further expectations are being discussed, such as forcing self evaluation to be done at all institutions, disclosure of information, supervision, and in-service training.

2. Elementary School Transition Program

The issue of elementary school transition is not a new topic in our field. With the traditions of the Japanese ideologues, such as Souzou Kurahashi, of Tokyo Women's Normal School(currently Ochanomizu Univ.), the pioneer in the history of early childhood care and education in Japan, and Heiji Oikawa of Akashi Women's Normal School(currently Kobe Univ.), the one of the 8 pioneers in the history of the Japanese New Education Movement, Japanese ECCE field practitioners and professionals feel much more comfortable with ideas such as, intre-subjectiveness, double contingency, ambivalence, reflexivity, reactivity, and child-centeredness. In elementary schools, the term "directing (shido) is used, which is not often used in the ECCE field, where "support (shien)" is used instead, even if shido can also be found in some official MEXT materials. In elementary schools, "class (jyugyo)" is used, but the ECCE field hesitates to use this word and tends to use the word "practice (jissen). In addition, in ECCE settings, terms such as autonomy, active learning, and response are more likely to be used. The methods for the educational practice are also different. Elementary School teachers often tell the students the aim of each class period at the beginning of each 45 min. class. Thus, elementary school education is goal-oriented while, preschool education focuses on the process.

In my research with Prof. Mimura and Prof. Yoshitomi of Hiroshima University (Kitano, Mimura, & Yoshitomi, 2006) according to elementary school first grade teachers in 3 cities, children's emotional intelligence has recently been decreasing. From our questionnaires, it was clear that what elementary school teachers want and expect from preschool education most, was to prepare learning attitudes for young children. Elementary school teachers said that gradually 1st grade children become worse at listening, and at expressing and explaining their own ideas, and at sharing ideas and emotions with friends. The Central Education Council (2005) also pointed out that Japanese children's motivations for learning are very low. Children are good at memorizing things but not good at questioning by themselves. They are not good at using knowledge and skills to make decisions on their own.

There is more focus on this issue, recently, as there has been a lot of report telling that many elementary first grade classes are disordered. Both the revised national guidelines for Kindergarten (MEXT 2008a) and Elementary School (MEXT 2008b), and the revised guideline for Day Care Centers (Ministry of Health, Labour, and Welfare (MHLW) 2008) emphasize the need to create a smooth transition program for children from ECCE settings to elementary schools.

The attitudes and the ways of evaluation are also unique in ECE. In preschool institutions, children are not given tests or grades. They are only tested after they enter the 1st grade of the elementary school. The way that children's achievement and condition are recorded is also different. From April 1st 2010, all ECE institutions are to hand the Child's Individual Record Cards to the elementary school when the child enters the elementary school (Kitano 2011a).

The problem of transition to elementary school is related to other issues as well. In many countries, the education and care institutions are shifting from the private to the public domain,

however, in Japan, the privatization of the early childhood care and education seems more likely to happen. Though most elementary schools are public, we have a lot of private kindergartens. About four times as many children are enrolled in private kindergartens as are enrolled in public ones. The numbers of children enrolled in private and public day care centers are almost the same but the number of the enrollment of public day care centers has been decreasing. As for this, there are huge differences of practices between ECE institutions. Regulation for recommendation for in service training is legally strong for public institutions but not for private institutions. For this reason, there are huge gaps between ECE institutions. It can be said that this makes elementary school education too boring for some children.

I would like to introduce the results of my granted research project taken from 2007 to 2011 (Kitano 2011b). In order to analyze what children are learning during the free play activities in the eldest classes in preschool and to correlate the contents of their learning with those of elementary school's subjects, visual data of free play activities of 5 year-olds class in the Kindergarten were gathered for 63 days. The 124 play episodes were examined and contents of their learning were compared with those listed in the national guideline for elementary school education. As the result, it was made clear that all of play episodes included contents of learning in the subjects of elementary school education. This revealed that the preschool children's free play activities provide multiple learning opportunities. Though the free play approach is different from the structured approach of the elementary school, varieties of the subjects did not show a wide difference. The quantities of contents were quite similar to those provided in Physical Education (38%), Art (21%), and Life Environment Studies (18%), Music (10%), and Home Economics (7%). Their might have been some individual difference as each child has its own preference. We focused on one certain child but the child did not show a selection bias during the observation period. Some contents shown in free play activities were the same as those they taught in the 5th grade.

In our research, we corrected both of the all eldest classes' classroom newsletters of ECCE settings and all elementary school first grades' classroom newsletters in a city during one school term in 2008 and we compared the contents of their learning. 57% of the places were the same for both ECCE setting and elementary school field trips. There were examples showing that 1st grade elementary school children were taken to the same places for field trip that they had already visited when they were in the preschool. Through the research, we found that there are significant overlaps between ECCE and elementary school education and sometimes there are inversion phenomena. The study suggests the importance of transmitting information about the contents of learning in early childhood education, though information is limited to only about family and children with special needs, in Japan. The transition program should not expect to provide early instruction of studies but coordinate what children learn in preschool with what children learn in elementary school.

The research also found that though there are huge overlaps in the contents of learning in ECCE and elementary school education, there are huge gaps in the methods and goals of education between the ECCE and elementary school education. By observating free play activities in ECCE, it was clear that preschool teachers are expected to make a lot of live decisions through interacting with children's interactions, and the teachers tend to value children's learning process and socio emotional development rather than the results of learning. Preschool teachers tend to expect preschool children to set their own goals, and find problems rather than just solve them (Kitano 2011b).

Though it became compulsory from April 1st 2010 for all ECCE institutions to hand the Child's Individual Record Cards to the elementary school when the child enters the elementary school, there are problems for both the elementary school and ECCE teachers to understand each other. From 2007-2011, I made interviews and had lesson studies with ECCE and elementary school teachers, and also co-organized the Liaison Council of ECCE and elementary school directors. Form the interviews it became clear that a lot of elementary school teachers do not use or even do not even read the Each Child's Record Cards as the focus and contents of the card are different from their interest. Some elementary school teacher pointed out that the way ECCE teachers write is too abstract. Other teachers said that they wanted to know more about the contents of learning, such as what knowledge

and skills they learned and how they learned, and with which educational materials. On the other hand, from the interviews with ECCE teachers, it became clear that they tend to value human relationship the most, and children's socio-emotional development. We had 8 lesson studies taken place at ECCE institutions, using videos of children's free play situations. After watching the videos, teachers were asked to write down their insights on what children learned during the free play episodes. As the result, 78% of the contents the teachers named were on human relationships such as the socio-emotional development towards friends. Less than 24% of the contents were about certain knowledge or practical skills. We also asked the teachers about what they might do in the situation to improve the children's learning. What they said most often was "watch over (mimamoru)", followed by "make admissions (mitomeru)", "make up with adding words (kotoba wo oginau)", "empathize (kyokan suru)", and "share (kyoyu suru)".

From the research (Kitano 2011b) it can be seen that we tend to withdraw into the shell of our field and do not make the importance of our field clear to the outside world. The research suggests the need to improve evidence based narrative approach in order to make people understand the reflective professionalism of preschool teachers and to make people in general understand play as the basis of learning for young children.

3. Family Involvement in Another Context: Japanese Kosodate Shiene (Child Rearing Support)

As a lot of researches show that family involvements provide positive effects on children's because they make them comfortable at ECCE settings and also improve children's success, regardless of race/ethnicity, class, or parents' level of education (National PTA). However, Japanese family involvement seems to be in another context. Since after the revision of the national curriculum guidelines for both kindergarten and day care centers in 2000, it officially become the preschool teachers' duty to take care of children and support families in the institution's districts not only if their children attend the institution but even if they just happen to live near the institution. Regulations on child rearing support in ECCE settings were one of the parts of measures intended to help increase the birthrate. With the collected data, I classified the child rearing support practices in 4 categories (1) providing play programs directed by preschool teachers (2) opening up the ground for children and parents to provide safe playgrounds (3) giving educational consultation often on an individual basis, done by presidents or chief teachers, and (4) organizing and planning edification talks to the parents (They often take care of the children in the districts during the talk and thus it becomes a refreshment for parents) (Kitano & Tateishi 2006).

As you can see from these 4 categories, the child rearing support practices in Japan are originally started out from something like services that provided by ECCE settings to families in their districts. I have been working on three research projects with local ECCE associations in different districts (with more than 150 ECCE institutions) on family involvement in order to find a way to get parents involved and make them as partners in improving early childhood education rather than just givint them support by providing services. From the questionnaire survey to the all chief practitioners in one of the cities where I worked for 2 years, it was clear that they focused on supporting families in needs but not with, at the beginning when we started the research project. Most of ECCE institutions had parents' day events where invite d parents as guests and information about the children's development and practices in institutions were only provided in a one way fashion rather than as a discussion. In order to have family involvement on a daily basis and have more interactive communication, it is needed, for example, to sharing information in both ways, have parents make decisions on the practices by drawing a direct line, and so on. As preschool teachers tried to have more daily interactive involvement with families, they found gaps between the educational values for children and found the need to express the ECCE professionalism to ensure the best interest of the child. Things that are obvious to ECCE professionals are often not shared with parents. The researches made it clear that Japanese ECCE teachers were really modest and tended not to explain their contribution to the children's happiness and development but were satisfied just to see the children's happy face and development. I am proud of the ECCE field's tradition of voluntarism and

philanthropy. However, too much reliance on the tradition may not be economically and educationally advantageous recently.

4. Conclusion: Towards Evidence Based Narrative Approach to Improve the ECE Policy

The professionalization of early childhood care and education in Japan is a crucial and urgent issue. In order to get more political and financial support for our field, we have to work together to show scientific evidence to ensure the children rights. To ensure high quality early childhood care and education is critical for children's right. We now have more and more research evidence and easy to understand benchmarks to monitor the quality of early childhood care and education. Profssionalization of our field is important, though it is difficult. However, the professional knowledge is important. Share the knowledge and ideas to make improvement. Let us work together across national borders. I have been calling for "Evidence based narrative approach" in order to improve the ECCE policy. I believe that by informing general public and especially parents about the professionalism of ECCE practice, we can improve the field with better relation with public.

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A Fair Starting Point for Education: Anti-Poverty and the Early Child Development in China - Case Study and Policy Consideration

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Educational equity, an educational ideal which has been advocated in the development course of modern education, is an extension and manifestation of social justice in the field of education. A fair starting point for education is a direct reflection of educational equity, and is a basic and evident sign of it. Preschool education, as the beginning of lifelong education, lays the foundation for education as a whole; it is an indispensable part of a country's educational system, the most important aspect of a fair starting point for education, and the starting point and an essential part of social justice. It is appropriate to say that equity in preschool education means a fair starting point for education, and that developing preschool education, especially addressing preschool education concerns about disadvantaged children such as needy children, disabled children and minority ethnic children, has great significance for promoting a fair starting point for education and thus for promoting educational equity, intercepting the intergenerational transmission of poverty, building a harmonious society and achieving social justice.

Research Context

The Chinese Government Pays Great Attention to Preschool Education and Equity in It

The great significance and multiple functions of preschool education is increasingly drawing attention of the Chinese government which considers preschool education an organic part of its comprehensive social reform and public education reform and strives to drive the development of comprehensive social services, poverty alleviation in rural areas, and social justice and harmony through preschool education reform.

It is Imperative to Break Bottlenecks in Preschool Education Development in China

Since the founding of the People's Republic of China, remarkable achievements in preschool education have been made and the access problem of urban preschool children has also been solved basically, and kindergartens in some developed areas have already reached levels in developed countries. In poverty-stricken rural areas, however, the development of preschool education is quite backward. This problem has always been the bottleneck to the development of preschool education in China. According to statistics on basic education in China, in 2008, there were 134,000 kindergartens throughout the country, 48.1% (64,000) of them are in rural areas; there were 24,749,600 children at kindergartens, only 43.1% (10,673,600) of them are from rural areas and there were 1,434,200 kindergarten teachers and staff, 22% (315,400) of them are at rural kindergartens. Given the fact that the rural population is around 80% of the country's total population and most of rural families have two and even three children, however, each of the above three indicators for rural areas should be at 80%, and even higher, of the country's total. Therefore, the development of preschool education in rural China is exceptionally inadequate, both in size and quality; not only do rural children have far less access to education than urban children, but they also cannot compare with their urban counterparts in terms of quality of education received.

Improving the status quo of preschool education in rural areas is critical to promoting the country's preschool education. It is an unavoidable and imperative mission for us to give rural

children a fair starting point for education, to give them access to fair and quality preschool education and to provide them with good opportunities and conditions for lifelong development, letting each child grow healthily and create their beautiful lives.

Our Action

In August 2009, the "Project Team of A Fair Starting Point for Education" of Beijing Normal University launched its social experiment, titled "A Fair Starting Point for Education: Anti- Poverty and the Early Child Development in China", in the poor county of Ledu, Qinghai Province. This social experiment attached importance to eliminate poverty by the root, hoping to work out the macro-framework and practical proposal for promoting the integrative development of needy children by deep exploring Anti-poverty Model with Chinese characteristics, so as to make Equity of Educational Starting Point be an effective approach to get out of intergenerational transmission of poverty, and achieve social equity and national development.

The Profile of Ledu

Qinghai Province is located in western China. In recent years, Qinghai has enjoyed a rapid growth although it is one of the poorest provinces in China. The GDP for 2009 was just 108 billion RMB (US 15.8bn) and contributes to about 0.3% of the entire country's economy, ranked next to last among 31 provinces. Ledu County is one of the state poverty counties in China, also one of the poorest areas in Qinghai Province. In Ledu, by June 2009, there were about 15,700 children aged 0 to 5, about 2,610 at each age on average; that is, there were some 10,000 children in the 2-5 age group, who should all have been admitted to kindergartens. But currently there are 8 kindergartens (1 publicly run, 1 collectively run, and other 6 privately run) in all in the county, which accommodate a total number of 4,992 children, far unable to meeting the needs of schooling of preschool children.

Most parents are migrant workers, who are working in the city year round. Their children are left at home and usually fostered by their grandparents without their parents in Ledu County. More serious problemis that most of the old grandparents are illiteracy. The grandparents are unable to give education during the Enlightenment. Because of remoteness and scattered habitations, there is almost no chance for left-at-home children to receive normal preschool education. The development of their sociality development, intellectual enlightenment was delayed which leads to the lacking of confidence, being shy away from contact with people and so on.

What have We Done?

a. Create "Itinerating Teaching" model, Set up ECCE Sites

Facing this predicament, we are trying to explore a better model of anti-poverty in China’s poor area. This model must conform to the situation in China, especially in the poor regions. Considering this, we have created an "Itinerating Teaching" model. And we also turned this model into real action.

Because of the long distance between villages, it is very difficult to get the children together. So we let the teacher move. The preschool teachers itinerate around different villages to provide early childhood education for local children. We called this model "Itinerating Teaching". And the preschool teachers for this model are "Itinerating Teachers".

We set up 83 ECCE Sites in 83 villages, recruited and trained 46 itinerating teachers. Most of the ECCE sites were set at the primary school of the village.

b. Teacher Recruitment

First we announce the recruit information. And later we got 105 candidates' applications. Table 1 shows the educational background of the candidates. We can find out that most of the candidates graduated from the technical secondary schools. There are rarely candidates who received bachelor's degree.

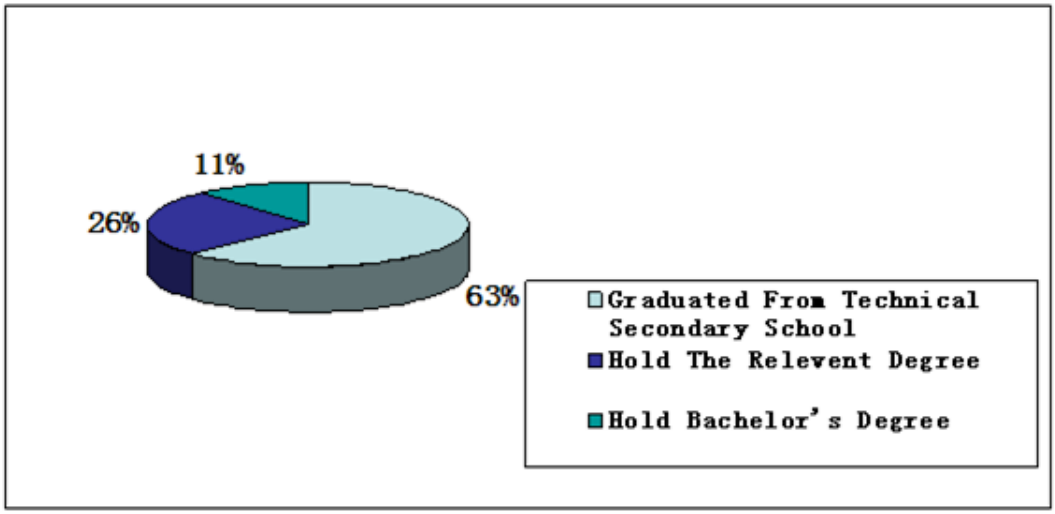
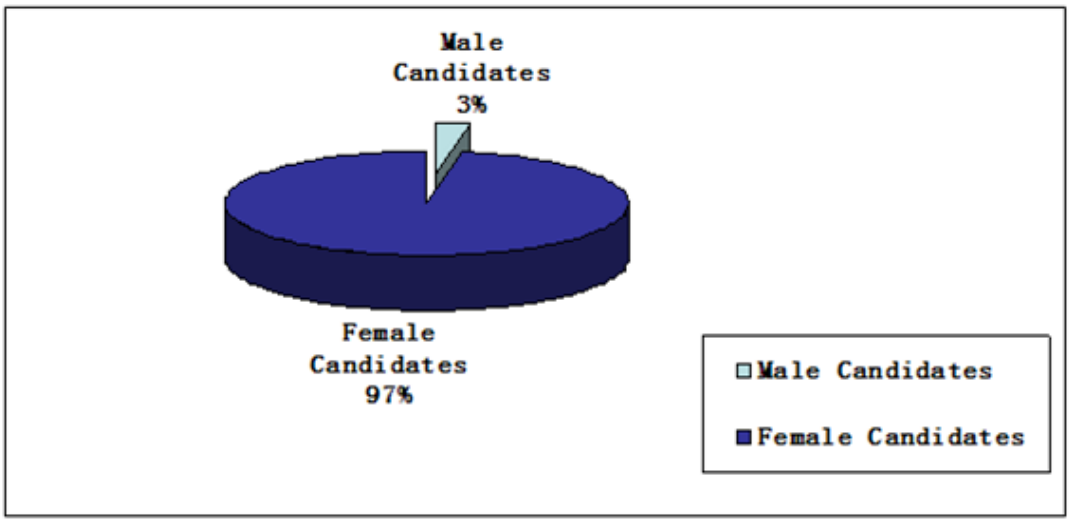


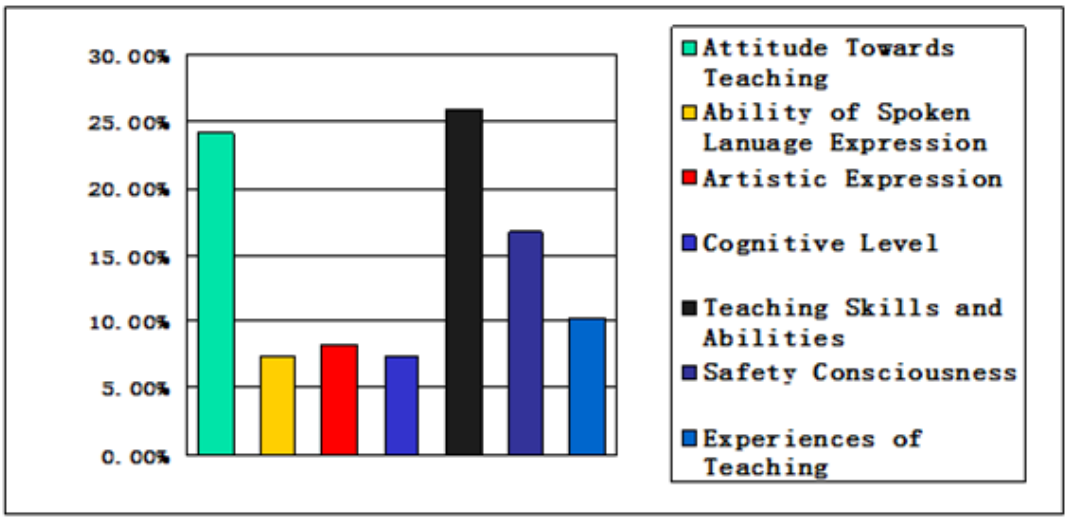
Table 2 shows the sex ratio of candidates. Not surprisingly, there are few male candidates applied forthe position. At the end, only 2 male candidates passed the examination and became one of the 46 Itinerating Teachers.



The recruitment contains 2 parts: written test and interview. We design the written test following these principles. First, combine knowledge with ability. Second, combine theory with practice. Third, combine rational thinking with affective thinking. Fourth, combine skills and technique with professional knowledge.

In order to get better understanding of each candidate, we took an interview after the written test. The interview had several sections, which allows candidates to have the opportunity to show their overall ability. Interview jury was composed of nine persons who came from three fields: 2 experts from the Beijing Normal University, 5 outstanding kindergarten teachers (4 from Ledu, 1 from Beijing) and 2 Project Officers from China Development Research Foundation. The judges raised 108

questions in the interview. These questions mainly focused on the basic criteria to be a qualified itinerating teacher. These questions can be divided into seven aspects, including the attitude towards teaching; the expression ability of oral language, artistic expression; the cognitive levels; teaching skills and abilities, safety consciousness and the experiences of teaching. From this chart we can find out that teaching skills and abilities is the field that judges were most interested in. (Table 3)



Each candidate's interview results were scored from the 9 judges' points, getting rid of the highest and lowest points, and averaged the left 7 points to get the final points. Finally, 46 candidates who passed the examination in 105 would soon become the Itinerating Teachers.

c. Teacher Training

The kindergarten teachers, soul of preschool education, serve as the bridge between school curriculum and children, playing vital role in guaranteeing sustainability of preschool education projects in impoverished areas. This project attempts to find an effective set of methods for professional development of kindergarten teachers in impoverished areas. We have trained the future teachers after the recruitment. There are 3 steps in further training: background training, technical training and practical training.

1) The background training attached the importance in the theoretical knowledge of preschool education, including pedagogy and psychology of early childhood education, and the overview directions of preschool education from the government. We used two reports to fulfill the background training: one is The Characteristics of Preschool Children and the Teaching Points; the other is "Overview Directions of Preschool Education" and the Development of Early Childhood Education Reform in Rural Areas.
2) The technical training attached the importance in teaching ability of the future teachers. The experts explained the curriculum design ideas and the teaching technical for the future teachers.
3) Practical Training: The teachers are categorized into several groups and each group takes up the task of one or two villages. There are two persons in one group who are jointly responsible for early childhood education and education for the parents as well. They provide early childhood education every week in villages for 3-5 year-old children who had no access to kindergartens so as to "make up" their lack of family education.

What will We Do Next?

a. Organize "Mom's club" and introduce the knowledge of family education.
b. Organize "play groups"and set up Children's Interaction Club;
c. Organize "Parent school"and popularize the knowledge of civic education.
d. Establish a "mentoring system" and provide "direct-style" and "ladder-style" services;
e. Using "online conference"to provide the long-distance guide.

Project Consideration and Vision

The project of A Fair Starting Point for Education: Anti- Poverty and the Early Child Development in China, is a comprehensive social study conducted in collaboration with nongovernmental organizations, the government, and research institutes. By providing all-round nursing and educational services to disadvantaged children in rural poor areas, the project is designed to provide the state with suggestions about its social justice policy decision-making, work mechanisms for social justice actions, and sustainable development strategies.

Ultimate Aim

Our Ultimate Aim is to provide the practical framework…
- for the state's policymaking in anti-poverty and social justice.
- for the state's project on large-scale anti-poverty projects in rural areas - working mechanism, operational procedures and sustainable development strategy.
- for the state's Equity of the Education Start - organization structure and teaching model.
- for state's rural pre-school education teacher team construction, job requirements, certification authority, training model and incentive mechanism.
- for state's anti-poverty strategy - multiple cooperation model between non-governmental organizations, government and research institutions.

Policy Consideration 1: China's Way Out of Poverty

More and more people of insight have recognized that a fair starting point for education is the starting point and an important part of social justice and has great, lasting significance for the development of individuals, family harmony, social harmony and national advancement.

The Chinese government has paid increasing attention to the importance of a fair starting point for education. President Hu Jintao articulated the need of "attaching importance to preschool education" in his Report to the Seventeenth National Congress of the Communist Party of China (CPC), and demanded effort to "develop preschool education in rural areas" when addressing the Third Plenary Session of the 17th CPC Central Committee. The country's National Education Plan further raised three tasks, "achieving universal popularization of preschool education", "clarifying government duties" and "attaching importance to preschool education in rural areas", and required the implementation of major programs to "accelerate preschool education in rural areas."

a. Universal popularization of preschool education

1) Institutional assurance: "clarify government duties"
2) Work emphasis: "attach importance to preschool education in rural areas" and
3) Implement government duties in rural preschool education: organize and carry out "programs that accelerate preschool education in rural areas."

b. Several Opinions of the State Council about Present Development of Preschool Education: Plan as a whole the government duties and rural preschool education, and implement the action plan of three-year preschool education.

c. Local governments play a primary role in developing preschool education and addressing the "kindergarten crunch."

Policy Consideration 2
: Implications of Anti-Poverty Beginning with a Fair Starting Point for Education

This point is a consideration based on the meaning and value of preschool education, and an action-based reconsideration of the meaning and value of preschool education. As the beginning of lifelong education and the foundation of basic education, preschool education is an indispensable part and the beginning of the country's education system. With China's social and economic development in a stage of transition and a new starting point in its educational reform and development now , a re-examination and careful consideration of the foundation-laying, long-acting, pluralistic and multiple roles of preschool education would have great significance.

a. Preschool education is of great value to the physical and mental health, habit formation and comprehensive development of children

The early years of children is a period in which individuals grow rapidly, both physically and mentally. In this period, individuals adapt themselves quickly to society after getting out from mothers' close body into open families, institutional and social environments; their brains develop rapidly, nervous connections are established fast, and their complicated cognitive abilities begin taking shape. This period is the most important period for individuals to get acquainted with basic human characters, such as walking upright, using tools, and communicating by using languages.

Extensive physiological, psychological, sociological and anthropological studies at home and abroad have proved that the preschool period is vital for physical and mental development of children, which lays the foundation for lifelong development of individuals. Just for these reasons, we can say that the "prepared environment and education" – that is, good preschool education – in this period is of great value to children's healthy physical and mental development, formulation of good behavioral habits, development of interests, and comprehensive development.

b. Preschool education is of great value to family harmony and the improvement of women's status

Families are the cells of society, while children are at the core of them. Whether or not children can grow healthily and happily through high-quality preschool education is an important issue concerning harmony of millions of families. The implement of the country's one-child policy makes each child become the core element which will influence members of various classes, for example, their fathers and mothers, grandfathers and grandmothers. Thus, preschool education has great significance for family harmony and social stability.

At the same time, the development of preschool development is closely connected with women's status. With children at school, women can not only work outside to increase family income and improve economic conditions, but also participate in social activities by which to improve their status

both at home and in society. In women emancipation terms, preschool education provides an important safeguard needed to ensure family stability and improve the quality of family life, and has great significance for maintaining women's rights and improving their status.

c. Preschool education is of great value for kids to school readiness and transition to primary school

Primary school education, as institutional education, differs from family education in requirements on behavioral habits, learning abilities and comprehensive qualities. Therefore, the role that preschool education plays in getting children ready for development of study attitudes and skills is of great importance to helping children get ready for school life.

One important goal of the renowned U.S. preschool education programs – Head Start Program and Early Head Start Program –is to effectively promote the school readiness of children and achieve the effective connection between preschool education and school education. Related research findings from these programs also showed that preschool education plays a positive role for school readiness and adaptation. It is justifiable to say that lack of appropriate and adequate school readiness leads to the lack of self-confidence, cowardice, and school failure of children at school. Therefore, preschool education is of great importance to school readiness.

d. Preschool education is of great value to improving the quality of compulsory education and the comprehensive qualities of the people

To what extent preschool education is spread and how good its quality is are closely linked to the quality of compulsory education, and appropriate, high-quality preschool education is of great importance in improving school completion rates, lowering drop-out rates and reducing school failures. U.S. preschool education programs, including Head Start Program and Early Reading First, have produced great effects on improvement of the quality of basic education, especially on students'study habits, interests and results, leading to increased completion rates and reduced drop-out rates in compulsory education.

It is proper to say that because the diffusion and completion rates of basic education have a direct bearing on the people's acquisition of basic knowledge and skills and their improvement of qualities and abilities, preschool education sets the stage for strengthening basic education, improving the country's educational system, and ultimately improving the people's qualities and promoting their comprehensive development.

e. Preschool education has great significance for preventing crimes and building a harmonious society

Antisocial behavior such as crime and violence endangers social harmony. The preschool period lays the foundation for the formation and development of individual emotional, personality and sociality orientations, for the establishment and development of such social relations as good parent-child relationship, companionship and teacher-student relationship, and for the formation and development of such pro-social behavior and qualities as friendship, sharing, cooperation and responsibility.

According to studies, antisocial behavior such as violence tendencies and assaults is closely linked to the early brain development and experience of children, and exertion of appropriate influenceon their brain development and acquisition of early experience will have a persistent effect on their display of positive emotions, good personality and social qualities in their adult lives. According to

a U.S. tracking research that lasted more than 30 years, preschool education delivers a much higher return on investment than other stages of education; for every dollar invested in preschool education, a return of 17.07 dollars was obtained, of which, 4.17 dollars was individual growth and 12.9 dollars for social public service, manifested in reduced investment in social welfare, remedial education and crime prevention, as well as increased tax payment. It is therefore evident that preschool education has a lasting, effective effect on preventing antisocial behavior, building a harmonious society and ensuring social stability.

f. Preschool education has great significance for promoting social justice and intercepting the intergenerational transmission of poverty

The problem of poverty is the bottleneck to social justice. Since the 1950s, the government-led, long-term preschool education programs, for example, the U.S.' "Early Head Start Program", the UK's "Sure Start", and India's "Integrated Child Development Services", have not only achieved great success in children nursing and education, but also made important contributions to social justice and poverty reduction in these countries.

Rural parents have much stronger aspiration than urban ones for their children to receive preschool education. A fair starting point for education is the hope for rural children to get out of poverty, change their fate and fuse into the process of urbanization. As poverty of knowledge is the root cause of poverty, promotion of human development should be the theme of Anti- poverty. Implementing the "rural preschool education promotion project", particularly "giving major support to the building and rebuilding of township and village kindergartens in central and western impoverished regions", is the human capital investment in needy children and families, an educational and social justice undertaking to combat and reduce poverty of knowledge, and a new move of development-oriented poverty reduction, which has great significance for intercepting at root the intergenerational transmission of poverty and ultimately realizing social justice.

In conclusion, our aims include:

- Developing the early child development in rural area through ECCT sites and Itinerating Teaching
- Exploring Anti-poverty Model with Chinese characteristics
- Providing macro policy references and practical proposal supporting the future national anti-poverty project and preschool education program.
- Hoping to make China's contribution to the world-wide anti-poverty process.

Policy Influences on Reading Education / Fathering Practices

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1. The Implication of No Child Left Behind Policy on Kindergarten Reading Education in the United States of America

   Guang-Lea Lee *(Associate Professor, Old Dominon University)*

   Joanne K. Sullivan *(Old Dominon University)*

2. The Role of Korean Fathers: A Comparison of Korean Fathering Practices in Korea and the United States

   Keun Kyu Kim *(Assistant Professor, Delaware State University, U.S.A.)*

   Jeayong Chung *(Journalist, Korea Broadcasting System (KBS))*

The Implication of No Child Left Behind Policy on Kindergarten Reading Education in the United States of America

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The United States of America is actively involved in initiating educational policies and proposing educational programs at the federal, state, and local level to raise students' reading scores. Legislators and stakeholders believe that reading ability is essential to a child's academic success. Studies have shown that a child's reading level by the end of third grade is a more accurate predictor of school success than any other variable - including family income, educational attainment of parents, ethnic or cultural identity or home language (Carter,1984; Duncan, et al., 1994; McLoyd, 1998). Several studies reveal that the early childhood years are most critical for literacy development (Hoffman, 2010 Schickednanz, 1998; Slegers, 1996; National Early Literacy Panel, 2008 Teale, et al., 2007). Successful development of literacy skills during kindergarten is an accurate and useful predictor of success in the remaining years of primary education and thereafter.

As new administrations are elected, new reading initiatives and policies are enacted, representing significant efforts at the federal level to improve literacy proficiency of children. When a new reading education policy is passed, the U. S. DOE must coordinate with stateagencies and local school districts to effectively implement the new guidelines. Although the federal government initiates various reading policies, it tries to avoid prescribing national standards and instructional activities as this infringes on the autonomy of state and local education agencies. While federal government leads the reforms of problematic policies, states are encouraged to proceed with their own plans and strategies. Generally, states have been flexible in their response to unique local situations because mandating uniform programs on a national level cannot provide the differentiated instruction needed to meet the needs of individual children with varying abilities. Since each of the fifty states has different reading policies, their instructional practices and assessment are also varied. This paper will focus on one selected state, Virginia, in order to assist readers understanding of the dynamics among federal, state, and local reading education policies and practices. It describes the implication of the No Child Left Behind Act (NCLB) on reading education policy in Virginia, the Virginia Standards of Learning (SOL), effective practices of teaching reading, and assessment of kindergarten student's reading ability.

Implication of NCLB Act on Reading Education Policy in Virginia

The federal NCLB signed into law in 2002 regulates school policies. School divisions are to ensure that all students reach standardized proficiency levels by 2014 (USDOE, 2011). For example, when a school identifies students who fail to pass the grade level benchmark, they must receive additional remediation instruction. This benchmark must be met regardless of ethnicity, specified demographic subgroups, limited English proficiency, or other identified disability factors. Student competency is demonstrated via standardized testing through which Adequate Yearly Progress is closely monitored. Since the introduction of the NCLB, all states have adopted standards of learning to measure student achievement, which impacts federal funding at the state, school district, and individual school (USDOE, 2011).

In order to meet the NCLB, the VDOE (2010) sets the state's standards of learning for each subject and grade. It also provides Curriculum Guides to help teachers understand what they are expected to teach. Specific learning objectives are established for each program, at grade level, for each subject, at each school district. Achievement of these learning objectives is a basis for evaluation of student performance and school districts are permitted to plan their own lessons, adopt

teaching materials, and design assessments to meet the standards. For example, the Chesapeake School District located in Southeastern Virginia states that "the Superintendent is encouraged to initiate research into courses of study and other means by which the division might enhance the educational program for the students (Chesapeake School Board Policy, 2010, section 6-13)." The school district encourages creating experimental and innovative programs to increase student achievement. Assessment of students' educational needs is the basis for such programs. While each school is at liberty to set instructional objectives, plan lessons, implement best practices, and informally assess student progress, school districts must test students annually in grades 3-8, and at least once in grades 9-12. This is required to monitor student achievement and ensure Adequate Yearly Progress, as well as offer alternative teaching strategies to meet the individual needs of all learners. Federal guidelines mandate that all students identified as having literacy deficiencies, must be offered remediation. This remediation is offered either during or after school, and continues until the student reaches or surpasses the literacy benchmarks (PALS, 2011).

The Virginia Standards of Learning (SOL)

Prior to the enactment of the NCLB, Virginia implemented its own learning standards in 1995 to ensure that students are prepared to enter the work force and become knowledgeable citizens after 12 years of public education. Virginia's SOL is the curriculum for each grade level from kindergarten through grade twelve, which provides learning outcomes in each subject area. The Virginia Department of Education (VDOE, 2010) provides teachers with sample lesson plans for differentiated instruction, intervention plans, assessment tools, and strategies to improve students' reading ability. Teacher accountability for teaching the standards is measured through the administration of the first Reading SOL test given in grade three (Maleyko, et. al., 2011). Thus, teachers should use the SOL as instructional groundwork for kindergarten reading instruction to improve oral language, reading, and writing ability (Virginia Board of Education, 2003). When using SOL, teachers need to be aware that well defined standards alone, cannot guarantee student success without highly qualified teachers who possess the appropriate instructional skills, appreciate diverse students, and believe in the abilities and talents of every student.

One major problem of SOL is using a reading program and a standardized assessment that may not match the needs of a local school. Some school districts, therefore, augment the standards by designing their own in order to reach beyond the state minimums. For example, in Chesapeake, teachers are encouraged to be innovative and exceed the state standards through the implementation of best practices. Their reading tests are city-created benchmarks given three times a year, classroom assessments, and school-based assessments, in addition to the PALS (Phonological Awareness Literacy Screening).

While Virginia complies with the NCLB federal policy, it opted out of implementing the Common Core of State Standards, a national initiative offering national curriculum guidelines since Virginia already has the SOLs, which exceed those standards contained in the national standards (Sampson, 2010, p.1). Marshall (2011), agreeing with Sampson, criticized the federal government's ever increasing role in standardizing curriculum: "The constitution does not provide for a federal role in education, and public schools have traditionally been under the jurisdiction of local authorities."

Effective Practices of Teaching Reading

The reading education goals in kindergarten are to teach all students to read fluently and comprehend various fiction and non-fiction texts. In order to meet these goals, the VDOE mandates that kindergarten students have two hours and fifteen minutes of uninterrupted instructional time in language and literacy activities. These blocked hours are used for Reading Aloud or Shared Reading (20 min.), Interactive or Shared Writing (20 min.), Letter/Word study (10 min.), Guided or

Independent Reading (60 min.), and Writing Workshop (25 min.). The literacy block helps children learn essential literacy skills - Concept of Word and Print, Phonological Awareness, Phonics, Fluency, Vocabulary, Reading Comprehension, and Oral Language (Ford, et al, 2008 Glasswell, et al., 2010 Miller, et al, 2009 National Institute for Literacy, 2003; National Institute of Child Health and Human Development, 2000; Schirmer, et al., 2010 Stone, 2009; Welsch, 2008).

During the literacy block, teachers create student-supportive teaching (e.g., coaching, modeling, and scaffolding), guided practice, and opportunity for application instead of teacher-directed practices. They limit lecturing because excessive amounts of "telling," especially where coaching students to come up with their own responses is possible, may rob children of the opportunity to take responsibility for their own skills and strategies (Taylor et al., 2002). Similarly, Miller, et al. (2009) stated that effective teachers know how to adjust the practices and assessments to help each child become a skilled reader and meet the learning standards. For example, during reading aloud to students, effective teachers are able to not only embrace interactive conversation but also modify the complexity of questions (Miller, 2010, p. 25). As such, effective teachers incorporate practices that appreciate the individual learning style and ability by engaging learners in differentiated and meaningful instruction. This task is especially daunting, as teachers attempt to fill the academic achievement gaps, yet, many perform effective practices that include implicit and explicit lesson, integrated content reading lessons, and a balance among whole group, small group, and independent activities (Pearson, et al., 2007; Taylor, et al, 2002). Several examples of student supportive teaching practices are explored in the Table. These activities are practiced during the reading block and integrated throughout the day in content area lessons which help all children acquire literacy skills, meet the kindergarten learning standards, and progress to the next grade.

Table
Student Supportive Teaching in Kindergarten

Teaching objective	Student practice	Literacy focus
Word family/rhyme patterns	Sort words by letter/sound relationships or spelling features in a word study notebook	Phonemic awareness
Alphabet study	Write the letter of the week in their journal, i.e. "V" is for Volcano.	Phonics
Writing	"Share the Pen" interactive writing	Fluency
Questioning strategies	Students answer how and why questions from a short passage	Comprehension
Sequencing	Students will illustrate a story when given the cue letters, "B," "M," and "E," (Beginning, Middle and End).	Reading
Oral language through poetry	Students maintain a poetry journal and illustrate the events, setting, or characters of the poem. Students practice the poem with peers and the teacher.	Fluency
Content reading	Students assemble a plant from pre-drawn plant parts and write words or sentences about the plant.	Vocabulary

Assessment of Kindergarten Student's Reading Ability

So long as a school complies with federal regulations, it is the school districts' discretion to adjust their assessments to match the wide range of emergent reading skills in kindergarten classrooms. Schools may informally administer additional assessments not mandated by the state or district. For example, when the administration and teachers believe that developmental spelling programs best support reading instruction, they may give a school based spelling test. In Virginia, kindergarten teachers use the Phonological Awareness Literacy Screening (PALS) to determine a child's fundamental literacy knowledge, and identify a struggling reader. If a student is identified as in need of remediation, the state mandates 150 minutes of weekly remediation, which continues until the student meets the required benchmarks. Kindergarten teachers also record student academic progress by maintaining Reading Levels, Observation Survey notes, writing samples and literacy interventions or remediation efforts in a student's classroom portfolio. Teachers also maintain a Kingore Observation Inventory (KOI) profile on each student from kindergarten through grade two. The KOI is a portfolio assessment tool used to aid in early identification of gifted and talented children. It is a collection of original work samples, such as, illustrations, language experience dictations, journals, learning logs, and video clips of reading profiling student ability in language, analytical thinking, motivation, perspective, sense of humor, sensitivity, and accelerated learning (Kingore, 2001).

In addition, teachers maintain student performance data on the Kindergarten Student Literacy Data (KSLD) form, and submit it to the school's Reading Specialist at the end of school year. The form includes four components: (1) PALS scores from Fall semester, Mid-Year, and Spring; (2) Observation Survey consisting of Letter Identification, Word Test, Concepts About Print, Writing, Vocabulary, and Hearing Sounds in Words (dictation); (3) Reading Levels; and (4) documentation of literacy intervention or remediation. While teachers use the information gathered in the KSLD form to justify and adjust instruction, reading specialists use it as a source for their planning guide, professional development, mentoring, and curriculum resources. Based on the student literacy data, the evidence is comprehensively analyzed by the teacher, principal, Reading Specialist, and parents as they contemplate a child's possible retention in kindergarten.

The federal policy also mandates the Annual Yearly Progress of both special needs and ESL students. In complying with the NCLB, Virginia ensures differentiated instruction and assessment for special needs students. Kindergarten students who are considered to have learning disabilities participate to varying degrees in regular classrooms depending on the severity of their disabilities. These learning disabilities may include, but are not limited to Intellectually Disabled, Developmentally Delayed, or other health impaired (IDEA 2004). Unlike special needs students, ESL students participate in regular kindergarten classrooms where no intervention is provided for their first language because they receive optimum benefit with full English immersion. It is believed that their language deficits, if there are any, will be met through the Virginia's kindergarten SOLs. Therefore, ESL students are identified, but not remediated at the kindergarten level in Virginia (VDOE, 2010).

Closing Remarks

Virginia is used as a representative case to illustrate the implication of federal policy on reading education in kindergarten in the United States of America. Although this paper is focused on reading education policies and practices in Virginia, the findings can be used to benefit all school systems around the world. However, readers need to be cautious that each school district, state, and nation is unique, and policy, curriculum, instructional objectives and activities, and evaluation procedures should be tailored to their specific needs. As the United States is newly exposed to the latest policy, the Elementary and Secondary Education (ESEA) Reauthorization Act of 2011-2012, aka NCLB Part

II, all stakeholders need to strive to understand how each child is unique and learns differently and be attentive to the unique characteristics of each child so that they can actively take responsibility for improving the reading skills of the nation's children.

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The Role of Korean Fathers: A Comparison of Korean Fathering Practices in Korea and the United States

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Age differences were examined in affective processing, in the context of a visual search task. Young and older adults were faster to detect high arousal images compared with low arousal and neutral items. This study explored various perspectives of Korean fathers' involvement in Korea and in the United States. The purpose of the study is to examine Korean fathers' perspectives on their involvement in children's schooling and provide suggestions for early childhood educators and teachers. Qualitative method and in-depth interview were applied for the primary means of collecting data. Five Korean fathers were participated in the study: two fathers in Korean and three immigrant Korean fathers in the US. Semi-structured interview protocol was used with four research questions about fathers' involvement both at home and at school. The results of the study overall indicate that two groups of Korean fathers commonly experienced difficulties and frustration when they were participated in their children's learning, schooling, and playing. However, immigrant Korean fathers acknowledged several barriers of their involvement such as language issues, cultural differences, and lack of concerns from US schools.

This study is a comparison of the involvement in children's learning and schooling exhibited by two groups of Korean fathers, one that lives in Korea and one that lives in the United States. To date, little attention has been given to the needs of father-child relationships in Korea. Although many educators and teachers are trying to involve Korean fathers in children's learning practices, few studies have been done in Korea (Jeong & Choi, 1995). There is a great deal of interest in the role of fathers in children's learning and schooling even though fathers are frequently left out of the parent involvement discussions in early childhood programs(Jay, 1996; McBride, Rane, & Bae, 2001; Turbille & Marquis, 2001). Over the past three decades, however, fathers have increasingly been recognized as significant contributors to their children's development (Pruett, 2000).

Studies on fathering in Korea are limited and have primarily focused on fathers' role in cognitive development, emotional development, academic accomplishment, and moral development of children. Few studies have investigated the role of the Korean father in children's education. In traditional Korean society, fathers' roles have been based on Confucian philosophy, which offers ethical teaching for human relationships. In Confucian teaching, children are expected to obey and respect their parents (Lee, 1998). The role of a Korean father is basically that of a strict, unemotional educator and disciplinarian, while the maternal role is that of a nurturer. Thus, there are recognized differences in the involvement of fathers and mothers in child-rearing in Korea.

In this paper, I will present the argument that the perspective of Korean fathers is different depending on their location; Korean fathers who have immigrated to the U.S. will play a different role in their children's learning and schooling than those fathers who remain in Korea. Where Korean fathers may be bound by the traditional Korean roles, immigrant Korean fathers are free from these cultural contexts. Further, immigrant Korean fathers face several cultural conflicts with their children. For these reasons, this comparative study will be helpful to compare differences between Korean fathers and immigrant Korean fathers.

Method

Qualitative method and in-depth interviews were applied for data collection. A semi-structured interview protocol was developed dealing with one overarching research question and four research questions. The overarching research question is: How are Korean fathers involved in their children's learning both at home and at school in Korea and how are immigrant Korean fathers involved in their children's learning both at home and at school in the U.S? This overarching question is broken into several sub-questions:

1. What do Korean fathers do at home to support their children's learning and schooling?
2. What do Korean fathers do at school to support their children's learning and schooling?
3. What are the difficulties and barriers experienced by Korean fathers when they attend to their children's learning and schooling?
4. How do children and wives respond to their fathers'/husbands' involvement?

Participants

The participants are two Korean fathers in Korea, one from the city of Chin-Ju and one from Seoul, and three immigrant Korean fathers living in the U.S, in Athens, Georgia. The participants meet the following criteria: a father who has at least one child between the ages of 6- to15-years-old.

One of the immigrant Korean fathers is studying at the University of Georgia, the other two are visiting scholars UGA. All three are temporary immigrants from South Korea who will be returning when they have completed their studies at UGA. I tried to select fathers who have different backgrounds and have children of varying ages. The following paragraphs provide descriptive information about the three participants.

Mr. J is an international student studying at UGA. He is a thirty-six year old husband and a father of two; his daughter is five and his son is an infant. He has been living in Athens for four years. His daughter (YW) was born in Korea and attends a Pre-K class at an elementary school in Athens. His new baby was born a few weeks ago. He and his wife were teachers in an elementary school in Korea. He is very interested in his daughter's education and physical development.

Mr. L is a forty-five year old professor, writer, husband, and father of two children: TH, a 15-year-old male, and TS, a 12-year-old female (both children were born in Korea). His family has been living in Athens for 11 months. He is a visiting scholar at UGA and is going to return to his home country of Korea during the summer because his sabbatical year has come to an end. As a professor and a novelist, he is interested in his children's reading and learning of English. In my opinion, he is very humble and modest.

Mr. K is a 43-year-old professor, husband, and father of two children: BC, a seven-year-old male, and BH, a five-year-old male (both children were born in Korea). His family has been living in Athens for four months. He is on sabbatical from a university in Korea and is a visiting scholar at UGA. He and his family are going to return to Korea next spring. In my opinion, he is very cautious and meticulous. His main concern is focused on his children's English skills and transition to new school environments.

I interviewed the two Korean fathers living in Korea during August 2010, in the cities of Chin-Ju and Seoul. Mr. Young is a 36-year-old father. He is the manager of a personal art institute and also works as a freelance artist. He has two sons; one of them is seven-years-old, the other is three-years-old. His wife is also working at the same institute as an art teacher. Managing the institute takes up a lot of his time and he sometimes feels stressed because of his responsibilities.

Mr. Ho lives in Seoul, Korea. He is an airline pilot. He is 42-years-old and has two daughters (one is 13-years-old and the other is ten-years-old) and one son (8-years-old). His wife is full-time homemaker.

Findings

Korean Fathers' Role at Home

All three immigrant Korean fathers commonly stated that their role at home is focused on checking the homework or assignments from their children's schools. The three immigrant Korean fathers always gave their children rides to school and listened to their children's difficulties at school. Their considerations are mainly related to their children's language development. For example, Mr. L and Mr. K hired personal tutors for their children. The tutors teach conversation and help with the homework. Also, Mr. L and Mr. K often visit libraries with their children in order to improve language skills. For older siblings, buying books may be too costly, so parents encourage them to go to the library and check out the books they like. Parents also rely on children to bring home books from the school library (Delgado, 2004, p. 52). Two fathers (Mr. L and Mr. K) want to create a good literacy learning environment for their children's studying while they visit libraries.

One interesting thing I found is that the younger father (Mr. J) spends a lot of time with his child in both indoor and outdoor activities. Whereas Mr. L and Mr. K spent a lot of their time assisting their children's learning, Mr. J, the younger father, said that he always reads books with his daughter before going to bed and that they often go for walks in the park together. I wondered how this finding would be related to the father's age or children's gender and age.

As for the two Korean fathers, Mr. Young often reads several books to his son and plays outside with him. Whenever his son asks to play computer games, they play together. Although he is busy working at his institute, he makes more time for his son than Mr. Ho. Mr. Ho never plays with his children; his main role is checking grades and report cards from his children's school. He often watches videos with his two daughters; however, he does not play with his son. I wonder whether these two Korean fathers' different perspectives of involvement in their children's activities at home are related to their age. Also, I am curious about how a child's gender may affect the father's involvement in children's activities at home.

Korean Fathers' Involvement at School

As for the three immigrant Korean fathers, Mr. J is an active volunteer in his daughter's school. If a teacher asks him to attend the Pre-K classroom as a volunteer or to participate in teacher-parent conferences, he readily consents. He can also freely discuss with the teachers about his daughter's life in the classroom and consult with teachers about the development of his child. He knows that parental involvement is important to children because he has worked at an elementary school for eight years in Korea. Indeed, he tries to improve his conversation skills in English by speaking with his daughter's teachers. Attending school activities as an enthusiastic attendee was one of the prominent aspects that I found in his interview.

On the other hand, two of the participants (Lee, 1998; Kang, 1993) have some problems when they are invited by schools to participate in their children's education. Language barriers are the most serious problems in teacher-parent conferences. They cannot communicate and share the problems of their children's lives well with their children's teachers. They want to be welcomed at schools. When they feel discomfort with the teachers, they shrink away from teacher-parent conferences and regular meetings. Delgado (2004) posits that when American educators use professional terminology, their language can sound unfamiliar, even to parents who are native English speakers. Thus, parent-teacher conferences need to be conducted bilingually for immigrant parents.

The two Korean fathers who live in Korea never attend school events or teacher-parent conferences. Mr. Young tells to me that there are several differences between Pre-K class in Korean public schools and private kindergartens. Although he is interested in the parents' program at his son's school, the school does not invite the parents, especially, a dual-income family. Mr. Young

says that his son's school has just two annual events (a picnic and a fall sports day) while there are various or diverse parents programs in private kindergartens in Korea. He never has been invited to participate by his son's teacher. It is a common thing in public schools in Korea. In the case of Mr. Ho, he believes that a good father is a good breadwinner while the mother is the main educator and caregiver for children at home. He says that if he does not earn more money, he may not properly provide a good quality of education for his children.

Discussions and Implications

While analyzing the data, I expected that by interviewing mothers and children about their expectations of their fathers' role, I would acquire some interesting funds of knowledge. In the future, I would like to conduct three-dimensional interviews (from the viewpoints of fathers, mothers, and children) about the fathers' role at home and at school for further study. I interviewed three Korean fathers who have different ages, despite similar education levels. After reviewing the data, I question whether the age of the father can affect their individual roles and involvement in children's learning and schooling, and whether their interactions with their children are related to the children's age and gender.

The common interests among the three fathers are focused on their children's linguistic problems. They pay attention to their children's reading and writing skills, specifically how their children improve their English skills. Moreover, two of the participants (Kang, 1993; Lee, 1998) have communication problems with teachers. These findings are very similar to Delgado's (2004) findings. Delgado (2004) says that Hispanic parents whose experience with the schools has been minimal or negative feel intimidated when meeting with educators because of language problems (p. 33). I am curious about whether the immigrant parents in Delgado's study and the immigrants in this study can speak English well, and whether they actively participate in their children's school events and activities.

On the other hand, the two Korean fathers in this study are mainly focused on the father's role as a breadwinner. However, there are some different aspects between the two Korean fathers; while Mr. Young is active and progressive in sharing parental roles at home and at school, Mr. Ho is not. Although Mr. Young spends about ten hours a week reading to his children, helping them with homework, and playing with them, Mr. Ho rarely participates in his children's learning and playing. The fathers' jobs and age (Mr. Young has a job with flexible time; but Mr. Ho spends more time in his company rather than at home), dual-income family status (Mr. Young and his wife both work; Mr. Ho's wife does not work), and number of children and children's gender (Mr. Young has two sons; Mr. Ho has two daughters and one son) may affect the different roles of Korean fathers at home and at school.

The purpose of this study is to gain a better understanding of the role of Korean fathers in children's learning and schooling in Korea and in the U.S. While I was interviewing the two Korean fathers living in Korea and the three immigrant Korean fathers, I found out about their wives, children, and teachers' expectations about fathers' roles at home and at schools and what their difficulties or barriers are when they participate in their children's learning and schooling. All of those I interviewed focused on their roles as supporters and partners with their spouses and children. They all said that they believe that their roles as fathers influence their children's learning and schooling.

However, immigrant Korean fathers have a more active role in their children's learning and schooling than Korean fathers. They try to share parental roles with their wives. They are supportive and contributive in their children's learning and schooling while reading books, providing a ride go to the libraries, helping their children's homework, and hiring personal tutors. However, there are barriers and problems, including cultural challenges and diverse needs from American schools. For example, when the immigrant Korean fathers attend school activities, such as parent-teacher conferences or school events, the three immigrant Korean fathers face enormous language barriers

which block their active participation. Also, I found that there are some different perspectives of fathers' roles at home and at school within the three immigrant Korean fathers.

As for the two Korean fathers in Korea, Confucianism affects the Korean fathers' role. In particular, Mr. Ho believes that the father is the breadwinner and manager of his whole family. The father's role also is focused on being the head of the family. This finding is very similar to Kang (1993) and Yang(2000)'s findings. She posits that the Korean fathers' role is mainly focused on working hard as a breadwinner while their wives take care of their children. Korean fathers typically focus on earning more money as a means to constantly increase financial security. In contrast, Mr. Young is less conservative from a traditional Korean father viewpoint. He tries to share parental roles and help his wife's work at home. Mr. Young apparently spends more time reading books and playing with his children than Mr. Ho.

In conclusion, there is a clear difference in the role of the father at home and at school between the two Korean fathers and the three immigrant Korean fathers. In fact, the latter group spends more time involved in their children's learning and schooling than the former. However, there are several different, individual perspectives among the three immigrant Korean fathers. Also, the two Korean fathers have markedly different roles at home and at school. The father's job, the status of a dual-income family, the number of children, the child's age, and the child's gender may affect the fathers' role at home and at school in this study.

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Policy Issues in Selected Countries

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1. ECCE in Malaysia: Current Status and the Way Forward

   Ng Soo Boon *(Head of Assistant Director in Curriculum Development Division, Ministry of Education, Malaysia)*

2. Three-Year Multi-Stage Study of the Impacts of Hong Kong Pre-primary Education Voucher Scheme

   Hui Li *(Assistant Professor, The Universityof Hong Kong, Hong Kong, China)*

3. Early Childhood Teacher Policy: Recruitment, Preparation, and Retention of EC Teachers in the United States

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ECCE in Malaysia - Current Status and the Way Forward

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Malaysia places great effort in ensuring education and care for all children. This effort is manifested through the many sectors involving in Early Childhood Care and Education (ECCE) and the progressively increasing amount of allocation given to ECCE each year. A milestone that has been achieved in ECCE is in formally recognizing the importance of preschool education (for the 4-6 years old) by officially including it as part of the formal education system through the Education Act 1996. Another milestone that is pending is the inclusion of childcare (for the 0-4 years old) as part of the education system which will be tabled soon in Parliament.

Current Status of ECCE in Malaysia

ECCE in Malaysia is broadly divided into two main groups, which are the 0-4 years old and the 4-6 years old. ECCE for the 4-6 years old group falls under the responsibilities of three Ministries, i.e. Ministry of Education, Ministry of Rural and Regional Development, as well as Department of National Unity and Integration. Ministry of Rural and Regional Development is the pioneer in setting up preschools in Malaysia (beginning early 1970's), currently (2010) there are 8525 preschools set up by this Ministry which are commonly known as the KEMAS preschool. KEMAS preschools are located in rural or suburban and are set up based on request by the local community. In the late 1970's Department of National Unity and Integration set up preschools in the urban areas where there are 'Rukun Tetangga', a friendly neighborhood scheme, these preschools are generally known as the PERPADUAN preschools, PERPADUAN preschools must accept students from the different races, currently, there are 1643 PERPADUAN preschools (2010). Ministry of Education (MOE) is the latest in setting up preschools. In the year 1992, 1131 preschool classes were set up by MOE in the form of pilot project as an annex to the existing primary school. In the year 2003, MOE preschool project was rolled out to whole nation; currently there are 7521 of these preschools classes which are situated all over the country (2010).

Other than MOE, KEMAS and PERPADUAN, other providers of preschool education include also the State Religious Department (JAIN), the Malaysian Islamic Youth Movement (Angkatan Belia Islam Malaysia, ABIM) as well as the private sectors. Various names are given to preschool education in the local language, e.g. the MOE's prasekolah, KEMAS *Tabika*, PERPADUAN *Tadika,* and the private kindergarten. To facilitate discussion, all would be known as preschool in this paper. Currently (2010), rivate preschools made up of 45.7% of the total enrolment of preschool students in Malaysia.

Childcare centers in Malaysia are generally named as TASKA. Legally all childcare centers need to be registered with the Ministry of Woman, Family and Community Development. There are various types of childcare centers in Malaysia, these are: Community Childcare Center, Workplace childcare center, Institutional childcare center, Plantation childcare center, Home based childcare center and Permata Center. TASKA are mainly built and run by private or non-profit organizations. The government sets up the registration and evaluation mechanism to monitor development of TASKA. However, since 2007, the government is beginning to set up some TASKA through the PERMATA projects. Gross Enrolment Ratio, GER for children of the age of 0-4 years old in Childcare Center in 2005 indicates that only 1.82 % of total population of the age group of 0-4 years old is attending TASKA. This percentage does not increase much since then. This is not a very realistic figure and is believed that it does not reflect the actual situation in the country, the contributing factor could be unregistered childcare centers.

National Plans and Strategies to Expand ECCE and Maintain Quality of ECCE

The 10th Malaysia Plan (2011-2015)

The 10th Malaysia Plan regards education as a National Key Result Area (NKRA) for the government. The education NKRA is intended to provide the starting point and platform to improve student outcomes across Malaysia's school system and to enable access to quality education for all students. Six NKRAs have been selected as the priority areas for the nation and for the people of Malaysia. They represent a combination of short-term priorities and long-term issues affecting the people. To reflect the importance of the NKRAs, they are collectively owned by the Cabinet with accountability for delivery resting on a lead minister, who is appointed and formally monitored by the Prime Minister. The education NKRAs is targeted at improving student outcomes and is anchored upon four areas: Pre-school enrolment rates, High Performing Schools, Literacy and Numeracy Screening (LINUS) programme, and a New Deal for Head Teachers and Principals. A significantly large budget has been earmarked for this programme during the period 2010-2012.

The 10th Malaysia plan recognizes the vital role early childhood education plays in reducing existing and future disadvantages for the nation with regards to human capital. Since the earliest formative years of a child's development has been acknowledged as the most crucial with the biggest impact on the mental development of a child, the government is committed to further expand and improve ECCE to provide more children in Malaysia with a better head-start. An early childhood development programme for children aged four and below acronamed PERMATA program will be further expanded in the period of 2011 to 2015. PERMATA is currently under the purview of the PERMATA division directly under the Prime Minister's Department. It will be transferred to the MOE by 2012. The PERMATA Early Childhood Centers will be established throughout the country during the 10th Malaysia period with a significant allocation of funding.

National Key Result Areas (NKRA)

In the quest of achieving Malaysia Vision 2020, the present government formulate the Government Transformation Plan (GTP) alongside the principle of 1 Malaysia, People first, Performance Now. GTP sets to strengthen the efficiency of the government delivery system. It identifies objectives and key performance indicators (KPI) in specific areas which are known as the National Key Result Areas (NKRA). There are six NKRAs, which are reducing crime, fighting corruption, widening access to quality and affordable education, rising living standards of low income households, improving infrastructure in rural area, and improving urban public transport. These NKRAs are directly or indirectly related to each other. The Education NKRA is 'Widening access to quality and affordable education". This Education National Key Result Ares have four sub-NKRAs. The first sub-NKRA is related to ECCE which is 'Increasing the preschool enrolment of 4+ and 5+ years olds'.

Table 1
Target Set by The NKRA on Preschool Enrolment from 2009 to 2012

Year	2009	2010	2011	2012
Target	67% (Baseline)	72%	80%	87%

Note. Source: NKRA 2009.

The NKRA team has also taken a holistic approach and identified 7 key thrusts to widen access to affordable and quality preschool education. These key thrusts are stated in Table 2.

Table 2
The 7 Key Thrusts in Sub-NKRA Preschools

		Key Thrusts
1	Governance	Establish a national committee on preschool education a MOE Preschool Division
2	Standards	Roll out the National Preschool Curriculum Standard (NPCS)
3	Standards	Harmonise support for government students
4	Delivery- Quality	Improve and harmonise quality of teachers and teacher assistants
5	Delivry - Capacity	Increase the number of preschool classes in urban (poor), rural and remote areas
6	Delivery – Quality and Capacity	Increase Public-Private-Partnerships(PPP) in preschool education
7	Performance monitoring	Launch a national preschool Information System

Table 3
Potential Tasks Identified to be Undertaken by the National Committee on Preschool Education

		Details
1	Developing an excellence framework	The excellence framework comprises of excellence KPIs for the various aspects of preschool education delivery such as management organization, teaching and learning, children's development. Assessment grid detailing what is excellence, good, acceptable and unsatisfactory performance for each KPI will be developed.
2	Launching awareness campaign	Design and run nation-wide campaign to increase parents' awareness of preschool education importance.
3	Developing concept for use of English as mode of instruction	Develop options on how to use English as a mode of instruction in preschools. Plan capacity build-up for existing teachers to improve English proficiency
4	Developing roadmap to reduce class size over time	In particular for the 4+ segment, class sizes need to be reduced to enable better quality education.

National Key Economy Area

National Key Economy Areas (NKEA) are areas identified by the country to spur economic growth in the process of driving the country towards creating a high income workforce. The main driver will be the private sector with assistance from the public sectors. Among the areas identified is ECCE. It is believed that Malaysia would benefit both commercially and socially by enforcing ECCE driven by private sectors. A NKEA laboratory was set up in 2010 and a core group of government officials as well as private ECCE professionals, operators, practitioners and NGOs were involved fulltime to analyse current ECCE situations and to formulate the NKEA plans.

NKEA is a plan where the private sectors support delivery of NKRA enrolment targets. Two areas have been identified which are the rapid scale up (increase accessibility) of ECCE centers and setting up of ECCE training centers to enhance the quality of ECCE workers. Rapid scale up/ramp

up is set in place to grow high quality private preschools and capture untapped early childcare market. Provision of ECCE training entails provision of short term course (e.g. 3-6 weeks) or long term accredited certificate, diploma or bachelor degree (e.g. 3-5 years. Table 4 provide information for each of the enablers, its specific actions and the Key Performance Indictors for NKEA.

Table 4
Enablers and Its Related Actions and Key Performance Indicators (KPI)

	Major Bottlenecks	Enablers	Specific actions
1a	Demand issues, *e.g.* willingness of parents to pay, awareness of parents for quality ECCE.	Expand sliding-scale voucher scheme for deserving parents to send their children to private preschools/childcare centres.	Voucher scheme to be extended to lower middle income families along a sliding scale to increase access. Qualification for voucher assistance (which was originally planned for the hardcore poor under the NKRA) to be revised.
1b		Provide attractive incentives for CSR scheme for ECCE	Corporate participates in ECCE as CSR by either: - Set up ECCE centres in their workplace - Establish ECCE fund for their staff - Provide land and space for other parties to setup ECCE centres.
1c	Low quality training and low teacher salary	Develop private-run leading regional training centres for ECCE	Short term training 3-6 weeks. Long term training for certificate. Network with ECCE institution/training centres locally and globally. Establish childcare and preschool labs through networking. Charting possible career path of ECCE workers. - Convert the working experience to credit. - Design and accredited certificate and Diploma course.
1d	Structural issues, *e.g.* access to funding, regulatory approval.	Revise licensing/approval process	Streamline registration – approve within 7 working days. Harmonize standards and procedures across all agencies throughout the country.
1e		Provide soft loan schemes for ECCE operators	Provide soft loan schemes for ECCE training, and setup of new or expansion of existing ECCE centres. Provide matching grants for the setup of non-profit ECCE centres.
1f		Partnership with property developers / corporate bodies	Land sold/leased at nominal price by developers and Ministry of Education for ECCE purposes. Land to be set aside for ECCE in proportion to households by developers.
1g	Low quality control	Set-up a private-led ECCE Council for quality control and professionalization of the workforce.	Set up a Council comprising members of the ECCE industry to upgrade, assure its quality and represent the industry. Create awareness through advocacy programmes and be involved in people development.

Note. Source: NKEA 20.

PERMATA Program for the 0-4 Years Old

PERMATA program was started in 2007 by the currret Prime Minister's wife. Currently, 80 PERMATA centers are in operation. These centers serve the rural children from parents of low income. The government has decided that the PERMATA will be put under the jurisdiction of Ministry of Education beginning January 2012. In view of that, Ministry of Education and Ministry of Woman, Family and Community Development are working on changes in the Education Act and the Childcare Center Act. The purpose is to ensure a systematic and effective provision of quality early childhood care and education for the 0-4 years old as well as comprehensive monitoring mechanism. It is also hoped that through this inclusion of ECCE for early years into the education system, there will be a better co-ordination and integration with the school system. The potential of PERMATA program is great and can be a mean to ensure the early start for all children in Malaysia.

The Way Forward

It is an exciting time for ECCE in Malaysia, plenty of happenings from the public and private sectors. The government has also shown great commitment through NKRA, NKEA and PERMATA initiatives. The ECCE sectors need to take advantage of the momentum that has been set on to bring the field of ECCE to higher ground. However in the quest of more participation or accessibility in ECCE, quality of ECCE need to be maintained and enhanced. It is in this issue that lies the challenge for ECCE advocators.

Three-Year Multi-Stage Study of the Impacts of Hong Kong Pre-primary Education Voucher Scheme

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Until recently, the Hong Kong government adopted a laissez-faire policy orientation towards pre-primary education, as reflected by insufficient regulatory measures and monetary support since the colonial period. As a result, pre-primary education in Hong Kong became extremely expensive yet teachers were often under-trained. The introduction of the Pre-primary Education Voucher Scheme (PEVS) in 2007 for non-profit-making kindergartens (NPMKs) finally gave pre-primary education in Hong Kong a new impetus for building a quality culture.

As "an integral part of government support for the family" (Office of the Chief Executive, 2006, para. 43), the PEVS is the government's first major financial commitment to pre-primary education in years. All the children aged between 3 and 6 years are entitled to receive a voucher of HK$13,000 per annum (progressively be raised to HK$16,000 in 2011/12) to pay their tuition fees of NPMKs that charge fees no more than HK$24,000 (half-day)/ HK$48,000 (whole-day) per student per annum. A part of the subsidy must be used for the professional development of teachers, whom are required to obtain suitable level of training by 2011/12. To ensure the teaching quality and accountability of kindergartens, all participating institutions are required to provide information on their facilities and achievements, and they are also subject to classroom inspection (Education and Manpower Bureau, 2006a). However, as all pre-primary education services are provided by private operators, limiting the eligibility of redeeming vouchers to only NPMKs has been heavily criticized for curtailing parental choice to a certain sector of the market by the principals, teachers, and parents of for-profit institutions, also known as private independent kindergartens (PIKs). To address their concerns, the government made a compromise by arranging for a transition period of three years, allowing PIKs to redeem the vouchers until the end of the 2009/10 school year. Meanwhile, a one-time subsidy of HK$30,000 was provided to help these PIKs transform into NPMKs (Education and Manpower Bureau, 2006b). These controversial measures have provoked a fierce debate among educators, government officials, education advocates in Hong Kong and around the world. This 3-year multi-stage study was therefore designed to investigate the perceived impacts of the PEVS and the specific concerns of different stakeholders, consequently to generate suggestions for the policy makers to improve the scheme.

A Three-Stage Study

Stage One[1)]

Stage one was an Internet survey study conducted in December 2006 to investigate the public's views on the PEVS before its actual implementation. Using Google Hong Kong, the PEVS were found to be discussed in 51,600 Chinese webpages and 129 English webpages. Content and statistical analyses were conducted to thoroughly analyze the online public opinions. Table 1 summarizes the supporting and opposing opinions and rationales. It is interesting to note that the vast majority of proponents were government officials or related persons, while opponents were exclusively non-officials. This may imply that the government did not thoroughly consult the sector and the public.

1) For detailed results and discussion, see Li, Wong, and Wang (2008).

Stage Two[2)]

Stage two was a large-scale questionnaire survey conducted in October 2007, right after the implementation of the PEVS. Stratified random sampling was conducted to recruit 103 kindergartens (10 % of the target population), in which 79 agreed to participate. Altogether 380 parents, principals, and teachers took part in the study, each was asked to complete one of the three sets of self-administered questionnaires specifically designed to elicit the views of parents, principals, and teachers, respectively.

Table 1
Reasons for Supporting and Opposing The Pre-primary Education Voucher Scheme

Support	Oppose
· Eases parents' financial burden	· Fetters parental choice of schools
· Assures public funding will not be siphoned off for other wasteful purposes	· Discriminates against PIKs
· Promotes quality education and enhances teachers' qualification	· Cannot assure the salary of teachers will be commensurate to their qualifications
· Turns PIKs into NPMKs	· Turns PIKs into NPMKs

Note. Source: Li, Wong, & Wang (2008)

The results indicated that in general, survey respondents, regardless of their roles, expected the PEVS to have some positive impacts on the affordability, quality, and accountability of kindergarten education. Contrary to critics' belief, 80% of the parents did not agree that their school choices were limited by the policy; instead, they perceived enhancement in education quality. In fact, the voucher scheme was perceived way more favorably by parents (M = 68.07) than principals (M = 58.54) and teachers (M = 62.87), F (2, 376) = 8.08, $p < .001$; and by respondents of NPMKs (M = 66.64) than those of PIKs (M = 54.07), F (1,310) = 16.61, $p < .001$. These are probably because the policy measures were all favorable to parents, but at the same time brought forth difficulties and pressures to principals and teachers. The PIKs also received greater transitional pressure from the educational authorities.

Stage Three

To capture any changes of views during the process of the implementation of the PEVS, two years later in 2009 the same questionnaires were sent to 186 randomly selected parents, principals, and teachers. Like the results in stage two, the respondents generally agreed that the PEVS had some positive impacts on the affordability, quality, and accountability of pre-primary education. As most of the participating PIKs had already converted into NPMKs, the views of the respondents of these kindergartens (M = 60.77) were more or less the same as their counterparts of the traditional NPMKs (M = 61.03), F (1, 160) = .005, p = .95. Parents (M = 68.17) continued to be more supportive than principals (M = 57.00) and teachers (M = 55.95), F (2,167) = 11.05, $p < .001$. The obvious decline in teachers' rating of the PEVS (comparing to M = 62.87 in stage two) are concurred by the decline of their confidence in various areas, e.g., confidence in kindergarten operation (stage two: 40%; stage three: 20%; t = 3.083, p = .002). These may reflect a lack of support to the teachers from the government. The experiences of most of the teachers can be represented by the following quotations:

> *Not only do we have additional paperwork to do at work, but we also have to go to training classes in the evening, 24 hours a day never seems to be enough. Further, because of the increased competition in student recruitment and number of student*

2) For detailed results and discussion, see Li, Wong, and Wang (2010).

> *activities, we often need to go to work during holidays. Our private time is being ripped and it seems like we could never take a rest!* (Teacher A)[3)]
> *Kindergartens do have more flexibility over salaries, but that doesn't mean teachers are guaranteed to be paid more after they received the training required by the government, especially in smaller schools which receive less voucher subsidies from the government. Many class teachers rather work as supply teachers, whose main role is merely to assist the class teachers that undergo training, or even quit the profession once and for all.* (Principal B)[4)]

Moreover, even the PEVS enhanced parents' general affordability of kindergarten education and did not limit parents' choices of schools, parental choice of education might still not necessarily be facilitated in certain circumstances, as commented by Principal C,

> *Some parents, due to their job situation or other reasons, need to enroll their children in whole-day classes. However, since the voucher is only worth HK$15,000, many parents simply cannot afford to pay an additional HK$10,000 or so to enroll their children in whole-day classes. There might be problems in the welfare of those children.*[5)]

Conclusion

Generally speaking, the respondents in this multi-stage study, regardless of their roles, expected the policy to have some positive impacts on each of the affordability, quality, and accountability of pre-primary education. The findings are quite remarkable considering that many school choice policies in other regions and countries failed to deliver their promises. Nonetheless, support for teachers should definitely be enhanced, but how? Should the government simplify the paper work needed? Should it allow more time for completion of in-service training? Or should a salary scale be officially established? Also, should the government increase the manpower and resources for whole-day kindergarten? If so, how? These are some of the questions which the government needs to answer. One thing for sure is that the government should continue to consult and promptly respond to public views.

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3) This quotation can also be found in Wong, Li, and Rao (in press).
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Early Childhood Teacher Policy: Recruitment, Preparation, and Retention of EC Teachers in the United States

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The decentralized nature of the early childhood education and care (ECEC) system in the U.S., coupled with an ongoing teacher shortage, high teacher turnover rates, and the increasing demand for early childhood (EC) teachers, has led to low entry requirements and lenient regulations for most EC sectors. Efforts to provide quality ECEC services by improving the quality of the teaching force at various levels have been initiated in the U.S. This paper examines: demographic profile of America's ECEC teaching force; regulatory standards regarding entry-level teacher requirements; condition of pre-service teacher training in higher education; and provision of professional development and retention efforts. Current trends and challenges of EC teacher policy in the U.S. are presented, and implications are discussed.

There are more than 20 million children under age five, comprising about 7 % of total U.S. population (U.S. Census Bureau, 2006). Approximately two-thirds of their mothers are in the labor force, and about 30 % of families with children are single-parent households. Demographic changes in the family, such as increased rates of mothers of young children in the workforce, coupled with a high divorce rate and teen birth rate, have led to heated discussions of ways to provide affordable, available, and quality care for the nation's young children. Quality of care affects children's positive learning and development. Given that approximately 60 % of America's young children (birth through age five) are in at least one weekly non-parental care arrangement and about two-thirds of them are in center-based care (Iruka & Carver, 2006), the goal of providing quality ECEC services while considering the expense and accessibility has been an ongoing challenge for U.S. policymakers. One of the critical components influencing the quality of ECEC services is teacher quality[1)] due in part to two-tiered (i.e., child care and early education) ECEC system and diversity of EC workforce in the U.S.

Two-Tiered ECEC System.

The care and education of young children in the United States historically has been largely seen as the responsibility of families with the government only stepping in to provide financial support in terms of national security and social welfare. The roots of child care began with *Day Nurseries* (child care centers) for the children of poor working immigrant mothers and *American Infant Schools* designed for preschoolers deemed developmentally at-risk that were funded by charities. These efforts gave birth to the social stigma of child care as assistance to less competent parents, opening the door to a two tiered system of child care and early education, which laid the foundation for the fragmented system found today. The significant development of early education includes nursery schools and Kindergartens. *Nursery schools,* frequently linked to universities, emphasized play and parent involvement and found appeal with middle class families. Kindergartens, a pre-primary school experience, eventually joined the formal K-12 school system, bringing a rise in status and professional standards for these teachers.

Diversity of EC Workforce.

The U.S. government at all levels (i.e., federal, state, and local) has sought to address the issue of providing quality early care and education by improving the quality of the teaching force at both the pre-service and in-service levels of teacher training. The process has not been without challenge.

Due to the decentralized and fragmented nature of the ECEC system in the U.S., policymakers at federal and state levels have faced difficulties in coordinating policy efforts. As diverse as the ECEC services are EC teachers who work in multiple sectors that are operated under a variety of auspices and funding streams. Accordingly, the education and training of EC teachers vary greatly. The EC field has also suffered from ongoing teacher shortage and high turnover rates. A national study (Whitebook, Howes, & Phillips, 1998) on child care staff showed 30 % to 40 % annual turnover rates throughout the nation. This alarming turnover rate has been persistent in the past decades. Whereas the increasing demand for EC teachers led to low entry requirements in most EC sectors, increasing the complexity of the system, there is also "a conflicting push to restrict the supply of teachers to only those teachers who are highly qualified" (Tarrant, Greenberg, Kagan, & Kauerz, 2008, p.138), especially due to the No Child Left Behind Act of 2001 and current national pre-kindergarten movement. What is the current policy regarding recruitment, preparation, and retention of EC teachers in the U.S., what are the challenges involved, and what can we learn from it? Presented below are: (a) demographic profile of America's EC workforce; (b) regulatory status regarding entry-level teacher requirements; (c) condition of pre-service teacher training in higher education institutions; and (d) status of professional development and retention efforts.

Demographic Profile of EC Workforce

According to the findings from a national study (Burton et al., 2002), there are more than 2.3 million people in the EC workforce[2)] serving children ages zero to five in the U.S. The EC practitioners are employed in various ECEC service programs such as center-based programs (e.g., nursery schools, pre-kindergarten programs, Head Start, and public and private child care centers) and home-based services (e.g., family day care, relative care, and non-parental care services). Approximately one quarter of the workforce (550,000) is employed in center-based programs, with 30 % of center-based teachers caring for infants (0-18 months), about 50% with toddlers (19-36 months), and about 20% work with preschoolers (three to five years). While there is a lack of national data regarding the characteristics of EC teachers in the U.S., a few available studies (Burton et al., 2002; Cost, Quality & Child Outcomes Study Team, 1995; Herzenberg, Price, & Bradley, 2005) found that teachers' educational qualifications vary greatly depending on the auspice of the EC programs. On average, family day care providers' formal education levels are lower than those of center-based staff's. According to a study, only 17% of family day care providers had a bachelor's degree or higher, in comparison to 33% of center-based teachers and 69% of center directors (Burton et al., 2002). The proportion of center-based teachers and administrators with at least a four-year college degree declined over the last two decades (Herzenberg, Price, & Bradley, 2005). Though data on EC staff in center-based programs do not include teachers in public school pre-kindergartens, Herzenberg and his colleagues posit that the education levels of EC staff "have fallen even further relative to the workforce as a whole, which has become better educated over time" (p. 1). Such declining educational attainment of EC teachers is due, in part, to current regulatory status regarding entry-level teacher qualifications. To meet the increasing demand for a larger EC workforce, the focus of federal and state governments has been more on increasing the supply of teachers rather than on increased quality, which resulted in setting lenient standards. Teacher demographics relative to training, experience, and compensation, which influence service quality in ECEC, vary greatly due to regulations and funding.

Regulatory Standards Regarding Teacher Requirements

Regulatory standards establish the baseline for quality in ECEC. Described in this section are regulations regarding staff qualifications for individuals who are eligible to work in four different types of ECEC settings: Head Start programs, state-funded pre-kindergarten programs, private child care centers, and family child care providers.

According to Head Start regulations reauthorized in 2007, all Head Start teachers should have at least an Associate's degree (two-year college degree) by the year 2013, and half of them should be at least four-year college graduates. However, there is no statement about how the regulation is enforced if Head Start centers do not follow the guidelines. With the exception of Head Start programs, the federal government does not regulate EC programs and teachers. Each state government regulates EC programs, dictating minimum staff qualifications in its licensing regulations, which vary greatly in terms of stringency and enforcement.

The training requirements for teachers working in state-funded pre-kindergarten programs vary between public school settings and community-based programs. While each state sets different qualifications, some states require pre-kindergarten teachers in public schools to have a bachelor's degree and a teacher certificate while those in non-public schools are exempted from such requirements.

Thus, with the exception of public school teachers (primary grades, kindergarten, and some pre-kindergarten) and Head Start teachers, there is no universal policy regarding who is eligible to teach young children in private child care centers and family child care providers. Instead, each state identifies minimum pre-service qualifications for EC teaching staff as a part of program licensing regulations, which in most cases do not require a post-secondary degree, even for master teachers.

Pre-Service Teacher Training in Higher Education

The pre-service training of teachers is provided by higher education institutions. Curriculum for each EC teacher preparation program is guided by the program standards of the National Association for the Education of Young Children (NAEYC). Regarding what tomorrow's EC teachers should know and be able to do, the NAEYC standards are framed around the following five areas: (a) promoting child development and learning; (b) building family and community relationships; (c) observing, documenting, and assessing; (d) teaching and learning; and (e) becoming a professional. Based on these five areas, each college's EC teacher education program – at the associate's, bachelor's, or master's levels – offers various courses such as child development, building home-school relations, assessment of young children, EC curriculum, and leadership and advocacy in EC education. The minimum number of courses, required coursework, electives, and credit hours vary by college, department, or program. Each state sets a minimum number of clock hours for field-based training of pre-service teachers.

Two-year institutions or community colleges (including an option for a one-year program leading to a certificate and a two-year program leading to an Associate's degree) play a major role in pre-service training for center-based teachers, directors, and family child care providers. Some community colleges develop a memorandum of understanding with four-year colleges in order to ease the transition of their students to a higher degree level. The focus of curriculum in four-year colleges is on preparing teachers of preschoolers and early elementary students, while little attention has been given to preparing teachers of infants and toddlers.

The quality of EC teacher preparation programs at higher education institutions is monitored by national organizations such as the National Council for Accreditation of Teacher Education (NCATE) and Teacher Education Accreditation Council (TEAC). According to NCATE (2008), standards for teacher education institutions focus on "systematic assessment of candidate learning" (p. 1) and evaluate "an institution's effectiveness according to the profession's expectations for high quality teacher preparation" (p. 9). The six standards include:

- Standard 1: Candidate Knowledge, Skills, and Professional Dispositions
- Standard 2: Assessment System and Unit Evaluation
- Standard 3: Field Experiences and Clinical Practice
- Standard 4: Diversity
- Standard 5: Faculty Qualifications, Performance, and Development
- Standard 6: Unit Governance and Resources (pp. 12-13).

Under the standards, teacher preparation programs offer educational opportunities for teacher candidates to gain a better understanding of the professional knowledge, skills, and attitudes and to demonstrate competence in the areas that are necessary to work with young children and their families. Faculty members in each department or program, guided by national and state standards for teacher preparation, determine the nature and scope of curriculum and practical training for teacher candidates. Despite the critical role of EC faculty in promoting the quality of teacher training programs, EC teacher preparation programs have faced challenges in staffing qualified faculty members. According to recent studies (Early & Winton, 2001; Maxwell, Lim, & Early, 2006; Washington, 2008): (a) most programs depend heavily on part-time and adjunct faculty; (b) there are variations in qualifications and preparations of faculty (e.g., a master's degree or a doctorate; research-based training or practice-oriented training; previous EC classroom teaching experience) for offering theoretical and practical training to teacher candidates; and (c) the majority of EC programs lack training specific to working with infants and toddlers, students with special needs, students learning English, or children and families from diverse cultural backgrounds. These issues raise concerns about the "quality and consistency" (Tarrant et al., 2008, p.142) of the nation's EC teacher preparation programs.

In-Service Training and Initiatives for Teacher Retention

While some teachers are prepared through two-year or four-year colleges, the majority of the EC workforce is still being hired without proper education or pre-service training. In-service training requirements for ECEC providers vary greatly among the states, with varying numbers of annual ongoing training hours (from zero clock hours in California and Hawaii to 30 clock hours in Maine) required for teachers and master teachers in center-based child care programs (NCCIC, 2008). In the case of public pre-kindergarten and kindergarten teachers, 27 states require at least 15 clock hours of annual ongoing training (OECD, 2006).

In order to improve the knowledge and competence of EC teachers, various professional development systems that incentivize teachers' attainment of advanced training, qualifications, and credentials have been initiated by many states. To encourage credentialing of ECEC staff, incentives such as scholarship programs and wage incentives like the T.E.A.C.H (Teacher Education and Compensation Helps) project along with several state initiatives are in place. T.E.A.C.H. scholarship programs offer an increased salary (3 to 5%) or bonus payment to participant teachers who have reached their educational goals, and wage incentive programs reward EC teachers depending on their educational qualifications, years of experience, and tenure (Center for the Child Care Workforce, n.d.). These initiatives are expected to contribute to reducing the high turnover rates and increasing the educational qualifications and tenure of EC teachers. Yet, some of the incentives are small one-time payments and not integrated into salary schedules, unlike those of public school teachers. In order to improve the quality of EC teachers and to retain qualified teaching staff, researchers (e.g., Kagan & Kauerz, 2008; Mitchell & LeMoine, 2005) and professional organizations (e.g., NAEYC) argue that more systematic and ongoing professional development and retention initiatives need to be implemented.

Conclusion

There is a growing trend (visible in national standards, college curriculum, and accreditation procedure) to equip teacher candidates with knowledge, skills, and dispositions for effectively working with diverse group of students and families and to blend teacher preparation programs, which offer interdisciplinary services to their teacher candidates for meeting the diverse roles and responsibilities in various settings. Growing research attention has been given to designing a framework for teacher recruitment, professional development, and retention that ensures a stable

qualified workforce, through a coherently articulated and well-coordinated policy.

The "decentralized, complex, and uneven" (Gormley, 1995, p. 52) nature of the ECEC system in the U.S. and the diversity of the teaching force and governance approaches challenge the process to regulate and monitor the quality of EC teachers. Given the situation, Kagan and Kauerz (2008) assert, "the burning question is ... how the multitude of public and private actors and initiatives can be configured to maximize efficiency, outcomes, equity, excellence, and individuality" (p. 15). In doing so, articulating an agreed-upon nomenclature, career lattice, and incentive system will contribute to reducing the complex patchwork of the ECEC system.

Diversity and complexity are the two terms that define the EC teacher policy of the U.S. The diversity can be considered a strength that provides parents a multitude of options regarding the types of services and choices. However, the diversity of rules, regulations, and standards has also caused great challenges for policymakers, because regulations and governance that affect teacher policy are inextricably linked. Without attending to the interconnected nature of policy elements, a solution may invite another problem. Policymakers need to be sensitive to the interconnected nature of policy elements and build a functional governance structure that can coordinate interdependent policies (e.g., policies on teacher qualification, compensation, funding, and related regulations) to be mutually supportive. More attention should be given to the way the policy contexts, challenging aspects, and stakeholders interplay and the way they impact each other.

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1) Teacher quality includes: "(a) the aptitude, skills, experience, and beliefs that a teacher brings into the classroom, and (b) the structures, processes, resources, requirements, and public perceptions that influence who teaches, where they teach, and what happens in the classroom" (Public Education Network, 2002, p. 3).

2) This figure does not include approximately 2.4 million care-giving population who provide unpaid child care services

Plan to Childbirth 1

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1. Determinants for Additional Child Birth Choice of Current Mothers

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2. Work Plan Decisions by Heterogeneous Female Groups Out of Work for Baby Birth

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   Byung In Lim *(Associate Professor, Dept. of Economics, Chungbuk National University)*

3. Discriminant Analysis of Factors Influencing Intention of Additional Childbirth

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Determinants for Additional Child Birth Choice of Current Mothers

Sejin Min
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This paper studies what explain the mothers' intention to have more children. Korea is one of the most rapidly aging countries, and among various approaches to tackle the aging problem, including boosting the overall productivity of labor force, increasing the number of economically active population, and etc., raising birth rate is critical in the long run. Raising birth rate is, however, slow and difficult, like other approaches, and it can be a little faster to encourage the married couples to have more children than, for example, to nudge youngsters to marry earlier, or to cool down the enthusiasm for the children's education. Using the year 2008 data of the Panel Study on Korean Children (PSKC) and the logit model, I estimate the effects of factors on the mothers' plan of having another child. The birth order, marriage duration, mother's education level, and mother's age have negative marginal effects on the probability of having another child. A very interesting result is the statistically significant positive coefficient estimates for the degree of the father's participation in child caring. The mothers with husbands who play with the children often particularly tend to have higher probability of having another child. The household income does not explain the probability of having another child. Instead, the coefficients for the asset and net asset, i.e., asset-liability, are significantly positive.

This paper studies what explain the mothers' intention to have more children. Korea is one of the most rapidly aging countries, and among various approaches to tackle the aging problem, including boosting the overall productivity of labor force, increasing the number of economically active population, and etc., raising birth rate is critical in the long run. Raising birth rate is, however, slow and difficult, like other approaches, and it can be a little faster to encourage the married couples to have more children than, for example, to nudge youngsters to marry earlier, or to cool down the enthusiasm for the children's education. Using the year 2008 data of the Panel Study on Korean Children (PSKC), I estimate the effects of factors on the mothers' plan of having another child.

Model for Additional Child Birth Choice

To set up an econometric model figuring out the determinants of additional child birth choice, I describe economic reasoning to have another child. A mother may plan to have another child if and only if the expected marginal benefit of having the child exceeds the expected marginal cost, and total expected cost for raising all the children, including the planned one, is lower than the portion of income spared for the children. Thus, if a mother does not plan to have another child, it is the case either the expected marginal benefit is smaller than the expected marginal cost of having another child, or, even if the expected marginal benefit is larger than the expected cost, the total expected cost of raising all the children is larger than the portion of income for the cost of all children:

$$Y = 1, \text{ iff } MB_{n+1} > MC_{n+1} \text{ and } TC_{n+1} < \alpha I$$
$$Y = 0, \; o.w.$$

Y is a binary choice variable whose value is 1 if a mother plans to have another child, and 0 if not. The constituents of expected marginal benefit may include the birth order, marriage duration, and mother's religion: similar to consumption of ordinary goods, having another child may bring less additional benefit – satisfaction, amusement, etc.- than the previous child(ren). For marriage duration, additional child may or may not give a couple with longer marriage duration more marginal benefit.

A couple may feel another child would refresh the family ties, or would add more labor onto the couple. Finally, a religious mother may feel obliged to have more children.

The expected marginal cost would consist of the direct expenditure for another child, the cost related to the economic opportunities which have to be foregone were a mother to have another child (opportunity cost), and psychological and physical cost such as parenting stress and laboriousness. The current expenditure for existing child(ren) will serve as a proxy for the expenditure for another child. The opportunity cost might be affected by the facts whether the mother is working, how stable the mother's working status is, if she is working, and how highly the mother is educated. The psychological and physical cost could be related with how burdensome the mother feel about having more child(ren), how helpful the father is expected to be in caring for another child, and whether the parents and/or relatives can take care of another child. Since it is not possible to precisely predict how stressful and laborious it would be to have another child, it will be a good approximate to use current level of parenting stress, the degree to which the father helps in nursing , and whether the present child(ren) is(are) taken care of by the parents and/or the relatives. And it is plausible that the mother's age is related to parenting stress and laboriousness.

The total expected cost for raising all the children, including the planned one, and the portion of income spared for the children might be influenced by the current cost of raising existing child(ren), which are already included above, household income, household assets and liabilities, and ownership of a house.

I set up a model which transforms the above economic reasoning to an assessable econometric one:

$$y_i = 1, \text{ if } y_i^* > 0$$
$$\text{where } y_i^* = MB_i - MC_i + TC_i - \alpha_i I_i + \epsilon_i.$$

If it is assumed that is symmetrically distributed with mean 0 and variance 1, the following holds:

$$\Pr(y_i = 1) = \Pr(y_i^* > 0) = \Pr(-\beta' x_i < \epsilon_i) = \Pr(\epsilon_i < \beta' x_i)$$

For this kind of binary choice model, the logit or the probit models are popular choices, and I use the logistic distribution because of its mathematical convenience.[1)]

$$\Pr(y_i = 1) = \frac{e^{\beta' x_i}}{1 + e^{\beta' x_i}} = \Lambda(\beta' x_i)$$

Method and Results

Data

I use the year 2008 data of the PSKC. The PSKC samples 2,078 babies newly born during April to July in 2008, and carries a general survey once a year for each of the panels that started in 2008. In-depth studies of 200 selected panels are to be delivered in 2009, 2012, and 2015 mainly concerning the child's development status. The PSKC is intended to follow each child's life course looking into the child's health, developmental status and growth from birth to the 6th grade of

1) Ruud(1983) shows that the logit and the probit models are same in terms of consistency of parametric estimation, but different in calculating estimates' variances, which, however, are not very different because the logistic and the normal distributions are not very different without heavier tails of the former.

elementary school, as well as each family's caring and educating their children. The PSKC also tracks the community environment and social and government support for child rearing. The survey is done by (initially) hospital visits, questionnaires, interviews, telephone calls, and direct mailing.

Table 1 and 2 display summary statistics of variables which I use for the model. 27.8% of the mothers plan to have additional child(ren) (Group 1), while 50.4% plans not to have more child(ren) (Group 2). 21.7% of the mothers say they did not determine (Group 3).

When the panels are divided according to the answers to the plan of having additional child(ren), some variables show values worth noting. 90.6% of mothers in Group 1 currently have one child, and more than 80% of mothers in Group 2 have more than two children. It hints that the marginal benefit of having another child declines over number of children. Many variables have mean values which are different among different groups.

Table 3 collects the variables whose means significantly differ over the groups. The marriage duration and the mother's age of Group 2 is largest and the duration and the age of Group 3 is larger than those of Group2. The proportions of mothers who are religious are not very different between the Group 1 and 2, but the proportion of the Group 3 is lower, at the 5% significance level, than that of each Group. By contrast, the proportion of mothers who have academic degrees higher than bachelor in the Group 3 is higher, at the 5% significance level, than that of each Group. The proportion of the mothers' working is higher for Group 1 than Group 2, which rather contradict to conventional perception about mother's working. It may be related to the fact that mothers in Group 1 currently have less children.

Table 4 shows the birth order of the latest child and the proportion of mothers' working. Two things stand out: First, more than half of working married women dropped out of labor market before and after the latest birth. The 59.3% of working married women stopped working 'before the pregnancy' and to 'after the birth' of the first child, and 59.8% and 63.1% of working mothers did so for the second and third child, respectively. It is not clear whether the mothers who answered to have stopped working 'before the pregnancy' actually meant they did so to be pregnant, i.e., the reason of ceasing working is directly related to the latest child, but it must be true that significant portion of working mothers drops out because of pregnancy and birth. At least, 35.7%, 26.9%, and 33.6% of working married women stopped working during the pregnancy of the first, second, and third child, respectively. Second, there seems a self-selection in which the mothers who have not worked have more children. While 20.3% of mothers who gave birth of the first child have never worked, 37.7% of mothers with three children have never worked. Combined together, the proportion of the mothers' working may be higher for Group 1 than Group 2 not because working mothers want more children, but because the mothers who want more child(ren) now have only one child(90.6%) and the larger portion of them are (still) working.

The survey also shows significant difference in mothers' parenting stress and their husbands' help among groups. Mothers in Group 1, who want more child(ren), are less stressed and more supported by their husband in nursing than those in Group 2. The mothers in Group 3, who did not determine whether to have more child(ren), are more stressed than those in Group 1, but more helped by their husbands than those in Group 2. In terms of family's financial status, families in Group 2 earn more, keep bigger assets and have higher debt than those in Group 3. Also, the household liabilities of Group 2 are larger than those of Group 1. The interpretation of household liabilities, however, require a little caution because the response rate of the relevant question in the survey is rather low and seems uneven among the groups: Only 1421 families out of 2078 revealed the debt amount, including zero. I will come back to this issue later.

Table 1
Summary Statistics 1

	No. of responses	No. or mean value (%)	Plan to have another child (Group 1) (%)	Plan not to have another child (Group 2) (%)	No plan (Group 3) (%)
Plan to have another child	2077				
Yes		577(27.8)			
No		1046(50.4)			
Don't know		451(21.7)			
Marginal benefit	2071				
Birth order					
1		983(47.5)	520(90.6)	162(15.5)	301(66.9)
2		862(41.6)	51(8.9)	668(64.0)	139(30.9)
3		199(9.6)	3(0.5)	187(17.9)	9(2.0)
4		23(1.1)	0	22(2.1)	1(0.2)
5 or higher		4(0.2)	0	4(0.4)	0
Marriage duration (year)	1904	3.93	2.14	5.20	2.86
Mother's religion	1853				
Yes		990(53.4)	294(55.4)	504(54.4)	191(48.6)
No		863(46.6)	237(44.6)	422(45.6)	202(51.4)

Table 2
Summary Statistics 2

	No. of Responses	No. or *M* Value (%)	Plan to have Another child (Group1) (%)	Plan not to have another child (Group2) (%)	No plan (Group3) (%)
Marginal cost					
Monthly expenditure for children (10,000 won)	1964	62.1	61.5	62.0	63.5
Mother's working (yes)	2073	656(31.6)	201(34.9)	315(30.2)	139(30.8)
Mother's working status (full-time)	621	533(85.8)	159(85.5)	260(86.4)	113(85.0)
Mother's education (bachelor and higher)	2062	829(40.2)	220(38.1)	406(39.2)	203(45.4)
Prenting stress*					
Not happy as before	1860	2.4	2.3	2.5	2.4
Expenditure burdensome	1858	3.5	3.3	3.7	3.5
Father's help*					
Nursing participation on	1860	3.6	3.7	3.4	3.6
Play w/ child	1860	3.8	4.0	3.6	3.9
Day-care (parents)	2078	1738(83.6)	483(83.7)	871(83.3)	381(84.5)
Mother's age	2077	31.3	29.5	32.7	30.6
α					
Household income (10,000 won)	2065	319.33	315.83	327.59	305.1
Household asset (10,000 won)	1777	18,515	17,808	20,258	15,432
Household liability (10,000 won)	1421	3,169	2,770	3,600	2,639
Home ownership (yes)	1863	1029(55.2)	412(57.1)	630(58.4)	376(63.3)

Note. * 5-point Likert scale 1 (not at all) ~ 5 (very much so).

Table 3
Characteristics of the Panels Categorized by the Birth Plan

	Plan to have another child (Group 1) (*SE*)	Plan not to have another child (Group 2) (*SE*)	Don't know (Group 3) (*SE*)	Note**
Marriage duration (year)	2.14 (0.0828)	5.20 (0.0998)	2.88 (0.1068)	G2 > G3 > G1
Mother's religion (yes)	55.4% (0.0216)	54.4% (0.0164)	48.6% (0.0252)	G1, G2 > G3
Mother's working (yes)	34.9% (0.0199)	30.2% (0.0142)	30.8% (0.0218)	G1 > G2
Mother's education (Bachelor and higher)	38.2% (0.0203)	39.2% (0.0152)	45.4 (0.0236)	G3 > G1, G2
Parenting stress* (Not happy as before)	2.28 (0.0436)	2.47 (0.033)	2.44 (0.0496)	G2 > G1
Parenting stress* (Expenditure burdensome)	3.28 (0.0464)	3.69 (0.0321)	3.50 (0.0524)	G2, G3 > G1
Father's help* (Nursing participation)	3.74 (0.0492)	3.44 (0.0380)	3.62 (0.0571)	G1, G3 > G2
Father's help* (Play w/ child)	3.97 (0.0368)	3.64 (0.0312)	3.89 (0.0477)	G1, G3 > G2
Mother's age	29.5 (0.1368)	32.7 (0.1089)	30.6 (0.1631)	G2 > G3 > G1
Household income (10,000 won)	315.83 (6.3191)	327.59 (4.7644)	305.1 (6.8966)	G2 > G3
Household asset (10,000 won)	17,808 (1,366.1)	20,258 (907.3)	15,432 (838.3)	G2 > G3
Household liability (10,000 won)	2,770 (283.64)	3,600 (221.24)	2,639 (310.18)	G2 > G1, G3
Home ownership (yes)	57.1% (0.0184)	58.4% (0.0150)	63.3% (0.0198)	G3 > G1, G2

Note. * 5-point Likert scale 1 (not at all) ~ 5 (very much so). ** The inequalities hold at the 5% significance level.

Table 4
Birth Order of the Latest Child and the Proportion of Mothers' Working

%	Not Working				Working
	Used to work (quitting during pregnancy)		Never Worked	Etc. (ex. In school)	
1st child		67.1		0.7	32.1
	46.7	(28.1)	20.3		
Working vs. used to work	59.3	(35.7)			40.7
2nd child		70.9		0.6	28.5
	42.5	(19.1)	28.4		
Working vs. used to work	59.8	(26.9)			40.2
3rd child		76.4		1.0	22.6
	38.7	(20.6)	37.7		
Working vs. used to work	63.1	(33.6)			36.9

Regression

I use the logit model and the PSKC data to figure out the determinants of additional child birth choice described in the previous sections. The dependent variable is 'plan to have another child', whose value is 1 if yes (Group1) and 0 if no (Group 2). The data in which the mothers did not decide whether or not to have more child(ren) (Group 3) are not used in the estimation.

I use the method of maximum likelihood (ML) and Newton's method to estimate the parameters.

Table 5 displays the regression results. I tried 5 combinations of explanatory variables, all of which have statistically significant constant terms. Other variables which have statistically significant coefficient estimates are birth order, marriage duration, mother's education level, father's help (play with kids), and mother's age. As the birth order of the latest child increases by 1, the probability of a mother's planning to have another child decreases by about 30%p, ceteris paribus. The marginal effect of the variation in birth order on the probability is largest among variables, thus detailed exploration is desired: it seems true that the marginal benefit of having another child declines over number of children. If so, an interesting question would be whether it is possible to slow down the negative marginal effect of the birth order, or, to increase the total planned number of children. The PSKC data also have questions about the ideal and the planned number of children, and it will be worth of investigating what explains variations in the ideal or planned number of children and the gap, if it exists, between the ideal and the planned number of children.

The marriage duration, mother's education level, and mother's age have negative marginal effects on the probability of having another child. As the marriage duration and the mother's age increase by 1 year, the probability decreases by around 1.4%p, and 1.8%p, respectively. And mothers with bachelor or higher academic degree tend to reduce the probability by around 4.9%p on average.

What interests me most in the results is the statistically significant positive coefficient estimates for the degree of the father's participation in child caring. The mothers with husbands who play with the children often particularly tend to have higher probability of having another child. As the mothers' satisfaction increases by one in 5-point Likert scale question regarding their husbands' hanging around their kid(s), the probability to have another child increases by around 3.6%p. Please note that it is the only variable with significantly positive coefficient. There are other variables to measure the expected psychological and physical cost of raising another child, such as whether the mother is not happy as before after giving birth, how burdensome the expenditure for current child(ren) is, or how helpful the father is in nursing, but none of these have significant coefficients. It may be the case that mothers' expectation for their husbands is not so high that they are happy enough to decide to have another child if their husbands just play with kid(s).

Table 5
Determinants for Additional Child Birth Choice

	(1)		(2)		(3)		(4)		(5)	
# of obs.	1197		995		995		995		995	
Est. for	β	$\partial\Lambda(\beta'x)/\partial x$	β	$\partial\Lambda(\beta'x)/\partial x$	β	$\partial\Lambda(\beta'x)/\partial x$	β	$\partial\Lambda(\beta'x)/\partial x$	β	$\partial\Lambda(\beta'x)/\partial x$
Constant	10.322* (1.245)		10.272* (1.366)		10.151* (1.362)		10.313* (1.374)		10.171* (1.352)	
Birth order	-3.191* (0.226)	-0.310* (0.034)	-3.201* (0.246)	-0.307* (0.037)	-3.191* (0.244)	-0.307* (0.037)	-3.202* (0.245)	-0.307* (0.037)	-3.194* (0.245)	-0.300* (0.041)
Marriage duration	-0.115* (0.056)	-0.011 (0.007)	-0.151* (0.061)	-0.015* (0.008)	-0.150* (0.061)	-0.014* (0.008)	-0.148* (0.061)	-0.014* (0.008)	-0.150* (0.061)	-0.014* (0.007)
Mother's religion	0.261 (0.190)	0.025 (0.024)	0.205 (0.211)	0.020 (0.027)	0.229 (0.210)	0.022 (0.027)	0.211 (0.211)	0.020 (0.027)	0.234 (0.211)	0.023 (0.026)
Expendi-ture for children	-0.114 (0.125)	-0.011 (0.016)	-0.105 (0.140)	-0.010 (0.018)	-0.108 (0.140)	-0.010 (0.018)	-0.109 (0.139)	-0.010 (0.018)		
Exp./income									-0.331 (0.341)	-0.032 (0.039)

Table 5
Determinants for Additional Child Birth Choice (continued)

	(1)		(2)		(3)		(4)		(5)	
# of obs.	1197		995		995		995		995	
Mother's working	-0.008 (0.276)	-0.001 (0.035)	-0.070 (0.306)	-0.007 (0.039)	-0.068 (0.306)	-0.007 (0.039)	0.369 (0.482)	0.035 (0.062)	-0.101 (0.291)	-0.010 (0.035)
Mother's working status							-0.606 (0.520)	-0.059 (0.067)		
Mother's education	-0.462* (0.206)	-0.045* (0.026)	-0.505* (0.229)	-0.049* (0.029)	-0.495* (0.229)	-0.048 (0.030)	-0.500* (0.229)	-0.048 (0.030)	-0.507* (0.226)	-0.049* (0.030)
Stress (not happy as before)	-0.0430 (0.987)	-0.004 (0.013)	-0.080 (0.109)	-0.008 (0.014)	-0.077 (0.109)	-0.007 (0.011)	-0.079 (0.109)	-0.008 (0.014)	-0.078 (0.109)	-0.007 (0.013)
Stress (exp. burden-some)	-0.155 (0.095)	-0.015 (0.012)	-0.116 (0.106)	-0.011 (0.014)	-0.112 (0.106)	-0.011 (0.014)	-0.107 (0.106)	-0.010 (0.014)	-0.102 (0.104)	-0.010 (0.013)
Father (help nursing)	-0.025 (0.104)	-0.002 (0.013)	-0.109 (0.114)	-0.010 (0.015)	-0.111 (0.114)	-0.011 (0.015)	-0.115 (0.114)	-0.011 (0.015)	-0.114 (0.114)	-0.011 (0.014
Father (play w/ kids)	0.278* (0.133)	0.027 (0.017)	0.376* (0.147)	0.036* (0.019)	0.369* (0.147)	0.036* (0.019)	0.370* (0.147)	0.036* (0.019)	0.369* (0.147)	0.035* (0.018)
Day-care (parents)	0.106 (0.326)	0.010 (0.04)	-0.047 (0.363)	0.005 (0.046)	-0.065 (0.362)	-0.006 (0.046)	-0.191 (0.376)	-0.018 (0.048)	-0.037 (0.359)	-0.004 (0.044)
Mother's age	-0.206* (0.032)	-0.020* (0.004)	-0.192* (0.034)	-0.018* (0.005)	-0.189* (0.034)	-0.018* (0.005)	-0.190* (0.034)	-0.018* (0.005)	-0.191* (0.034)	-0.018* (0.004)
Income	0.039 (0.080)	0.004 (0.010)	-0.032 (0.088)	-0.003 (0.011)	-0.011 (0.086)	-0.001 (0.011)	-0.000 (0.087)	-0.000 (0.011)		
Asset	0.042 (0.032)	0.004 (0.004)	0.076* (0.037)	0.007 (0.005)						
Liability			0.167 (0.204)	0.016 (0.026)						
Asset-liability					0.075* (0.037)	0.007 (0.005)	0.075* (0.037)	0.007 (0.005)	0.072* (0.036)	0.007 (0.004)
Home ownership	0.176 (0.199)	0.017 (0.025)	0.101 (0.224)	0.010 (0.029)	0.165 (0.217)	0.016 (0.028)	0.167 (0.217)	0.0160 (0.028)	0.162 (0.217)	0.016 (0.026)
Log likelihood	-381.57		-314.51		-315.23		-314.52		-314.99	
Goodness of Fit (LRI)**	0.499		0.504		0.503		0.504		0.503	
Likeli-hood ratio***	759.29		638.11		636.66		638.08		637.15	

Note. Either $H_0: \beta > 0$ or $H_0: \beta < 0$ is tested at the 5% significance level.
** $LRI(likelihood\ ratio \in dex) = 1 - \frac{\ln L}{\ln L_0}$, where L is the maximized likelihood and L_0 is likelihood computed with only a constant term. *** H_0: All the slope coefficients in the logit model are zero.

An intriguing aspect of the results is that household income does not explain the probability of having another child. Instead, the coefficients for the asset and net asset, i.e., asset-liability, are significantly positive in (2) ~ (5), but not in (1) in which the panels who did not answer the amount of household liability are included. As noted above, there seems self-selection in responding the amount of assets and liabilities: the response rates of the relevant questions in the survey are rather low, especially for the liabilities. Table 6 shows the averages, the minima, and the maxima of the assets in Group 1 and 2, and depending on the response of the liabilities. Even though the differences in assets between the 'liability revealed' and the 'liability hidden' are not significantly different in Group 1 and 2, the variations, or standard errors, of the assets are rather large for the 'liability hidden', so inclusion of the 'liability hidden' in (1) could reduce the effect of assets on the probability of planning another child. And the asset response rates are different among the groups, which could cause changes in some coefficient estimates in (1) and others.

Table 6
Assets of Different Categories

	Plan to have another child (Group 1)		Plan not to have another child (Group 2)	
# of responses (response rate)	508(88.2%)		888(84.9)	
	Liability amount revealed	Not respond	Liability amount revealed	Not respond
# of responses (response rate out of the asset responded)	417(82.1%)	91	728(82.0%)	160
Mean of assets (*SE*) (100 mil. Won)	1.89(0.18)	2.14(0.42)	1.97(0.09)	2.19(0.34)
Min. (100 mil. Won)	0	0.1	0	0.06
Max. (100 mil. Won)	51	20.3	31	43

Several other variables are worth comments. Whether a mother is working and whether the working mother has a full-time-job do not have impacts on the mother's plan to have another child. While mother's education level, that is, whether the mother has bachelor or higher degree, does have effect on the probability, the correlation coefficients between mother's education level and mother's working, and between mother's education level and mother's having a full-time-job are only 0.23 and 0.21, respectively.

The expenditure amount for the latest child, or the proportion of the expenditure amount out of household income do not either explain the probability. The coefficients are negative as are guessed, but not significant.

Further Research

Immediate issues to tackle are the followings

1. Expanding the data to 2009: the 2008 data are collected when the babies are less than one year old. The effects of, for example, mother's working, expenditure for the latest child, who takes care of the child during the daytime can be very different as the babies grow.
2. In-depth study for the decision of working mothers: it is an important policy issue to identify huddles for working mothers to have more child(ren).
3. Investigating the self-selection problem of the Group 3: If the mothers in Group 1 and 2 are not random samples, other techniques, e.g. sequential logit model, may have to be used.
4. Checking the ideal and/or planned number of children: the effect of birth order is very strong, so checking and trying to explain the variations in the numbers would be worthwhile. It might be possible to track and study the changes in the ideal and/or planned number of children from 2008 to 2009 data.

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Work Plan Decisions by Heterogeneous Female Groups Out of Work for Baby Birth

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Our research investigates work plan decision of females who are out of work after baby birth. We notice that those who ever worked are qualitatively different from those who never did on their work plan. Reflecting this heterogeneity, we conduct separate logit analysis for each group to understand their work plan. We find that individuals of each group plan to work on different motivation. Those who ever worked make decision for work plan based on life-time carrier pursuit, but those who never worked did for a pecuniary reason. In addition, we employ bivariate probit model to consider the sequential labor decision of a woman, past work decision in her early carrier and work plan decision after baby birth and childcare. it is found that past work experience is crucial in determining work plan.

In Korea, female economic activity is low. Generally, many women stop working for either pregnancy or childcare. Even some women have never had job even after finishing formal education. In addition, many women defer child birth to hold jobs. This difficulty of having a baby while in work has created both a low birth rate and a slow female economic activity. The government makes efforts of laying a legal framework for maternity protection and anti-women discrimination, and encourages workplaces to furnish childcare measures so that women can continue to work despite baby birth. Along with this government policy, some researches were made to see how work environments affect child-bearing of a woman worker (Kim 2009, Woo 2010). On the other hand, Kim (2004) explored whether female workers would resume work or quit after baby birth. An increase in female economic activity can be achieved in two ways, one by having women keep work while caring children, and another by helping women out of jobs for childcare to return to work. This study is concerned with the latter. It will see what individual traits, background or family economic status helps women to return to work or prevent them from doing so.

The Panel Study on Korean Children (PSKC) is an useful source for researches on economic activity of females undergoing baby birth. But it asks only current information for female with children. Thus, its informations for the measures offered for childcare by workplaces such as maternity leave, in-office nursery is limited only for those in job currently. On the other hand, we have no way of knowing what environments their previous workplace had for those who once worked but not now. It is agreed that work environment is critical for having women maintain jobs throughout pregnancy. So, with this unequal information of PSKC for two groups, we are not able to examine confidently what factors caused one to keep jobs or quit with her undergoing pregnancy and baby birth. Kim (2004) investigated whether women who delivered babies returned to the old job or quit. She employed only individual traits as explanatory variable in a logit model. Her research is limited because it did not include workplace measures for childcare that seems to be critical for work return decision.

For this reason, our research is rather targeted for those who are out of job. They are separated into ones who never worked and ones who once worked. The survey asked individuals of both groups whether they plan to work. So, we have only informations of females' planned actions (or desire), not observed actions. That is, the survey does not identify who actually returned to work or who did not. Of course, it makes value of this research limited. But because there were few researches that investigated work decision of females who are out of work after baby birth, it is worthwhile to pursue this study.

Before starting this study, we notice that those who ever worked are qualitatively different from

those who never did on their work plan. Thus, instead of combining these two groups and examining work plan in a single econometric model while ignoring heterogeneity of two groups, we conduct an empirical model on each group respectively. The empirical results of the separate model show that each group plans to work for different motivation. On the other hand, in order to take into account this heterogeneity of two groups more explicitly, we build two equation model, one that tells how a female chose to work in the past, and another that illuminates whether she plans to work after baby birth in another decision making.

Previous Literature

There are two strands of researches in Korea regarding women's work and childcare. One is focused on baby birth plan of a female employee. These researches investigated whether corporate policy of maternal protection or children-care supports of the government influence a female worker to have a new baby (Kim 2009, Woo 2010). These researches were made among the atmosphere where the society was concerned with a low birth rate. It was implicitly assumed that insufficient maternal protection at workplaces is a major barrier for baby birth by female workers.

Woo (2010) argued that women working in public sector would bear more children than those in private sectors. It reflects that maternal protection or children-care supports well-furnished in public sector leads women workers to have babies. In contrary, Kim (2009) found that those in unstable or temporary jobs would have less likelihood of having babies and also those in manufacturing sectors would be in similar situation.

Another kind of research is interested in knowing whether women would return to work after baby birth. It investigates how individual traits or family economic status affects their decision to return to work. Kim (2004) was concerned with work return after baby birth by women who are in birth leave, not out of job as in our research. She used a data from Korea Labor Income Panel Survey (KLIPS). The survey data has some drawbacks for work return research. Since the survey was targeted for general households, not at females having children, the sample size is small. Kim (2004) divided a female worker into one returning to work and another not returning, and used a logit analysis. It was found that a female would have more chance of returning to work if there is childcare person or she worked more years in the same job.

Method

It is thought that a female makes two decisions at different time points in her life. In her early period, probably after finishing formal education, she faces the first decision of whether she would enter into labor market or not. According to this decision, she could be a person who once worked or another who never worked. Later when she is out of job for pregnancy or childcare, she is confronted with the second decision of whether she would attempt to have a job or not.

According to the data, there are 1,391 females out of job now. Among them, females of 861 chose to work at the first decision or in her early carrier and females of 524 did to stay out of job. That is, the first group once worked and the second never worked. Out of those in the first group with job experience, females of 596 plans to return to work at the second decision or after baby birth and childcare but the remaining 264 females want to stay out of job. It implies that if a female has ever worked, she is more likely to resume work. On the other hand, for the second group with no job experience, females of 207 plan to work at the second stage but other 317 females have no plan. It tells that a female who never worked are relatively reluctant to have a job.

Comparison between two groups

The most conspicuous difference between those who ever worked and those never worked is work

plan. More percentage of those who ever worked plan to work. There is virtually no difference between two groups in the number of children, married period, age, living together with spouse, and education. But those who ever worked has a tangible lead over those who never did in spouse regular job. Also more percentage of them live in metropolitan area.

On the other hand, there is almost no difference in breast feed and parent nursing. That is, almost every one of both groups take care a baby for herself. Regarding financial aspects, those who never worked has more income but the gap is not much. Also their percentage of owning house is higher. On contrary, those who ever worked have more monthly debt payment. Combined together, those who never worked are in a better position financially. Both groups spend almost same sum on living expenditure but those who ever worked more on baby expenditure. Lastly, there is no notable disparity in attributes of residential surrounding of two groups such as nursing facility, education facility, and security.

Table 1
Those Out of Work (n = 1,391)

Variable	Those who ever worked (*n* = 861)	Those who never worked (*n* = 524)
Work plan (y/n)	69.3%	39.5%
Order of a new baby	1.6	1.8
Spouse (y/n)	99.5%	99.4%
Married period	3.8	3.6
Age	31.3	31.2
Living together with souse (y/n)	99.2%	98.1%
Education	14.0	13.8
Spouse age	33.8	33.9
Spouse employment (y/n)	98.7%	97.8%
Spouse regular job (y/n)	82.5%	76.2%
Spouse work hours	54.7	55.6
Spouse education	14.4	14.2
Parents nursing (y/n)	99.9%	99.4%
Breast feed (y/n)	67.7%	66.8%
Metropolitan residence (y/n)	39.8%	35.7%
Owning house (y/n)	42.0%	45.8%
Welfare beneficiary (y/n)	3.9%	3.6%
Monthly household income	269.5	273.3
Real estate value	14,929.6	13,592.2
Financial asset	2,841.1	2,701.6
Financial debt	2,996.5	2,634.4
Monthly debt payment	40.2	28.0
Expenditure	154.0	153.5
Expenditure for baby	45.0	41.9
Sufficiency of nursing facility	3.43	3.45
Sufficiency of preschool	3.26	3.25
Sufficiency of private education	3.26	3.24
Sufficiency of public park and leisure facility	3.20	3.16
Sufficiency of cultural facility	2.52	2.46
Sufficiency of neighborhood security	3.28	3.32

Note. Unit: Years, 10 thousand wons.

Comparison of subgroups with different work plans out of those who ever worked. The subgroup with no work plan has more married years and live in metropolitan area. Also, they are generally affluent in terms of percentage of owning house income, financial assets, monthly debt

payment, expenditure, and baby expenditure. In addition, their residential environment is better in nursing, education, and security.

Table 2
Those Who Are Out of Work but Ever Worked (n = 861)

Variable	Work plan (*n* = 596)	No plan (*n* = 294)
Order of a new baby	1.6	1.7
Spouse (y/n)	99.3%	100.0%
Married period	3.6	4.2
Age	31.0	31.9
Living together with souse (y/n)	99.2%	99.2%
Education	14.0	14.0
Spouse age	33.6	34.3
Spouse employment (y/n)	98.6%	98.8%
Spouse regular job (y/n)	81.4%	85.0%
Spouse work hours	54.8	54.4
Spouse education	14.3	14.6years
Parents nursing (y/n)	99.8%	100.0%
Breast feed (y/n)	67.4%	68.2%
Metropolitan residence (y/n)	35.6%	49.2%
Owning house (y/n)	40.5%	45.3%
Welfare beneficiary (y/n)	4.5%	2.8%
Monthly household income	264.4	281.0
Real estate value	14,046.6	16,752.2
Financial asset	2,711.3	3,119.4
Financial debt	2,687	3,659.4
Monthly debt payment	44.4	31.3
Expenditure	149.1	165.0
Expenditure for baby	40.9	54.0
Sufficiency of nursing facility	3.37	3.56
Sufficiency of preschool	3.18	3.41
Sufficiency of private education	3.18	3.42
Sufficiency of public park and leisure facility	3.14	3.33
Sufficiency of cultural facility	2.43	2.71
Sufficiency of neighborhood security	3.21	3.45

Note. Unit: Years, 10 thousand wons.

Comparison of subgroups with different work plans out of those who never worked. The subgroup with no work plan has slight more number of children, longer married years, and more percentage of spouse regular job, and is more likely to live in metropolitan area. Also, they are generally affluent in terms of percentage of owning house income, real estate value, monthly debt payment, expenditure, and baby expenditure. No salient difference is observed in their residential environment. On the other hand, the subgroup with work plan has more percentage of breast feed.

Table 3
Those Who Are Out of Work but Never Worked (n = 524)

Variable	Work plan (*n* = 207)	No plan (*n* = 317)
Order of a new baby	1.7	1.9
Spouse(y/n)	99.0%	99.7%
Married period	3.1	4.0
Age	30.7	31.6
Living together with souse(y/n)	97.6%	99.4%
Education	13.8	13.7
Spouse age	33.3	34.2
Spouse employment(y/n)	97.0%	98.4%
Spouse regular job(y/n)	80.5%	78.5%
Spouse work hours	54.11	56.6
Spouse education	14.1	14.4
Parents nursing (y/n)	99.5%	99.4%
Breast feed (y/n)	72.0%	63.4%
Metropolitan residence (y/n)	26.6%	41.6%
Owning house (y/n)	40.5%	49.2%
Welfare beneficiary (y/n)	3.6%	4.0%
Monthly household income	263.3	279.8
Real estate value	12,784.2	14,106.8
Financial asset	2,994.7	2,510.9
Financial debt	2,377	2,804
Monthly debt payment	34.3	23.7
Expenditure	150.7	155.3
Expenditure for baby	41.4	42.3
Sufficiency of nursing facility	3.41	3.48
Sufficiency of preschool	3.20	3.28
Sufficiency of private education	3.25	3.24
Sufficiency of public park and leisure facility	3.17	3.16
Sufficiency of cultural facility	2.44	2.47
Sufficiency of neighborhood security	3.26	3.35

Note. Unit: Years, 10 thousand wons.

Model

Model Specification

The simple approach for investigating whether females out of work for baby birth plan to work seems to build a logit model that has explanatory variables such as individual traits and family economic status. However, one additional crucial factor of determining work plan is a previous job experience. Many women leave job for pregnancy or childcare and are out of jobs while children are quite young, but some of them return to job when they reach a certain age. On the other hand, it is expected that those who never worked to have less chance of having jobs as long as the other conditions are the same. Accordingly, it is desirable to consider a previous job experience in work decision. However, if we put job experience along with other individual traits variables as explanatory variables in the logit model, we can encounter a couple of problem. First, the group of those unemployed with job experience is qualitatively different from another group of those without it. Thus, if we place two groups together in a logit model, there is a need to take into account group heteroschedaticity. Second, endogeneity can occur. That is, the previous job experience is influenced by unobserved individual ability. Also current work plan decision is also done by it. So if we put

the previous job experience as an explanatory variable in work plan decision equation, it can cause endogeneity. To avoid these problems, we can take two different approaches, a separated logit analysis for those who ever worked and those who ever worked, or a bivariate probit analysis.

The Separate Logit Analysis for Two Different Groups

This approach is to divide samples into two groups, those with job experience and those without it, and run a logit model for each group. If different explanatory variables are observed to affect work plan decision in each group, a meaningful interpretation can drawn for work decision of each group.

Empirical results for those who ever worked. We find that married period, spouse regular job, and real estate value, positively influences female work plan. It is interesting to note that a woman whose spouse has a regular and stable job rather want to work. On the other hand, age, metropolitan residence, and neighborhood security affects negatively work plan. Contrary to our expectation, parents nursing, breast feed, and education are not factor that have effects on work plan decision.

Table 4
Those Who Are Out of Work but Ever Worked (n = 861)

Variable	Coefficient	*SE*	Wald	*p* value	Exp*(B)*
Order of a new baby	.000	.000	1.150	.284	1.000
Spouse (y/n)	-20.031	28410.960	.000	.999	.000
Married period	.000	.000	1.939	.164$^{\#}$	1.000
Age	-.050	.023	4.656	.031*	.951
Living together with spouse (y/n)	.000	.000	.000	.999	11000
Education	.000	.000	.328	,567	1.000
Spouse age	.000	.000	.280	.596	1.000
Spouse regular job(y/n)	.000	.000	3.067	.080†	1.000
Spouse work hours	.000	.000	.000	.994	1.000
Spouse education	.000	.000	.400	.527	1.000
Parents nursing (y/n)	-20.238	40192.328	.000	1.000	.000
Breast feed (y/n)	.019	.182	.011	.917	1.019
Metropolitan residence (y/n)	-.586	.175	11.217	.001***	.556
Owning house (y/n)	-.093	.177	.275	.600	.911
Welfare beneficiary (y/n)	.000	.000	.788	.375	1.000
Monthly household income	.000	.001	.718	.397	.999
Real estate value	.000	.000	3.711	.054*	1.000
Financial asset	.000	.000	.066	.797	1.000
Financial debt	.000	.000	.260	.610	1.000
Monthly debt payment	.000	.000	.014	.907	1.000
Expenditure	.000	.000	.103	.748	1.000
Expenditure for baby	.000	.000	.008	.928	1.000
Sufficiency of nursing facility	-.009	.148	.004	.952	.991
Sufficiency of preschool	.002	.157	.000	.990	1.002
Sufficiency of private education	-.111	.121	.851	.356	.895
Sufficiency of public park and leisure facility	.041	.102	.162	.687	1.042
Sufficiency of cultural facility	-.112	.099	1.274	.259	.894
Sufficiency of neighborhood security	-.216	.118	3.337	.068†	.806
Constant	44.288	49219.976	.000	.999	1.715E19

$^{\#}p. < .20.$ $^{\dagger}p. < .10.$ $^{*}p. < .05.$ $^{***}p. < .001.$

Table 5
Those Who Are Out of Work but Ever Worked (n = 861)

Variable	*B*	*SE*	Wald	*p* value	Exp*(B)*
Order of a new baby	.000	.000	1.083	.298	1.000
Married period	.000	.000	2.108	.147#	1.000
Age	-.051	.023	5.218	.022*	.950
Education	.000	.000	.145	.703	1.000
Spouse regular job (y/n)	.000	.000	3.067	.149#	1.000
Metropolitan residence (y/n)	-.639	.167	14.563	.000***	.528
Monthly household income	.000	.001	1.712	.191	.999
Real estate value	.000	.000	2.471	.116#	1.000
Sufficiency of nursing facility	-.009	.086	1.317	.251	.906
Sufficiency of neighborhood security	-.246	.104	5.593	.018*	.782
Constant	4.017	.785	26.159	.000	55.555

#*p*. < .20. †*p*. < .10. **p*. < .05. ***p*. < .001.

The empirical results for those who never worked. It is found that breast feed, financial asset and expenditure influences female work plan. It is noteworthy to see that a woman with breast feed is more likely to plan work. The positive effect of financial asset seems to be caused by the fact that a rich woman has job option for self-employed business. On the other hand, spouse work hours, metropolitan residence, and monthly income affects negatively work plan. Especially, it is interesting that expenditure has a positive sign but monthly income a negative one. In fact, income is not necessarily equal to expenditure. The combination of two signs tells that as a household has more expenditure over income, a woman feels it necessary to have a job. Contrary to our expectation, parents nursing, and education are not factor that have effects on work decision. Seemingly strange enough, breast feed has a positive effect on work plan.

Table 6
Those Who Are Out of Work but Never Worked (n = 524)

Variable	*B*	*SE*	Wald	*p*-value	Exp*(B)*
Order of a new baby	-.261	.299	.763	.382	.770
Married period	-1.106	.091	1.359	.244	.900
Age	-.021	.058	.128	.721	.979
Living together with spouse(y/n)	-.574	1.722	.111	.739	.563
Education	.042	.095	.193	.661	1.043
Spouse age	.012	.051	.052	.819	1.012
Spouse regular job(y/n)	-.059	.373	.025	.874	.942
Spouse work hours	-.019	.012	2.617	.106†	.981
Spouse education	-.051	.091	.308	.579	.951
Parents nursing (y/n)	-.421	1.509	.078	.780	.656
Breast feed (y/n)	.598	.318	3.533	.060†	1.819
Metropolitan residence (y/n)	-1.106	.344	10.373	.001***	.331
Owning house (y/n)	-.236	.304	.605	.437	.789
Welfare beneficiary (y/n)	-1.146	1.142	1.008	.315	.318
Monthly household income	-.005	.002	7.172	.007***	.995
Real estate value	.000	.000	.032	.857	1.000
Financial asset	.000	.000	2.775	.096†	1.000
Financial debt	.000	.000	.029	.865	1.000
Monthly debt payment	.001	.006	.021	.885	1.001

Table 6
Those Who Are Out of Work but Never Worked (n = 524) (continued)

Variable	*B*	*SE*	Wald	*p*-value	Exp*(B)*
Expenditure	.004	.003	2.582	.108†	1.004
Expenditure for baby	.002	.003	.362	.548	1.002
Sufficiency of nursing facility	.210	.240	.766	.382	1.234
Sufficiency of preschool	-.107	.252	.182	.670	.898
Sufficiency of private education	.019	.213	.008	.930	1.019
Sufficiency of public park and leisure facility	.117	.191	.378	.538	1.124
Sufficiency of cultural facility	-.153	.170	.809	.368	.858
Sufficiency of neighborhood security	.019	.178	.011	.915	1.019
Constant	2.847	3.063	.864	.353	17.237

†$p. < .10.$ ***$p. < .001.$

Table 7
Those Who Are Out of Work but Never Worked (n = 524)

Variable	*B*	*SE*	Wald	*p*-value	Exp*(B)*
Order of a new baby	-.229	.230	.989	.320	.795
Married period	-.070	.065	1.183	.277	.932
Spouse work hours	-.012	.009	2.813	.094	.985
Breast feed (y/n)	.499	.249	4.009	.045	1.647
Metropolitan residence (y/n)	-1.084	.254	18.156	.000	.338
Monthly household income	-.003	.001	4.942	.026	.997
Financial asset	.000	.000	1.508	.219	1.000
Expenditure	.002	.002	1.162	.281	1.002
Sufficiency of nursing facility	.098	.120	.666	.415	1.103
Sufficiency of cultural facility	-.024	.114	.046	.831	.976
Constant	1.153	.773	2.226	.136	3.166

#$p. < .20.$ †$p. < .10.$ *$p. < .05.$ ***$p. < .001.$

Comparison of the empirical results of two groups. There is a strong difference in factors that influence work decision for two groups. First of all, physical age and married period is effective in work decision for those who ever worked, but are not for those who ever worked. Thus, so called "M" curve of labor activity for women is appropriate only for those who ever worked. On the other hand, current cash flow (expenditure minus income) is important in work decision for those who never worked. Accordingly, those who ever worked seem to behave according to work schedule over life span labor schedule while those who never worked seem to act on financial need. In other words, those who ever worked is motivated by carrier pursuit but those who never worked by economic incentive.

Table 8
The Factors That has Effects on Work Plan for Each Group

Those who ever worked	Those who never worked
Positive sign	Positive sign
Negative sign	Negative sign
Married period	Breast feed
Age	Spouse work hours
Spouse regular job	Financial asset
Metropolitan residence	Metropolitan residence
Real estate value	Expenditure
Neighborhood security	Monthly income

The Bivariate Model

We set up two probit models for sequential work decision. The first probit model is concerned with past job experience, i.e., whether a female had a job before or not. Job experience is a binary variable. The second probit model is presented for work plan decision. Likewise, work plan is also a binary variable. We cannot help overemphasizing that job experience is an important explanatory variable used in the second probit model. If we take into correlation of two error terms in the two probit equations, we can overcome a possible risk of endogenity associated with the use of job experience as an explanatory variable.

To reflect a relation between the two decisions, we use bivariate probit model. Two latent equations are employed, each corresponding to each of two decisions. The model specification would be

$$y_1^* = x_1'\beta_1 + e_1,\ y_1 = 1 \text{ if } y_1^* > 0, 0 \text{ otherwise}$$

$$y_2^* = x_2'\beta_2 + \gamma y_1 + e_2,\ y_2 = 1 \text{ if } y_2^* > 0, 0 \text{ otherwise}$$

$$E(e_1) = E(e_2) = 0$$

$$var(e_1) = var(e_2) = 1$$

$$cov(e_1, e_2) = \rho$$

Here, we denote x_1 as explanatory variables for the first decision equation. and y_1 a binary variable representing the past work experience. Then, we list explanatory variables x_2 for the second decision equation and y_2 a binary variable for work plan. This system of two equations is an extension of the model by Kim (2004). She used a single decision equation like the second equation in our model and placed the number of work years as explanatory variable which is similar to job experience in our model. If there is covariance of the errors of two decision equations or y_1 is related to the error e_1 in the second decision equation, endogeneity problem can emerge. On the other hand, this model specification can avoid it.

The empirical results. In the first equation regarding past work experience, we use education, financial assets as explanatory variables because they are believed to be fixed many years ago or relatively stable over time. The crucial factor for determining past work experience is education. Other variables are not significant. We do not have information of her marital status when she worked. If she worked when she was single, the current assets that has been accumulated together by spouse and herself is not relevant to her past work decision.

In the second equation regarding work plan, the past work experience and nursing facility have positive effect. On the other hand, married period negative one. In other words, as a woman becomes old and settles in keeping house, she loses motivation to work. On the other hand, though not strong significant, a woman with two babies has intention to work because she finishes her birth plan. This is comparable to so-called M curve of female labor activity over life time. On the other hand, errors of two equations are not correlated much. Accordingly, we are able to run only the second equation not worrying endogeneity. However, it is not worranted because we already found a rich and interesting facts by taking the separated logit models for the different groups.

Table 9

	Coefficient	*SE*	*t*-value	*p*-value
Equation for Y1				
Education	.12431563	.00998892	12.445	.0000
Spouse work	-.00040245	.00300281	-.134	.8934
Owning house	-.03987154	.07335619	-.544	.5868
Real estate	.59487D-08	.367229D-07	.071	.9437
Equation for Y2				
Y1	.35043731	.22764093	1.539	.1237
Order of child	.08461248	.06574269	1.287	.1981
Married period	-.02394268	.01577466	-1.518	.1291
Breast feed	.07488648	.07526383	.995	.3197
Nursing facility	.06896474	.03552148	1.941	.0522
Disturbance correlation				
RHO(1,2)	.08400919	.14393587	.584	.5595

Conclusion

Our research investigated work plan decision of females who are out of work after baby birth. We claim that those who ever worked are qualitatively different from those who never did on their work plan. Reflecting this heterogeneity, we conduct separate logit analysis for each group to understand their work plan. We find that individuals of each group plan to work on different motivation. Those who ever worked make decision for work plan based on life-time carrier pursuit. On the other hand, those who never worked did for a pecuniary reason. In addition, we saw majority of those who never worked stay out of job. These are combined together to imply that they do not want to work as long as they are economically comfortable.

This different reasons for entering into work can lead to a policy implication that it is effective for job information and job counseling to be targeted at those who ever worked. Because they can work if they find jobs that are similar to their past job or match their preference. We found that regardless of group, women in metropolitan area are more reluctant to work. The reason for it should be examined for lifting female economic activity.

In addition, we employ bivariate probit model to consider the sequential labor decision of a woman, past work decision in her early carrier and work plan after baby birth and childcare. It is found that past work experience is crucial in determining work plan. Also if nursing facility is good in the neighborhood, it makes it easy for a woman to work.

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Discriminant Analysis of Factors Influencing Intention of Additional Childbirth

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The purpose of this study was to find what the factors that distinguish the direction of additional prediction childbirth intention, as exploring specific factors that divide among two groups who changed their intention of additional childbirth; one who changed their intention to give additional childbirth or another who changed their intention to give no more additional childbirth. Through this, we expect it will be used as basic data for making policy measures against low birth rate. For this study, Panel Study on Korea Children (PSKC)'s first and second year data that Korean Institute of Child Care and Education (KICCE) conducted. Targeted the panels who participated at both first and second year's researches, this study used the answers of 291 wives who changed their answers about additional childbirth intention. Totally 203 of all 291 people were correctly classified as actual group, and accuracy of classification is 69.8%.

Until now, the problem about a low birth rate has been discussed actively, for finding a reason of this phenomenon, people have been studying from demographic aspect to social and economic aspect, using various ways of analysis and choosing various factors. Previous studies have approached to a low birth rate through macroscopic aspect and microscopic aspect. In macroscopic aspect, the effects of wage and economic development have been mainly discussed, and in microscopic aspect, the characteristics of the household that affect to the childbirth have mainly discussed.

In macroscopic aspect, the discussion about a low birth policy gave an importance to financial abilities or a connection with an unemployment rate, but overlooked a psychological compensation and its complex connection with the family's financial environment (Shin, Cho, & Kim, 2009). Even in childbirth policy, the environment which childbirth happens, dynamics of family relation, and psychological and social factors did not consider as important things. If a level of wealth is a rate of birth, it can't simply explain why well educated and rich families have low birth rates, or delay their childbirth (Cha, 2008). Those mean there were serious gap in understanding about each family member's characteristic, and also missing one part of important decision of seeking policy efficiency.

Meanwhile, the studies which dealt with parents' role in microscopic level have emphasized that being parents mean understanding of themselves and give them purpose of their life. Recently, along with the actual cost for children's education was raised and as parents' immersion in education and nurturing were raised, psychological burdens of parents' role have been increased. Especially, in women's case, as they got more social pressure for their career role, at the same time, they got primary responsibility of the nurturing of child, and they got more psychological burdens for being parents or additional childbirth (Hwang, 2005). In addition, as scientific techniques develop, especially contraception which can control the time of pregnancy and pregnant statue, the parents' role is recognized as an optional situation.

Recent studies, related to a low birth rate, have mainly discussed about burdens of financial expense of childbirth and nurturing. It is thought that a child causes tension for financial expense, and in adults' life, the role as a parent brings new stress and tension. Like that, being a parent is regarded as burdens of family economy and psychological burdens for individual person, but on the other hand, they say, parents' role is regarded as the happiest and the most valuable thing. In Kang (2007)'s study, it turned out that the psychological characteristics of family environment have influence on intention of additional childbirth, and the quality of husband and wife relationship, the value of preference for son, the duty for nurturing can be factors that affect to childbirth. Studies of Freidman, Hechter and Kanazawa (1994) and Myers (1997) which pointed out that family dynamics,

the quality of family relationship could be related to childbirth started from self-reflection which is about pre-existing childbirth theory only emphasized the social-economic aspect of family and individual person, and tried to focus the value of child in strong bond aspect.

Those studies agree that childbirth is affected by complex aspects and various factors that can't be explained as one factor. Especially, among various factors, family environment is the most familiar and direct field of life, and it does very important role in childbirth (Cha, 2008). Because demographic change through the change of childbirth ability has a close connection with childbirth decision that occurs in family which is essentially measured in husband and wife (UN, 2003), family environment has important meaning in establishing family's childbirth policy. In this context, western researchers criticized that the studies about childbirth ability gave undue value with social-economic, demographic aspect analysis (Nock, 1988), and examined that internal attributes of family environment, that is, in microscopic level what connection does family members' view of value about a child and the quality of husband and wife relationship have, through theoretical and concrete positive materials. Especially, when considering that the family in our society has experienced rapid change not only with internal aspect but external aspect, it is needed to examine the connection between childbirth and family factors thoroughly as considering internal attribute environment. Eventually, there is need for setting various factors which form family environment as a main analysis and examine its connection with intention of childbirth, because a family is the closest and most familiar measure when childbirth happens.

So, analyzing the connections with additional childbirth intention focusing on various internal and external characteristics which are made in family environment like values toward their child as a family member, not only family's financial situation or demographic characteristics should be done. The purpose of this study was to find what the factors that classify the direction of additional prediction childbirth intention, as exploring specific factors that divide two groups that are the group who changed their intention about additional birth; one who changed their intention to give an additional birth or another who changed their intention to give no more additional birth. Through this, it is expected to be used as basic data for making policy measures against low birth rate.

The following research questions were posed

1. How is the relative influence of variables that affects to additional childbirth intention?
2. What are the variables that classify intentional group and non-intentional group, and how is their influence?

Method

Participants

The data from Panel Study on Korean children (PSKC)'s first and second year that Korea Institute of Child Care and Education (KICCE) conducted was used in this study. Targeted the panels who participated at both first and second year's researches, the answers of 291 wives who changed their answers about additional childbirth intention were used in this study. Targets classified by final groups are the same as Table 1. 164 people, 56.4%, who answered no intention of additional birth, or no idea in the first year's research but in the second year's research, they answered they had intention of additional childbirth. There were 127 people, 43.6% people, who answered no intention of additional birth or no idea in first year's research and answered no intention in second year's research.

Table 1
Participants (n = 291)

Group	n	%
No intention of additional childbirth / Unsure → Intention of additional childbirth	164	56.4
Intention of next childbirth / Unsure → No intention of additional childbirth	127	43.6

Materials and Procedure

In order to find the variable that affects to the classification of childbirth intention group, six main categories were looked through like demographic factor of husband and wife, born child factor, household factor, wife's internal factor, being parent factor, and factor of husband and wife. Details for each factor are like Table 2.

Table 2
Materials

Prediction Factor	Respondent	Measurement
Demographic factors	Wife, Husband	
Wife's & husband's age		
Wife's & husband's highest level of education[1)]		
Wife's & husband's employment statue		
Born child factors	Wife	
Child's gender		
Temperament – Emotionality, Activity		Buss(1984)'s The EAS
Household factors	Wife	
Average monthly income of a household		
Average monthly expense of a household		
Consumptive expense for a child		
Non-consumptive expense for a child		
The number of a family member		
Helper in a household or not[2)]		
Wife's internal factors	Wife	
Self-esteem		Rosenberg (1989)'s Self-Esteem Scale
Self-efficacy		Pearlin (1981)'s The Pearlin Self-Efficacy Scale
Depression		Kessler's K6
Being parents factors		
Value of a child-emotional, instrumental	Wife, Husband	Samsik Lee and the rest (2005)
Parental Style	Wife	Bornstein (1996)'s PSQ
Parenting Stress	Wife	Kim & Kang (1997)
Husband and wife Factors		
Husband's participation in nurturing	Wife	Kang (1998)
Marriage period	Wife	
Marital Satisfaction	Wife, Husband	Chung (2004)'s RKMSS
Conflict between husband and wife	Wife, Husband	Markman (1994, 2001)

Data collected by PSKC was analyzed with following method using SPSS 18.0 Window Program. First, in order to classify the research target, the first year's data and second year's data were compared, and classified the group that changed their intention of additional childbirth by data conversion. Second, in order to verify the prediction factors that classify the group that changed into having intention of additional childbirth, we used direct discriminant analysis.

1) Classified as lower than high school graduation or higher than university graduation
2) Existence of adult family member who related with a panel child except for sibling among the whole family

Results

Research targets are all the members of the group who changed their childbirth intention in the first and second year's research, and they were divided into two groups which is the group that answered have intention of additional childbirth when their child in infant period, four month old, but changed their answer to have no intention in next research taken 12 month later, and the group that answered no intention of additional childbirth in the first research but changed their answer to have intention of additional childbirth. In order to verify the prediction factors (demographic factor, born child factor, household factor, wife's internal characteristic, being parent factor, husband and wife factor, and social factor), direct discriminant analysis was used, and the result is like this.

Table 3
The Average Difference Between Two Group's Independent Variables (n = 291)

Prediction factors	Intention group *M (SD)*	Non-intention group *M (SD)*	All *M (SD)*	Wilk's λ	*F*
Demographic					
Wife's age	30.84(3.31)	31.78(3.75)	31.25(3.53)	.98	5.12*
Husband's age	33.50(3.80)	34.59(3.92)	33.97(3.88)	.98	5.73*
Wife's level of education	.72(.45)	.66(.48)	.69(.46)	1.00	1.46
Husband's level of education	.70(.46)	.69(.46)	.70(.46)	1.00	.02
Wife's employment	1.67(.47)	1.71(.46)	1.69(.46)	1.00	.48
Husband's employment	1.01(.11)	1.02(.15)	1.02(.13)	1.00	.55
Born child					
Gender	1.46(.50)	1.54(.50)	1.50(.50)	.99	2.12
Order of birth	1.33(.52)	1.48(.56)	1.39(.54)	.98	6.11*
Temperament-emotionality	2.82(.65)	2.77(.65)	2.80(.65)	1.00	.47
Temperament-activity	3.84(.60)	3.85(.53)	3.85(.57)	1.00	.01
Household					
Average monthly incomes	371.16(490.40)	455.48(722.32)	407.96(603.01)	1.00	1.40
Average monthly expense	256.74(228.99)	285.09(387.34)	269.11(307.99)	1.00	.61
Consumptive expense for a child	38.14(35.14)	51.01(159.81)	43.76(108.77)	1.00	1.00
Non-consumptive expense for a child	10.36(11.04)	10.84(11.24)	10.57(11.11)	1.00	.13
The number of a family	2.48(.73)	2.70(.91)	2.57(.82)	.98	5.48*
Helper in a household or not	.11(.31)	.12(.32)	.11(.32)	1.00	.05
Wife's internal factor					
Self-esteem	3.44(.44)	3.46(.47)	3.45(.45)	1.00	.21
Self-efficacy	3.70(.71)	3.49(.78)	3.61(.75)	.98	5.05*
Depression	11.84(4.44)	12.32(4.72)	12.05(4.57)	1.00	.82
Being parents					
Wife's child value-emotional	4.30(.54)	4.16(.69)	4.24(.61)	.99	3.96*
Wife's child value-instrumental	2.90(.68)	2.78(.78)	2.84(.73)	.99	2.16
Husband's child value-emotional	4.45(.50)	4.47(.53)	4.46(.51)	1.00	.09
Husband's child value-instrumental	3.33(.79)	3.33(.77)	3.33(.78)	1.00	.00
Wife's nurturing type	3.88(.49)	3.84(.54)	3.86(.51)	1.00	.32
Wife's nurturing stress	2.76(.65)	2.85(.68)	2.80(.66)	1.00	1.25
Husband's participation in nurturing	3.72(.84)	3.48(.89)	3.62(.87)	.98	5.44*
Husband and wife factor					
Marriage period (month)	42.20(28.14)	50.87(30.69)	45.99(29.55)	.98	6.28*
Wife's marital satisfaction	3.95(.73)	3.64(.89)	3.82(.82)	.96	10.77**
Husband's marital satisfaction	4.37(.70)	4.24(.76)	4.31(.73)	.99	2.17
Wife's marital conflict	1.93(.71)	2.31(.88)	2.10(.81)	.95	16.58***
Husband's marital conflict	1.96(.69)	2.15(.77)	2.05(.73)	.98	4.77*

*$p < .05$. **$p < .01$. ***$p < .001$.

According to Table 3, the average difference between two group's independent variables show significant result in wife's age, husband's age, child's birth order, the number of family, wife's self-efficacy, wife's emotional value for the child, husband's participation for nurturing husband and wife's marital satisfaction, conflict between husband and wife. That is, among those discrimination factors, 10 variables have great effect on additional childbirth plan. Especially, because the conflict that the wife feels shows the smallest Wilk's λ and the biggest *F*, it highly contributes to the intention of additional childbirth.

As we'd performed verification about dispersion between groups, that is, the basic supposition of classification function, it turned out that the covariance matrix was not the same (Box's M = 1005.82, p = .000.), so, in this study, we suggested the result of discriminant analysis performing individual-group convert into covariance matrix that is applied in classification method. In addition, we suggest the result of X^2 about Wilk's λ in order to examine for significance about discrimination. Absolute value is 0.217, and this function explains 100% of discrimination (X^2 = 53.612, p = .01.).

Table 4
Classification Function's Significant

Absolute value	Common variate (%)	Canonical correlation	Wilk's λ	χ^2	*df*
.217	100.0	.422	.822	53.612**	31

**p < .01.

We suggest coefficient of function and structure matrix in order to invest the relative importance among the variables that affect to the discrimination of the group of additional childbirth intention, and we suggest centroid that is average of group member's discrimination score and canonical discriminant function in order to decide each group's characteristics. Absolute value of canonical discriminant shows that husband's employment, helper in a household or not, and wife's self-esteem are important factors. That is, mainly, the intention change of research target can be predicted as change of additional childbirth intention, whether it changes into the intention to give additional childbirth or not, in accordance with husband's employment or unemployment, having helper in a household or not, wife's self-esteem.

Besides, it turns out that husband and wife's educational background in demographic factor, the gender of a child in born child factor, self-esteem in wife's internal factor, and the conflict that the wife feels in husband and wife factor have effect on discrimination, but there's no main prediction factor that effects on discrimination in being parents factor.

Table 5
Result of Direct Discriminant According to Prediction Factors

Prediction variables	Standard canonical discriminant	Structure matrix	Canonical discriminant function
Demographic			
Wife's age	0.19	0.29	0.06
Husband's age	0.14	0.30	0.04
Wife's level of education	-0.36	-0.15	-0.77
Husband's level of education	0.34	-0.02	0.74
Wife's employment	0.18	0.09	0.38
Husband's employment	0.20	0.09	1.52
Born child			
Gender	0.35	0.18	0.69
Order of birth	-0.19	0.31	-0.36
Temperament-emotionality	-0.20	-0.09	-0.30
Temperament-activity	0.09	0.02	0.15

Table 5
Result of Direct Discriminant According to Prediction Factors (continued)

Prediction variables	Standard canonical discriminant	Structure matrix	Canonical discriminant function
Household			
Average monthly incomes	0.31	0.15	0.00
Average monthly expense	-0.34	0.10	-0.00
Consumptive expense for a child	0.20	0.13	0.00
Non-consumptive expense for a child	0.04	0.05	0.00
The number of a family	0.72	0.30	0.89
Helper in a household or not	-0.47	0.03	-1.49
Wife's internal factor			
Self-esteem	0.55	0.06	1.21
Self-efficacy	-0.40	-0.28	-0.53
Depression	-0.07	0.11	-0.02
Being parents			
Wife's child value-emotional	-0.17	-0.25	-0.29
Wife's child value-instrumental	-0.19	-0.19	-0.26
Husband's child value-emotional	0.06	0.04	0.12
Husband's child value-instrumental	-0.00	-0.00	-0.01
Wife's nurturing type	-0.04	-0.07	-0.08
Wife's nurturing stress	-0.06	0.14	-0.10
Husband's participation in nurturing	0.05	-0.30	0.06
Husband and wife factor			
Marriage period(month)	0.10	0.32	0.00
Wife's marital satisfaction	-0.14	-0.42	-0.17
Husband's marital satisfaction	-0.01	-0.19	-0.02
Wife's marital conflict	0.56	0.52	0.71
Husband's marital conflict	-0.04	0.28	-0.06
Constant			-8.74

According to Table 6, centroid of the group that has intention of additional childbirth by discriminant function is -0.41 and centroid of the group that has no intention of additional childbirth is 0.53, so, it turns out the group is divided by discriminant function.

Table 6
Group Centroids

Type of group	Centroids
Group with intention of additional childbirth	-.41
Group with no intention of additional childbirth	.53

Next, the data about how well the classification function classified each group in accordance with prediction factors is given in Table 7. Among the research targets who changed their intention to have an additional childbirth, the group who became having intention of additional childbirth are 130 people of 164 people, which is 79.3%, and 20.7% people were classified as a group of no intention of additional childbirth. In case of the group members who changed into no additional childbirth group, 57.5%, 73 people of 127 people were correctly classified and 42.5% were incorrectly

classified as the group of having additional childbirth intention, 203 of all 291 people are correctly classified as actual group, accuracy of classification is 69.8%.

Table 7
Result of Group Classification

Actual group	Prediction group		Total
	Group with intention of additional childbirth	Group with no intention of additional childbirth	
Group with intention of additional childbirth	130 (79.3)	34 (20.7)	164 (56.4)
Group with no intention of additional childbirth	54 (42.5)	73 (57.5)	127 (43.6)
Total	189 (54.4)	99 (45.6)	291 (100.0)

Note. Classification accuracy rate = (130+73)/291 = 69.8%

Discussion

The purpose of this study was to search the characteristic that causes the classification of two groups; the group that changes intention into giving additional childbirth, or the group that changes intention into giving no more additional childbirth, and tried to classify the prediction factor that distinguish the way of childbirth on the basis of those factors. As summarizing the result from the study and discuss it, it is as in the following.

First, the average difference between relative variables which affects to the additional childbirth intention shows significant result as wife's age, husband's age, child's birth order, the number of household, wife's self-efficacy, wife's emotional child value, husband's participation of nurturing, marriage period, marital satisfaction, and conflict between husband and wife. Especially, it turns out that the conflict between husband and wife highly contributed to the intention of additional childbirth. Such a result supports many studies that insist wife's age at marriage mainly influences on fertility (Kramer, 1987; Kim, 1993; Yoon, 2005). In addition, the result that husband and wife's satisfaction and conflict between husband and wife do important role in hoping for additional childbirth suggests that deciding a childbirth or bearing don't show equal patterns according to social standard, but show various family's individual pattern according to the quality of husband and wife's relationship at spouse unit.

Second, as examing the relative importance of variables that influences on intention of additional childbirth, it turns out husband's employment, having a helper in a household or not, and wife's self-esteem are the most important factors. Variables of wife's age and husband's statue of economic activity have close connection with Korea's social-economic situation. Bringing women's childbirth age forward means lower the age of first marriage. The reason why the age of first marriage increases or childbirth delays is because young people feel burden with high housing cost, satisfying the basic economic requirement for preparing marriage and childbirth(Jeon, 2002; Kohler & Ortega, 2002; Kohler, Billiari, & Ortega, 2006). For this, if the policy that can guarantee stability of future income is designed, it will lower the age of the first marriage and increase the men's economic activity rate, so in the long term, it is expected to motivate people to give additional childbirth.

Through the result of this study, it was able to make sure that family's internal and external variables influence on intention of additional childbirth. Therefore, to promote childbirth, conditions that reduce the material and psychological burdens of nurturing should be prepared, and ultimately, it will be needed to make various levels of efforts to reduce parents' anxiety of their child's future. It will be needed to lay the culture foundation and social atmosphere that can see parents' role positively, with practical financial policy like adopting a children's allowance, supporting money for a child education.

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Father in Child Rearing

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1. Father's Child-Rearing Attitudes and Recognition on Expectations

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2. Father Involvement as a Mediator of the Effect of Infant Temperament and Mother Depression on Mother's Parenting Stress

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3. The Conceptional Gap Analysis About Attitude of Child, Nurturing Belief, Future Expectation, and Sense of Responsibility Between New Generation of Fathers and Mothers

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Father's Child-Rearing Attitudes and Recognition on Expectations

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Modern society is having influence upon function of family owing to nuclear family and to a social change such as married woman's employment. The function of family is developed on the basis of a role in each of family members. A role comes to be requested to perform, which is given to the position in husband & wife, parents & children, and brothers & sisters. Especially, as a method that a father participates in housekeeping or child-rearing, the parents' function is being changed. Due to a change in parents' function, the androgynous parents' role is being demanded to parents. This implies to rear and guide a child with similar characteristic rather than what a role of father and mother is mutually distinguished clearly. Owing to woman's advance to society, a father's role is being noticeably changed (Cabrera, Tamis-LeMonda, Bradely, Hoffeerth & Lamb, 2000). Thus, what fathers, who directly participate in child-rearing, are gradually growing (Hoffman, 1989) shows that parents' function is changed into androgynous parents' role (Jang & Lee, 2008). Rousseau already emphasized an educator's role as saying that a true tutor is a father. Even a concept of Eombujamo (嚴父慈母) in Korea' traditional society implies that a father's ability is equal to a mother in child-rearing (Heo, 2006). In addition, fathers' interest in child-rearing and education and change in recognition are being requested fathers to positively participate in child-rearing unlike the past

The findings (Mun, 1983; Yun, 1998; Lee, 1992; Jeong, 1993; Hyeon & Choe, 1996) are being shown as saying that today's fathers are having positive interest in child-rearing unlike the previous generation. Also, it has been actively progressed a research, which aims to expand a concept of father's child-rearing participation (Lee, Lee, & Jo, 1999), a research on father's image or a research of development in child-rearing participation scale (Kim, 2005; Kim, Kim, & Jo, 2008; Jo & Choe, 2004), and a research, which analyzed relationship between the father's child-rearing participation and the child development (Kim, 2005; Mun & Seol, 2006). In addition, an effort (Lamb et al., 1987; Pleck, 1997; Gang, 2000; Ming & Lee, 2006; Heo, 1992) has been made to closely examine prior variable on father's child-rearing participation and to elaborate a model. Lamb-Pleck model (Lamb et al., 1987; Pleck, 1997) on variable of having influence upon father's child-rearing participation is suggesting 4 factors such as motive, skill, social support, and institutional factor. Gang (2000) analyzed father's view on occupation, father's thought about child, father's personality, and satisfaction with marriage as determinants of father's child-rearing participation. Min and Lee (2006) analyzed demographic variables like father's education and income, and dual income (Lee, 2008). Additionally, the father's child-rearing participation may be different depending on external variable that a father has. Bigner (1977) showed positive relationship of father's age with father's attitude toward role or with time of being spent in father-child activity, thereby having reported that the older age in father leads to the more reduction in time of interaction with child. Also, Kim (1990) reported that the performance of role in fathers, who belong to 35~40 years old, was the highest, and that the younger age in fathers led to the higher performance level on a role, which allows a child to have emotional stability, and on a role of striving for parent oneself(Jang & Lee, 2008). Synthesizing these findings, the researches in quantitative aspect based on father's socio-demographic background variables, namely, the researches related to the physical child-rearing time amount between father and child or to the general relationship between the discipling method and the child development have been performed, but are difficult to be found consistency in the findings. Also, even in a research in the qualitative aspect based on father's psychological characteristic background, the psychological characteristic factors were emphasized as important factor of predicting father's role. However, consistency is difficult to be found through relevant findings. Due to the lack of a research of having

psychological characteristic as background, it is the real situation that is difficult to discuss a research in a general way.

Furthermore, it is the real situation of having few or no research on child-rearing attitudes and expectations depending on father's background variables as well as research on father's child-rearing attitudes and expectations. Accordingly, this study aims to examine a father's child-rearing attitudes and expectations that a father has as a parent for child's future, based on father's background variables (age, academic career, Job status, marriage satisfaction, couple's conflict). This will be basic data in establishing direction of a research on desirable father's role and performance.

The following are specific research problems for achieving this objective.

First, what about child-rearing attitude depending on father's variables (age, academic career, Job status, marriage satisfaction, couple's conflict)?

Second, what about expectation for a child depending on father's variables (age, academic career, Job status, marriage satisfaction, couple's conflict)?

Method

Participants

Research subjects are 2,078 households with newborn baby, which participated in a survey for the 1st year (2008) among households as the general survey PSKC, which was conducted by Korea Institute of Child Care and Education. PSKC implemented samples by having subjects as newborn babies in 2008. It is a long-term longitudinal research, which will be carried out a survey every year from 2008 to 2020. The population includes households with newborn babies, who were born at medical institutions nationwide in 2008(Je-ju Island excluded). Samples are 2,078 households with newborn babies, who were born at lying-in hospitals, which were sampled nationwide from April to July in 2008. Examining socio-demographic characteristics in subjects of this study, they are as Table 1.

Table 1
Socio-Demographic Characteristics

Type	*N*	%
Age (*N* = 1992, *M* = 33.88, *SD* = 4.044)		
Under 30	270	13.6
Early 30	875	43.9
Late 30	693	34.8
Over 40	154	7.7
Degree (*N* = 1,993)		
High school degree	569	28.5
College degree	420	21.1
University degree	804	40.3
Graduate degree	200	10.0
Job status (*N* = 1,978)		
Permanent position	1,564	79.1
Temporary position	78	3.9
Daily worker	39	2.0
Other	221	11.2

Materials and Procedure

For data analysis of this study, *SPSS 12.0 program* was used. Frequency, percentage, the mean,

standard deviation, *One-way ANOVA* were calculated. And, post-test was carried out by using *Scheffe* statistics.

Results

Father's Recognition on Child-Rearing Attitudes

Father's recognition on child-rearing attitudes. As a result of examining father's recognition on child-rearing attitudes, they are as Table 2.

Table 2
Father's Recognition on Child-Rearing Attitudes

Type	*N (%)*					*M(SD)*
	Not so at all	Not so specially	Moderate	Generally so	Very so	
What becomes a parent is valuable in life (*n* = 1,656)	5 (0.3)	3 (0.2)	49 (3.0)	367 (22.2)	1,232 (74.4)	4.70 (0.562)
A child allows conjugal relations to be firmer (*n* = 1,654)	3 (0.2)	14 (0.8)	95 (5.7)	559 (33.8)	983 (59.4)	4.51 (0.661)
People who have children are less lonely in old age (*n* = 1,654)	8 (0.5)	36 (2.2)	197 (11.9)	670 (40.5)	743 (44.9)	4.27 (0.791)
Having a child may lead to being helped economically in old age (*n* = ,653)	88 (5.3)	469 (28.4)	748 (45.3)	265 (16.0)	83 (5.0)	2.87 (0.917)
A married couple needs to certainly have a child (*n* = 1,652)	43 (2.6)	152 (9.2)	296 (17.9)	646 (39.1)	515 (31.2)	3.87 (1.038)
Having a child is natural in order to follow a family line (*n* = 1,654)	129 (7.8)	321 (19.4)	471 (28.5)	474 (28.7)	259 (15.7)	3.25 (1.165)
Having a child is a duty on society (*n* = 1,654)	168 (10.2)	364 (22.0)	521 (31.5)	421 (25.5)	180 (10.9)	3.05 (1.147)
Total						3.79 (0.582)

As shown in Table 2, the result of examining father's recognition on child-rearing attitude was indicated to be more than moderate (*M* = 3.79, *SD* = 0.582).

Father's recognition on child-rearing attitude depending on age. As a result of examining Father's recognition on child-rearing attitude depending on age, they are as Table 3.

Table 3
Father's Recognition on Child-rearing Attitude Depending on Age

Age	*n*	*M*	*SD*	*F*	*Scheffe*
Under 30	234	3.83	0.626	0.628	-
Early 30	729	3.77	0.567		
Late 30	555	3.80	0.566		
Over 40	120	3.81	0.641		

As shown in Table 3, father's recognition on child-rearing attitude depending on age wasn't indicated significant difference.

Father's recognition on child-rearing attitude depending on academic career. As a result of examining Father's recognition on child-rearing attitude depending on academic career, they are as Table 4.

Table 4
Father's Recognition on Child-Rearing Attitude Depending on Academic Career

Degree	*n*	*M*	*SD*	*F*	*Scheffe*
High school degree	466	3.76	0.601	1.031	-
College degree	353	3.77	0.593		
University degree	652	3.81	0.561		
Graduate degree	171	3.83	0.575		

As shown in Table 4, father's recognition on child-rearing attitude depending on academic career wasn't indicated significant difference.

Father's recognition on child-rearing attitude depending on Job status. As a result of examining Father's recognition on child-rearing attitude depending on Job status, they are as Table 5.

Table 5
Father's Recognition on Child-Rearing Attitude Depending on Job Status

Job Status	*n*	*M*	*SD*	*F*	*Scheffe*
Permanent position	1281	3.80	0.575	0.596	-
Temporary position	58	3.81	0.665		
Daily worker	30	3.66	0.616		
Other	189	3.80	0.575		

As shown in Table 4, father's recognition on child-rearing attitude depending on Job status wasn't indicated significant difference.

Father's recognition on child-rearing attitude depending on marriage satisfaction. As a result of examining Father's recognition on child-rearing attitude depending on marriage satisfaction, they are as Table 6.

Table 6
Father's Recognition on Child-Rearing Attitude Depending on Marriage Satisfaction

	B	*S.E*	*Beta*	*t*	R^2	*F*
Marriage satisfaction	0.167	0.021	0.195	8.080***	0.038	65.281***

*** $p < .001$.

As shown in Table 6, as a result of examining father's recognition on child-rearing attitude depending on marriage satisfaction, the explanatory power in marriage satisfaction about father's child-rearing attitude was 3.8% (R^2 = 0.038), thereby having been indicated to have significant influence ($p < .001$).

Father's recognition on child-rearing attitude depending on couple's conflict. As a result of examining Father's recognition on child-rearing attitude depending on marriage satisfaction, they are as Table 7.

Table 7
Father's Recognition on Child-Rearing Attitude Depending on Couple's Conflict.

	B	*S.E*	*Beta*	*t*	R^2	*F*
Couple's conflict	-0.087	0.020	-0.105	-4.270***	0.011	18.237***

*** $p < .001$.

Father's Recognition on Child-Rearing Expectations

Father's recognition on child-rearing expectations. As a result of examining Father's recognition on child-rearing expectations, they are as Table 8.

Table 8
Father's Recognition on Child-Rearing Expectations

Type	*N (%)*				*M (SD)*
	Paying no attention at all	Paying no attention specially	Wanting a little	Wanting so much	
Making money well	12 (0.7)	250 (15.1)	949 (57.4)	441 (26.7)	3.10 (0.661)
Winning fame or coming to be famous	33 (2.0)	503 (30.4)	785 (47.5)	331 (20.0)	2.86 (0.751)
Having high Job status	33 (2.0)	520 (31.5)	755 (45.7)	344 (20.8)	2.85 (0.763)
Willingly helping other person	2 (0.1)	165 (10.0)	910 (55.1)	575 (34.8)	3.25 (0.627)
Having happy home	2 (0.1)	9 (0.5)	218 (13.2)	1,424 (86.1)	3.85 (0.378)
Emphasizing hobby or leisure more than work	45 (2.7)	601 (36.4)	816 (49.4)	190 (11.5)	2.70 (0.704)
Total					3.10 (0.410)

As shown in Table 8, the result of examining Father's recognition on child-rearing expectations was indicated to be more than moderate (M = 3.10, SD = 0.410).

Father's recognition on child-rearing expectations depending on age. As a result of examining Father's recognition on child-rearing expectations depending on age, they are as Table 9.

Table 9
Father's Recognition on Child-Rearing Expectations Depending on Age

Age	*n*	*M*	*SD*	*F*	*Scheffe*
Under 30	234	3,08	0.427	0.989	-
Early 30	727	3,11	0.408		
Late 30	555	3,10	0.401		
Over 40	119	3.05	0.421		

As shown in Table 9, father's recognition on child-rearing expectations depending on age wasn't indicated significant difference.

Father's recognition on child-rearing expectations depending on academic career. As a result of examining Father's recognition on child-rearing expectations depending on academic career, they are as Table 10.

Table 10
Father's Recognition on Child-Rearing Expectations Depending on Academic Career

Degree	*n*	*M*	*SD*	*F*	*Scheffe*
High school degree	467	3.08	0.408	1.956	-
College degree	352	3.10	0.423		
University degree	649	3.13	0.404		
Graduate degree	171	3.06	0.404		

As shown in Table 10, father's recognition on child-rearing expectations depending on academic career wasn't indicated significant difference.

Father's recognition on child-rearing expectations depending on job status. As a result of examining Father's recognition on child-rearing expectations depending on Job status, they are as Table 11.

Table 11
Father's Recognition on Child-Rearing Expectations Depending on Job Status

Job status	*n*	*M*	*SD*	*F*	*Scheffe*
Permanent position	1277	3.10	0.407	0.748	-
Temporary position	59	3.13	0.441		
Daily worker	30	3.02	0.426		
Other	189	3.10	0.412		

As shown in Table 11, father's recognition on child-rearing expectations depending on Job status wasn't indicated significant difference.

Father's recognition on child-rearing expectations depending on marriage satisfaction. As a result of examining Father's recognition on child-rearing expectations depending on marriage satisfaction, they are as Table 12.

Table 12
Father's Recognition on Child-Rearing Expectations Depending on Marriage Satisfaction

	B	*SE*	*Beta*	*t*	R^2	*F*
Marriage satisfaction	0.002	0.015	0.003	0.114	0.000	0.013

As shown in Table 12, father's recognition on child-rearing expectations depending on marriage satisfaction wasn't indicated significant difference.

Father's recognition on child-rearing expectations depending on couple's conflict. As a result of examining Father's recognition on child-rearing expectations depending on couple's conflict, they are as Table 13.

Table 13
Father's Recognition on Child-Rearing Expectations Depending on Couple's Conflict

	B	*SE*	*Beta*	*t*	R^2	*F*
Couple's conflict	0.001	0.015	0.001	0.049	0.000	0.002

As shown in Table 13, father's recognition on child-rearing expectations depending on couple's conflict wasn't indicated significant difference.

Conclusions

This study aimed to examine father's recognition on child-rearing attitudes and expectations depending on socio-demographic characteristics. The following are the results that discussed centering on the findings.

First, Father's recognition on child-rearing attitudes depending on age, academic career, and Job status wasn't shown significant difference. However, the significant difference was indicated in marriage satisfaction and conjugal conflict. It can be known that the higher marriage satisfaction and the lower conjugal conflict lead to the higher positivity in father's child-rearing attitudes. Second, Father's recognition on child-rearing expectations depending on age, academic career, Job status,

marriage satisfaction, and conjugal conflict wasn't shown significant difference.

Making a suggestion for a follow-up research based on this study, they are as follows. First, given carrying out a qualitative research side by side through interview or telephone interview as an in-depth research on which significance the analytical results of research have, the more specific and broad findings will be possibly elicited.

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Father Involvement as a Mediator of the Effect of Infant Temperament and Mother Depression on Mother's Parenting Stress

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The study examined the mediating effects of home environment factors (i.e., father involvement) on child characteristic and mother depression affecting mother's parental stress. The data from Panel Study on Korean Children collected by Korea Institute of Child Care and Education (KICCE) were used. The total 466 infants who are at risk for developmental delay and their families participated. The results indicated that infants with delay and non-delay did not significantly differ on their characteristic. The correlation and regression analysis results showed that infant temperament in emotionality, mother depression, father involvement were considered as important predictors of variance in mother's parenting stress. Based on structural equation models, on the other hand, father involvement played a mediating role in the effect of infant emotionality and mother depression on parenting stress, but found to be a partially mediating role. Mother depression generally affected her stress level much stronger than father support and involvement.

In the 1990s, many researchers had argued that parental stress was further prompted by various factors, for example, child characteristic, child-parent relationship, father involvement, and so on. In particular, Crnic and Greenberg (1990) suggested that parental stress negatively affects parenting behaviors and practices, and therefore, shapes the way how child-parent relationships are formed. Since then, similar research has claimed a similar stance. For example, parental stress leads to a challenging relationship between parents and their child; hence, it is possible to yield poor parenting behavior and practice, and as a result potential harmful effect on the child's current and future development. Considering infant and early childhood stage as a critical and "needy" period for young children, parental stress during this period can generally have further detrimental effect on children than other later stages.

Parenting stress is generally caused by three factors. First, child characteristics also correlate with parenting stress. Among various characteristics a child holds, the child's sex and temperament are recognized to significantly affect mother's parenting stress. In particular, Kim and Do (2004) found that babies with high needs tend to increase the level of parenting stress. As opposed to easy-going babies, babies with high needs tend to inhibit emotional connections and relationships between the parent and the child. The researchers stated that, as a result, the lack of bond between the parent and the child further intensifies mother's parenting stress. More recent studies claimed that a child's temperament and parenting stress may mutually affect each other. Because of a parent's increased stress level, a child may display poor temper control and demand higher needs to the parent.

Second, parent characteristics (e.g., personalities, temperament, etc.), self-recognition, self-respect, or self-efficacy internally impacts parenting behavior and practice and therefore parenting stress level. In particular, mother's depression normally leads to higher stress level of the parent and accordingly have a significant, negative effect on parenting behavior and/or parent-child relationship. Given that a critical period exists in child development, the effect of mother's depression on a child during infant and early childhood stage could be even greater. Whether mother's depression occurs before or after childbirth (postpartum), both seem to increase the level of stress and hence affected the relationship with her newborn. According to the Panel Study on Korean Children (PSKC) in 2010, mild to moderate depression accounted for 22% and moderate to severe depression accounted for 5% immediately after childbirth; one month after childbirth, mild to moderate depression accounted for 9.3% and moderate to severe depression accounted for 2.3%.

Third, additional family external factors, in other words, home environment conditions in the family, positively relate to parenting stress. These conditions include father involvement in child-care and emotional support from the other family members. In particular, father involvement in child-care generally enhances

mother's parenting practices. Accordingly, these practices are known to decrease mother's parenting stress.

In addition to child characteristics, a child's development also influences parental stress. The child's developmental traits are considered as strong, immediate factors that affect mother's parenting stress. When the parent and the child interact with each other, it is inevitable that the child's cognitive, social, emotional, physical, and overall developmental traits impinge upon the parent and her parenting practices. Therefore, it is commonly suggested that the child's developmental traits directly impact parental stress level. Accordingly, a parent who has a child with developmental delay or disability would encounter more challenging parenting experience due to an unexpected developmental progression and behavior of her child. As such, these parents may experience higher parenting stress level because of their unique circumstances.

Therefore, child characteristic, parent personality, and family factors interconnect with one another and together incite the level of parental stress. For example, a parent notices her child's developmental traits possibly because both child characteristic and parent factors interact and take part; in other words, the child's developmental traits are identified by the parent because of her cognitive ability and the child's characteristic. Also, some researchers suggested that a child's high needs and temperament may be resulted from a mother's depression before childbirth.

According to the PSKC in 2010, infants who are at risk for development delay accounted for 8.4% of the total (Lee, Shin, & Park, 2010). Examining the data from PSKC in 2010 and 2011, the present study used Denver Developmental Screening Test (Korean version) to identify infants who are at risk for development delay. Initially, the study intends to uncover the characteristics of the infants who are at risk for developmental delay. Then, in an attempt to zoom in on parenting stress and its (direct) factors, the study tries to closely observe infant temperament, mother depression, and father involvement factors. Finally, any mediating effect of father involvement is considered and if any revealed in the study. Therefore, we hypothesize that infant temperament and mother depression are associated with family factors such as father involvement, and that family factor (i.e., father involvement) in turn affects mother's parenting stress.

In so doing, the study's results would be able to aid both parents and educators who care for infants and children who are at risk for developmental delay. For parents, we hope to suggest ways to reduce parenting stress level when dealing with their child's unusual behavior and developmental progression, and ultimately, help develop positive parent-child relationships in the household. For teachers and educators, on the other hand, we aspire to include useful information, such as learning how to reduce parenting stress, when providing parenting education in early intervention programs. When provided with "early" intervention, it seems to help prevent other future problems children and their family may encounter. Thus, it is our hope both parents and educators utilize the study's findings in their practice in an effort to aid children who generally needs more adult assistance.

Method

Sample

The study used the data from PSKC in 2010 collected by Korea Institute of Child Care and Education (KICCE). After removing missing data from the research variables, the total sample of PSKC was 1874 infants and 468 infants were identified as those who are at risk for developmental delay. These samples of 468 infants were included in the analysis. Overall, there were more boys (n = 286, 61.1%) than girls (n = 182, 38.9%). Mean of their age was 13.91 (SD = 1.09) months. Most infants were first born (217, 46.4%) or second born children (198, 42.3%). The majority of infants had not received a specific diagnosis.

Most parents in this sample were in their 30s (mother: n = 299, 63.9%; father: n = 365, 78.0%). 35.2% of mothers and 44.5% of fathers graduated from 4-year college and 30.3% of mothers and 20.2% of fathers graduated from 2-year college while 30.3% of mothers and 27.5% of fathers graduated from high school. The socioeconomic status of the families was unidentified as many parent participants did not answer the item.

Measures

Infant temperament. The infant's temperament was measured by the EAS Temperament Survey for Children-Parental Ratings (Buss & Plomin, 1984). Among the EAS, 10 items from emotionality and activity subscale were selected, and each item measures by a 5-point Likert scale. The internal consistency was .775 for emotionality and .769 for activity.

Mother depression. For mother depression, 6 items from Kessler's K6-short version (Kessler et al., 2002) were used. Each item measures by a 5-point Likert scale and the higher score means the higher level of depression. The internal consistency was .915.

Father involvement. Father involvement is based on Kang(1998)'s study and consists of 4 questions about father involvement to support mother's parenting. It used 5-point Likert scale and the higher score means the higher level of father involvement. The internal consistency of this measure was .801.

Mother's parenting stress. Mother's parenting stress was measured by Korean version of Parenting Stress Measure (Kim & Kang, 1997) based on PSI-SF (Parenting Stress Index-Short Form, Abidin, 1990). For parenting stress, 10 items of burden of parents' role and distress were selected from Parenting Stress Measure. Each item was measured by 5-point Likert scale, and the higher score means the higher level of parenting stress. The internal consistency for this measure was .861.

Data Analysis and Results

Descriptive Results for Risk Infants

Table 1
Comparisons Between Non-Risk and Risk Infants frequency (%)

Variables	Non-risk infants	Risk infant	Total	*df*	x^2
Infant sex					
Boys	662(47.1)	286(61.1)	948(50.6)	1	27.639***
Girls	744(52.9)	182(38.9)	926(49.4)		
Total	1406(100.0)	468(100.0)	1874(100.0)		
Birth order					
First-born	651(46.3)	217(46.4)	868(46.3)		
Second-born	594(42.2)	198(42.3)	792(42.3)	2	0.006
Others	161(11.5)	53(11.3)	214(11.4)		
Total	1406(100.0)	468(100.0)	1874(100.0)		
Mother's education level					
Less than high school	427(30.7)	141(30.3)	568(30.5)		
2-year college	325(23.1)	141(30.3)	466(25.0)	3	10.364*
4-year college	573(46.2)	164(35.2)	737(39.6)		
Masters or doctorates	72(5.2)	20(4.3)	92(4.9)		
Total	1397(100.0)	466(100.0)	1863(100.0)		
Father's education level					
Less than high school	373(27.0)	127(27.5)	500(27.1)		
2-year college	266(19.2)	93(20.2)	359(19.4)	3	3.483
4-year college	598(53.9)	205(44.5)	203(43.5)		
Masters or doctorates	150(10.8)	36(7.8)	186(10.1)		
Total	1402(100.0)	465(100.0)	1848(100.0)		

* $p < .05$. *** $p < .001$.

As shown in Table 1 and 2, there is not any significant difference between non-risk and risk

infants, except infants' sex and mother's educational levels; more boys were at risk than girls, and high school graduate mothers have a greater chance to have a child at risk for delay than other groups.

Table 2
Descriptive Analysis for Non-risk and Risk Infants

Variables	Non-risk infant (n = 1319) M(SD)	Risk infant (n = 468) M(SD)	t
Infant age (month)	14.12(1.07)	13.91(1.09)	3.578***
Mother's age	32.18(3.64)	32.12(3.72)	0.402
Father's age	34.63(4.00)	34.95(3.91)	-1.479
Temperament-emotionality	2.71(.62)	2.72(.63)	-0.234
Temperament-activity	3.93(.57)	3.86(.59)	2.147
Mother depression	1.91(.70)	1.94(.72)	-0.721
Father involvement	3.65(.88)	3.61(.88)	0.835
Mother's parenting stress	2.72(.63)	2.77(.66)	-1.571

***p < .001.

Correlation and Regression Results

The correlations between infant temperament, father involvement, mother depression and mother's parenting stress are shown in Table 3. The correlation results indicated significant relations between infant temperament in emotionality, mother depression, father involvement and mother's parenting stress. However, there was no significant correlation of sex and infant temperament in activity with other variables. In order to select important predictors of mother's parenting stress, backward regression was conducted with infant temperament (both emotionality and activity), father involvement and mother depression to mother's parenting stress. The results from regression analysis suggested also infant emotionality, mother depression, father involvement as an important predictor of variance in mother's parenting stress ($R^2 = .305,\ F(4,464) = 67.944^{***}$).

Table 3
Correlation Among the Variables for Risk Infants (N = 468)

Variable	1	2	3	4	5	6
1. Infant age (month)	1.000					
2. Temperament-emotionality	-.045	1.000				
3. Temperament-activity	-.067	.112*	1.000			
4. Mother depression	-.054	.306***	.024	1.000		
5. Father involvement	-.109*	-.113	.000	-.221***	1.000	
6. Mother's parenting stress	-.076	.364**	.018	.501***	-.190***	1.000

*p < .05. **p < .01. ***p <. 001.

Table 4
Regression Results for Risk Infants (N = 468)

	Model	Unstandardized coefficient		Standardized coefficient	*t*	*p*
		B	*SE*	*β*		
1	(constant)	1.712	.236		7.242	.000
	Infant temperament-emotionality	.245	.043	.234	5.698	.000
	Infant temperament-activity	-.038	.044	-.034	-.873	.383
	Mother depression	.379	.038	.413	9.941	.000
	Father involvement	-.054	.030	-.072	-1.810	.071
2	(constant)	1.573	.175		8.980	.000
	Infant temperament-emotionality	.241	.043	.229	5.634	.000
	Mother depression	.381	.038	.415	10.015	.000
	Father involvement	-.054	.030	-.072	-1.811	.071

Note. Step1: $R^2 = .302, F(4,463) = 51.122. p = .000.$, Step2: $R^2 = .305, F(3,464) = 67.944. p = .000.$

Analysis for Structural Equation Model

In our model, we hypothesized that family factors (i.e., father involvement) play a mediating role between infants and mothers' characteristics and mother's parenting stress. Depending on the results of multiple regression, the mothers' parenting was regressed on stress all three predictors, thereby estimating the direct effect of infant temperament in emotionality, mother depression, father involvement on parenting stress and indirect effect of first two predictors. To test our hypothesis, we used structural equation model (Amos, 2008). Hypothetical model was examined for the risk infants and fit indices and path coefficients were estimated using maximum likelihood estimates. We used χ^2statistics and other indices such as goodness of fit index (GFI), comparative fit index (CFI), root mean square error of approximation (RMSEA) to assess the fit of the model. On these fit indices, estimation of the hypothetical model yields fairly good fit. Compared to the other parsimony models, the saturated model depicted in Figure 1 is best fitted to the data.

The results of this model are shown as in Table 4. The results indicated that the paths from infant temperament in emotionality to parenting stress ($\beta = .284, p < .05$) and from mother depression to parenting stress ($\beta = .439, p < 05$) were significant, indicating the direct effects on parenting stress. However, a path from father involvement to mothers' parenting stress turned out non-significant in this overall model ($\beta = -.092, p < .10$), indicating that father involvement did not mediate the relation of infant temperament and mother depression to mothers' parenting stress. In this model, both the effects of infant temperament and mother depression were considered in a model, the unique contribution of father involvement to parenting stress was minimized, and thus in the following two separate analyses were conducted to examine the mediating effect of father involvement.

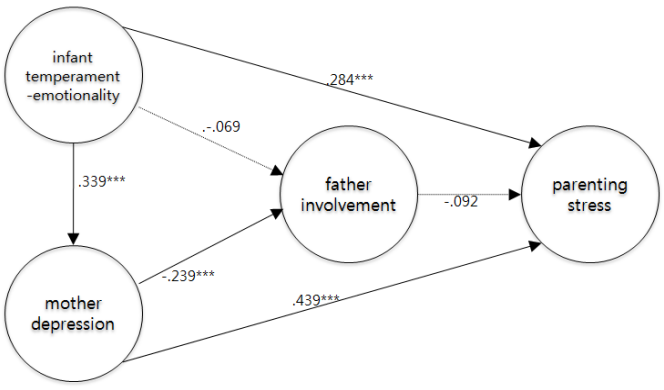


Figure 1. Model 1: Overall model for mother's parenting stress.

Table 5
Path Coefficients and Direct and Indirect Effect for Overall Model

Criterion	Preditors	Estimate	*SE*	C.R	Total effect	Direct effect	Indirect effect	R^2
Mother depression	Temperament-emotionality	.339	.068	5.994	.339	.339***	.000	.115
Mother involvement	Temperament-emotionality	-.069	.075	-1.100	-.150	-.069	-.081	.073
	Mother depression	-.239	.064	-3.718	-.239	-.239***	.000	
Mother's parenting stress	Temperament-emotionality	.284	.059	4.979	.446	.284***	.163	.395
	Mother depression	.439	.046	8.337	.461	.439***	.022	
	Father involvement	-.092	.046	-1.745	-.092	-.092	.000	

***$p < .001$.

Two sets of structural models were additionally tested to examine the mediating effect of father involvement. The first set of structural models examined the mediating effect of father involvement in the relation between infant temperament and parenting stress (partial mediation model vs. full mediation model). The second set of structural model examined the mediating effect of father involvement in the relation between mother depression and parenting stress (partial mediation model vs. full mediation model).

The first structural model includes infant temperament, father involvement and parenting stress (see Figure 2). The model fit indices indicated that the partial mediation model (2a) is better than the full mediation model (2b). Estimation of the partial mediation model showed that a direct path from infant emotionality to parenting style was significant ($\beta = .42, p < .001$). Moreover, the path from infant emotionality to father involvement ($\beta = -.13, p < .05$) and from father involvement to parenting stress ($\beta = -.19, p < .01$) were significant, indicating the mediating role of father involvement in indirect effect of infant emotionality on parenting stress.

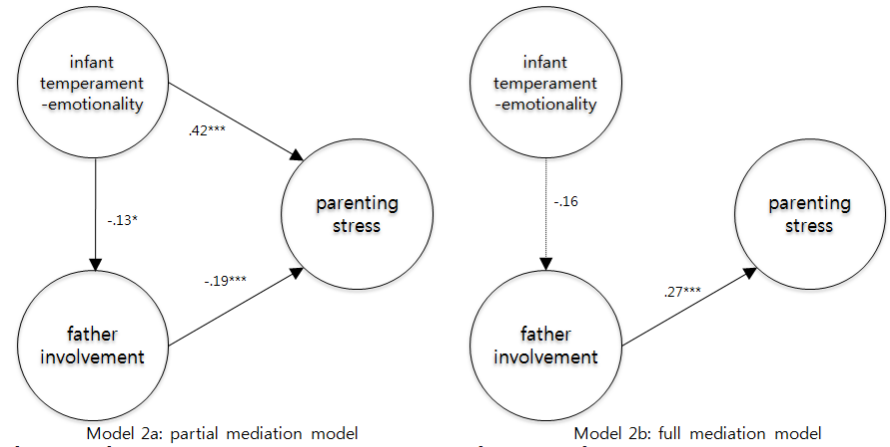


Figure 2. Model 2: The structural model among infant emotionality, father involvement, and parenting style (Model 2a and Model 2b).

A second set of structural models includes mother depression, father involvement and parenting stress (see Figure 3). As seen in the previous models, the model fit indices indicated that the partial mediation model (3a) is better than the full mediation model (3b). Estimation of the partial mediation model showed that a direct path from mother depression to parenting style was significant ($\beta = .53, p < .001$). Moreover, the path from mother depression to father involvement ($\beta = -.26, p < .001$) and from father involvement to parenting stress ($\beta = -.11, p < .05$) were

significant, indicating the mediating role of father involvement in indirect effect of mother depression on parenting stress.

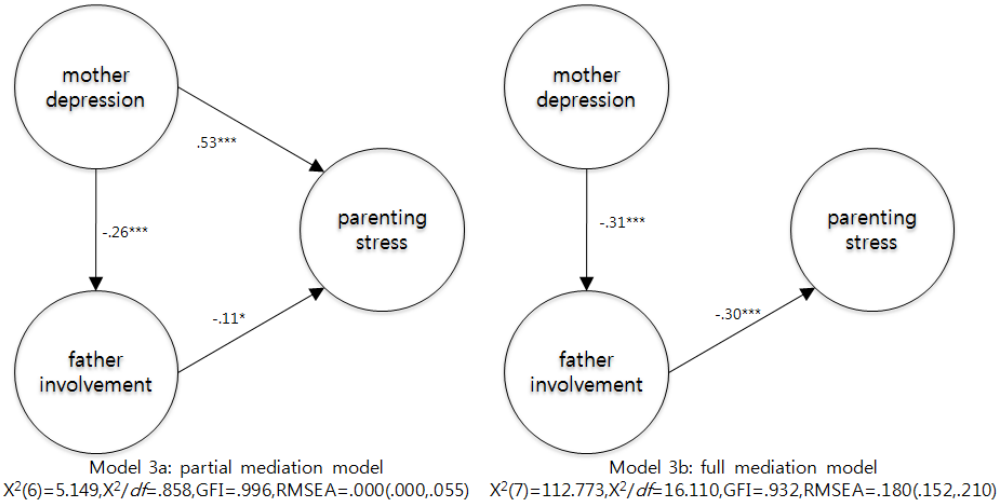


Figure 3. Model 3: Mediation model for mother depression.

Discussion

Previous studies have asserted that father involvement in child-care affects lowering the level of mother's parenting stress. Child characteristic also impacts mother's stress level. And, her own depression inhibits positive parenting behaviors and practices and thus increase mother's stress level.

In the present research, we tried to find out child characteristics that trigger infants' developmental delay. The results showed that there was no significant difference between infants who were and were not at risk. And then, we particularly tried to address the question of whether a strong relationship between father involvement, mother depression, and parenting stress exists. We examined their correlations via two different mediation models (i.e., full versus partial) and the results were shown above. The partial mediation model showed stronger evidence than the full mediation model. As shown in the structural models, infant emotionality has a direct relationship with mother's parenting stress and also an indirect relationship via father involvement. In the same vein, mother depression has a direct and indirect effect (via father involvement) on mother's parenting stress. Father involvement has a partial mediation (rather than a full mediation) effect on mother's parenting stress. Father involvement in child-care may affect the level of mother's parenting stress to some extent. However, mother's depression had a stronger effect on parenting stress. Our research results demonstrated that mother's depression had a much stronger effect than father involvement on mother's parenting stress.

Although mother depression is a strong predictor, there is still much unexplained variability in this study. One of the study's limitations was the lack of items related to father involvement in the data. Upon seeing the results, we wonder if the hypothesis that questions the correlations between mother's parenting style or knowledge, father involvement (with more items), and mother's parenting stress would have better supported. Future studies could consider these unexplained variables in an attempt to investigate the problem further.

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The Conceptional Gap Analysis About Attitude of Child, Nurturing Belief, Future Expectation, and Sense of Responsibility Between New Generation of Fathers and Mothers

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This analysis examined the gap in fathers and mothers' attitude of child, nurturing beliefs, future expectation, and responsibility by using the 2-year data surveyed the 2,708 households having the infants born in April to July in 2008, and 1,904 households in 2009 from Korea Institute of Child Care and Education (KICCE).The result of this study is as follows. First, new generation of parents feels the most value in becoming parents in their lives, forming the positive perception. However, they don't think their children will help them financially in their old ages showing perceptional difference from the previous generation of parents. Second, regarding their nurturing belief, fathers tend to rate diligence importantly whereas mothers put higher rate on politeness, responsibility, tolerance & respect for others, determination & persistence, and religious piety, showing the difference between the groups. Third, it shows parents have positive awareness in that they have priority on their children making happy families and helping others. Yet, they still have expectational gap in a sense that fathers want their children to earn fame, but mothers want them to make good money. Fourth, when it comes to the thought of sacrifice for their children, this tendency was strong to mothers in the previous research, but fathers have stronger feeling than mothers' in this survey. This shows the shifting images of typical fathers by the changes in modern society. New generation of fathers not only devote themselves to rearing their children but they are more likely to show active participation in it.

The cognition that the parents have their children was changed by the times. In 19th century, the children in the West family was the investment object and the thing to put into everything. However, in 20th century, this was broken by the extension of the individualism and the generality of the school education. But in this 21th century, the children is still the object of 'the thing to put into everything' in Korea society. The every day in the family is managed and the family's future is planed by their children's study and the economic and cultual investment are too (Lee·Kim·Son·Yoon·Sun, 2010: 268). How long is lasted this phenomenon? These questions are confirmed through parent's values of the latest newborns.

It is more important to count something as the main nature that their children has in the children's care than their parents have how value about their children. However, the researches of the belief in the children's education and care were made of their mother (Kim, 1995; Lee, 1995; Kim, 2000; Sim, 2000) and the researches of the belief in their father were lacked. Until now, the father's attachment was managed with secondary (Bang, 2009) but in nowadays, the intervention's need of the father in the children care was increasing by the extension of the expectation and the social support in the recent family (Main & Weston, 1981). Through the fact that the fathers participation in their children's education has the affirmative influence to the children's development (Jeong & Choi, 1995) and can help in the mother's care behavior, the participation of the father was required(Song, 2010: 364) and how the father has care belief can influence in their children's education directly.

Parents' future expectation about their children can also have significant impact on child development (Edginton, 2007; Holton, 2009) because it can determine the direction of child education. In addition, the sense of responsibility for child education can affect child education importantly. In this respect, this study analyzes parents' attitude of child, nurturing belief, future expectation, and responsibility affecting child education. However, these factors can vary depending on the times. In this sense, it can have meaning in that the survey about parents' consciousness conducted first by Panel Study on Korean Children (PSKC) in 2008 not only reflects new parents' awareness, but it will be the base for the later studies for disclosing future trend, continuing to

research for 12 years until 2020.

For this reason, this study will discuss how the parents' value about their children, nurturing belief, future expectation, and responsibility vary according to the times as well as the conceptional gap in those matters between fathers and mothers. It can not only find some differences regarding these factors from the studies with the older generation as its center, but also verify perceptional gap about their children between fathers and mothers.

The subjects to attain the objectives of this study are as follows. They are the factors having difference in the responses depending on parents' gender even though both are new generation of parents. First, the degree of different views about attitude of child between fathers and mothers. Second, the degree of different views about the belief in rearing their children between fathers and mothers. Third, the degree of different views about future expectation about their children between fathers and mothers. Fourth, the degree of different views about the sense of responsibility between fathers and mothers.

The Analysis of Previous Studies

The concept, idea and view about how parents see their children, and the way of thinking and expecting about their children plays a prerequisite role in deciding nurturing methods (Baek, 2005; Lee & Eom, 2008: 176). Parents' beliefs and values are very important factors since it has an effect on child development and functions as the instruction of child nurturing process and interaction between parents and their children (McGillcudy-De Lisi, 1985; Goodnow, 1988; Miller, 1988). Meanwhile, parents' view of children is influenced by the role as parents, experiences related to the qualities, social interactions, and the role expected from the society(Lee & Eom, 2008: 176).

Women have various identities. The identity of maternal love is one among them and it exercises its strong influence to women. It is a complex concept and social component including biological elements like pregnancy, childbirth, nursing, as well as such social factors as bringing up, social norms and values, and ideology (Kim & Jeong, 2010: 267). With the changes of modern society, fathers' participation to child nurturing is strongly required(Kim·Jang, 2010: 31). Above all, modern society do not acknowledging traditional father figure, ignoring child rearing and being in charge of an economic supporter in family. As the role of women's gender and members in a family start to change, fathers are asked for taking part in child nurturing more actively apart from the instrumental role by social demand (Kim & Kim, 2011: 113).

Even though fathers' methods of child nurturing can be different from the mothers' ones, there is no result of research that shows fathers are less influential in child development than mothers (Parke, 1996). Rather, Bigner (1977) argued early that fathers' attitudes on child rearing have more effects on child behavior and development. Lamb (1986) also saw them as essential rearing and caring parents in child growth and development no less than mothers. The result of previous studies shows some tendency that the younger fathers are, the more they make an effort for their children's emotional stability and carrying out parents' own roles (Kim, 1990). In practice, unlike the past, modern fathers participate in child rearing with various ways (Kim& Jang, 2010: 44) thus fathers' participation needs to activate more.

On the basis of this parents' view about their children and the changes of times, this study will analyze what kinds of values, future expectation, nurturing belief, and responsibility about their children new generation of parents have, and discuss how fathers' and mothers' thoughts about child nurturing are different.

Method

Analyzing Subjects

Korea Institute of Child Care & Education (KICCE) has a plan to carry out the research to track the growing process from child birth for 12 years, that is, model development in 2006, preliminary

research in 2007, and longitudinal study from 2008 to 2020. It divides the whole country into 6 regions, Seoul, Kyeongin, Chungcheong·Kangwon, Kyeongbuk, Kyungnam, and Cheonra area, getting the data in proportion to the number of delivery using a stratified sampling method. The first survey aimed at 2,078 households which gave birth to babies in obstetrics across the country was conducted between April and July in 2008 and the second survey was targeted at 1,904 households which remained 91.6% of the first survey when compared.

Analyzing Methods

PSKC has separate questionnaires for fathers and mothers each, but the questionnaires for mothers have more questions than fathers' ones. Thus, this study will compare mothers' responses with the basis of the questions in the fathers' questionnaires and verify the difference between them. The focus of this study is on the analysis of the conceptional gap between new generation of fathers and mothers about their attitude of children, future expectation, nurturing belief, and responsibility. Frequency, T-test, and Cross tab are conducted by using SPSS WIN 18.0 to do this.

Results

The Differences in Views on Children Between Fathers and Mothers

The question having the highest average score was 'Being a parent is important in one's life' among the 7 questions about the attitude of child, followed by 'Children strengthen the relationship between the parents', 'People with children are less lonely in their old age', 'Married couples must have children', 'Having children is essential to carry on the family line' and 'Having children is a duty to society'. 'People with children can receive financial assistance from their children in their old age' obtained the least, 2 points, which respondents thought children were not helpful financially in their old ages. The result of the comparison between fathers and mothers' average in 2008 and 2009 showed statistically meaningful difference except 'Being a parent is important in one's life', and 'People with children can receive financial assistance from their children in their old age'. Thus, it proved that fathers attached more importance to the attitude of child than mothers.

Table 1
T-test for the Differences in Attitude of Child Between Fathers and Mothers

Variable	08			09		
	Father	Mother	*t*	Father	Mother	*t*
Being a parent is important in one's life	4.70	4.71	-.294	4.67	4.56	5.845***
Children strengthen the relationship between the parents	4.51	4.45	2.692**	4.50	4.34	6.831***
People with children are less lonely in their old age	4.27	4.21	1.987*	4.24	4.03	7.625***
People with children can receive financial assistance from their children in their old age	2.87	2.70	1.785	2.88	2.70	7.695***
Married couples must have children	3.87	3.70	4.984***	3.94	3.60	9.650***
Having children is essential in order to carry on the family line	3.25	2.60	14.013***	3.30	2.62	18.266***
Having children is a duty to society	3.05	2.73	8.336***	3.20	2.81	10.884***

*$p < .05$. **$p < .01$. ***$p < .001$.

As a result of analyzing the 7 questions about attitude of child asking how fathers and mothers' opinions are different, the questions showing the difference for two years, 2008 and 2009 were four questions, 'Children strengthen the relationship between the parents', 'Married couples must have children', 'Having children is essential to carry on the family line', and 'Having children is a duty to society'. The rest three questions showed meaningful gap. Fathers showed relatively higher rate of 'Generally Agree' and 'Totally Agree' on 'Children strengthen the relationship between the parents',

'Married couples must have children', 'Having children is essential to carry on the family line', and 'Having children is a duty to society' than mothers. It did not show big difference between two parents on the issues, 'Being a parent is important in one's life', 'People with children are less lonely in their old age', and 'People with children can receive financial assistance from their children in their old age' in 2008, but it showed the difference .001 level, which is statistically meaningful. When adding up 'Generally Agree' and 'Totally Agree', fathers showed relatively higher responding rate and they demonstrated, in turn, more assertive attitude on their children over time.

The questions showing an increasing trend were 'Being a parent is important in one's life', 'People with children can receive financial assistance from their children in their old age', and 'Having children is a duty to society' when seeing the annual trend after adding up 'Generally Agree' and 'Totally Agree'. In contrast, the questions of rising in fathers but falling in mothers were 'Children strengthen the relationship between the parents', 'Married couples must have children' and 'Having children is essential to carry on the family line'. 'People with children are less lonely in their old age' showed decreasing trend to both parents.

Table 2
Cross-Tab for the Attitude of Child Between Fathers and Mothers

Variable	08			09		
	Father	Mother	Total	Father	Mother	Total
Children strengthen the relationship between the parents						
Totally Disagree	3(0.2)	2(0.1)	5(0.1)	4(.2)	8(.4)	12(.3)
Generally Disagree	14(0.9)	23(1.3)	37(1.1)	9(.5)	30(1.6)	39(1.1)
Neutral	90(5.6)	164(8.9)	254(7.4)	80(4.4)	169(9.0)	249(6.7)
Generally Agree	532(33.4)	594(32.4)	1126(32.9)	707(39.0)	772(41.2)	1479(40.1)
Totally Agree	954(59.9)	1051(57.0)	2005(58.5)	1014(55.9)	897(47.8)	1911(51.8)
Total	1593(100.0)	1834(100.0)	3427(100.0)	1814(100.0)	1876(100.0)	3690(100.0)
χ^2		15.182**			53.446***	
Married couples must have children						
Totally Disagree	42(2.6)	50(2.9)	92(2.7)	36(2.0)	63(3.4)	99(2.7)
Generally Disagree	146(9.0)	255(14.6)	401(11.9)	133(7.3)	305(16.2)	438(11.9)
Neutral	291(18.0)	338(19.4)	629(18.7)	307(16.9)	378(20.1)	685(18.6)
Generally Agree	629(38.9)	642(36.8)	1271(37.8)	773(42.6)	697(37.1)	1470(39.8)
Totally Agree	508(31.4)	460(26.4)	968(28.8)	565(31.1)	434(23.1)	999(27.1)
Total	1616(100.0)	1745(100.0)	3361(100.0)	1814(100.0)	1877(100.0)	3691(100.0)
χ^2		31.444***			102.328***	
Having children is essential in order to carry on the family line						
Totally Disagree	128(7.9)	195(19.4)	323(12.3)	120(6.6)	296(15.8)	416(11.3)
Generally Disagree	313(19.3)	321(31.9)	633(24.1)	329(18.2)	637(34.0)	966(26.2)
Neutral	459(28.4)	257(25.6)	716(27.3)	554(30.6)	532(28.4)	1086(29.4)
Generally Agree	464(28.7)	164(16.3)	628(24.0)	512(28.3)	303(16.2)	815(22.1)
Totally Agree	254(15.7)	68(6.8)	322(12.3)	297(16.4)	108(5.8)	405(11.0)
Total	1618(100.0)	1004(100.0)	2622(100.0)	1812(100.0)	1876(100.0)	3688(100.0)
χ^2		188.259***			313.890***	
Having children is a duty to society						
Totally Disagree	166(10.3)	274(14.9)	440(12.7)	143(7.9)	236(12.6)	379(10.3)
Generally Disagree	355(21.9)	509(27.8)	864(25.0)	320(17.7)	489(26.1)	809(21.9)
Neutral	508(31.4)	600(32.7)	1108(32.1)	595(32.8)	660(35.2)	1255(34.0)
Generally Agree	412(25.5)	341(18.6)	753(21.8)	539(29.7)	379(20.2)	918(24.9)
Totally Agree	177(10.9)	109(5.9)	286(8.3)	216(11.9)	112(6.0)	328(8.9)
Total	1618(100.0)	1833(100.0)	3451(100.0)	1813(100.0)	1876(100.0)	3689(100.0)
χ^2		71.342***			121.313***	
Being a parent is important in one's life						
Totally Disagree				4(.2)	1(.1)	5(.1)
Generally Disagree				5(.1)	9(.5)	11(.3)
Neutral				31(1.7)	91(4.9)	122(3.4)
Generally Agree				502(28.1)	601(32.5)	1103(30.4)
Totally Agree				1247(69.8)	1146(62.0)	2393(65.9)
Total				1786(100.0)	1848(100.0)	3634(100.0)
χ^2					47.868***	

Table 2
Cross-Tab for the Attitude of Child Between Fathers and Mothers (continued)

Variable	08			09		
	Father	Mother	Total	Father	Mother	Total
People with children are less lonely in their old age						
Totally Disagree				14(.8)	8(.4)	22(.6)
Generally Disagree				38(2.1)	106(5.7)	144(3.9)
Neutral				213(11.8)	308(16.5)	521(14.1)
Generally Agree				790(43.6)	856(45.8)	1646(44.7)
Totally Agree				757(41.8)	593(31.7)	1350(36.7)
Total				1812(100.0)	1871(100.0)	3683(100.0)
χ^2					72.713***	
People with children can receive financial assistance from their children in their old age						
Totally Disagree				110(6.1)	121(6.5)	231(6.3)
Generally Disagree				461(25.5)	711(37.9)	1172(31.8)
Neutral				858(47.4)	778(41.5)	1636(44.4)
Generally Agree				296(16.4)	222(11.8)	518(14.1)
Totally Agree				84(4.6)	43(2.3)	127(3.4)
Total				1809(100.0)	1875(100.0)	3684(100.0)
χ^2					80.414***	

*$p < .05$. **$p < .01$. ***$p < .001$.

The Differences in the Belief of Child Nurturing Between Fathers and Mothers

Regarding the response about the questions asking for choosing 5 in the 11 items that list qualifications and traits that can be learned at home, it showed statistically meaningful difference in the 6 items except independence, creativity, frugality, altruism, and obedience to elders both in 2008 and 2009. The items that fathers chose in relatively higher rate were diligence, whereas mother responded higher on politeness, sense of responsibility, tolerance & respect for others, determination & persistence, and religious piety.

When seeing the annual trend, the rising factors both in 2008 and 2009 were responsibility, determination & persistence to both parents. Politeness, tolerance & respect for others, and religious piety showed increasing trend to fathers, but diligence, politeness, tolerance & respect for others showed falling trend to mothers, demonstrating religious piety, 13.6%, the same to both parents.

Table 3
Cross-Tab for the Belief of Child Rearing Between Fathers and Mothers

Variable	08			09		
	Father	Mother	Total	Father	Mother	Total
Politeness						
Do not choose	325(18.1)	152(8.2)	477(13.0)	233(13.0)	161(8.5)	394(10.7)
Choose	1472(81.9)	1710(91.8)	3182(87.0)	1562(87.0)	1737(91.5)	3299(89.3)
Total	1797(100.0)	1862(100.0)	3659(100.0)	1795(100.0)	1898(100.0)	3693(100.0)
χ^2		79.416***			19.583***	
Diligence						
Do not choose	857(47.7)	967(51.9)	1824(49.8)	852(47.4)	1009(53.2)	1861(50.4)
Choose	940(52.3)	895(48.1)	1835(50.2)	944(52.6)	889(46.8)	1833(49.6)
Total	1797(100.0)	1862(100.0)	3659(100.0)	1796(100.0)	1898(100.0)	3694(100.0)
χ^2		6.585**			12.088***	
Sence of responsibility						
Do not choose	387(21.5)	256(13.7)	643(17.6)	298(16.6)	224(11.8)	522(14.1)
Choose	1410(78.5)	1606(86.3)	3016(82.4)	1498(83.4)	1674(88.2)	3172(85.9)
Total	1797(100.0)	1862(100.0)	3659(100.0)	1796(100.0)	1898(100.0)	3694(100.0)
χ^2		79.416***			17.453***	

Table 3
Cross-Tab for the Belief of Child Rearing Between Fathers and Mothers (continued)

Variable	08			09		
	Father	Mother	Total	Father	Mother	Total
Tolerance and respect for others						
Do not choose	667(37.1)	407(22.4)	1074(29.7)	581(32.3)	460(24.2)	1041(28.2)
Choose	1130(62.9)	1412(77.6)	2542(70.3)	1216(67.7)	1438(75.8)	2654(71.8)
Total	1797(100.0)	1819(100.0)	3616(100.0)	1797(100.0)	1898(100.0)	3695(100.0)
χ^2	79.416***			29.896***		
Determinination and persistence						
Do not choose	1025(57.0)	984(53.3)	2009(55.2)	969(53.9)	957(50.4)	1926(52.1)
Choose	772(43.0)	861(46.7)	1633(44.8)	829(46.1)	941(49.6)	1770(47.9)
Total	1797(100.0)	1845(100.0)	3642(100.0)	1798(100.0)	1898(100.0)	3696(100.0)
χ^2	5.056*			4.459*		
Piety						
Do not choose	1642(91.4)	1594(86.4)	3236(88.9)	1620(90.1)	1640(86.4)	3260(88.2)
Choose	155(8.6)	251(13.6)	406(11.1)	179(9.9)	258(13.6)	437(11.8)
Total	1797(100.0)	1845(100.0)	3642(100.0)	1799(100.0)	1898(100.0)	3697(100.0)
χ^2	22.783***			11.762***		

The Gap in Children's Future Expectation Between Fathers and Mothers

As result of the parents' response about their children's future expectation, the item achieving the highest score was 'to have a happy family', followed by 'to help others willingly', to make good money'. The result of comparison of the average in both parents was that fathers had higher expectation on 'to be famous', and 'to focus more on pastimes than work' in 2008. Mothers rated higher on 'to make good money', and 'to have a happy family'. This tendency maintained continuously in 2009.

Table 4
T-test for the Children's Future Expectation Between Fathers and Mothers

Variable	08				09			
	Father	Mother	*t*	*p*	Father	Mother	*t*	*p*
Make good money	3.10	3.17	-3.647	.000***	3.16	3.22	-3.050	.002**
Be famous	2.85	2.78	2.938	.003**	2.89	2.81	3.443	.001***
Have a high social status	2.85	2.82	1.094	.274	2.88	2.83	1.597	.110
Help others willingly	3.25	3.22	1.170	.242	3.29	3.21	3.800	.000***
Have a happy family	3.85	3.91	-4.495	.000***	3.85	3.88	-1.833	.067
Focus more on pastimes than work	2.70	2.62	3.115	.002**	2.79	2.65	5.777	.000***

*$p < .05$. **$p < .01$. ***$p < .001$.

As a result of cross tab analysis about the 6 questions asking parents' expectation toward their children, statistically meaningful items both in 2008 and 2009 were 'to make good money', 'to be famous' and 'to focus more on pastimes than work'. 'To make good money' was higher responding rate to mothers, but comparatively fathers preferred to choose 'to be famous' and 'to focus more on pastimes than work'

When seeing the annual trend after adding up 'Very much' and 'somewhat', 'to make good money', 'to be famous', 'to focus more on pastimes than work', 'to have a high social status', and 'to help others willingly' were all on the rise, but 'to have a happy family' was on the decrease even though the difference was minimal.

Table 5
Cross-Tab for the Children's Future Expectation Between Fathers and Mothers

Variable	08			09		
	Father	Mother	Total	Father	Mother	Total
Make good money						
Very much	428(26.6)	514(28.0)	942(27.4)	502(29.3)	574(30.8)	1076(30.1)
Somewhat	924(57.5)	1147(62.5)	2071(60.2)	995(58.1)	1142(61.3)	2137(59.8)
Not very much	243(15.1)	160(8.7)	403(11.7)	203(11.9)	139(7.5)	342(9.6)
Never	12(.7)	13(.7)	25(.7)	12(.7)	9(.5)	21(.6)
Total	1607(100.0)	1834(100.0)	3441(100.0)	1712(100.0)	1864(100.0)	3576(100.0)
χ^2		34.171***			20.912***	
Be famous						
Very much	327(20.0)	345(18.5)	672(19.2)	387(22.3)	348(18.4)	735(20.3)
Somewhat	772(47.3)	806(43.3)	1578(45.2)	811(46.7)	866(45.8)	1677(46.2)
Not very much	499(30.6)	662(35.6)	1161(33.2)	506(29.1)	635(33.6)	1141(31.5)
Never	33(2.0)	48(2.6)	81(2.3)	34(2.0)	40(2.1)	74(2.0)
Total	1631(100.0)	1861(100.0)	3492(100.0)	1739(100.0)	1889(100.0)	3627(100.0)
χ^2		11.779**			12.680**	
Focus more on pastimes than work						
Very much	188(11.5)	170(9.1)	358(10.2)	277(15.9)	154(8.9)	431(12.4)
Somewhat	806(49.4)	868(46.6)	1674(47.9)	865(49.7)	865(49.7)	1730(49.7)
Not very much	593(36.3)	775(41.6)	1368(39.2)	556(31.9)	683(39.3)	1239(35.6)
Never	45(2.8)	48(2.6)	93(2.7)	43(2.5)	37(2.1)	80(2.3)
Total	1632(100.0)	1861(100.0)	3493(100.0)	1741(100.0)	1739(100.0)	3480(100.0)
χ^2		12.552**			48.569***	

The Gap in Sense of Responsibility for Children Between Fathers and Mothers

The views of parents' responsibility for their children showed statistically meaningful difference both in 2008 and 2009. It showed that fathers considered they had to sacrifice themselves for their children more than mothers did throughout two years. The opinion was on the rise from 2008. It means the thought that parents have to sacrifice themselves as their children grow up is on the rise.

Table 6
Cross-Tab for the Sense of Responsibility for Children Between Fathers and Mothers

Variable	08			09		
	Father	Mother	Total	Father	Mother	Total
Have to sacrifice	816(51.5)	852(47.1)	1668(49.2)	923(54.3)	903(48.7)	1826(51.4)
Not to sacrifice	767(48.5)	956(52.9)	1723(50.8)	776(45.7)	952(51.3)	1728(48.6)
Total	1583(100.0)	1808(100.0)	3391(100.0)	1699(100.0)	1855(100.0)	3554(100.0)
χ^2		6.609**			11.319***	

Summary and Conclusion

The results of analyzing the gap in the attitude of child, belief of child rearing, future expectation, and sense of responsibility between fathers and mothers can be summarized following this.

First, as a result of analyzing the average scores of the 7 views on child, the order of parents' conceptional importance was like this: 'Being a parent is important in one's life', 'Children strengthen the relationship between the parents', 'People with children are less lonely in their old age', 'Married couples must have children', 'Having children is essential in order to carry on the family line', 'Having children is a duty to society', and 'People with children can receive financial assistance from their children in their old age'. Especially the last one obtained only 2 points, which means it does not helpful in their old ages. Fathers have more important meaning on the attitude of child than mothers. When seeing the annual trend, fathers have more assertive views on their children over time than mothers. When compared the data in 2008 and 2009, 'Being a parent is important in one's life','People with children can receive financial assistance from their children in their old age', and

'Having children is a duty to society' were all on the rise, whereas the items rising on fathers and dropping on mothers were 'Children strengthen the relationship between the parents', 'Married couples must have children', and 'Having children is essential in order to carry on the family line'. 'People with children are less lonely in their old age' was on the decrease to both parents.

Second, when it comes to the belief of child nurturing, fathers rated higher on diligence, but mothers responded highly to politeness, responsibility, tolerance & respect for others, determination & persistence, and religious piety. The annual trend revealed that responsibility, determination & persistence were on the rise to both parents from 2008 to 2009, but diligence, politeness, tolerance & respect for others, and religious piety were increasing trend to fathers. On the other hand, diligence, politeness, and tolerance & respect for others were decreasing trend to mothers, and religious piety remained the same rate.

Third, regarding the views on children's future expectation, the highest item achieved was 'to have a happy family' followed by 'to help others willingly' and 'to make good money'. When compared the average of parents, fathers have higher expectation to 'to be famous', and 'to focus more on pastimes than work' both in 2008 and 2009 than mothers. Mothers rated higher to 'to make good money' and 'to have a happy family'. As a result of cross tab analysis about 6 questions asking expectation about their children having as parents, mothers tend to lean in the direction of 'to make good money' but fathers responded highly to 'to be famous', 'to have a high social status' and 'to focus more on pastimes than work' in a relative sense. When seeing the annual trend after adding 'very much' and 'somewhat', 'to make good money', 'to be famous' and 'to have a high social status', 'to focus more on pastimes than work', and 'to help others willingly' were all growing trend to both parents. Even though 'to have a happy family' showed shrinking trend, the difference was minimal.

Fourth, in terms of the sense of responsibility, fathers were more likely to think that they had to sacrifice themselves both in 2008 and 2009 than mothers thought. However, since the proportion of the response, to sacrifice themselves for their children, were on the rise to both parents compare to 2008, it shows the thought that parents should sacrifice as children grow up is increasing.

The implications of this results are summarized following this.

First, new generation of parents are forming positive perception, feeling being parents the most worthwhile event in their lives. Meanwhile, since they do not think their children will help them financially in their old ages, they have different views to the previous generation of parents.

Second, when it comes to the belief of child nurturing, it showed difference between groups, fathers rating higher to diligence, but mothers responding highly to politeness, responsibility, tolerance & respect for others, determination & persistence, and religious piety. Thus, when bringing up children, mutual understanding and cooperation regarding from which trait they should raise for their children at first are needed.

Third, this parents are forming positive awareness in that they put their children having a happy family and helping others before anything else. However, they still have expectational gap in a sense that fathers want their children to earn fame, but mothers want them to make good money. Thus, because such a gap in future expectation between parents can directly affect child nurturing, they need to have an agreement about it between fathers and mothers.

Fourth, in relation to the thought that parents should sacrifice for their children, previous studies showed this tendency was stronger to mothers, but this study showed it was stronger to fathers. This demonstrates current father's figure by the changes of society and new generation of fathers are not only dedicated to child rearing, but also have more chance of active participation. Thus, there need to conduct more empirical studies about fathers' perception of child nurturing, and the changes of the actual practice.

In addition, the conceptional differences between previous generation and new generation of parents emerging as a result of this study can be utilized as a basic material to set up parental roles. In other words, it can be made best use to judging how to realize child attitude, educational quality thought to be important, fulfillment of expectation about children, and the sense of responsibility as parents in raising children at home.

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Infant Temperament & Parenting

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1. Differential Effects of Child Temperament on Parenting Style: A Regression Mixture Modeling Approach

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2. The Infant Temperament Stability and the Mediation Effect of the Maternal Parenting Behavior on the Relationship Between the Temperament and Development of Infant

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3. Effects of Temperamental Characteristics and Maternal Depression on Social and Cognitive Development in Infants

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Differential Effects of Child Temperament on Parenting Style: A Regression Mixture Modeling Approach

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Child's difficult temperament is known to elicit negative behavior and inhibit positive behavior from parents and yet individual and contextual characteristics contribute to variation in this association. The purpose of this study was to identify latent classes of links between temperament and parenting, representing differential effects of temperament and to identify individual and contextual characteristics accounting for these differential effects. Applying a regression mixture model, the present study identified three latent classes varying in the association between temperamental difficultness and parenting style; nonreactive class, reactive-high class, and reactive-low class. Overall, depression was most predictive of class membership. Maternal self-efficacy, marital conflict, and coparenting alliance also explained differential effects of temperament. On the contrary, family income, maternal employment, and child's gender were not significant predictors of class membership when individual and contextual resources were taken into account. Overall, mothers with less individual and family resources exert less optimal parenting style, regardless of child's temperament. Implications of the findings are discussed.

Despite long-standing controversy over the definition of temperament, a consensus is emerging that the term 'temperament' refers to constitutionally based differences in behavioral style that are visible from the child's earliest years (Sanson, Hemphill, & Smart, 2004). In Buss and Plomin's (1975) temperament model the dimensions that constitute temperament are emotionality, activity, and sociability. Emotionality is equivalent to distress, activity involves behavioral arousal, and sociability is the preference for being with others rather than being alone (Prior, 1992). A difficult temperament among infants and toddlers is often manifested by high activity level and anger proneness, or high emotional reactivity and poor regulatory control (Rubin, Burgess, & Hastings, 2002). It has been widely recognized that child temperament is a crucial factor in understanding the individual differences in parenting style (O'Connor, 2002). Parenting style reflects parental attitudes and behaviors toward children that, taken together, help to create the emotional climate of the family (Darling & Steinberg, 1993). Different parenting styles are generally defined by variations in parental responsiveness and demandingness. Responsive parents are nurturing and child-centered. Demanding parents have high, yet reasonable expectations for children and enforce rules in a consistent, flexible manner (Maccoby & Martin, 1983).

Difficult temperament is known to elicit negative behavior and inhibit positive behavior from parents (Anderson, Lytton, & Romney, 1986). Distress-related temperament (e.g., irritability, negative reactivity) tends to covary with parental punishment/power assertion, low levels of positive parenting and general unresponsiveness (e.g., Hemphill & Sanson, 2000; Hinde, 1989; van den Boom & Hoeksma, 1994). Child inhibition tends to be associated with parental over-control and over-protectiveness (Rubin et al., 1997). Associations of child's positive affect and self-regulation with parental responsiveness, social interaction and use of rewards have also been reported (Hinde, 1989). Low levels of 'difficult temperament' at 12 months of age were associated with maternal responsiveness during the child's second year (Spangler, 1990). On the contrary, other researchers failed to find a significant direct path from a child's temperament to parenting styles (e.g., Yu & Gamble, 2008). Although a child's difficult temperament is likely to elicit irritable and punitive responses from parents, this does not always hold true (Lemery & Goldsmith, 2002; Neitzel & Stright, 2004). Rather, some parents invest more positive efforts and still provide warm and appropriate parenting toward a child who is emotionally irritable and socially inhibited (Rubin et al., 1998). Rubin and his colleagues (1998) reported that very young boys with poor behavioral and

emotional regulation (i.e., low anger/frustration tolerance and low self-control) received higher levels of both maternal warmth and negative dominance (negative control and hostile affect).

Alternatively, a plausible explanation for the nonsignificant relation between child temperament and parenting styles centers around the potential moderating role of maternal resources either psychological or contextual. For example, Neitzel and Stright (2004) showed that mothers with higher levels of education were more likely to be emotionally and cognitively supportive toward their young children if they perceived their children as difficult.

Differential Effect of Temperament on Parenting

The majority of studies suggest that more difficult infant temperament is associated with less positive response from the mother (e.g., van den Boom, 1991), although the contrary has also been reported (Zahr, 1991). To account for such inconsistencies, researchers consider maternal characteristics or other contextual variables that may interact with the temperament to predict parenting behaviors (Donovan, Leavitt, & Taylo, 2005). Parents vary in the degree to which their behavior is affected by child temperament (Jenkins, Rasbash, & O'Connor, 2003). The implication of this approach is that there are factors that moderate the child effects such that some parents show more positive parenting style in reverse proportion to temperamental difficultness of child, whereas others would show a negative or positive parenting regardless of child temperament. However, previous studies have ignored the role of the individual and contextual differences in how parents are susceptible to the child's temperaments. This study aimed to investigate how and what would explain differential effect of temperament on parenting.

A few studies examine moderators of the effects of temperament on parenting (Brody, Stoneman, & Burke, 1987). In such studies, the most commonly examined moderators are demographic variables such as child's gender, maternal employment, and socioeconomic status. Most of these studies simply report effects for each group without specifically testing for differences, whereas others report statistical interactions but fail to find consistent evidence of moderation. Previous studies have found that parenting problems increase as economic resources are lacking (Hoff-Ginsberg & Tardif, 1995). In families in which most of these resources are devoted to coping with economic stress, parents exhibit more controlling and harsh behavior in disciplining their children and are less warm and involved than parents from higher socioeconomic backgrounds (Jenkins et al., 2003). Both maternal employment and child's gender were associated with parenting (Mulsow, Caldera, Pursley, & Reifman, 2002). For instance, mothers of boys report more parenting stress than mothers of girls (Scher & Sharabany, 2005). Mothers with full-time job provide fewer positive mother-child interactions (Nomoguchi, 2006), although the contrary has also been reported that maternal employment predicted fewer depressive symptoms and less negative parenting style over time (Jackson, Bentler, & Franke, 2008). In spite of these empirical findings, it is not yet known whether they moderate the association between temperament and parenting.

Beyond these demographic variables, there is suggestion that various individual and family resources may be related to differential effects of temperament (van Horn et al., 2009). Parents with abundant psychological and contextual resources can exert more positive and less negative parenting behaviors and they would be differentially affected by temperamental difficultness. Following the Belsky's (1984) ecological model positing that parenting is multiply determined by a series of factors such as parent characteristics, child characteristics, and contextual factors, the present study investigates the role of individual and contextual differences in how parents are susceptible to the child's difficult temperament.

With respect to individual psychological resources, maternal depression and self-efficacy have identified as compelling predictors of parenting behavior (Donovan, Leavitt, & Walsh, 1998; Leerkes & Crockenberg, 2002; Teti & Gelfand, 1991). Less efficacious and highly depressed mothers tend to exert more negative and less positive parenting (Hetherington & Clingempeel, 1992). Although empirical evidences are rare, these maternal characteristics are expected to alter the association between

temperament and parenting (Crockenberg, 1986). With respect to family contextual variables, marital relationship was a factor that affected parenting behavior (Cummings & Davies, 1994; Donovan et al., 2005; Osnat & Burman, 1995; Yu & Gamble, 2008). Positive parenting decreases as marital conflict increases (Deal, 1996; Volling & Elins, 1998). Marital conflict was positively associated with harsher discipline, less involvement, and more negative parent–child interactions (Cummings & Davies, 1994; Jenkins & Smith, 1991; Osnat & Burman, 1995). Similarly, marital happiness and satisfaction predicted maternal sensitivity to infant's behavior (Donovan et al., 1998). The coparenting alliance led to positive parenting such that parents were more supportive of one another's parenting efforts (Gable, Belsky, & Crnic, 1992). Satisfaction with partner support had buffering effect for difficult temperament (Leerkes & Crockenberg, 2002).

Taken together, these individual and contextual characteristics are prominent factors affecting parenting. Nevertheless, it is not known whether they are associated with differential effect of temperament on parenting. Given that these are highly relevant to parenting behaviors, it follows that they would contribute significantly to variation in temperament–parenting association.

Method

A critique implied in much of previous work is that focus on average effects of temperamental difficultness fails to capture the complex processes that lead some parents to succeed and others to struggle. Nevertheless, research that examines individual differences within those experiencing child effect is quite limited (e.g., van Horn et al., 2009). One possible reason for the lack of research is that there are serious limitations in the existing methods typically used to study differential effects. Empirical research using interactions often lags behind the theoretical rationale supporting differential effects. This is partly due to the difficulty in interpreting the multiple parameters needed to evaluate these effects (Cohen, Cohen, West, & Aiken 2003). An additional problem with this approach is that it involves testing a large number of null hypotheses, requiring the consideration of a Type I error rate adjustment, which could result in considerably underpowered tests of those interactions owing to multi-collinearity (Cohen et al., 2003).

Although testing for complex interaction effects is not recommendable, few methods exist that are efficient in evaluating moderation that is more complex than two- or three-way interactions (Boyce et al., 1998). Regression mixture model is a good alternative to overcome well-recognized limits of traditional interactions. An advantage of this model is that it potentially provides a parsimonious explanation of complex interactions. It begins by testing the hypothesis that there are differential temperament effects. If this hypothesis is affirmed, the plausible reasons for these differences were examined. It would offer promise in attempting to delineate the more complex relationships between temperament and parenting.

Research Questions

The purpose of the present study is to examine differential effects of temperament on parenting style in a nationally representative sample in Korea by applying regression mixture models. This study has two research questions. First, can moderating factors that represent individual differences in the relationship between temperament and parenting be identified? This involves determination of the optimal number of latent classes that comprise the moderating factor and interpretation of differences in regression weights and intercepts between classes. It was expected that difficult temperament would, on average, be associated with negative parenting style, yet there would be a group of parents who is more or less susceptible to the negative effects of difficult temperament of their children. Second, do individual and family resources predict differences in the relationship between temperament and parenting? It was hypothesized that the relation between negative parenting style and child's difficult temperament would be stronger among parents high in individual and family resources.

Participants

Data for this study were collected as part of a Panel Study on Korean Children (PSKC) —a nationally representative longitudinal study conducted by the Korea Institute of Child Care and Education (KICCE). Using a stratified multistage cluster sampling method, a total of 2,130 mothers of newborn babies in hospitals nationwide were invited to participate in this study. In the first stage hospitals were selected and in the second stage, families were recruited through hospital visits shortly after their child's birth. The first wave of the longitudinal data was collected in 2008 and the participants were followed every year. The present study analyzed wave 2 data when infants were 14 months of age (*SD* = 1 month). Of the original 2,130 study participants, 44.2% (*n* = 942) were mothers of female and 45.2% (*n* = 962) were mothers of male children. 28.2% (*n* = 600) were full-time working mothers and 60.4% (*n* = 1,287) were housewives.

Measures

Parenting styles and child temperament

Child temperament was measured by the Emotionality, Activity and Sociability - Temperament Survey for Children-Parental Ratings (EAS; Buss & Plomin, 1984). Two subscales were adopted to assess mothers' perceptions of their infant's temperament: emotionality (5 items) and activity (5 items). Mothers indicated on a 5-point scale (1 = never, 5 = always) how frequently their infants responded to specific behaviors. Items tapping emotionality included "My baby feels bad easily" and "My baby is emotional." Items tapping activity included "My baby moves continuously" and "My baby moves actively right after waking up". Two items of activity was reverse scored so that higher score represents higher movement. Higher score on emotionality indicates infants express negative emotionality more often. Cronbach's alpha for emotionality and activity were .76 and .78 respectively.

Parenting styles were assessed by the Parental Style Questionnaire (PSQ; Bornsteinet et al., 1996). The questionnaire was originally developed to assess parenting style of mothers of 20-month-old infants and addressed three parenting style: social interaction, didactic/material stimulation, and limit setting. This study adopted social interaction subscale which is appropriate for mothers of younger infants. Although original subscale had 9 items, 3 items were not included due to the lack of internal consistency. Mothers rated on each item using a 5-point Likert scale anchored at 1 (never) to 5 (always). Higher score indicates more optimal and positive parenting style. Cronbach's alpha of .83 was obtained.

Predictors of latent classes membership

Maternal self-efficacy was assessed by Pearlin Self-efficacy Scale (Pearlin, Lieberman, Menaghan, & Mullan, 1981). This study adopted short version of 4-item with 5-point Likert scale. All items were reverse scored so that higher score represents higher self-efficacy. Sample items include "I can hardly control things that happen to me" and "I can't solve some of issues I have now by myself". Cronbach's alpha of .82 was obtained.

Maternal depression was measured by Kessler depression scale (K6; Kessler et al., 2002). Mothers rated how often they felt depressed feelings in the last 30 days (e.g., anxious, impatient, worthless, etc). 6 items were used with 5-point scale from never (1) to always (5). Higher score represents higher depression. Cronbach's alpha of .91 was obtained.

Father's participation in child rearing was measured by 4-item scale adapted from the Family and Work Role Performances (Hong, 2001). Mothers used a 5-point Likert scale (1 = never, 5 = always) to rate the degree to which partners share responsibilities over various domains of caring for their child. Sample items include "My husband plays with our baby" and "My husband feeds or bathes our baby." Cronbach's alpha of .80 was obtained.

Marital satisfaction was assessed using the Korean version of the Kansas Marital Satisfaction Scale (KMSS; Schumm, Nicols, Schectman, & Grigsby, 1983; Chung, 2004). Mothers used a 5-point Likert scale response format (1 = very dissatisfied, 5 = very satisfied) in responding to the 4-item subscale, based on the extent of satisfaction with spouse. Sample items include "Are you satisfied with your husband as your spouse?", and "Are you satisfied with your husband as the father of your child?" Higher score indicates higher marital satisfaction. Cronbach's alpha of .92 was obtained.

Marital conflict was assessed by a 8-item scale adapted from the Marital Conflict Test (Markman, Stanley, & Blumberg, 2001). Mothers rated each item on a 5-point Likert scale (1 = never, 5 = always). Sample items include "My husband is unlikely to respect me", and "It is no use telling my husband what I really think, feel, or desire to change in our relationship". Higher score indicates higher marital conflict. Cronbach's alpha of .91 was obtained.

Demographic variables include gender of child, maternal employment, and family income. Child's gender was coded 0/1 with 0 representing boys. Maternal employment was dichotomized to indicate whether mother was employed (1) or not (2). Family income was reported by mothers.

Analytic Approach

To examine our hypothesis that differential effects exist between child temperament and parenting style, regression mixture modeling was performed using Mplus 5.0 (Muthén & Muthén, 1998-2007). Analysis was preceded in two phases; unconditional model and conditional model. The first phase involves the identification of latent group of respondents who differ in the effects of child temperament on parenting style. The intercepts of parenting style scores are allowed to vary across the classes and the residual variance is not held equal across classes. The estimator for this analysis was maximum likelihood with robust standard errors (MLR).

Once the latent classes are identified, the influence of individual and contextual factors on the latent classes can be assessed. The multinomial logistic regression of the categorical latent variable (i.e., latent classes) on the predictors are performed to compare between classes. Multinomial logistic regression model expresses the probability that each individual falls in a given class as a function of the covariates. This implies that the log odds comparing a given class to the normative class (i.e., reference class). This conditional model includes categorical variables, and therefore a maximum likelihood estimator with robust standard errors using a numerical integration algorithm was used. Monte Carlo integration was applied to generate random integration point.

Results

Identification of Latent Classes Representing Individual Differences

The present analysis begins with regression mixture analysis to identify groups of mothers who differ in effects of child's temperament on parenting styles. The intercepts and variances of the outcomes are allowed to vary across groups because constraining either the intercepts or the variances imposes fairly stringent assumptions, and it did not make a substantive difference in model interpretation.

The first task is to determine the number of latent classes that best characterize the sample. Table 1 reports fit indices and estimates of the proportion of respondents in each class for models with one through four classes. The lower values in the AIC and BIC reflect the best fitting model (Dayton, 1998). Although the four-class model is best when judged by the AIC and BIC, they continue to go down rather than hit the minimum and start going back up.

Table 1
Fit Indices for Regression Mixture Model

Criterion	One class	Two class	Three class	Four class
Log-likelihood	-3224.59	-3086.46	-2975.41	-2931.09
Parameters	6	12	18	24
AIC	6461.17	6196.91	5986.83	5910.18
BIC	6492.30	6263.17	6086.21	6042.69
Entropy	-	.453	.588	.601
LMRT	-	270.27	217.270	86.73
p value	-	.000	.000	.036
Class 1 (%)	100	60.01	41.21	18.38
Class 2 (%)	-	39.99	42.57	39.98
Class 3 (%)	-	-	16.22	4.68
Class 4 (%)	-	-	-	36.97

Note. AIC = akaike information criterion; BIC = bayesian information criterion; LMRT = lo-mendell-rubin likelihood-ratio test of model fit.

The Lo-Mendell-Rubin likelihood ratio test (LMRT) was used to compare the estimated model with a model with one-less class than the estimated model. A low p-value indicates that the model with one-less class is rejected in favor of the estimated model. LMRT values indicated that there was slight increase in p-value at four class and the three-class solution was preferred. Plotting Log-likelihood also showed that there were substantial increase from one-class to three-class solution and it started leveling out at four class solution. Moreover, four-class solution is lacking in interpretability because of a low portion of respondents in one group; the smallest class contains less than 5% of the respondents, which is small enough to discount. One class in the three-class model seems to divide up into two classes in the four-class model but they are very similar in substantive meaning of classes. Taken the evidences together, it supports the three-class over four-class solution, which forms the basis for the rest of this study. The entropy value (how well the model is able to classify individuals) was .59 in three-class model.

Meaning of the Three Classes

The next step is to interpret the meaning of the three classes. Before selecting the three-class solution, it has to be sure that the three classes are meaningful and have reasonable distinctiveness. The first class (see Table 2), comprising 43% of the respondents, is characterized by the lack of a relationship between child temperament and parenting style. In general, mothers in this class report less positive parenting style; they have a somewhat lower intercept on parenting style than those in the other two classes. There is no unique effect for emotionality and activity. These mothers are not significantly affected by any of the temperament measures. Because these mothers are relatively unaffected by the child temperament, this class is thus termed the non-reactive class.

The second class contained about 41% of the respondents. Mothers belonging to this class are best characterized by being somewhat higher than other mothers on positive parenting style; higher than non-reactive class but lower than reactive class. For this class the pattern of association between temperamental difficultness and parenting style is not consistent; there is negative effect for high emotionality and positive effect for high activity. Because this class is significantly affected by difficult temperament and has relatively lower parenting style, it is termed the reactive-low class.

About 16% of the respondents are classified as belonging to the third class, which is distinguished by having high intercepts for parenting style and significant effects of difficult temperament on parenting. In Class 3 it is clear that difficult temperament, both emotionality and

activity, is strongly related to parenting style. Because this class is significantly affected by difficult temperament and has relatively higher parenting style, it is termed the reactive-high class.

Table 2
Parameter Estimates and Standard Errors for Three-Class Model

Parameter	Non-reactive (43%)			Reactive-low (41%)			Reactive-high (16%)		
	B	*SE*	*Beta*	*B*	*SE*	*Beta*	*B*	*SE*	*Beta*
Intercept	3.78	.19	19.89	3.81	.09	39.93	4.43	.20	21.89
Emotionality	-.09	.04	-1.94	-.03	.02	-2.05*	-.09	.04	-2.45*
Activity	.01	.04	.07	.06	.03	2.20*	.09	.05	2.13*
Residual	.27	.03	9.30	.03	.01	3.99	.08	.02	4.02

*$p < .05$.

Predictors of Class Membership

In the second aim, multinomial latent class regression was used to assess the relationship of demographics (family income, maternal employment, and child's gender), individual characteristics (self-efficacy and depression), and family resources (coparenting alliance, marital conflict, and marital satisfaction) with the latent classes. The entropy increased from .59 in the unconditional model (with no predictors of class membership) to .66 in this model, indicating that adding predictors slightly increased the ability of the model to classify individuals into three latent classes. The effects of difficult temperament vary across groups of mothers and that those groups differ in their makeup in terms of individual and family resources.

The reactive-high class was the reference class; therefore, the parameter estimates reported are the log odds of being in each of other classes versus the reactive-high class. The odds for mothers with high depression in non-reactive class versus reactive-high class is 19.54, indicating they are almost 20 times more likely than mothers with low depression to be in non-reactive class than the reactive-high class. The mothers experiencing high marital conflict are 3.7 times more likely to be in the non-reactive class than reactive-high class, whereas mothers with high coparenting alliance are about half as likely to be in the non-reactive class than reactive-high class. Further, mothers with high self-efficacy were less likely to be in the non-reactive class versus the reactive-high class, with the odds ratios about .15 for this effect.

The odds for mothers with high depression in reactive-low class versus reactive-high class is 4.58, indicating they are almost 4.5 times more likely than mothers with low depression to be in reactive-low class than the reactive-high class. The mothers experiencing high marital conflict are 2.4 times more likely to be in the reactive-low class than reactive-high class. Further, mothers with high self-efficacy and high coparenting alliance were less likely to be in the reactive-low class versus the reactive-high class, with the odds ratios about .36 and .70 for each of these effects respectively.

Overall, depression was the most significant predictor of class membership; the odds for mothers with high depression in non-reactive versus the reactive-high class are 19.54, whereas for mothers with high depression in reactive-low class versus reactive-high class are 4.58. The effects of demographic variables (i.e., family income, maternal employment and child's gender) were not significant when individual and family resources variables were taken into account. Mothers in reactive-high class were significantly more affected by the difficult temperament on their parenting styles. This finding provides some explanation for the observation that mothers with high resources were more likely to be in reactive-high class rather than the reactive-low class and non-reactive class. Summing all up, mothers with positive family and individual resources tend to be negatively impacted by the difficult temperament, whereas mothers with low resources show negative parenting style regardless of child temperament.

Table 3
Multinomial Regression of Class Membership on Predictors

Parameter	Reactive-low vs. reactive-high				Nonreactive vs. reactive-high			
	B	*SE*	*Beta*	*OR*	*B*	*SE*	*Beta*	*OR*
Income	-.13	.08	-1.51	.88	-.05	.11	-.43	.95
Employment	-.05	.26	-.19	.95	-.19	.30	-.65	.82
Gender	.18	.23	.77	1.20	.12	.28	.43	1.13
Depression	1.52	.29	5.19***	4.58	2.97	.38	7.82***	19.54
Self-efficacy	-1.01	.24	-4.24***	.36	-1.89	.32	-5.85***	.15
Satisfaction	-.24	.19	-1.22	.79	-.27	.26	-1.01	.76
Conflict	.88	.41	2.13*	2.40	1.31	.43	3.07**	3.71
Coparenting	-.35	.18	-2.02*	.70	-.53	.21	-2.56*	.59

Note. *OR* = Odds Ratio.
*p < .05. **p < .01. ***p < .001.

Discussion

Even under the best of conditions, parenting is a challenging task. Further, difficult temperament is a risk factor by virtue of the demands children place on mothers. Difficult temperament, especially negative affectivity, is known to elicit negative behavior and inhibit positive behavior from parents (Anderson et al., 1986). And yet individual and family contextual characteristics contribute to variation in this association.

The purpose of this study was to attain a clearer understanding of the association between child temperament and parenting style. Specifically, the goal of the present study was twofold. It was (a) to identify latent classes of links between temperament and parenting, representing differential effects of temperament, and (b) to identify individual and contextual characteristics accounting for these differential effects. Applying a regression mixture model, the present findings provide evidence that the association between child's temperament and parenting style was not the same across all individuals. The major findings are as follows.

First, congruent with previous findings (e.g., Jenkins et al., 2003), this study supports that parents vary in the degree to which their behavior is affected by child temperament. Three latent classes were identified varying in the association between temperamental difficultness and parenting style; nonreactive class, reactive-high class, and reactive-low class. Mothers in nonreactive class (43%) are relatively unaffected by the child temperament and they exert less optimal parenting style. That is, their parenting style is negative regardless of difficult temperament. Mothers in reactive-high class (16%) are clearly reactive to their children's difficult temperament; they showed less optimal parenting style as children show more difficult temperament. Further, their parenting style is more positive than any other classes. Mothers in reactive-low class (41%) also showed significant association between temperament and parenting style, whereas the intercept of parenting style is lower than reactive-high class. Promising evidence from this result suggests that some mothers exert variation in parenting style depending on child temperament, whereas others are not affected.

Second, there is general agreement that individuals bring different developmental profiles to an environment, which in turn results in individual variation in how the environment shapes future outcomes (Gottlieb, Wahlsten, & Lickliter, 2006; van Horn et al., 2009). This study supports this fundamental ecological axiom that mothers differ in how they respond to the parenting contexts. It has been recognized that parents may differ in the degree to which child's difficult temperaments affect their parenting styles and it may depend on maternal characteristics and their social circumstances (Crockenberg, 1986; van den Boom, 1991). Mothers with less resources may have

negative parenting style regardless of child's temperament, whereas mothers with sufficient resources may responsive to child's temperament and exert different parenting style. That is, the effects of difficult temperament vary across groups of mothers and that those groups differ in their makeup in terms of maternal and family contextual resources.

This study identified several factors that render some mothers more influenced by temperament than others. Overall, depression was the most significant predictor of class membership. Maternal self-efficacy, marital conflict, and co-parenting alliance were also significant predictors of class membership. On the contrary, family income, maternal employment, and child's gender were not significant predictors of class membership when contextual and individual variables were taken into account.

Specifically, the findings of the current study underscore the role of maternal depression in explaining differential susceptibility of child temperament to parenting style. It was found that mothers with high depression were almost 20 times more likely than mothers with low depression to be in non-reactive class than the reactive-high class. The mothers experiencing high marital conflict were 3.7 times more likely to be in the non-reactive class than reactive-high class, whereas mothers with high co-parenting alliance were about half as likely to be in the non-reactive class than reactive-high class. Further, mothers with high self-efficacy were less likely to be in the non-reactive class versus the reactive-high class. Taken together, mothers with positive individual and family contextual resources tend to be negatively impacted by the difficult temperament, whereas mothers with low resources are not susceptible to the effect of temperament and show negative parenting style regardless of child temperament.

The present investigation endorses the premise that the association between temperamental difficultness and parenting style is not the same across all mothers. The conclusion drawn from this study would be that difficult child temperament matters more to some parents than others. The differential effects are rooted both in mothers'own psychological resources (i.e., self-efficacy and depression) and in the current family contexts in which they parent (i.e., marital conflict and co-parenting alliance). It is also a reminder that universal interventions for all are unlikely appropriate. The same approach to child temperament can be counter-productive unless take mothers' individual and family contextual characteristics into account.

Although this study was able to extend previous research by moving from examining interaction effects to identifying latent classes as a way of understanding differential effects and individual differences, methodological limitations should be noted. First, conclusions about the causal relations between temperament and parenting often cannot be drawn because present study used only cross-sectional data. Hence, present findings reporting links between temperament and parenting need to be interpreted with care. Second, both temperament and parenting were measured via mother-rated questionnaires so that underlying parental characteristics might influence both sets of data. It is possible that the relations that have been observed are due to shared method variance. Subsequent research is necessary to confirm the relationships reported in this study using other methods (e.g., observation, alternative informant).

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The Infant Temperament Stability and the Mediation Effect of the Maternal Parenting Behavior on the Relationship Between the Temperament and Development of Infants

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This study intended to evaluate the stability of temperament by examining the changes in the infant temperament using the Panel Study on Korean Child (PSKC) the 1st and 2nd data, and to verify what role the mother's parenting behavior has in relation to the temperament and the development of infants. As the results, infant temperament showed the difference in stability depending on the sub factors. There was no difference in Emotionality but there was a difference in Activity. Also, the mediation effect of parenting behavior on the relationship of temperament and development was verified. The subordinate types of temperament did make a difference in the mediated effects of mother's parenting behavior on infant development according to the gender.

As most parents have experienced, all babies have a unique personality. In describing an infant's character, researchers focused on temperament. Temperament is an individual tendency that responds in a predictable way to circumstantial incidents, and is thought to consist of the emotional and behavioral characteristics that form the character of an adult (Caspi & Silva, 1995; Goldsmith et al, 1987). The main topics of discussion are the component of temperament; the influence of genes and environment on temperament; the stability of temperament; and temperament and the parenting behavior. Among these, the topic of 'how stable temperament of early days is with time' has been attempted to be verified through longitudinal study. Will an eight month old infant, who is very confused and scared when he/she sees an unfamiliar face, be wary of strangers when 24months old, and avoid new play friends at four years of age? Longitudinal study shows that some temperaments, such as activity level, sensitivity, sociality, shyness are to some extent stable up to infancy, childhood, and sometimes to the early part of adulthood (Caspi & Silva, 1995). Discoveries like these provide the reasons why many development scholars consider temperament to be the foundation of an adult's personality. However, not all people have a stable temperament. Let's consider behavioral inhibition, i.e. the tendency to be intimidated by strangers or by an unfamiliar situation, which is a temperamental attribute that Kagan(1992) discovered while carrying out the longitudinal study. It demonstrated that behavioral inhibition is a very stable attribute, with a deep biological root, and one that has large influence of genes.

Nevertheless, Kagan et al. (1994) and Swedish researchers discovered that only children at the extreme end of continuity, i.e. if the child is very shy or very outgoing, or the level of behavioral inhibition is very high or very low, are likely to show such long-term stability. Most other children grow out of infant temperament and changes the level of inhibition considerably as time went on. This observation signifies that the aspects of temperament that is influenced by genes can be modified by environmental effects. In Korea, the longitudinal study on infants is still at an early stage, and empirical studies on such characteristics have not been progressed to date. By examining the changes on infant temperament through 2008 and 2009 child panel data, this study aims to broaden the understanding on the characteristics of the Korean infants' temperament.

Along with the stability of the infant temperament, the topic that is considered important is the effect of temperament on the infant's future development. Thomas and Chess (1977) classified the infants' temperament into three types - easy, difficult and slow temperament. These patterns may continue with time and could influence the child as it adapts to various circumstances in the future. Children who had a difficult temperament in infancy also had problems in their relationships with peer group or had short attention span in their school; and children who had a slow temperament

also had problems when they had to adapt quickly into a new environment (Thomas, Chess & Korn, 1982).

However, the temperamental characteristics of the early days sometimes continue and sometimes don't. In other words, it is thought that the ideal development of an infant depends on the harmony between the infant and the parents' temperament. Thomas and Chess (1977) presented the 'goodness of fit' model, which explains that ideal results are produced by the interaction between the infant's temperament and the environment. As the adaptive development of difficult infants is introduced, the importance of the interaction between the temperament, which is an individual inner characteristic, and the environment is being magnified (Lahey, Waldman, & McBurnett, 1999). By studying the relationship between specific temperament that have an effect on the child's problematic behavior and the mother's rearing behavior, van Aken et al. (2007) identified that the effect of the mother's parenting behavior, which influences the problematic behavior, changes according to the level of specific temperament. This result demonstrates that positive development can be achieved if innate weaknesses such as difficult temperament are able to interact with the positive parenting behavior.

On the other hand, although the gender, which is an individual inner characteristic, received attention for a long time, unanimous conclusion on the effect of gender on infant development is still not to be reached. Studies are generally being introduced showing male child having more negative development compared to female child. However other study results are also being steadily presented that demonstrate no difference between genders on child development. In these circumstances, the argument of one-sided relationship verification, which predicts the development difference with gender, will be unreasonable (Hyde, 1984), and it would be appropriate, as Sterba, Prinstein and Cox (2007) argue, to examine the third variable such as the parent's parenting variable on the difference in development of a male and female child.

However, despite these implications, when considering the variables related to child development, limited study was carried out at the same time on the gender, which is a child's inner characteristic, and the mother's parenting behavior, which is an environmental characteristic. Precedent study to date is mostly for children who are older than infants, with studies on infants being rare. Therefore, it would have an important significance in examining the relationship between individual inner characteristic and environmental characteristic that influence infant development, focusing on the gender and temperament as infant's individual inner characteristics, and the mother's parenting behavior as environmental characteristic.

Therefore, this study intends to examine the infant temperament stability through Panel Study on Korean Children (PSKC), and identify the main characteristics of infant development by examining the mediation effect of mother's parenting behavior on the infant's temperament and development.

Method

Participants

Analysis was made based on the infant data from households that participated in the PSKC of the Korea Institute of Child Care and Education (KICCE). The data from the 1st survey (2008) and the 2nd survey (2009) were used. The sample of this study is largely divided into two groups. Firstly, the total number of infants included in the 1st and 2nd temperament longitudinal study was 1,810 (male 914, female 896). Secondly, infants participated in the study on the relationship between temperament and development were the same infants who participated in the development measurement (K-ASQ) of the 2nd survey. The total number in the study was 1,895 (male 958, female 937). At the 1st survey (2008), infant's mean age was 5.5months and at the 2nd survey (2009), infant's mean age was 14months.

Measures

Infant Temperament. EAS (The EAS - Emotionality, Activity and Sociability - Temperament

Survey for Children-Parental Rating) for parents by Buss and Plomin (1984) were used. EAS is divided into Emotionality, Activity and Sociability, and the Likert scale was used to rate ranging from 'not at all (1 point)' to 'very much so (5 points). In the 1st and 2nd sutvey, infants were measured for Emotionality and Activity but not for Sociability. Negative questions were scored the opposite way to calculate the total scores for each area. A high score in Emotionality means that the child has a lot of negative emotion, and a high score in Activity means that the child likes to move around and has active characteristics. For 2008 panel data, Cronbach α=.73 for Emotionality and Cronbach α=.69 for Activity, and for 2009 panel data, Cronbach α=.76 for Emotionality and Cronbach α=.78 for Activity.

Infant development. ASQ, which was developed by Squires, Potter and Bricker (1999), was standardized to suit Koreans by Heo Gye-hyung, Squires, Lee So-young, Lee Jun-seok (2006) and the result was the K-ASQ (Korean-Age & Stage Questionnaire). It measures the development of 4-60months infants in 5 areas (communication, gross-motor, fine-motor skill, problem solving, individual-sociability). Each area has 6 questions, with there being 30 questions in total. The respondents were the mothers of infants, and the response can either be 'yes' (the infant is performing the action, 10 points), 'sometimes' (the infant is starting to show the action, 5 points), or 'no' (the infant is not performing the action yet, 0 points). The total score for each area for the 2009 child panel data were used in this study, and the overall development score was calculated using the average of total score for each area. Cronbach α= .74 for 30 questions.

Maternal parenting behavior. The Parental Style Questionnaire (PSQ) developed by Bornstein et al. (1996) was used for this. Among the PSQ, 6 questions for Sociability area were analyzed and they were divided into two factors - Warmness and Responsiveness. Each factor consists of 3 questions and has a 5 points rating. The higher the score, more warm and responsive. Cronbach α =.83 for the 2009 child panel data.

Analysis

Firstly, the short-term longitudinal study that examines the temperament changes in infants investigated whether there is any temperament difference between those newly born and those one year old through paired-t test.

Secondly, in order to examine the mediation effect of a mother's parenting behavior in relation to the temperament and development of infants, Baron & Kenny's(1986) verification and Sobel test were carried out.

Results

The Stability of Temperament

First, the temperament variables with infant gender were examined(see Table 1). There was gender difference in activity temperament. Mothers described their male infants as more active than female infants. This difference is more larger to the one year old infant than newborn.

Table 1
The Temperament Variables with Infant Gender

Variable	Male (n = 914)	Female (n = 896)	t
Newborn			
Emotionality	13.57 (2.95)	13.60 (3.11)	-0.191
Activity	18.76 (2.66)	18.43 (2.73)	2.557 *
One year old			
Emotionality	13.49 (3.05)	13.59 (3.24)	-0.670
Activity	19.80 (2.88)	19.28 (2.97)	3.744 ***

*$p < .05$. ***$p < .001$.

To examine the stability of temperament, whether there is any temperament difference between those newborn and those one year old through paired-*t* test (see Table 2). There was gender difference in activity temperament. The one year old infants were higher than newborn in activity temperament. There was same tendency in male and female infants.

Table 2
The Temperament Variables with Infant Age

Variable	Newborn *M (SD)*	One year old *M (SD)*	Paired - *t*
Child (*N* = 1810)			
Emotionality	13.59 (3.03)	13.54 (3.15)	0.597
Activity	18.60 (2.70)	19.54 (2.93)	-12.832***
Male (*n* = 914)			
Emotionality	13.57 (2.95)	13.49 (3.05)	0.764
Activity	18.76 (2.66)	19.80 (2.88)	-10.384***
Female (*n* = 896)			
Emotionality	13.60 (3.11)	13.59 (3.24)	0.082
Activity	18.43 (2.73)	19.28 (2.97)	-7.847***

***$p < .001$.

The Mediation Effects of Maternal Parenting Behavior in the Relations Between Infant Temperament and Infant Development

General tendency of th variables. Means, standard deviations, skewness, and kurtosis for the variables were reported in table 3. According to the normal distribution standards by West, Finch, and Curran (1995) (|skewness|>2, |kurtosis|>7 : severely non-normal distribution), the variables were satisfied by the normal distribution assumption.

Table 3
Means, Standard Deviations, Skewness, and Kurtosis for the Variables (N = 1895)

Variable	*M*	*SD*	Skewness	Kurtosis
Infant temperament			.	
Emotionality	13.53	3.13	296	.335
Activity	19.53	2.94	-.331	.267
Parenting behavior	23.35	2.99	-.206	.457
Infant development	51.11	7.67	-1.479	3.298

Correlations for the variables were reported in Table 4. Maternal parenting behavior and Infant development were related to infant emotionality temperament negatively, but to infant activity temperament positively. Emotionality temperament and activity temperament were correlated low.

Table 4
Correlations for the Variables

Variable	1	2	3	4
Infant temperament	1			
Emotionality				
Activity	.053*	1		
Parenting behavior	-.216***	.122***	1	
Infant development	-.075**	.098***	.091***	1

*$p < .05$. ***$p < .001$.

Mediation Effect

Regression analyses were conducted to evaluated the possibility that maternal parenting behavior mediate any relations between infant emotionality temperament and development. The results were reported in Table 5. According to Baron and Kenny's (1986) model, maternal parenting behavior mediate any relations between infant emotionality temperament and development in total group.

On the other hand, emotionality temperament made a difference in the mediation effect of parenting behavior on infant development according to the gender. While the mediation effect on emotionality was noticeable with male infants, this was not the case with female infants.

Table 5
The Mediation Effects of Maternal Parenting Behavior in the Relations Between Infant Emotionality Temperament and Development

Model	β	t	R^2
Child			
Step 1			
Emotionality → Development	-.075	-3.255**	.006
Step 2			
Emotionality → Parenting behavior	-.216	-9.612***	.047
Step 1			
Emotionality → Development	-.058	-2.462*	.011
Parenting behavior → Development	.079	3.360**	
Male			
Step 1			
Emotionality → Development	-.079	-2.460*	.006
Step 1			
Emotionality → Parenting behavior	-.208	-6.581***	.043
Step 1			
Emotionality → Development	-.060	-1.834	.014
Parenting behavior → Development	.092	2.791**	
Female			
Step 1			
Emotionality → Development	-.074	-2.275*	.006
Step 1			
Emotionality → Parenting behavior	-.223	-6.995***	.050
Step 1			
Emotionality → Development	-.060	-1.797	.009
Parenting behavior → Development	.063	1.899	

*$p < .05$. **$p < .01$. ***$p < .001$.

Soble (1982) has provided a formula for assessing the statistical significance of partial mediation (see Table 6). The mediation effect of parenting behavior was verified in the total and male groups.

Table 6
The Verification of the Mediation Effect

Path	Sobel-z	p-value
Child		
Emotionality → Parenting behavior → Development	-3.67	0.000
Male		
Emotionality → Parenting behavior → Development	-2.91	0.003

The result of the mediation effects of maternal parenting behavior in the relations between infant activity temperament and development were reported in Table 7. The variables were met Baron and Kenny's (1986) criteria and could be considered potentially mediated by parenting behavior. There was same tendency in male and female infants.

Table 7
The Mediation Effects of Maternal Parenting Behavior in the Relations Between Infant Activity Temperament and Development

Model	β	t	R^2
Child			
Step 1			
Activity → Development	.098	4.306***	.010
Step 2			
Activity → Parenting behavior	.122	5.331***	.015
Step 1			
Activity → Development	.089	3.862***	
Parenting behavior → Development	.080	3.495***	.016
Male			
Step 1			
Activity → Development	.120	3.749***	.014
Step 1			
Activity → Parenting behavior	.152	4.759***	.023
Step 1			
Activity → Development	.107	3.304**	
Parenting behavior → Development	.088	2.716**	.022
Female			
Step 1			
Activity → Development	.098	3.024**	.010
Step 1			
Activity → Parenting behavior	.095	2.908**	.009
Step 1			
Activity → Development	.092	2.818**	
Parenting behavior → Development	.068	2.087*	.014

*$p < .05$. **$p < .01$. ***$p < .001$.

Also, the mediation effect of parenting behavior was verified through the Sobel test (see Table 8). The mediation effect of parenting behavior was verified in the total and male groups. There was low statistical significance in the female group.

Table 8
The Verification of the Mediation Effect

Path	Sobel-z	p-value
Child Activity → Parenting behavior → Development	3.18	0.001
Male Activity → Parenting behavior → Development	2.68	0.007
Female Activity → Parenting behavior → Development	1.83	0.060

Discussion

This study intended to evaluate the stability of temperament by examining the changes in the infant temperament using the Korea Child Panel the 1st and 2nd data, and to verify what role the mother's parenting behavior has in relation to the temperament and the development of infants.

Firstly, infant temperament showed the difference in stability depending on the sub factors. When new born and one year old were compared, there was no difference in Emotionality but there was a difference in Activity. The reason why the Activity is higher at age one may be due to the physical and sense/cognitive development of infants. Infants that could not even control their own head become mobile and started walking when they become one year old. This is the most noticeable and progressive progress in their motor development. In addition to the motor development, sense and perception also develop, and an infant starts to understand the world with its whole body. When considering the characteristics of an one year old, a higher level of activities of infants compared to before can be considered as a general characteristic of development.

These results suggest the importance of defining detailed factors when measuring infant temperament. As there are various definitions and measuring methods, it would be difficult to understand the characteristics of infants properly if temperament is defined with only one method. In fact, if you look at the classification of temperament types by Thomas and Chess (1977), typical 3 temperamental types are not included in 35% of the cases. Infants have their own unique temperament pattern, therefore infant's natural characteristics may be overlooked and mistakes can be made by over-stereotyping. On the other hand, Emotionality is stable in the temperament characteristics of an infant. This suggests that Emotionality is an important component in temperament. By nature, the level of negative emotion is different for each infant and if the aspect of stability being dependant on the time and situation is understood, unreasonable expectation of dealing with negative emotion can be thrown away and the characteristics of infants can be understood more easily.

Secondly, the mediation effect of parenting behavior on the relationship of temperament and development was verified. This means an individual achieves the optimum development when exchange takes place by harmonizing its own characteristics with the matching environment through close relationship, i.e. when interaction takes place (Windle & Lerner, 1986). Negative emotion which is the infant's Emotionality steer negative parenting behavior from the mother, as a result it has negative influence on infant development. Infant's Activity steers the mother to positive parenting behavior.

However, other previous studies state that a child's high activity level causes negative parenting behavior i.e. more restrictions and refusals from the parents (Lerner & Lerner, 1983). In addition, some studies report that it triggers control, over protection, forced parenting behavior from the mother (Kang, 2010; Park et al, 2009; Im, 1994; Hemphill & Sanson, 2000; Lee & Bates, 1985). So, it would be unreasonable to make any consistent conclusion regarding the relationship between the activity level of infant and parenting behavior of mother. More study results on the activity level of an infant needs to be accumulated before any discussions can take place. On the other hand, the subordinate types of temperament did make a difference in the mediated effects of mother's parenting behavior on infant development according to the gender. The gender of infant did not make much difference for Activity. However, it did make some difference for Emotionality. While the mediated effect on Emotionality was noticeable with male infants, this was not the case with female infants.

This result partially coincides with the study results of Kim (2011), Park (2006), and Warren & Simmens (2005), mother's sensitive and positive parenting showing bigger effect on male compared to female child. Through this result, it may be anticipated that mothers expect and perceive the temperament of infant differently according to their gender, and this perception can be seen in their parenting behavior. Having differences in mother's parenting behavior dependant on gender and temperament is closely related to actual infant development, therefore the result of this study may be used as preliminary data for ideal infant-rearing behavior of parents.

This study is relevant in the following points. Firstly, by examining the stability of temperament through longitudinal study on Korean infants, it aims for a better understanding of the infant temperament. Although the longitudinal study period, which was the 1st (2008) and 2nd (2009) data, was not from a long enough period, by confirming significant changes on the temperament characteristic even for the new born and one year old, our understanding on the stability of infant temperament has been broadened.

Secondly, by examining in general the relationship between gender and temperament, which is the individual characteristics of infant, and the parenting behavior, which is the environmental characteristic, the relationship between the main factors that influence infant development have been identified.

Despite the relevance, this study has some limits. Firstly, only two subordinate factors of infant temperament is measured for the infant's age. Through varying observation or measuring tools, it is necessary to conduct a more detailed study on infant temperament. Secondly, the development of an infant relies on the mother's self report. To understand the accurate development level of infants, more accurate measurement of development through individual development test on the infant is necessary.

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Effects of Temperamental Characteristics and Maternal Depression on Social and Cognitive Development in Infants

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The sample included 1,655 mothers who participated in the Panel Study on Korean Children (PSKC) Wave I and Wave II. Results revealed that infant emotionality, activity, and maternal depression were significantly related to infant social development, indicating high negative emotionality and low activity levels and high maternal depression predicted low social development while only high negative emotionality was associated with low cognitive development. There were significant interaction effects of infant temperament and maternal depression on infant social development such that for mothers with more depressive symptoms, infants who displayed lower negative emotionality and higher activity levels demonstrated higher social development. Mothers with less depressive symptoms reported higher social development of infants than their counterpart regardless of infant temperamental difficulties. Interaction effects on infant cognitive development were only marginally significant.

Infancy is the period that children undergo rapid developmental changes. Research has consistently shown the critical influences of this period on later development, and many studies have attempted to identify both infant as well as parents-related factors that may affect development in infancy (Crockenberg, 1981; Braungart-Rieker, Garwood, Powers, & Wang, 2001). Temperament is the one of important characteristics of infants in explaining child development. Temperament bases on the child's biological factors (Gunnar, 1990) and has high stability and continuity than any other aspects of personality. Individual differences in temperament in early years are closely related to the later development in personality and sociability (Kagan, 1998; Rothbart & Bates; 1998). Meanwhile, researchers have agreed that children's high negative emotionality and high activity are difficult temperamental characteristics (Park & Rubin, 2008). Temperament research shows that children who exhibit difficult temperament in infancy tend to have more behavioral problems in later years than children whose temperament was regarded easy or slow to warm-up. For example, infants who had a tendency of higher activity and sadness at 6 months presented more maladaptive behaviors in social emotional contexts at 18 months (Kim & Kwak, 2007).

However, some researchers argue that difficult temperament does not always lead to negative developmental outcomes. Instead, Belsky and others (1997, 1998, 2005) suggest that difficult temperament needs to be understood as a differential susceptibility rather than vulnerability, a concept that each child in the same family can respond differently to both negative and positive environments depending on his or her sensitivity. In Feldman, Greenbaum, and Yirmiya (1999)'s longitudinal study, when a 9 month-old infant who had higher negative emotionality experienced low levels of synchrony in mother-infant interactions, the child showed more noncompliance for clean up than others at age 2. However, difficult children who experienced high levels of synchrony in mother-infant interactions showed better ability to self-control than those who did not. Another study (Klein Velderman, Bakermans-Kranenburg, Juffer, & Van IJzendoorn, 2006) reported that improved maternal sensitivity was a stronger predictor of attachment security in infants with higher negative reactivity than in other infants. It is still unclear how temperament and environment including parent characteristics account for differential development in infants.

Studies have long been focusing on parenting behavior as single parental factor which affects infant development (Morris et al., 2002; Stright & Gallagher, 2008). Recent infant development studies, however, showed that there are multiple parental factors which influence infant development other than parenting behavior, including psychological state of the mother. Psychological state in

particular and infant development should be examined together because mothers' depression can have a significant impact on infant early life (Galler, Harrison, Ramsey, Forde, & Butler, 2000; Righetti-Veltema, Bousquet, & Manzano, 2003), and many newborn mothers found to suffer from postnatal depression (Kwon, Kim, Kim & Jang, 2006). Depressed mothers tend to be less sensitive to their infant and provide less stimulating environments, indicating detrimental effects on child development (Black et al., 2007). Whiffen and Gotlib (1989) found that infants whose mother was depressed were less competent. Cogill, Caplan, Alexandra, Robson, and Kumar (1986) also found that children whose mothers had suffered from depression at age four experienced intellectual deficit only when onset of mothers' depression occur within a year of their child's birth, suggesting the crucial role of mothers psychological status in infant early cognitive development within a year. Another study showed that infants had low levels of cognitive and psychomotor development regardless of their gender if their mother suffered from chronic depression that lasted postpartum and beyond (Cornish et al., 2005). Also, studies reported that mothers' postpartum depression affects social emotional development of infants and toddlers. Children whose mother experienced postpartum depression had difficulties establishing relationship with peers (Song & Kim, 2000).

Whereas much research has shown temperament of young children and maternal factors are linked with social, cognitive development of children, more concrete explanations of this relationship would be that it is interaction of infant temperament and parenting environment that has significant impact on child development (Park, Rubin, Chung, Yoon, & Doh, 2007). That is, the development of an infant depends on continuous interaction between the infant and environments (Scarr & McCartney, 1983). It also suggests that effects of parents on their infant may not be the same for different dyad and developmental outcome may vary. Belsky, Hsieh, and Crinic (1998) have made a compelling case where interactions of infant negative emotionality and maternal negativity predicted boys' externalizing problems at age 3. Belsky and his colleagues (1998) suggested further that childrens' maladaptive behaviors needed be explained by considering the child-rearing environment in which children behavior with others as well as the effects of infants on the environment simultaneously.

There have been research studies that show individual relationships among temperament of children, maternal depression, and developmental consequences. Little is known, however, about whether the interactions between these variables affect development in early years particularly during infancy. The present study focused on infancy and investigates both the main effect and interaction effect of children's temperament and maternal depression on social and cognitive development, using longitudinal data from the Panel Study on Korean Children (PSKC). In this article, we hypothesized that infant difficult temperament and maternal depression would be negatively associated with social and cognitive development. We also examined whether there would be interaction effects of Infant temperament and maternal depression on social and cognitive development.

Method

Participants

As stated above, data for this study were drawn from the PSKC Wave I (2008) and Wave II (2009). To examine the longitudinal effects of infant temperamental characteristics and maternal depression on infant social and cognitive development, study participants had to have answered the questionnaires at both time points. Of 1853 mothers who participated in PSKC, 1655 mothers with complete documentation were included in the analyses.

Measures

Maternal depression. We used maternal depression as measured on a 5-point Kessler's Depression Scale (K6) (2002) at Wave I with higher scores indicating more depressive symptoms (Cronbach's = .91).

Infant temperament. Emotionality and Activity: Emotionality, Activity, and Sociability - Temperament Survey for Children-Parental Rating (The EAS) by Buss & Plomin (1984) was used to assess infant emotionality Cronbach's α = .75) and activity (Cronbach's α = .85) at Wave I.

Infant social and cognitive development. We employed K-ASQ (Korean-Ages & Stage Questionnaires, Huh et al., 2006) of which infants' Personal/Social Development (social development) and Problem Solving (cognitive development) were assessed at Wave I with high scores indicating better developmental status.

Statistical Analysis

Using SPSS 18.0, univariate statistics were used to describe mother and infant demographic characteristics. To examine the effects of infant temperament and maternal depression on infant social and cognitive development, we conducted correlational and hierarchical regression analyses. VIF was examined for multi-collinearity and significant level was set at .05.

Results

Sample Characteristics

Mothers were 32 years old and infants were 5 months old on average at Wave I (Infant mean age =14.1 months, *SD* =1.1 at Wave II). More than half of mothers in this study received some college education or above (64.2%), and were stay-at-home mothers (67.7%) with a monthly income between 1010000 – 4000000 won (75.0%) (see a Table 1). The mean infant emotionality and activity scores were 13.57 (*SD* = 3.14) and 16.42 (*SD* = 1.75), respectively. The mean infant social and cognitive development scores were 52.56 (*SD* = 10.96) and 49.51 (*SD* = 11.90), respectively. Mothers' mean depression was 11.66 (*SD* = 4.23).

Table 1
Characteristics of Study Participants (N = 1655)

Characteristic	*f*	%
Education		
< High school	513	31.0
Some college	422	25.5
College graduate	640	38.7
Post college graduate	80	4.9
Employment		
Employed	527	31.7
Attending college	8	0.5
Full time home maker	1121	67.7
Monthly income		
<1,000,000	40	2.4
1,010,000~2,000,000	396	23.9
2,010,000~3,000,000	544	32.9
3,010,000~4,000,000	301	18.2
4,010,000~5,000,000	194	11.7
>5,010,000	180	10.9
Infant age at wave I (Mean/SD)	5.3 (0.9) months	
Mother age at wave I (Mean/SD)	32.2 (3.7)	

Note. The number of participants in each socio-demographic characteristic varies due to missing values.

Correlations Among Study Variables

Infant emotionality was positively associated with maternal depression (r = .194, p < .001) and

negatively associated with personal/social development (r = -.078, p < .01) and problem solving (r = -.055, p < .05), whereas infant activity was positively related with personal/social development (r = .063, p < .05). Maternal depression was negatively associated with infant personal/social development (r = -.108, p < .001) and problem solving (r = -.050, p < .05).

Hierarchical Regression Analysis of Infant Temperament and Maternal Depression on Personal/Social Development

Infant with high negative emotionality (β = -.081, p < .001) and activity (β = .070, p < .01), and maternal depression (β = -.089, p < .001) at Wave I were associated with low personal/social development at Wave II with maternal depression being the strongest predictor. There were significant interaction effects of infant temperament and maternal depression on infant personal/social development such that for mothers with more depressive symptoms, infants who displayed lower negative emotionality (M = 52.22 vs M = 47.89, p < .05) and higher activity levels (M = 49.61vs M =51.30, p < .05) demonstrated higher social development. Mothers with less depressive symptoms reported higher personal/social development of infants than their counterpart regardless of infant temperamental difficulties (Table 2, Figures 1, 2).

Table 2
Hierarchical Regression Analysis of Infant Temperament and Maternal Depression on Personal/Social Development (N = 1655)

Variable	Personal/Social Development							
	Model 1		Model 2		Model 3		Model 4	
	B	*β*	*B*	*β*	*B*	*β*	*B*	*β*
Demographics								
Age	-.021	-.007	-.027	-.009	-.037	-.013	-.034	-.012
Education	-.193	-.017	-.268	-.023	-.290	-.025	-.279	-.024
Employment	-.951	-.040	-.880	-.037	-.788	-.033	-.767	-.033
Infant								
Emotionality			-.340	-.097**	-.275	-.079**	-.282	-.081***
Activity			.427	.068*	.424	.068*	.435	.070**
Mother								
Depression					-.245	-.094***	-.230	-.089***
Interactions								
Emotionality X Depression							-.044	-.055*
Activity X Depression							.066	.050*
F (df)	.927 (1651, 3)		4.847 (1649, 5)***		6.471 (1648, 6)***		5.878 (1646, 8)***	
R^2	.002		.014		.023		.028	
ΔR^2	.002		.013		.009		.005	

*p < .05. **p < .01. ***p < .001.

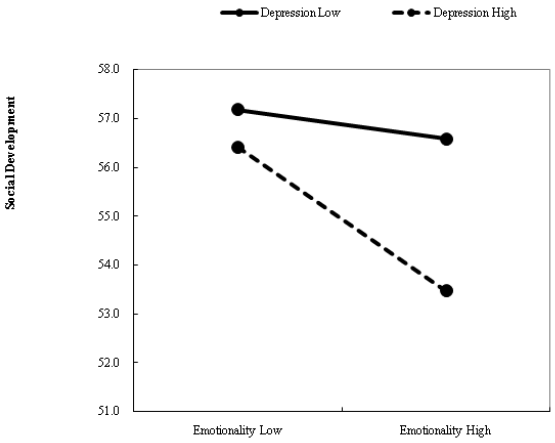


Figure 1. Interaction effects of emotionality and maternal depression on social development.

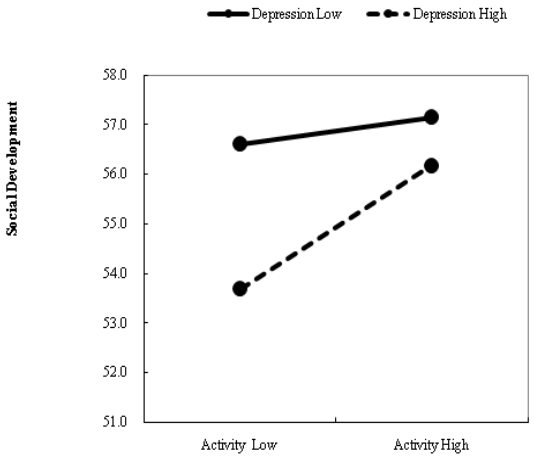


Figure 2. Interaction effects of activity and maternal depression on social development.

Hierarchical Regression Analysis of Infant Temperament and Maternal Depression on Infant Problem Solving

Only infant higher negative emotionality at Wave I was associated with low problem solving ability at Wave II (β = -.056, p < .05), and there were interaction effects of infant activity and maternal depression on problem solving (p < .05). However, the final regression model 4 that examined the main effects and interaction effects was marginally significant (F = 1.724, p < .10).

Table 3
Hierarchical Regression Analysis of Infant Temperament and Maternal Depression on Problem Solving (N = 1655)

Variable	Problem Solving							
	Model 1		Model 2		Model 3		Model 4	
	B	*β*	*B*	*β*	*B*	*β*	*B*	*β*
Demographics								
Age	.008	.002	-.006	-.002	-.010	-.003	-.006	-.002
Education	-.056	-.004	-.090	-.007	-.099	-.008	-.092	-.007
Employment	.126	.005	.128	.005	.163	.006	.188	.007
Infant								
Emotionality			-.232	-.061*	-.207	-.054*	-.213	-.056*
Activity			.006	.001	.004	.001	.015	.002
Mother								
Depression					-.095	-.033	-.084	-.030
Interactions								
Emotionality X Depression							-.034	-.039
Activity X Depression							.074	.051*
F (df)	.031 (1651.3)		1.236 (1649.5)		1.326 (1648, 6)		1.724 (1646, 8)†	
R^2	.000		.004		.005		.008	
ΔR^2	.000		.004		.001		.003	

†p < .10. *p < .05. **p < .01. ***p < .001.

Discussion

The present study systematically builds on and expands research on factors influencing infant development. Specifically, the study investigated the longitudinal effects of infant temperamental

characteristics and maternal depressive symptoms as well as the interaction effects of infant temperament and maternal depression on social and cognitive development. Consistent with our hypothesis, we found that higher levels of infant negative emotionality predicted lower social development is partly corresponding with previous research on negative emotionality and activity that are considered as the characteristics of difficult temperament (Park & Rubin, 2008). Out findings support the study showing that high negative emotionality predicted high level of internalizing and externalizing behavior problems (Janson & Mathiesen, 2008). However, an unexpected outcome was that infants' low levels of activity were associated with low social development in our sample, and this is not consistent with other previous research which found that infants with high activity levels at 6 months were more likely to show maladaptive behavior socially and emotionally at 18 months (Kim & Kwak, 2007). This may be due to the use of an activity measure as a negative temperamental charactsristic that was not sensitive to assess overly active infants. Also, several studies have shown that behavioral problem occurs only when the activity is exacerbated by negative emotionality (Kopp & McCall, 1982; Janson & Mathiesen, 2008). Indeed, infants showing high negative emotionality had low social development scores. However, the correlation between emotionality and activity was statistically significant but low (r = .104, p < .001) in this study. Further research is warranted to examine the relationship between these two temperamental characteristics with a more sensitive scale of activity given that the unexpected direction of the effects of activity on social development, albeit statistically significant.

Regarding the impact of maternal depression on infant social development, findings show that the level of social development was lower when mother's highly depressed. This supports the previous studies that maternal depression exerts adverse effects on children's social development adversely because of their overall low energy and interactions (Black et al., 2007; Song & Kim, 2000). Also, both negative emotionality and activity levels of infants were associated with social development by interacting with maternal depression. That is, social development of infants at 12 months was higher when highly depressed mothers reported that their infants had lower negative emotionality and higher activity. Meanwhile, infants whose mothers have lower depression level showed higher social development than infants with depressed mothers regardless of their temperament. This supports the perspective that the effect on child development can differ when temperament of children meets and works together with characteristics of mothers and parenting environment (Belsky et al., 1998; Morris et al., 2002). The interaction effects imply that mothers with less or no depressive symptoms provide positive and favorable environment for infant development through sensitive responses and loving interaction, so infants can fully develop social ability no matter what their temperamental characteristics are.

Of importance are the findings that neither infant temperament and maternal depression had significant main effects nor interaction effects on infant cognitive development. With respect to main effects, negative emotionality of infant appeared marginally significant in predicting infants' low problem solving ability (p < .10) whereas activity did not. This finding partly supports previous studies about infant temperament and cognitive development. According to Scholom and Schiff (1980), school age boys who have learning disability tend to have negative mood, but low activity levels when they were infants. Lemelin, Tarabulsy, and Provost (2006) reported that the level of cognitive development was high when infants' activity level was low. Comparing with previous studies, this study does not confirm the previous discoveries about activity level. This may be because of different age of studies. Another possible reason is that though high activity level can interfere with concentration during cognitive activities, it also can facilitate cognitive development by making easy to contact and explore their environment and objects. Future research should examine the mechanism by which activity influences cognitive development in a positive or negative way.

Maternal depression did not predict infants' problem solving and this is inconsistent with previous studies about maternal depression and cognitive development in infants (Cogill et al., 1986; Whiffen & Gotlib, 1989). The reason of inconsistency may be an issue based on the duration of negative mood states of mothers. Cornish and his colleagues (2005) compared the effects of maternal temporal

depression with chronic depression. When the mother's depression lasted more than a year, the level of cognitive development of infants became lower. However, infants' cognitive development was not affected if the duration of mothers' depression was brief. It implies that the duration of depression can play a significant role in infant cognitive development. Our study may not confirm the previous study because we used the data on maternal depression only at 4 month of infancy. Future research needs to consider following the course of maternal depression in order to examine its longitudinal effect on infant cognitive development.

With respect to the interaction effects, infant activity and maternal depression affected infants cognitive development, while negative emotionality did not have any interaction effect on cognitive development. This also supports the conceptual framework that infant cognitive development can be explained by both characteristics of mothers and infants simultaneously (Morris et al., 2002; Scarr & McCartney, 1983). However, when mothers were divided into two groups by levels of depression, the relationships of temperament and maternal depression are unclear. When maternal depression was low and infant was less active, problem solving ability of infants increased. However, in case of mothers with higher depression scores, highly active infants showed better ability of problem solving. A mother whose depression level is not so high can have energy to provide positive and stimulating environment for cognitive development, but if her infant is overly active, the mother's effort may not work well. In contrast, highly depressed mother tend not to make stimulating environment, and thus infant who is highly active rather can explore his/her environment for himself/herself. However, the main and interaction effect on infants' problem solving was only marginally significant in comparison to the effects on social development. There are several possible explanations. First, although genetic factors are known to be important to account for cognitive abilities, this study could not control genetic factors in appraising cognitive development of infants. Also, maternal stress during pregnancy might have influenced the findings because prenatal maternal stress can have a negative effect on cognitive development during infancy (Buitelaar, Huizink, Mulder, Robles de Medina, & Visser, 2003; Davis & Sandman, 2010).

Several limitations of the study should be noted. Mothers reported their infant's temperament, social and cognitive development, as well as their own mental health, a potential source of response bias. In particular, this study does not consider the possibility that depressed mothers may easily perceive that their children have difficult temperament than mothers who do not suffer from depression (McGrath, Records, & Rice, 2008; Whiffen & Gotlib, 1989). Since most studies about infancy did not investigate gender differences, we also did not consider it. However, a few studies reported that the effects of maternal depression on infant development differ depending on the gender of the infant (Hay, 1997; Murray, 1992), the relationship should be interpreted cautiously.

In conclusion, while most research mostly dealt with the development of toddlers and later years, the present study examined the development of very early years of human life span, infancy, using a longitudinal study design. The data suggest that parents or caregivers should attend both infant and environment characteristics to realize to full developmental potential of infants. Future studies will need evaluate other factors such as family cohesion and social support that can provide help for effective child rearing in this critical period when mothers face her own challenges.

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Plan to Childbirth 2

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1. A Longitudinal Study on Moderating Variables for Following Childbirth Intention

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2. Relationship Between the General Characteristics/Parenthood of Working Mothers with One Child and Second Childbirth Plan

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3. Factors That Affect Additional Childbirth Plan of Households Having One-Year Old Child: Based on the Second-Year Data of PSKC.

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A Longitudinal Study on Moderating Variables for Following Childbirth Intention

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The low-birth issue has been highlighted as the most important item out of major issues of the Korean society as of now. The birth rate of Korea was high at 6 persons in total fertility rate (TFR) in 1960s; lowed to 2.08 in the 1980s and 1.08 persons the lowest in the world in 2005. In 2007, the figure went up to 1.23 persons, but still the lowest level among OECD countries (Statistics Korea, 2008). The issue of low birth rate is in line with other social phenomena with which individuals come first to groups; attention is paid to quality issues rather than quantity; and welfare gets more value than growth. Therefore, the low birth rate is a complicated issue with other social phenomena so that efforts to assess the causes from various aspects and to solve the issue are required.

Even though there are diverse reasons for the low birth rate, the advancement of the female to the society has made the married women difficult to strike balance between their professional life and child caring. And despite the expansion of child caring policies, it is not helpful in the reality since the child caring expense is so huge. Due to these difficulties, many parents postpone or give up child birth and the difficulties have some impact on the intention for following child birth as well. There are various factors influencing the following child birth intention of the married women. The effects of influence factors and various variables on the intention of following child birth, centering on the outcome of the previous studies, are as follow;

First, the variable related to child has exercised impact on the intention of following child birth. The features of child characteristics influence the child caring behaviors of mothers (Belsky, 1984) and more picky young child has less positive and responsive attitude of mothers (Hemphill & Sanson, 2000). These child caring behaviors are expected to have impact not only on the intercourse with the child but also the idea on the following child birth. In particular, the child birth intention is the highest with the first child (24.2month old), starts to low from the time when the first child becomes 4 years old; and parents give up to have a second child when the first is 5 years old (57.4 months). From the perspective considering child birth and caring as a kind of economic activity in the manner of economic effect and expense, the high child caring cost imposes negative effect on the child birth rate (Blau & Robins, 1989), and financial support to reduce the burden has a positive effect on the birth rate increase (Gauthier & Hatzius, 1997; Del Boca, 2002).

Second, the marriage couple related variables have some impact on the willingness to have the second child such as features of father and mother as well as family. As for socio-demographic variables of a mother, high education level and income of herself or family reduced the time for house labor and child caring. Fathers of high education and income level participate more in child caring (Lee, Young-mi and Min, Ha-young, 2006). In the European countries, the more difficult for women to strike a balance between work and family has tendency to postpone the timing of child birth (Gustafsson, Kenjoh & Wetzels, 2002), the imbalance of sexual equity between individualism and family-oriented schemes brings about ‘working mother with excessive burden’; and the role conflicts of working mother between work and family causes the low birth rate (Rindfuss & Brewster, 1996; McDonald, 2000).

The belief of mothers in child caring is related to the willingness for child birth. It means that the daily stress of child caring of mothers weakens the interest of parents in child caring so that they are easy to have unfair and anti-function child caring behaviors (Abidin, 1992) and it is related to the psychological sense of welfare of parents so that results in the negative outcome as being a parent (Ahn, Ji-young, 2001).

As for the variables of fathers, their attitude to child caring rather than socio-demographic features has impact on the willingness for the second child. The participation level of spouse in child caring plays an important role as well (Olah, 2003). Fathers' participation in child caring is known as playing an important role for working mothers to strike a balance between work and family (Taylor & Spencer, 1989), and their child caring sharing ease the burden of mothers in family with infant children; enhance the satisfaction level of mothers to spouses; and play a positive role in the couple relationships (Lee, Jung-sun, 2003).

The burden of marriage couple for house work or child caring is exposed to factors of income and education level (Lee, Young-mi and Min, Ha-young, 2006). The richer and more income family have the higher birth rate (Hadelshi, 2003) and the high unemployment rate lowers the marriage rate and delay the ages for marriage and child birth (Ahn & Mira, 2001). Not only personal features of parents but also usage of supporters through private network of expanded family is also exposed to the financial competency of families (Lee, 2004; Jun, 1994). More favorable couple to co-child caring has higher intention for child birth, showing that the co-child caring has close relationship with satisfaction of marriage and all low-birth policies. When the spouse do more house work, the willingness of the male deteriorates while that of the female increases.

Third, the child caring support policies have some impact on the female's willingness for the second child. Females consider followings as decisive factors for the second child birth, the mandatory installation of child caring facilities in the working places and their favor goes down from benefits for housing purchase conditions and balance between work and family, child birth encouragement policies, support for pregnancy and child birth, child caring infrastructure to social and economic policies. In the study by Lee (2007) for influence factors for child birth intention, the supporters for child caring has some impact. Considering the precedent studies, the child caring policies have some impact on the willingness for the second child, meaning that the support of the policies will have some impact.

As seen, various influence factors have exercised influence on the willingness of females for the second child. Considering the changing society and following change in the ideas of people, deciding behaviors of people, the intention for child birth should be analyzed from various and comprehensive perspective rather than limited perspective such as demographic, social study, economy and psychology. By studying factors for the second child birth intention rather than general intention for child birth, it needs to assess the factors influencing females who have already a lot of information on the life of female through the experience of child birth and caring out of various theories for human child birth. By doing so, clear measures for low birth will be developed and in turn, attract the birth encouragement policies by the government.

Therefore, this study is about to assess diverse variables for the second child intention as for the females with experience of child birth. Variables are composed by centering on the factors which have impact on individual's child birth and based on the outcome of previous studies, the study model is decided to show the relation structure of moderating variables so as to assess the impact on the willingness and the process of the willingness decision.

Study Model and Questions

Study model refers to the model for easier understanding by analyzing the objective phenomenon for problem solving, assessing the factors closely related to the phenomenon and define the relations with other factors. It means that the most distinctive features are selected in the real phenomenon and simplified and organized. By making visual impact to the hypothesis statement, the flow of existing studies and development of new hypothesis can be made (Kim, 2000).

The study model of this paper is as follow;

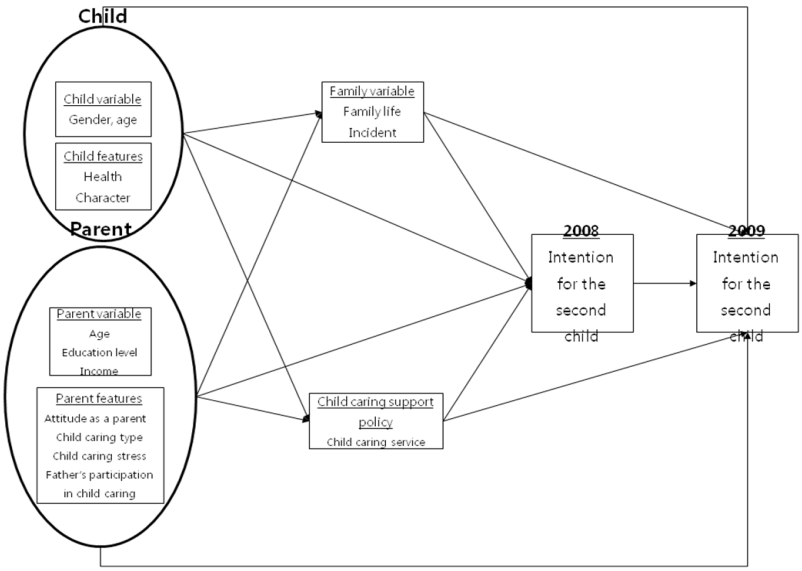


Figure 1. Study model.

Based on the study model, study questions are selected as follow:

1. What kind of factors do affect on the intention for the second child in 2008?
2. What kind of factors do affect on the intention for the second child in 2009?
3. What kind of impact is inflicted by the intention for the 2nd child in 2008 onto that of 2009?

Method

Study Objects

The survey data of Panel Study on Korean Children (PSKC), conducted by Institute of Child Caring Policy in 2008 and 2009, is in use for this paper. Out of the surveyed, parents with Korean nationality and spouses (first and second marriage) are the objects. To prove the model depending on job having of females, the female only who sustain their employment from 2009 to 2009 are the objects. The socio-demographic features of the surveyed object in 2008 and 2009 are as follow;

To prove the model depending on job having of females, the female only who sustain their employment from 2009 to 2009 are the objects. The socio-demographic features of the surveyed object in 2008 and 2009 are as follow:

Table 1
The Socio-Demographic Features of the Surveyed Object

Description	2008 (N = 511)		2009 (N = 195)	
	f	%	f	%
Child gender				
Male	258	50.5	98	50.3
Female	253	49.5	97	49.7
Mother's education level				
No education	1	.2	1	.5
Middle school	2	.4	31	15.9
High school	152	29.7	53	27.2
College	164	32.1	96	49.2
University	164	32.1	12	6.2
Master	25	4.9	2	1.0
Doctor	2	.4	-	-
No response	1	.2	-	-

Table 1
The Socio-Demographic Features of the Surveyed Object (continued)

Description	2008 (N = 511)		2009 (N = 195)	
	f	%	*f*	%
Father's education level				
Elementary school	1	.2	-	-
Middle school	5	1.0	1	.5
High school	142	27.8	30	15.6
College	126	24.7	47	24.5
University	197	38.6	93	48.4
Master	34	6.7	19	9.9
Doctor	2	.4	2	1.0
No response	4	.8	-	-
Occupation of fathers				
Manager	39	7.8	14	7.7
Professional and relevant business	119	23.7	51	27.9
Office worker	143	28.5	53	29.0
Service worker	25	5.0	13	7.1
Sales	53	10.6	15	8.2
Agricultural and fishery	12	2.4	-	-
Skilled worker and relevant business	52	10.4	25	13.7
Machinery and resembling	43	8.6	10	5.5
Simple labor	4	.8	2	1.1
No response	12	2.4	-	-

As for the surveyed in 2008, the gender of children is 50.5% for male and 49.5% for female. As for the education level of mothers, college and university 32.1%, respectively, followed by high school, Master, middle school and doctor, no education and no response. As for the education level of fathers, university is about 38.6%, followed by high school, college, master, no response, middle school, doctor and elementary school. The age range of mothers is the youngest 20 and the oldest 41 years old and average is about 29.42 while that of fathers, 22 as the youngest to 49 as the oldest and 32.02 in average. As for the occupation of fathers, the largest proportion is office worker, followed by profession and relevant business, sales, skilled worker and relevant business, machinery and resembling, manager, service, agriculture and fishery, no response and simple labor.

As for the surveyed in 2009, the gender of children is 50.3% and 49.7% for female. As for the education level of mother, the order is university, college, high school, master, doctor and no education while the order of fathers is university, college, high school, master, doctor and middle school. As for the occupation of fathers, the largest proportion is office worker, followed by profession and relevant business, skilled worker and relevant business, sales, manager, service, machinery and resembling and simple labor.

Measurement variables

Child variable. As for child variables, gender, age, health status after birth and characteristics are variables and regarding the health status after birth, questionnaire from PSKC (2008) is used. By taking advantage of structured questionnaire, self-report questions are used for measurement. As for the characteristics of child, EAS characteristics criteria; for parents (The EAS - Emotionality, Activity and Sociability- Temperament Survey for Children-Parental Ratings) is used. EAS developed by Buss and Plomin(1984) has relatively smaller number of questions for the people from one year old to the adult. The parent stable type EAS is for children from one to 9 years old. Out of 'not at all (1 point)' to 'very much (5 points)', it is stable Likert criteria. There are 10questions and negative questions are for anti-coding. In this study, trust level is .88.

Parent variable. As for the parent variable, the variables of socio-demographic aspects such as age, education, income, attitude as a parent, child caring type, child caring stress and fathers'

participation in child caring are selected to analyze the outcome. As for the attitude as a parent, out of 'not at all (1 point)' to 'very much (5 points)', it is stable Likert criteria. There are 7 questions, developed by Lee, Jeong, Kim, Choi, Park, and Cho (2005). In this study, trust level is .89. As for the child caring type criteria, PSQ of Bornstein (1989) is used. Out of 'not at all (1 point)' to 'very much (5 points)', it is stable Likert criteria. There are 6 questions while points range is about 6 – 30 (higher points means positive type.) In this study, trust level is .91.

As for the child caring stress, the criteria developed by Kim and Kang (1997), representative criteria of Parenting Stress Index (PSI) by Abidin (1983, 1990, 1995), Parenting Daily Hassles (PDH) by Crnic and Greenberg (1990) and measurement method developed based on Maternal Guilt Scale (MGS) by Mann and Thornberg (1987) are used. As for the children age, infant is included and as for the features of mothers, contents related to working mother is included. Out of 'not at all (1 point)' to 'very much (5 points)', it is stable Likert criteria. There are 10 questions, while higher points mean severe stress. In this study, trust level is .86. As for the participation of fathers in child caring, out of 'not at all (1 point)' to 'very much (5 points)', it is stable Likert criteria. There are 4 questions, while higher points mean higher participation. In this study, trust level is. 79.

Family variable. As for the family variables, family life incidents referring to special events which can cause various stresses is limited and in general the control scope by the family members is narrow while the caused circumstance and sentiments are negative. Therefore, the family life incidents as an experience a life accident causing stress have some direct impact on psychological welfare, resulting in low satisfaction on life and high depression so that it is very important forecast variable to life satisfaction (Ensel & Lin, 1991). As for the measurement of family life incidents, standard and non-standard incidents are surveyed separately and there are 16 questions for standard incidents, 11 for non-standard, totaling at 27. Higher points mean the high frequency of stress causing incidents for the last year. In this study, the regressive calculation is made for the questions to be in line with the direction of the study. The trust level is .89.

Child caring policy support variable. As for child caring policy support variable, child caring support is not a usual word so that proxy child caring is used in the survey. The proxy child care is defined as a person who spends more time in child caring than parents and grandparents, relatives, paid and unpaid supporter, teachers in facilities are included in the measurement.

Willingness for the second child. It is measured by PSKC as a child caring plan. The questionnaire used by Lee (2005) for the nation-wide survey research on marriage and child birth is used. Variables in this study are as follow in Table 2.

Table 2
Measurement Variables

Variable	No. of questions	Variable	No. of questions
Child variable		Characteristics	
Gender, age	2	Parent variable	10
Health status after birth	1	Age, education, income	5
Family variable		Attitude as a parent	7
Family life incidents	27	Child caring type	6
Child caring policy support variable		Child caring stress	10
Child caring support service	1	Fathers' participation in child caring	4
Willingness for the second child	1		

Data Analysis

In the study, the collected data is analyzed by SPSS and AMOS statistics program as follow;

First, the frequency and percentage are calculated to assess the socio-demographic features of the surveyed. Second, Cronbach'α is calculated for the trust level of measurement methods. Third, the co-relation of each variable is analyzed and multi-collinearity among variables is assessed. Forth, AMOS program is used to assess the structural relationship among multi variables and through Structural Equation Model, the co-relation among concepts is proven.

Results

Correlation Among Variables

The analysis on the correlation suggests the strength of relations among major variables used in all research hypothesis advance to the verification of the hypothesis and is used for verification of hypothesis so that outline variables in general (Cohen & Cohen, 1983) and it is a pre-requisite to all analysis. As a pre-stage for the verification, the Pearson correlation analysis is conducted to see the correlation among variables and the outcome is illustrated in Table 3. The analysis on the correlation shows the definition correlation as follow; gender of child (r = .233, p < .01), age (r = .309, p <.001), characteristics (r = .233, p .< .01), age of mothers (r = .346, p < .001), Education level of mothers(r = .446, p < .001), age of fathers (r = .321, p < .001), income (r = .201, p < .01), attitude as a parent (r = .332, p < .001), child caring type (r = .347, p < .001), child caring stress (r = .389, p < .001), fathers' participation in child caring (r = .453, p < .001), family life incidents (r = .364, p < .001), and child caring support service (r = .444, p < .001).

The multi-collinearity shall be considered only when the figure is over 0.8 (Hair et al., 1998), and in the study, the figure is not the level to raise the multi-collinearity issue.

Table 3
Correlation

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Child																
Gender	1															
Age	.135	1														
Health	.233**	.135**	1													
Characteristics	.364***	.100**	.102	1												
Father, mother																
Mother age	.306***	.200**	.211**	.199	1											
Mother's education level	.143	.122**	.103	.104	.111	1										
Father age	.122*	.108**	.113	.116	.120	.123	1									
Father's education level	.101***	.100**	.121	.112	.133	.124	.166	1								
Income	.132	.111**	.119	.176	.188	.198	.167	.155	1							
Attitude	.233**	.213**	.234**	.222**	.234**	.254**	.201**	.187	.175	1						
Type	.243**	.231**	.222**	.230**	.236**	.233**	.200**	.199	.187	.301***	1					
Stress	.333**	.276**	.135	.164	.245**	.245**	.222**	.188	.199	.229**	.245**	1				
Father participation	.201**	.233**	.169	.178	.299**	.109	.200**	.190	.174	.208**	.222**	.301***	1			
Family	.102	.190	.132	.133	.133	.190	.198	.193	.173	.221**	.236**	.288**	.395***	1		
Child caring	.101	.209**	.199	.176	.203**	.205**	.199	.176	.189	.200**	.298**	.229**	.399***	.353***	1	
Willingness	.233**	.309***	.198	.233**	.346***	.446**	.321***	.154	.201**	.332***	.347***	.389***	.453***	.364***	.444***	1

*p < .05. **p < .01. ***p < .001

Influence Factors for the Willingness for the Second Child in 2008

To assess the influence factors of the married women in the willingness for the second child in 2008, this study verifies each structural study model with covariance structure analysis, which explains many aspects related to model speculation and theological feasibility on the concreteness of subordinated relation and adjustment of the suggested relations, providing the theological rationality in most of aspects. It means that the analysis is a statistics method to judge the acceptance of the model so as to review the correlation of potential variables and verify the selected hypothesis. To see the unit feasibility required to verification of the general structural model, χ^2, GFI, AGFI, NFI, CFI, IFI, RMR and RMSEA are used.

Table 4
Feasibility of Structural Equation Model in 2008

Statistics	χ^2	df	χ^2/df	GFI	AGFI	NFI	CFI	IFI	RMR	RMSEA
Fitures	67.762	30	2.26	.911	.910	.912	.904	.988	.015	.026

Based on the structural equation, the model of χ^2 =67.762 (p < .001), GFI = .911, AGFI = .910, NFI = .912, CFI = .904, IFI = .988, RMR = .015, RMSEA = .026 is made. Generally Q shall be under 3, which is calculated by dividing χ^2 with (*df*) so that the model is feasible. Considering the fact that CFI free from sample features is recommended, the model feasibility of this study can be considered as acceptable since CFI is .904. RMR is .015, lower than .05 and GFI, AGFI, NFI, IFI are over .9, the feasibility criteria. It means that feasibility of the model is satisfied in this study.

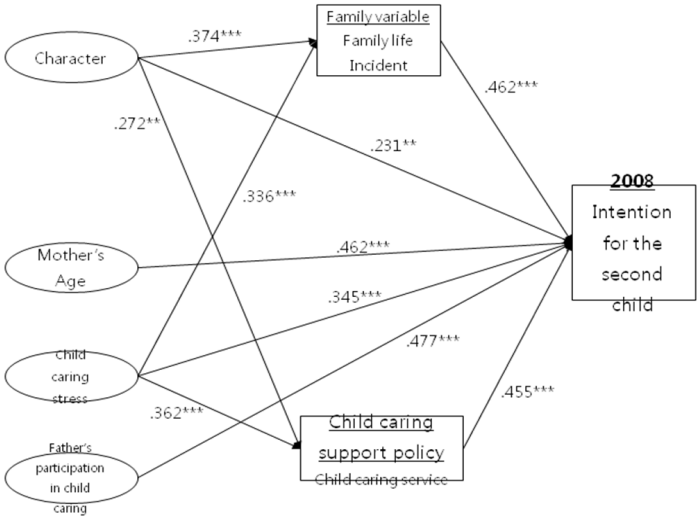


Figure 2. Willingness for the second child in 2008.
$^{**}p$ < .01. $^{***}p$ < .001.

As illustrated in the research model, the level of explanation on the endogenous variable by forecast variables (exogenous variable or other endogenous variable) can be seen through the review on SMC (Squared Multiple Correlation). SMS is corresponding to R^2 coefficient of determination in regression analysis and in this study; the second child birth willingness is illustrated as 60.2%.

The analysis outcome shows that the influence factors on the second child birth willingness in 2008 are mother age and father's child caring participation as direct influence factors and child characteristics and child caring stress impose indirect impact on family variable and child caring support policy variable so that exercise the impact on the married women's the second child birth willingness. Out of these factors, child caring participation of fathers has the highest impact. In addition, child variable and mother variable influence the family variable and child caring support policy variable service through moderating effects so that has definition impact on the second child birth willingness in 2008.

Influence Factors for the Willingness for the Second Child in 2009

Based on the structural equation, the model of χ^2 = 77.762 (p < .001), GFI = .984, AGFI = .953, NFI = .977, CFI = .986, IFI = .997, RMR = .013, RMSEA = .027 is made.

Table 5
Feasibility of Structural Equation Model in 2009

Statistics	χ^2	*df*	χ^2/df	GFI	AGFI	NFI	CFI	IFI	RMR	RMSEA
Figures	77.762	27	2.88	.984	.953	.977	.986	.997	.013	.027

Generally Q shall be under 3, which is calculated by dividing χ^2 with (*df*) so that the model is feasible. The model feasibility of this study can be considered as acceptable since CFI is .986. RMR

is .013, lower than .05 and GFI, AGFI, NFI, IFI are over .9, the feasibility criteria. RMSEA is .027 so that all criteria are satisfied. Comparing to the general evaluation criteria of covariance structure analysis, mentioned earlier, it means that feasibility of the model is satisfied in this study and the model is befitting to acceptance.

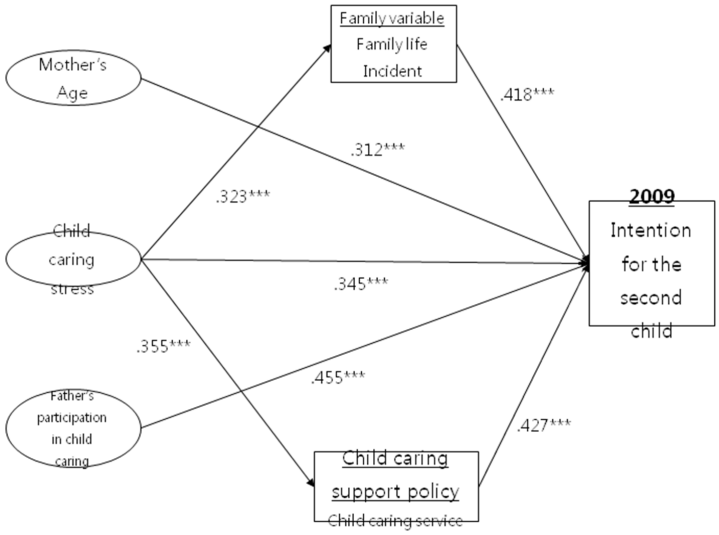


*Figure 3 T*he second child birth willingness in 2009.
$^{**}p < .01$. $^{***}p < .001$.

As illustrate in Figure 3, SMC on the study model for the second child birth willingness in 2009 is explained as 58.4%. The analysis outcome shows that the influence factors on the second child birth willingness in 2009 are mother age and father's child caring participation as direct influence factors and child characteristics and child caring stress impose indirect impact on family variable and child caring support policy variable so that exercise the impact on the married women's the second child birth willingness. Out of these factors, child caring participation of fathers has the highest impact. In addition, child variable and mother variable influence the family variable and child caring support policy variable service through moderating effects so that has definition impact on the second child birth willingness in 2009.

Impact of the Second Child Birth Willingness in 2008 on Willingness in 2009

To assess the impact of the second child birth willingness in 2008 on the second child birth willingness in 2009, the model of $\chi^2 = 82.657(p < .001)$, GFI = .903, AGFI = .900, NFI = .900, CFI = .902, IFI = .911, RMR = .027, RMSEA = .031 is made based on the structural equation.

Table 6
Feasibility of Structural Equation Model in 2008 and 2009

Statistics	χ^2	*df*	χ^2/df	GFI	AGFI	NFI	CFI	IFI	RMR	RMSEA
Figures	82.657	32	2.36	.903	.900	.900	.902	.911	.027	.031

Generally Q shall be under 3, which is calculated by dividing χ^2 with (*df*) so that the model is feasible. The model feasibility of this study can be considered as acceptable since CFI is .902. RMR is .027, and GFI, AGFI, NFI, IFI are over .9, the feasibility criteria. RMSEA is .031 so that all criteria are satisfied. Comparing to the general evaluation criteria of covariance structure analysis, mentioned earlier, it means that feasibility of the model is satisfied in this study and the model is befitting to acceptance.

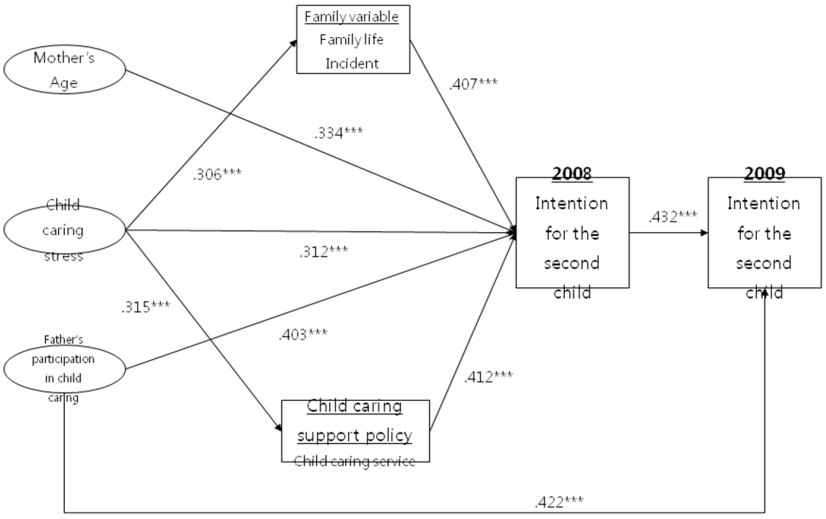


Figure 4. The second child birth willingness in 2008 and 2009.
$^{**}p < .01$. $^{***}p < .001$.

As illustrate in Figure 4, the willingness for the second child birth in 2008 and 2009 are explained as 44.5% and 59.4%, respectively. The analysis outcome shows mother age and father's child caring participation have direct impact on the willingness in 2008 so that of 2009 as well. The child caring stress of mothers imposes indirect impact on family variable and child caring support policy variable so that exercise the impact on the married women's the second child birth willingness in 2008 and riffle effect on that of 2009. Out of these factors, child caring participation of fathers has the direct impact. In addition, child variable and mother variable influence the family variable and child caring support policy variable service through moderating effects so that has definition impact on the second child birth willingness in 2008. As a result, the mothers' variable to child caring has an impact on the following child birth through family and child caring support policy variables.

Conclusion and Discussion

The objective of this study is to assess the factors for females' the second child birth willingness through the survey data of Korea children panel in 2008 and 2009 and to review the moderating effect of family variable and child caring support policy variable among others. The collected data is analyzed by SPSS and AMOS statistics program to calculate socio-demographic features and trust level of measurement methods; the co-relation of each variable is analyzed and multi-collinearity among variables is assessed; and AMOS program is used to assess the structural relationship among multi variables and through Structural Equation Model, the co-relation among concepts is proven.

The outcome by study questions is as follow:

First, the influential factors for the second child birth willingness in 2008 are mother age and father's child caring participation as direct influence factors and child characteristics and child caring stress impose indirect impact on family variable and child caring support policy variable so that exercise the impact on the married women's the second child birth willingness. Out of these factors, child caring participation of fathers has the highest impact. In addition, child variable and mother variable influence the family variable and child caring support policy variable service through moderating effects so that has definition impact on the second child birth willingness in 2008.

Second, the analysis outcome shows that the influence factors on the second child birth willingness in 2009 are mother age and father's child caring participation as direct influence factors and child characteristics and child caring stress impose indirect impact on family variable and child

caring support policy variable so that exercise the impact on the married women's the second child birth willingness. Out of these factors, child caring participation of fathers has the highest impact. In addition, child variable and mother variable influence the family variable and child caring support policy variable service through moderating effects so that has definition impact on the second child birth willingness in 2009.

Third, mother age and father's child caring participation have direct impact on the willingness in 2008 so that of 2009 as well. The child caring stress of mothers imposes indirect impact on family variable and child caring support policy variable so that exercise the impact on the married women's the second child birth willingness in 2008 and riffle effect on that of 2009. Out of these factors, child caring participation of fathers has the direct impact. In addition, child variable and mother variable influence the family variable and child caring support policy variable service through moderating effects so that has definition impact on the second child birth willingness in 2008. As a result, the mothers' variable to child caring has an impact on the following child birth through family and child caring support policy variables.

As seen, the child characteristic, mother age, child caring stress, and fathers' child caring participation are influential factors for the second child birth willingness. These influential factors have played a moderating role in family variable and child caring policy so that influence the willingness of married women for the second child birth. To enhance the willingness of married women for the second child birth, therefore, child birth willingness program should be developed in consideration of the child characteristic and mother age. The ways to reduce child caring stress and enhance fathers' child caring participation should be pursued. Substantial family program and child caring support policy should be developed by the government to enable them to play an important role in enhancing the second child birth willingness.

The limitations of this study outcome are as follow;

First, the objects of this study are limited in people with Korean nationality. Considering the expansion of multi-culture families, following studies should be made.

Second, the independent variables are categorized into child variable, father and mother variables; but among father and mother variables, the sentimental characteristics of father and mother are not considered. It means that the sense of efficiency and self-respect of father and mother are not considered as an individual variable. In the following studies, the psychological features should be considered.

Third, this study verifies only study model using child caring support service as a moderating variable out of child caring support policy. Considering various applications in their formats as for the child caring support service, however, the following studies considering the variables should be preceded.

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Relationship Between the General Characteristics/Parenthood of Working Mothers with One Child and Second Childbirth Plan

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The current study aimed to analysis the relationship between general characteristics and parenthood of working mothers with one child and their second childbirth plan. For this study, 296 subjects were selected on the national scale by provided Korea Institute of Child Care and Education (KICCE). To analyze the data, descriptive statistics (*M*, *SD*), chi-square and logistic regression were performed using SAS 9.0 program. The results were followed. First, the parenthood of working mothers with one child relatively showed higher scores than the national scores. Second, according to age of mother and father and monthly household's income, the second childbirth plan of working mothers with one child may be different. Lastly, a couple conflict, value of children and child rearing stress had an effect on second childbirth plan. Based on the results, several ways (e. g. parental education program) were discussed to improve the fertility.

In the 2000s, Korea's childbirth rate, which emerged as one of the most serious social issues, has been the lowest among OECD member countries, and the effort to solve such problem has become one of the policy tasks with the highest priority (Jung, 2010). The prerequisite to solving the problem of low birth rate is to identify and understand the causes. Actually, various views on the causes of low birth rate can be found (Ryu, 2005). First, as a change in the value of children, the view of a child changes to the concept of consumer goods of affection beyond the concept of investment goods (Lee, & Lee, 2004 in cited). Consequently, multiple-children birth had advantages in terms of the concept that views a child as investment goods. However, as the concept has changed to the concept of consumer goods as a view of child, 1-2 children are regarded as the appropriate number of children to be had (Lee, & Kim, 2009). Second, the sense of crisis with regard to Korea's unstable employment becomes a cause of the deepening low birth rate. Kim (2005) explains that the sense of crisis regarding the unstable employment of young people has delayed the formation of family represented by marriage, which functions as a factor promoting low birth rate, along with the burden of child rearing. Lastly, the establishment of infrastructure for compatibility between work and home of married women leaves a lot to be desired (Yeom, & Kim, 2011). Although social and national efforts are made including child care service expansion, activation of leave for child rearing, and support for married women's re-employment after childbirth, these are still highly difficult tasks.

The causes of low birth rate are the hindering factors of high birth rate; hence the considerable difficulty in improving the low birth rate without removing or weakening such causes. Thus, studies in various fields are actively carried out to solve such problems. There are various studies related to low birth rate: analyses of the low birth rate policy (Kim, 2008; Ryu, 2005; Lee, Park, & Kim, 2007; Lee, Cho, Lee, & Yu, 2005; Jang, 2009), studies that analyzed the relationship between Korean society's features and childbirth behaviors (Kim, Choi, & Oh, 2008; Yeom, & Kim, 2011; Jung, 2010; Cha, 2008; Matysiak, 2009), and studies that analyzed women's childbirth decision motives for multiple-children birth (Kim, Cho, & Oh, 2008; Shin, Choi, Kim, 2009; Shin & Bang, 2009; Lee, 2010; Lee, 2009; Cha, 2008; Han & Park, 2006). The findings of these studies can be summarized as follows.

First, the practice of a low birth rate policy that suits the reality is required. According to the previous studies, people regard some policies are useless due to its practical aspects. Second, there is a need to devise support ways for a couple to become the home economy's axes beyond the men-centered economic structure to solve household economic problems such as employment stability (Shin, Choi, & Kim, 2009). Third, these studies propose the need for practical aspects. Also,

work-home compatibility support policy should be established to urge childbirth rate. The other is that policies should create to consider people's needs. It means that policies can be applied for people according to their age, occupation group, and socioeconomic characteristics (Jung, 2010; Han & Park, 2006; Lee & Kim, 2009; Yeom & Kim, 2011; Yoo, 2007). Lastly, these studies emphasize the need for childbirth-related education/training in the kindergarten, elementary, and middle school curricula to raise the motivation of women's childbirth decision (Cha, 2008).

The stated above such studies on low birth rate identify the causes of Korea's low birth rate and present a direction in seeking various ways to improve the low birth rate. Nonetheless, most studies except a small number of studies are conducted from the socioeconomic background and gender equality perspectives, targeting unmarried and married women for policy assessment. Actually, there are few studies that have directly and specifically analyzed parenthood and childbirth relationship, including parents' role, parents' child rearing perception, attitude, and reality, and couple's satisfaction with marriage. The analysis of parenthood and childbirth relationship is important because what is needed to improve actual birth rate, i.e., the need for children in women's lives, such as values regarding children, joy and sense of achievements as parents, can serve as a variable that strongly affects second childbirth directly as much as economic support or public and private service support. Han and Park (2006) emphasized the need for parental education on parenthood before marriage to raise the birth rate.

The meaning of parenthood changes according to the change of perception with regard to marriage behaviors and family structure in modern times, unlike in the past when the biological and normative aspects of childbirth were emphasized (Cho, 2007). Parenthood has both personal and social aspects (Kim, 2006). The personal sense of parenthood is that a child is the person who establishes the physical and emotional identities of parents. Cho (2006) explained the personal meaning as follows: The basic need to become parents is achieved, psychological stability can be acquired to have children, and responsibility can be maintained, e.g., being parents can naturally carry on the family line, and has proved them to be healthy adults. Furthermore, they want to fulfill their dreams through their children. Otherwise, Veevers (1973) explained the social sense of parenthood that a child can enhance a couple's relationship and prevent divorce along with obligation performance as a citizen recruiting social members (Cho, 2007 in cited). In social aspects, parenthood helps adults contribute to healthy societies when they make new generations by having children. Such parenthood is forecast to have very close relevance with childbirth as viewed from the result of parents' values regarding children and marriage having close correlation with childbirth behaviors. Consequently, to analyze the relationship between the characteristics of parenthood and second childbirth behaviors may have a great meaning to understand the cause of low fertility and to solve it.

Meanwhile, it is very important to persuade working mothers with one child to have second child to improve fertility. Thus it is necessary to recognize the reasons why working mothers with one child hesitate to make a decision to have more children. A study by Yu and Jung (2002) and some relevant studies insist that the concept of selection on the first childbirth is hardly reflected in general, but that when parents plan a second childbirth, various causes including the parents' age, marriage age, educational level, economic situation, and values related to children are considered (Cha, 2008; J. Lee, 2009; Lee, 2010; Shin, Choi, & Kim, 2009). In particular, without useful supporting system and the change of perception of child and marriage, it is very hard to encourage for working mothers to plan more children because most mothers want to maintain their occupation in these days. In this sense, creating policies to support working mothers' second childbirth plan is very important. Above all, policy makers should consider the importance of compatibility with work and home without any prejudices and inequality if they want to urge working mothers with one child in additionally having children. In this light, Lee et al. (2009) and some other studies have explained the importance of parenthood including values regarding children of working mothers with one child (Han, & Park, 2006). Therefore, it is expectable that to analyze the relationship between parenthood and second childbirth plan of working mothers with one child s bring very meaningful results.

Consequently, this study aims to analyze the relationship between personal characteristics and parenthood's characteristics and second childbirth plan based on the social survey results on a national scale in order to make useful suggestions for improving fertility. The results of this study may be employed as an efficient data to seek actual and practical supporting ways and policies for working mothers' second childbirth plan.

The following are the research problems in achieving the purpose of this study:

1. How is the trend of parenthood of working mothers with one child (mother's satisfaction with marriage, couple's conflict, husband's participation in child rearing, expectation regarding child, social support, child rearing style, child rearing knowledge and stress, self-efficiency, self-respect, depression)?
2. How is the relationship between the general characteristics of working mothers with one child and their second childbirth plan?
3. How is the relationship between the parenthood of working mothers with one child and second childbirth plan?

Method

Subject

This study selected the subjects based on the second-year (2009) data of Panel Study on Korean Children (PSKC) for longitudinal study by the Korea Institute of Child Care and Education (KICCE). This study targeted 296 working mothers with one child among the panel survey subjects to achieve the study's purpose. Child's age, monthly average household income (aggregate), parents' age & education, and father's occupation (based on large-scale category) were presented for the general characteristics of subjects. Concerning the mother's occupation, only 24 (8.1%) out of 296 working mothers with one child responded to the large-scale category, medium-scale category, and small-scale category; 272 (91.9%) do not respond or gave missing values, which were not demonstrated in the following table, and it did not use as a research variable. From the general characteristics of the subjects, 4 in the monthly average household aggregate income, 13 in the father's age, 2 in the mother's education, 8 in the father's education and 26 in the father's occupation did not respond. The general characteristics of the subjects are presented in Table 1.

Table 1
The General Characteristics of Subject (N = 296)

Categories	f (%)	Categories	f (%)
Mother's ages		Father's ages	
25 or below	9 (3.04)	30 or below	64 (22.61)
26~30	132 (44.59)	31~35	164 (57.95)
31~35	134 (45.27)	36~40	49 (17.31)
36 or over	21 (7.07)	41 or over	6 (2.12)
Mother's academic level		Child's gender	
High school or below	45 (15.31)	Boy	148 (50.00)
2~3 years college	73 (24.33)	Girl	148 (50.00)
University	148 (50.34)	Father's occupation	
Graduate school (M.A or over)	28 (9.52)	Management worker	17 (6.30)
Monthly family average income (1,000won)		Professional work	74 (27.41)
100 or Below	2 (0.68)	Office worker	90 (33.33)
101~ 200	25 (8.56)	Service/sales workers	39 (14.45)
201~300	52 (17.81)	Engineers	30 (11.11)
301~ 400	84 (28.77)	Technicians	14 (5.19)
401~ 500	76 (26.03)	The others (physical labor, etc)	6 (2.22)
501 or over	53 (18.15)		

Research Methods

The measuring tools for this study consist of two types. One is selection-type questions on the general background and the second childbirth plan of working mothers with one child. The other is a rating scale that measures the characteristics of parenthood. A description of the specific measuring tools is presented in Table 2.

Table 2
The Research Methods of Parenthood

Variable	Source	Question
A Couple relation		
Marriage satisfaction	· Chung (2004) RKMSS (Revised-Kansas Marital Satisfaction Scale)	4
Husband in child rearing	· Kang (1998), Hong (1995)	8
A Couple conflict	· Markman et al. (2001) couple's conflict scale, Hyun (2004) couple's conflict modified scale	4
Expectation for children		
Emotional value Instrumental value	· Lee et al. (2005)	7
Hope for the future	· NWEC (National Women's Education Center of Japan, 2007)	6
Social supports		
Emotion support Tools support Leisure support Information support	· Lee & Ok (2001), Jung (1998)	12
Child rearing		
Child rearing style	· Bornstein et al. (1996) PSQ(The Parental Style Questionnaire)	6
Child rearing knowledge	· MacPhee (2002) Child Rearing Knowledge Scale	13
Child rearing stress	· Kim & Kang (1997) 'Korean Child Rearing Stress Scale', 'Distress & Responsibility about Parenting Role'	10
Mothers'emotional ability		
Self-efficiency	· Mainieri(2006) 'Pearlin Self-Efficacy Scale'	4
Self-esteem	· Rosenberg(1989) 'Rogenberg Self-Esteem Scale'	10
Self-depression	· Kessler(2002)'s 'K6'	6

Data Analysis

To achieve the purpose of this study, data analysis was carried out for each research problems. To identify the trend of parenthood of working mothers with one child, the averages and standard deviations were analyzed. The chi square test was also conducted to determine the relationship between the general characteristics and second childbirth plan of working mothers with one child. Lastly, to analyze the relationship between parenthood and second childbirth of working mothers with one child, logistic regression analysis was performed. Meanwhile, for the general characteristics of the study's subjects, frequency and percentage were calculated. For data analysis, the SAS 9.2 program was used.

Findings

Trend in the Characteristics of Parenthood of Working Mothers with One Child

The results of the analysis are presented in Table 3.

Table 3
The Trends of Parenthood of Working Mothers with One Child

Categories	*n*	*M*	*SD*
A couple relationship			
Marriage satisfaction	289	15.7	3.2
A couple conflicts	285	15.9	6.0
Husband in child rearing	291	15.2	3.6
Expectation for children			
Emotional value	294	13.0	1.6
Instrumental value	295	11.3	3.0
Hope for the future	294	11.2	2.3
Social supports			
Emotional support	294	7.8	1.6
Instrumental support	292	12	2.2
Leisure support	294	15.9	2.7
Information support	293	11.7	2.2
Child rearing			
Child rearing style	294	23.4	3.0
Child rearing knowledge	290	12.2	2.6
Child rearing stress	294	25.9	6.3
Mothers' emotional ability			
Self-efficacy	294	8.7	2.6
Self-esteem	292	31.1	3.9
Self-depression	294	10.8	4.0

Note. The lower the self-efficiency scores, the higher the self efficiency.

Satisfaction with marriage of working mothers with one child stood at 15.7 points, couple's conflict was 15.9, and husband's participation in child rearing was 15.2. In view of a 5-point scale, these were all considered high. Compared with the mothers' averages (15.5 for satisfaction with marriage, 16.19 for couple's conflict, 14.56 for participation in child rearing) targeting all subjects in PSKC, satisfaction with marriage of working mothers with one child and husband's participation in child rearing were high, but couple's conflict was lower.

Although the child's emotional value considered by working mothers with one child was high at 13.0, the value of tools was 11.3, which was low in view of a 4-point scale. Through these findings, working mothers with one child perceived emotional value regarding a child to be higher than the value of tools. Future expectation regarding children was pegged at 11.2, which was low in view of a 4-point scale. Since a lower score for this item means stronger desire, the expectation regarding children of working mothers with one child was considered to be high. Looking into the emotion, tools, leisure, and information support that can be received from social relations except family, scores were high in view of a 5-point scale.

Considering the child rearing system and child rearing stress among the child rearing items based on a 5-point scale, working mothers with one child have positive child rearing style and low child rearing stress. In view of the average child rearing style and stress of the mothers who participated in PSKC (2009, Basic Statistical Report) pegged at 23.38 points and 27.31 points, respectively, there was no difference in child rearing style, but working mothers with one child experience less child rearing stress. For child rearing knowledge, they have high child rearing knowledge with 12.2 points out of full marks of 13 points.

The self-efficiency of working mothers with one child was 8.7 points, which was low in view of a 5-point scale. Compared to the average score of 9.24 (2009, Basic Statistical Report) of all mothers who participated in PSKC, working mothers with one child had more positive self-efficiency. Based

on a 5-point scale, self-respect was 31.1 points, which was a high score and even higher than all mothers' average of 25.22 points (2009, Basic Statistical Report). The point of depression with a 5-point scale was very low in the case of working mothers with one child. Compared to the average of all mothers who participated in PSKC (11.53 points), the depression was weak, belonging to the normal range (6-13 points).

Relationship Between the General Characteristics of Working Mothers with One Child and Second Childbirth Plan

The results of examining the relationship between the mother's age and education, husband's age, education and occupation, monthly average household income and child's gender – which was presented as general characteristics of working mothers with one child and second childbirth plan - are presented in Table 4.

Table 4
The Relationship Between the General Characteristics and Second Childbirth Plan in Working Mothers with One Child

	Yes	No	Not sure	N/A	Total
Father's ages (N = 280)					
30 or below	49 (77.8)	6 (9.5)	8 (12.7)	-	63 (100)
31~35	92 (56.8)	37 (22.8)	33 (20.4)	-	162 (100)
36~40	24 (49.0)	14 (28.6)	11 (22.4)	-	49 (100)
41 or over	3 (50.0)	1 (16.7)	2 (33.3)	-	6 (100)
Total	168	58	54	-	280
$\chi^2_{(6)}$			12.74*		
Mother's ages (N = 293)					
25 or below	7 (77.8)	0 (0.0)	2 (22.2)	0 (0.0)	9 (100)
26~30	96 (74.4)	15 (11.6)	18 (14.0)	1 (0.8)	129 (100)
31~35	68 (51.5)	33 (25.0)	31 (23.5)	1 (0.8)	132 (100)
36 or over	5 (23.8)	11 (52.4)	5 (23.8)	0 (0.0)	21 (100)
Total	176 (60.5)	59 (20.3)	56 (19.2)	2 (0.7)	291
$\chi^2_{(9)}$			33.44***		
Monthly family average income (N = 293) (1,000won)					
~ 100 or below	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	2 (100)
101 ~ 200	18 (75.0)	2 (8.3)	3 (12.5)	1 (4.2)	24 (100)
201 ~ 300	31 (60.8)	8 (15.7)	12 (23.5)	0 (0.0)	51 (100)
301 ~ 400	48 (57.8)	21 (25.3)	14 (16.9)	0 (0.0)	83 (100)
401~ 500	16 (50.0)	8 (25.0)	8 (25.0)	0 (0.0)	32 (100)
501 or over	63 (62.4)	19 (18.8)	19 (18.8)	0 (0.0)	101 (100)
Total	176	59	56	2	291
$\chi^2_{(15)}$			87.02***		

* $p < .05$. *** $p < .001$.

The variables related to the second childbirth plan among the general characteristics of working mothers with one child were the mother's age and monthly average income. The mother's second childbirth plan showed a difference depending on the spouse's age [(6) = 12.74, $p < 0.05$)]. In other words, the ratio planning to have a second child (60%) in all age groups was higher than the ratio not planning to have a second child (20.7%). In case the spouse's age was 30 or younger, 77.8% had a second childbirth plan; only 9.5% said they had no second childbirth plan. In case the spouse's age was 31 or older, about 50% said they had a second childbirth plan (56.8%, 49%, 50%); thus demonstrating positive thinking on the second childbirth plan. With older spouse's age, however, conviction regarding the plan gradually declined. In other words, the ratio of "don't know" (12.7%

→ 33.3%) responses grew much higher as the spouse got older than the ratio not planning to have a second child (9.5% → 16.7%).

The mother's second childbirth plan has statistically significant difference according to the mother's age [(9) = 33.44, $p < 0.001$)]. When the ages of working mothers with one child were 25 or younger (77.8%), 26-30 (74.4%) and 31-35 (51.5%), the second childbirth plan was over 50%. Therefore, the ratio planning to have a second child was higher than the ratio not planning to have one. Meanwhile, when working mothers with one child were over 36 years, the ratio not planning to have a second child (52.45) was more than double the ratio planning to have a second child (23.8%). With older age, the conviction regarding the status of a second childbirth plan was stronger. In other words, as the working mothers with one child got older than 26 years, the ratio planning to have a second child fell by 20% (74.4% → 51.5% → 23.8%). Meanwhile, the ratio not planning to have a second child doubled (11.6% → 25.0% → 52.4%). The second childbirth plan diminished with older age.

The second childbirth plan according to the average household income of working mothers with one child showed statistically significant difference ((15) = 87.02, $p < 0.001$). The ratio planning to have a second child was higher than the ratio not planning to have a second child, except for the group with income level of 1 million or less. Looking at the income level, the group with income of 1 - 2 million won was larger in the ratio planning to have a second child at 75.0% compared to other income level groups. In the case of the group with income of 2 million won or higher, the ratio planning to have a second child fell (75.0% → 50.0%), but only the households with income of 5.01 million won or higher showed a 62.4% increase. In the case of two groups with income of 1.01 million – 3 million won, the ratio of “don’t know” was higher than the ratio not planning to have a second child. Meanwhile, in other income level groups, the group with conviction not to have the second child was higher than or equal to the group that said "don't know."

On the other hand, the education and occupation of working mothers with one child and husbands and child's gender did not show significant difference in terms of the second childbirth plan.

Relationship Between the Parenthood of Working Mothers with One Child and Second Childbirth Plan

To analyze the relationship between the parenthood of working mothers with one child and second childbirth plan, this study performed logistic analysis. The binary logistic analysis considered only 1 = plan not to have a second child, 2 = plan to have a second child. This was because it was valid to explain the impacts and increase rate of the variable of parenthood only in the case of clearly expressing intention of a second childbirth plan. For the explanation variables, variables related to the second childbirth plan were verified by setting models 1 ~ 6 considering the variables in each field as presented in Table 5.

Concretely, Model 1 is the model explaining the relationship between a couple’s relationship and a second childbirth plan. With greater couple’s conflict, a second child was wanted less ($p < .05$). Model 2 is the model describing the relationship between the expectation regarding a child and a second childbirth plan. When the child’s emotional value was lower ($p < .05$), and the child’s value of tools was lower ($p < .001$), a second child was not wanted. Model 3 is the model describing the relationship between social support and second childbirth plan. As a result of the analysis, social support and second childbirth plan had no relevance. Model 4 is the model explaining the relationship between the child rearing variables and a second childbirth plan. If child rearing stress was higher, a second child was not wanted. Model 5 is the model describing the relationship between the mother-related variables and a second childbirth plan, and they did not show statistically significant results. Model 6 is the model selecting the optimal explanation variable as a step-by-step selection method after inputting all explanation variables. As an analysis result, as the couple’s conflict was higher ($p < .01$), and the value of tools was lower ($p < .001$), no second childbirth plan was indicated.

Tables 5
The Relationship Between Parenthood and Second Childbirth Plan

Model	Estimate	Standard error	Odds Ratio Estimates (point estimate)	95% Wald Confidence Limits		-2 Log L	Wald Chi-square
Model 1							
constant	-2.0135	1.4188	-	-	-		
Marriage satisfaction	-0.049	0.063	-	-	-		
A couple conflict	0.0774*	0.032	1.08	1.015	1.15	239.22	12.1**
Husband in child rearing	0.027	0.0485	-	-	-		
Model 2							
constant	4.21	1.66	-	-	-		
Emotional value (child)	-0.2553*	0.141	0.775	0.631	0.951		
Instrumental value (child)	-0.2114***	0.0631	0.809	0.715	0.916	231.76	25.89
Hope for the future (child)	0.0258	0.073	-	-	-		
Model 3							
constant	0.9102	0.9607	-	-	-		
Emotional support	-0.169	0.1397	-	-	-		
Information support	-0.0247	0.1071	-	-	-	256.684	6.13
Leisure support	-0.0787	0.0919	-	-	-		
Instrumental support	0.0685	0.1173	-	-	-		
Model 4							
constant	-4.2275	1.975	-	-	-		
Child rearing style	0.0647	0.0586	-	-	-		
Child rearing knowledge	-0.0106	0.0613	-	-	-	249.666	6.06
Child rearing stress	0.0648*	0.0263	1.067	1.013	1.123		
Model 5							
constant	-6.5109	2.4252	-	-	-		
Self-efficacy	0.1036	0.0744	-	-	-		
Self-esteem	0.1304	0.0808	-	-	-	246.316	11.03*
Self-depression	0.0726	0.0451	-	-	-		
Model 6							
constant	0.333	0.8334	-	-	-		
A couple conflict	0.0868**	0.0289	1.091	1.031	1.154	199.01	25.23***
Instrumental value (child)	-0.2719***	0.0647	0.762	0.671	0.865		

* $p < .05$. ** $p < .01$. *** $p < .001$.

In the logistic regression analysis, the change extent of dependent variables according to the change in one unit of independent variable should be examined. In the couple's relationship field of Model 1, as 1 unit of couple's conflict rose, the probability of not having a second child rose 8%. For the expectation regarding a child of Model 2, as the child's emotional value declined 1 unit, the probability of not having a second child rose 23%. Likewise, as the child' value of tools fell 1 unit, the probability of not having a second child ascended 10%. In the child rearing variable field of Model 4, as the child rearing stress rose 1 unit, the probability of not having a second child increased 7%. In Model 6 to which variables in the subfields were inputted on a step by step basis, as the mother's stress rose 1 unit, the probability of not having a second child rose 9%; as a mother's tool value regarding a child fell 1 unit, the probability of not having a second child declined 23%.

Discussions and Conclusions

This study examined the relationship between the general characteristics of working mothers with one child and a second childbirth plan and between the parenthood of working mothers with one child and a second childbirth plan. And also it analyzed the relationship between the characteristics

of working mothers with one child and a second childbirth plan. The findings of this study can be summarized as follows:

First, compared to the entire panel survey, the satisfaction with marriage of working mothers with one child was higher, the couple's conflict was lower, and the husband's participation in child rearing was higher. The child rearing knowledge of the working mothers with one child was extensive; child rearing stress was relatively less, and they were bringing up children with positive child rearing style. These mothers had positive self-efficiency and self-respect, their depression level was normal, and higher social support that could be received from social relationship was being given to them. Their expectation regarding a child's future was higher, and they perceived a child's emotional value to be higher than the child's value of tools.

Second, there were significant differences in the age of those mothers and husbands and a second childbirth plan. Although the ratio planning to have a second child was higher than the ratio not planning to have a second child regardless of the spouse's age, as the spouse got older, the ratio planning to have a second child gradually declined in view of only the ratio planning to have a second child. Meanwhile, in the case of the mother's age, as the mother got older, the ratio of considering a second childbirth sharply decreased. In the case of 36 or older, the ratio not planning to have a second child was more than double the ratio planning to have a second child. Looking into the relationship between the monthly average household income and a second childbirth plan, the groups planned to have a second child, except for the group with income of 1 million won or less. The group with income of 1– 2 million won recorded the highest ratio. The ratio of groups with conviction not to have a second child was higher or equal to the ratio of the groups replying, "don't know," except for the two groups with income of 1.01-2 million won and 2.01-3 million.

Third, in the relationship between the parenthood of the mothers with one child and a second childbirth plan, as the couple's conflict and child rearing stress increased, the more they did not want a second child. Likewise, with lower expectation regarding a child, the more a second child was not wanted. Looking into the impacts, when the child's emotional value diminished, the probability of not planning to have a second child rose 23%; when the child's value of tools was lower, the probability of not planning to have a second child increased 10%. When the mother's stress rose, the probability of not planning to have a second child went up 9%. When the couple's conflict was higher, the probability of planning not to have a second child rose about 8%.

Based on the findings of this study, the following findings were drawn. First, in the case of working mothers with one child, considering the trend of parenthood variables and variables affecting a second childbirth plan, the result was similar to that of previous studies including the study by J. Lee (2009) and Han & Park (2006), which stressed that the value of a child strongly affected the second childbirth plan. From the findings, to induce and stimulate the second childbirth of working mothers with one child, it is necessary to create ways to support for them to recognize values regarding child and marriage positively. As for the results, the economic situation plays an important factor for a working mother with one child to decide having second childbirth plan. However, the most important and core determinant is the value of child. When they have positive emotions or attitudes for values regarding a child through continuous experiences in life via the sense of a child being valuable, joy acquired from a child, practice of love, and ties with child, they may decide to have second childbirth plan despite their economic situation. To do so, parent support programs may be developed to include knowledge, skill and attitudes regarding the establishment positive parenthood. These programs may be constructed of the ways of parent-child relationship and role playing and conversation technique with a child as parents. Moreover, some ways need to be devised to support couple's roles when they participate in child rearing. Fulfilling the role of both parents as primary persons responsible for child rearing requires minimizing the couple's conflict through child rearing programs for both mothers and fathers and child rearing system. To do so, child rearing education and policy programs need to be devised in the direction for couples rather than for women only.

Secondly, the findings in this study support the suggestions of previous studies including the

study of Shin et al (2009) stating the need for continuous education on the values of marriage and family. These studies cited the parents' age as an important decision factor for a second childbirth plan. To delay marriage at any reasons plays a crucial factor in having second childbirth plan. For the second childbirth to be carried out naturally, supporting compatibility between work and home for women and resolving men's employment instability and formation of positive values according to marriage and family formation are necessary. For compatibility between work and home, support for maternity leave, child rearing allowances, reduction of working hours, and installation of breastfeeding room and childcare room should be established as a natural and routine system. Thus, socioeconomic and family climate shift is needed for women to access and use the system regardless of the surrounding environment. Next is resolving men's employment instability. The Full-time employment rate for men's stable economic activities has been on the decline considering Korea's economic situation since the IMF financial crisis (Shin et al, 2009). To solve this problem, policy measures should be established for occupational training consolidation reflecting men's social and occupational life cycle. The successful practice of these efforts is expected to contribute naturally to resolving negative perception by marriage and resulting family formation. It is very an important thing for men because their economic ability is the main reason to hesitate marriage and family.

Third, policy suggestion to operate the household economy stably is necessary. The findings in this study match the results of previous studies including those of Cha (2009) and Han & Park (2006), which claimed that the household's economic level affected the second childbirth plan. The expansion of services at the public level to ease the burden of the household economy through the child care service and child rearing allowances system is a matter of urgency. Moreover, the men-centered household economy should shift to couple-centered household economy. To do so, the expansion of men-usable child care service measures and education on gender equality or integrated perspective education wherein the responsible people in the household economy and child care and education are both men and women should be implemented (Kim, 2008).

Concerning the second childbirth plan of working mothers with one child, Korea can get out of the low birth rate crisis faster if a shift in perspective at the personal level is realized in addition to national policy planning. In this study, the characteristics of working mothers with one child were discussed in relation to the need for policy support from the socioeconomic aspect. Parenthood has emphasized the importance of efforts to have a positive attitude on being parents and values regarding a child on a personal dimension. According to Cha (2009) and J. Lee (2009), the factors in deciding to have a second child are the emotional fruition and joy felt after being parents by working mothers with one child, although the economic aspect may become an important hindering factor in having additional children. Consequently, the positive value education effect of parenthood and policy preparation for socioeconomic support as core factors in solving the low birth rate problem should not be overlooked, and education on parental values needs to be conducted continuously.

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Factors that Affect Additional Childbirth Plan for Households Having One-Year Old Child: Based on the Second-Year Data of PSKC

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This study is designed to examine what factors affect subsequent childbirth plan of households having one-year old child based on the data of the second-year Panel Study on Korean Children (PSKC) in 2009. The primary concern is to study the relationship of such independent variables as child values, household economy, mothers' psychological characteristics, and child support policy, with additional childbirth plans as dependent variable. To that end, $\chi 2$ and logistic regression analyses were conducted. The results of this study revealed that birth order causes significant differences in additional birth plans, while the gender of child has no effect on future birth plans. With regard to household economy, mid-to-high income households are found to be less likely to have subsequent birth plans compared to low-income families. In addition, birth order, child values and marital conflict can also be discussed as factors that affect subsequent birth plans.

It is reported that the birth rate in Korea, which is the average number of births by a woman of childbearing age, stands at 1.22, a level lower than the average rate of births in OECD member countries (1.74) (Statistics Korea, 2010). According to Samsung Economic Research Institute (2005), a wide range of factors that relate to the low birth rate can be divided into four main categories: (1) income factor, such as the change of women's role in economic activity; (2) child factor, such as the increasing cost of childcare and education; (3) value factor, such as self-satisfaction and less dependence on children; and (4) social factor, such as women's status at work and at home.

Per the country's survey on marriage and childbirth (2009), working moms show the average number of births at 1.55, a level lower than that of non-working moms (1.72), indicating that differences arise in the average number of births depending on the status of married women's participation in economic activities. In response to the question of whether to have further birth plans, working mom groups show a higher rate of positive responses than non-working moms, regardless of the current number of children (Lee et al., 2009). According to Gong (2006), married women are seen to desire to have more children if they are employed and the monthly income of their spouse is high. In relation to this, Galor & Weil (1996) pointed out that the increase in income of working moms contributes more to the increase in opportunity cost for childrearing rather than wealth effect. In other words, increasing participation of married women in economic activities can be said to cause the difficulty in maintaining balance between work and family and the increase in child rearing cost, thus resulting in the low birth rate.

In terms of childcare cost, Seo (2010) claimed that the ratio of child rearing cost to ordinary household income stands at 25% for one child, 36% for two, and 52% for three, while the ratio of child rearing cost to actual consumption spending reaches up to 40%, 56%, and 69%, respectively. Given this, therefore, it would be necessary to clarify the relationship between the birth rate and economic factors like child care and education costs. However, psychological burden can also be said to serve as another main cause of the current low birth rate. In this respect, Yoon (2010) asserted that the decision of birth plan is affected not by the gender of child, but by child values, on which married women place great emphasis for their personal life. That is, child values have changed from a way to preserve a species to a matter of personal choices for the joy of parenthood, indicating birth plans are increasingly affected by personal reasons. Further, some studies show that gender role conflict in married couples serves as a contributing factor in the decrease in childbirth. Also, the

conflict can cause married women to cease to work due to the burden of child rearing, further deteriorating the relationship between married men and women and decreasing marital satisfaction for non-working moms (Ma, 2008; McDonald, 2000). Other factors that affect the low birth rate are: (1) intentional prevention of pregnancy by birth control; and (2) infertility and miscarriage, due to which women can no longer get pregnant.

At a time when the low birth rate is increasingly becoming the most serious problem, we are urgently needed to explore the ways to resolve the problem and help policymakers establish and further improve institutional schemes to overcome the current low birth rate. In this regard, the second-year PSKC conducted by KICCE in 2009 is used to examine the association between subsequent birth plans and related factors, such as household economy, the characteristics of married couples, and child care policy.

The research questions of the present study were as following:

1. What do households with one-year old child say about their subsequent birth plan?
2. What are the variables that can affect their additional childbirth plan?

Method

In this study, there are 1,904 households having one-year child, all of which also participated in the PSKC in 2009 (see Table 1). As shown in the table, the number of working and non-working moms stands at 600 and 1,287, respectively.

In view of demographic variables, the average age of children surveyed is 14 months, they are divided into 942 females and 962 males by gender, and among them, 887 are the first in birth order, while 1,017 are the second or more. As for household economy, the average monthly household income is shown to be 4.17million won, and total household spending is 2.78 million won, of which total household consumption expenditure reaches 1.9million won, while total consumption spending on children posts 390,000 won.

In this study, the dependent variable is subsequent birth plan, as to which 658 households out of 1,904 respond positively, with 1,018 on the negative side and 228 undecided. Among independent variables, marital satisfaction, marital conflict, and spousal support of child care are examined. In addition, child values are divided into two: emotional and instrumental. In view of childcare policy, there are maternal leave (18.0), childcare support (9.3), maternity protection (8.9), and flexible working environment (8.6).

Table 1
Descriptive Statistics (N = 1904)

Variable	*f* (%)	*M (SD)*	Medium	Min	Max
Additional childbirth plan					
Plan (or pregnant)	658(34.6)	-	-	-	-
No plan	1018(53.5)	-	-	-	-
No responses	228(12.0)	-	-	-	-
Gender of child					
Boys	62(50.5)	-	-	-	-
Girls	942(49.5)	-	-	-	-
Birth order of child					
First	887(46.6)	-	-	-	-
Second	1017(53.4)	-	-	-	-
Mother's employment					
Working	600	32.23(3.48)	-	210	43.0
Not working	1287	32.13(3.79)	-	200	47.0
Marital satisfaction	-	15.5(3.14)	-	4.0	20.0
Marital conflict	-	16.2(6.10)	-	8.0	39.0
Spousal support of child care	-	14.6(3.52)	-	4.0	20.0

Table 1
Descriptive Statistics (N = 1904) (continued)

Variable	*f* (%)	*M (SD)*	Medium	Min	Max
Values on child	-	24.6(4.13)	-	7.0	35.0
Emotional values	-	12.9(1.75)	-	3.0	15.0
Instrumental values	-	11.7(3.09)	-	4.0	20.0
Average monthly income	-	417.0(624.91)	300.0	50	900
Total household spending	-	278.4(287.54)	235.0	44	4200
Total household consumption expenditure	-	190.7(224.60)	150.0	20	3600
Total consumption spending on children	-	39.2(74.43)	25.0	2	1800
Maternal leaves	-	18.0(2.84)	-	4.0	20.0
Child care support	-	9.3(1.46)	-	2.0	10.0
Maternity protection	-	8.9(1.63)	-	2.0	10.0
Flexible working environment	-	8.6(1.73)	-	2.0	10.0

Analytic Approach

This study examines the normal characteristics of those surveyed, helped by frequency, percentage, mean, standard deviation, maximum, minimum and the median under SPSS 18.0 Window Program. And then, χ^2 tests were conducted to measure the correlation between dependent variable, subsequent birth plan, and independent variables, such as child values, household economy, the characteristics of married couples, and child care policy. Lastly, logistic regression analyses were also conducted to examine the impact of independent variables on the dependent variable.

Results

Additional Child Birth Plan

The difference of additional child birth plan according to child characteristics. To investigate differences in additional child birth plan depending on the gender and birth order of one-year old child, χ^2 tests were conducted, producing no statistically significant results χ^2 (df = 1) = .02. (see Table 2) In terms of birth order, there are statistically significant differences χ^2 (df = 1) = 686.93. (p < .001). In other words, among groups with one child, 552 (74.3%) are surveyed to have additional childbirth plan (or pregnant), while 191 (25.7%) are found to be negative in response to the question whether to have further birth plan. In case of households with two or more children, however, there were more negative answers at 827 (88.6%) than positive answers at 106 (11.4%) in response to subsequent birth plans.

Table 2
Additional Childbirth Plan According to Child Characteristics

	Plan (or pregnant)	No plan	Total	χ^2 (df = 1)
Gender				
Boy	334(39.1)	520(60.9)	854(100.0)	0.02
Girl	324(39.4)	498(60.6)	822(100.0)	
Total	658(39.3)	1018(60.7)	1676(100.0)	
Birth order				
First	552(74.3)	191(25.7)	743(100.0)	686.93***
More than second	106(11.4)	827(88.6)	933(100.0)	
Total	658(39.3)	1018(60.7)	1676(100.0)	

***p < .001.

The differences of additional child birth plan according to household variables. As indicated in the table, the results of χ^2 test revealed that subsequent birth plans show statistically significant differences in accordance with average monthly income (χ^2 $(df = 2)$ = 8.98,), average monthly spending (χ^2 = 23.36, df = 2) and total spending on child (χ^2 $(df = 2)$ = 36.66). In regards to the status of employment in moms, however, there were no statistically significant differences. (Table 3)

Based on the level of the country's average household income for 2009, household income groups are divided into high, medium, and low. The low income group, for example, consists of households with their average monthly income at 1.59million won or less. Among groups with medium to high average household income per month, there were less respondents with an additional birth plan (or pregnant) than those with no plans. In other words, more respondents are found to have no further plans in a medium or higher level of monthly average household income.

To study the correlation of total household spending and subsequent birth plans, respondents are divided into three groups - high, medium, and low - based on average household spending during the second and third quarters of 2009. Among medium or higher level of household spending groups, more respondents are surveyed to have no birth plans, while no differences are found to occur as to subsequent birth plans in a low level of household spending group.

With regard to the level of consumption spending on children, the response rate of no birth plans is found to be higher among groups with a medium or higher level of consumption spending on children. Thus, it is shown that more respondents are less likely to have further birth plans if they tend to show a higher level of consumption spending on children.

Table 3
Additional Childbirth Plan According to Households Economy

Variable	Plan (or pregnant)	No plan	Total	χ^2
Employment of mothers				
Employment/studying	207(40.7%)	302(59.3%)	509(100.0%)	.69
Unemployment/no study	444(38.5%)	709(61.5%)	1153(100.0%)	
Total	651(39.2%)	1011(60.8%)	1662(100.0%)	
Average monthly income				
High	211(38.4%)	338(61.6%)	549(100.0%)	8.98*
Medium	360(37.9%)	591(62.1%)	951(100.0%)	
Low	83(50.0%)	83(50.0%)	166(100.0%)	
Total	654(39.3%)	1012(60.7%)	1666(100.0%)	
Total household spending				
High	176(33.3%)	352(66.7%)	528(100.0%)	23.36***
Medium	156(35.5%)	284(64.5%)	440(100.0%)	
Low	308(46.0%)	361(54.0%)	669(100.0%)	
Total	640(39.1%)	997(60.9%)	1637(100.0%)	
Total consumption spending on children				
High	254(48.3%)	272(51.7%)	526(100.0%)	36.66***
Medium	149(41.7%)	208(58.3%)	357(100.0%)	
Low	247(31.9%)	528(68.1%)	775(100.0%)	
Total	650(39.2%)	1008(60.8%)	1658(100.0%)	

*$p < .05$. ***$p < .001$.

Variables that Influence Additional Childbirth Plan

In this study, logistic regression analyses were conducted to identify the relative association of independent variables with birth decisions. To that end, the total population is further divided into two subgroups: working and non-working moms.

Variables for the total population. For the total population, birth order is found to have the strongest association with additional childbirth plan, followed by child values and marital conflict. In the first stage in the table below, respondents with one child are found to have subsequent birth plans 23.4 times higher than those with two or more children.

During the second stage, which concerns both birth order and child values as input variables, those with one child are surveyed to have further birth plans 27.8 times more than those with two or more children, while those with more emphasis on child values are found to have additional birth plans 1.14 times more than those with less focus on child values.

In the third stage, which considers birth order, child values, and marital conflict, the response rates of subsequent birth plans are 27.5 times and 1.12 times higher among those with one child and those with more emphasis on child values, respectively, than their counterparts. In regards to marital conflict, the rate of no further birth plans is found to be 1.03 times higher among those with a high rate of marital conflict.

Table 4
Logistic Regression for Additional Childbirth Plan (Total Population)

Variable	*B*	*SE*	*Wals*	*df*	*sig*	*Exp(B)*	-2 Log likelyhood
Step 1							
Birth order	3.15	.14	500.91	1	.00	23.43	1343.06
constant	-2.06	.10	357.38	1	.00	.13	
Step 2							
Birth order	3.32	.15	488.74	1	.00	27.78	
Values on child	.13	.02	49.77	1	.00	1.14	1289.84
constant	-5.29	.48	119.63	1	.00	.01	
Step 3							
Birth order	3.32	.15	483.13	1	.00	27.55	
Marital conflict	-.04	.01	8.53	1	.00	.97	1281.24
Values on child	.12	.02	40.93	1	.00	1.12	
constant	-4.50	.55	66.64	1	.00	.01	

Variables for working mothers. The group of working moms shows the same result as the total population.

Table 5
Logistic Regression for Additional Childbirth Plan (Working Mothers)

Variable	*B*	*S.E,*	*Wals*	*df*	*sig.*	*Exp(B)*	-2 Log likelyhood
Step 1							
Birth order	3.19	.26	153.68	1	.000	24.33	413.16
constant	-2.09	.20	105.32	1	.000	.12	
Step 2							
Birth order	3.55	.29	149.62	1	.000	34.90	
Values on child	.17	.04	25.01	1	.000	1.19	385.20
constant	-6.62	.96	47.85	1	.000	.00	
Step 3							
Birth order	3.58	.29	147.59	1	.000	35.77	
Marital conflict	-.05	.02	5.16	1	.003	.95	379.92
Values on child	.16	.04	20.71	1	.000	1.18	
constant	-5.53	1.07	26.74	1	.000	.00	

In the first stage in the table above Table 5, respondents with one child are found to have subsequent birth plans 24.3 times higher than those with two or more children. During the second stage, which concerns both birth order and child values as input variables, those with one child are surveyed to have further birth plans 34.9 times more than those with two or more children, while those with more emphasis on child values are found to have additional birth plans 1.19 times more than those with less focus on child values.

In the third stage, which considers birth order, child values, and spousal conflict, the response rates of subsequent birth plans are 35.8 times and 1.18 times higher among those with one child and those with more emphasis on child values, respectively, than their counterparts. In regards to marital conflict, the rate of no further birth plans is found to be 1.05 times higher among those with a high rate of marital conflict.

Variables that affect subsequent birth plans for non-working mothers. Birth order shows the strongest correlation with subsequent birth plans for non-working moms, followed by child values. As for child values, the total population and the working mom group show the same result in response to the question whether to have further birth plans. In addition, marital satisfaction is found to serve as an additional variable that affects birth plan (see Table 6).

Table 6
Logistic Regression for Additional Childbirth Plan (Non-Working Mothers)

Variable	*B*	*SE*	*Wals*	*df*	*sig.*	*Exp (B)*	-2 Log likelyhood
Step 1							
Birth order	3.16	.17	344.94	1	.00	23.56	913.60
constant	-2.05	.13	250.79	1	.00	.13	
Step 2							
Birth order	3.25	.18	337.65	1	.00	25.94	
Values on child	.10	.02	24.19	1	.00	1.11	888.21
constant	-4.68	.56	69.18	1	.00	.01	
Step 3							
Birth order	3.23	.18	331.87	1	.00	25.48	
Marital conflict	.08	.03	7.31	1	.00	1.08	880.86
Values on child	.09	.02	17.52	1	.00	1.10	
constant	-5.54	.66	71.05	1	.00	.00	

An analysis of each stage's input variables based on odds ratio reveals that respondents having one child in the first stage are shown to have birth plans 23.6 times higher than those with two or more children. In the second stage, those with one child are surveyed to have additional birth plans 25.9 times more than those with two or more children, while the respondents with more emphasis on child values are found to have further birth plans 1.11 times more than those with less emphasis on child values. As for the third stage, ratios of subsequent birth plans are found to be 25.5 times, 1.08 times, and 1.10 times higher among those with one child, those with a high level of marital satisfaction, and those with more emphasis on child values, respectively.

Discussion

The purpose of this study is to identify what factors affect subsequent birth decisions to what extent for households with one year-old child. For this purpose, among others, child values, household economy, mother's psychological characteristics, and child care policy were employed as variables that can affect subsequent child birth plan. Based on the results of this study, birth order, not the gender of child, is found to be one of the variables that affect the decision. For example, 74.3% of households with one child are surveyed to have further birth plan, while only 11.4% of

households with two or more children are found to be positive in response to the question whether to have additional birth plan. In turn, the result can be said to reflect a general perception that the ideal number of children is two. Moreover, the fact that the gender of child does not affect birth decisions can lead us to believe that the preference for boys has dwindled in Korea.

In respect of the relation between additional childbirth plan and household economy, the medium and high income groups are found to be less likely to have further birth plan than the low income group. This is in line with recent demographic studies that suggest the higher the income the less likely they are to have birth plan while at the same time increasing their investment in human capital (Lee & Mason, 2010). However, this differs from the result of Gong(2006) that suggests the higher their husband's monthly income the more children they desire to have. As seen in recent studies, total household spending and consumption spending on children, rather than a level of monthly household income, have been increasingly discussed as variables that affect the birth rate. In addition, this study also suggests that those with higher household spending and consumption spending on children are less likely to plan to have a child, lending support to the above mentioned relationship between investment in human capital and the birth rate.

Meanwhile, the status of employment in moms is found to have no association with their subsequent birth plan. In this regard, this study can be seen to differ from other studies that indicate the negative association of married women's participation in economic activities with the birth rate, or the direct relationship between the level of income of working moms and the number of children they desire to have. Also, this study is different from previous studies that indicate non-working moms are found to be 3% more likely to have additional child birth plan (Shin, Choi, & Kim, 2009). Both working and non-working moms are found to be affected more by the characteristics of married couples in planning to have a child, rather than by monthly household income, total household spending, and total spending on children (Ehrhardt & Kphli, 2011). In other words, subsequent birth plans are seen to be affected more by personal reasons, rather than such variables as household economy.

For the future direction of policies, therefore, we believe that it would be more appropriate to shift focus from group-oriented policies to those that place more emphasis on the characteristics of married couples.

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Infant Development

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1. A Study of Variables Affecting Infants' Growth

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2. Coincidence of Child Rearing According to the Status of Parents' Characteristics Consentience and Child Development Characteristics According to Parents' Coincidence of Child Rearing

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3. A Study on BMI of Infants in Poverty

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A Study of Variables Affecting Infants' Growth

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This research sought to examine 1,017 12-month-old infants'growth, and the relationship between the characteristics of infants, their family environment, and their growth. Data from the first and the second year of the Panel Study on Korean Children (PSKC) were used. The analysis of the results showed that, first, 12-month-old Korean infants had good growth compared to the international standard. Second, height and weight varied depending on whether their mothers were working or not, and whether they were breast-feeding or not. Third, the characteristics of a child (such as weight at birth, emotionality of temperament, and sleeping habits) and those of their family environment (including their mothers' weight and degree of parenting stress, parental style, and mental health) were found to be related to infants' height and weight. The results of this research will be used as base data to investigate the effects of the characteristics of infants and their family environments at the early stage of life on their growth.

Humans' growth and development is affected by genetic and environmental factors. While genetic elements are determined by DNA, environmental causes influence overall human development from conception. The argument over the significance of genes versus environmental influences in relation to humans'physical maturity and growth is ongoing, but many scholars give more weight to environmental factors than to innate characteristics (Bogin, 1999). The general view is that for physical maturity and development, environmental factors are more important until childhood, whereas genetic elements play a more significant role after adolescence (Bogin & Louchy, 1997; Tanner, 1994). This research has determined that the qualitative characteristics of the environment at early stages of life have an important effect on human development, and the significance of development during the fetal life as well as during infancy should be emphasized.

Recent research has stressed that fetuses' and infants' growth and development should be carefully managed, regardless of individual differences, because rapid growth and development during pregnancy, birth, and early infancy is closely related to lifelong health problems (Chung & Park, 2010; Clark et al., 1989; Park, Lee, & Kim, 2007). From this standpoint, emphasis is now being placed on the health care of women of childbearing age (the Korea Institute for Health and Social Affairs, Korean Medical Record Association, & Ministry of Health and Welfare, 2008) and particularly on the health care of pregnant women over age 35 (Park, 2004). Moreover, based on clinical research showing that parents' drinking, smoking, or addiction to drugs is likely to delay infants' growth and have a negative influence on brain development, parents' health care before childbirth and forming desirable habits has also been stressed (Kim, Kim, & Ko, 2009).

Infants' growth is affected by their environment. Height and weight in particular have been considered important variables foretelling infants'later development, and recently many research studies have been conducted on them (Kim, 1995; Park, Lee, & Kim, 2007). In particular, since a child's growth reflects the quality of the environment and the general level of welfare of a society (Park, 2008; Pak, 2003, 2004), the research results on growth at each age can also be used to detect changes in the general level of welfare of each society, or to find vulnerable populations through comparing groups within each society (Fogel, 1985; Komlos, 1994, 1995). Height is one important indicator of body development, since taller stature is regarded as desirable in almost all societies (Cassidy, 1991). Height correlates with higher academic achievement, social mobility, and career success (Bogin, 1999; Christensen, Djurhuus, & Clayton et al., 2007). On the other hand, there is a negative correlation between weight and social success (Brown & Melvin, 1987).

In this respect, OECD (the Organization for Economic Cooperation and Development) nations emphasize not only the importance of health care before childbirth, but also the importance of

supporting infants' growth and development, and of offering various support services for pregnant women and infants (Kim, 2009). Furthermore, diverse research studies are being actively carried out on the relationship between the family environment such as socioeconomic status and educational level during infancy, including infants' interaction with parents, nutrition intake, and basic habits, and their growth and development. There are different variables related to these studies, among which infants' physical development level has become the most important standard for assessing their physical growth. In particular, physical development during early infancy is used as a crucial indicator and as the criterion for predicting a child's development in later childhood and adolescence, as well as for evaluating the importance of prenatal life and the effects of environmental factors (Ong & Dunger, 2004).

Currently, many scholars are paying attention to an infant's social and cultural background as one of the important factors causing individual differences in physical development. Also, infants' access to food, clothing and shelter, along with the physical developmental aspects affected by the family environment, are attracting attention. From this position, changes in the degree of children's growth and development with the passage of time in the same society (Yun, Ho, & Jo et al., 2004) as well as regional variation (Baek & Goo, 2000) are also being studied. Some of the factors directly affecting growth and development during infancy are gender, weight at birth, personality, number of siblings, parents'(especially mothers') age, height and weight, breast-feeding versus bottle-feeding, and the point at which the child is weaned (Choi, Oh, & Yang et al., 1998). As for the features of the family's family environment supporting infants' growth and development, these include whether their mother works or not, the mother's mental health, including her degree of parenting stress, her parental style, and so on (Choi, Oh, & Yang et al., 1998; Lee, 1981; Woo, 1984). Mental illness in particular has a direct influence on parents' ability to perform their parenting roles (Kwon & Bang, 2011; Kwon, Kim, & Kim et al., 2006; Field, 2011; Field, Diego, & Dieter et al., 2004), and parenting stress can affect parents' interaction with their children as well as their own mental well-being (Park, Lee, & Shin, 2009). Thus, both of these factors are strongly related to the degree of infants' physical development.

The research results on weight and height, important factors that foretell children's physical development (Bang, & Chun, 2002; Hong, 2008; McCain, 1990; O'callaghan & Harvey, 1997), have shown that parents' socioeconomic level, their degree of urbanization, the seasons and climate, nutritional conditions, educational level, family structure, and the degree of children's mental stress are the major environmental factors causing differences in children's physical development. Furthermore, in terms of a fetus's or a newborn baby's weight, some of mother's characteristics, such as her weight and eating habits before pregnancy and her mental health during pregnancy, are being examined as main variables (Chun, Shin, & Lee et al., 1985). In particular, among the factors related to infants' healthy growth and development, the interaction between a mother and infant (Barnard, 1978) and the caregiver's characteristics (Zeanah, Boris, & Larrieu, 1997) are crucial variables. Zeanah et al. (1997) have shown that the caregiver is the one of the factors affecting infants' development during the three years after birth.

On the other hand, some research indicates a difference in growth and development depending on whether a child is breast-fed or not, based on the grounds that nutrition during infancy is related to an individual's health during his or her whole lifespan. Recent research strongly suggests that breast-feeding is related to infants' future health and likelihood of being afflicted with chronic diseases, playing the role of enhancing infants' cognitive development and preventing allergies and diabetes (Wu & Chen, 2009). Some research results indicate that infants who were only breast-fed until the sixth month displayed a slower increase in weight, height and head girth compared to those fed with formula (Baird et al., 2008, Butte, 2009; Wu & Chen, 2009), and it has been reported that those breast-fed until the 12th month were smaller than bottle-fed infants. According to Boyd-Orr's cohort study, along with breast-fed infants being taller during childhood and adulthood and having longer legs, there were differences in height (Martin et al., 2002). Breast-feeding has also been shown to be effective in preventing obesity (Ju & Park, 2011). Furthermore, the point at which an

infant is weaned also affects weight, and Forsyth et al. (1993) found that infants with higher weight than average tend to have been weaned earlier than those with lower weight. Physical development and features during infancy or before can lead to higher adult weight and obesity, so management of body fat is very important from infancy (Wu & Chen, 2011).

The amount an infant sleeps is an especially crucial indicator of physical growth. Also, the average amount of sleeping during infancy is related to later cognitive development (Wenner & Barnard, 1980), and it has been reported that the factors of a pregnant woman's health, whether she breast-feeds or not, and weight at birth affect infants' sleep (Holdich-Davis & Edwards, 1998). In addition, infants' sleep is related to a mother's mental health, parenting stress and the formation of stable attachment (Lee, Park, & Park, 2008).

As mentioned above, much research is being conducted to examine infants' physical growth and to find the factors affecting it (Park, Lee, & Kim, 2007), and most of it is intended to investigate the difference in a child's physical growth and development according to regional differences or parents' socioeconomic level. Yet, studies on infancy, when children are most sensitive to environmental influences on their growth and development, are quite insufficient (Kim, 1995). Moreover, taking into consideration the fact that the rate of increase of height and weight for the first year after birth is higher than at any other period of life, it is crucial to examine the characteristics of the first year of infants' physical growth and variables related to it. The characteristics and variables should be analyzed through a synthetic approach that considers not only the variety of features of the family environment that affect infants' physical development, but also the infants' various characteristics. Therefore, this research aims to investigate Korean infants' physical growth based on the data on infants of the same age group and parents in Korea collected by Panel Study on Korean Children (PSKC) in 2008 and 2009, and to analyze the relationship between infants' characteristics and the features of their family environment. The study results can be used as the basic data for longitudinal research in the future to find out about infants' growth and development from the earliest stage of life addressed by the PSKC. These results will also contribute to establishing basic data to enhance Korean infants' growth and development.

The necessity and purpose of this research mentioned above led to the following research questions.

1. What is the degree of a newborn baby's and a 12-month-old infant's height and weight?
2. Is a 12-month-old infant's physical growth as measured by height and weight different depending on its parents' academic ability and income level and whether its mother works or not?
3. What is the relationship among a 12-month-old infant's height and weight, infants' characteristics, and the features of their family environments?

Method

Subjects

The subjects of this study were 1,017 12- to 15-month-old infants whose height and weight were reported by their parents through their regular12-month hospital check-ups. They were selected from the second-year nationwide data collected by PSKC. Infants whose parents had physical handicaps or rare genetic diseases, or were from a multicultural family background, were excluded.

Instrument

Infants' growth: Height and weight. In terms of a child's developmental features, the result variable of this research, height and weight, the most frequently used growth and development indexes, and the height and weight standard deviation scores of each age calculated through height and weight were used. For the growth and development conditions of all 1,017 infants, this study compared their 12-month-old weight and height as reported by their parents in the 2009 survey to

the Korean infants' growth standard for 2007 (Korea Center for Disease Control and Prevention, 2007). The standard deviation Z-score[1)] was calculated and their growth and development conditions were assessed. HAZ (Height-for-age), the standard deviation score of height for each age, is the index that shows how tall a child is for his or her age, and is considered to be an indicator of a child's long-term nutritional condition and level of general welfare. WAZ (Weight-for-age), the standard deviation score of weight for each age, refers to the index showing how heavy a child is for his or her age, and is used to display a child's long-term and short-term growth condition. BMI (Body Mass Index) is sometimes used as another measurement of growth to estimate whether a child is overweight or obese while controlling the effect of height on total weight, but in this research, only HAZ and WAZ were applied, because BMI is not generally considered a meaningful physical growth index for very young infants.

Infants' temperament. Temperament is one variable measuring an individual's personality that is often regarded as innate rather than learned. This study used the EAS temperament measure to determine the emotionality and activity of the infants, with correction and supplementation. The EAS temperament measure consists of 10 questions in total, divided into five questions about emotionality and five about activity. Mothers answer the given questions with scores from "never" (1 point) to "very much" (5 points) in the questionnaire, and the possible score range is 5 to 25 points each for emotionality and activity. Higher emotionality means that an infant has more negative emotions. The coefficient of internal consistency of all questions measured in this study, Cronbach's α, was .79 for emotionality and .78 for activity.

Infants' sleeping habits. Infants' sleeping habits were assessed through a question about sleeping times among the questions created based on Allen's and Martoz's (2003) infants' basic tasks. (An infant usually falls asleep around 8 to 9 and sleeps for about 10 to 12 hours. When infants skip naps, they typically fall asleep around dinner time.) This is measured on a five-point Likert scale from "never" (1 point) to "very likely"(5 points) with a higher score meaning an infant has developed good sleeping habits.

Mothers' parenting stress. Mothers' stress from rearing children was measured through Kim and Kang's (1997) parenting stress scale, after correction and supplementation. This measure consists of five scales from "never"(1 point) to "very likely" (5 points) with 10 questions in total, and a total possible score range of 10 to 50 points. The more parenting stress the mother reports, the higher the score. The coefficient of internal consistency of all questions measured in this study, Cronbach's α, was .85.

Mothers' parental style. To measure mothers' parental style, the Parental Style Questionnaire (PSQ) developed by Bornstein and others (1996) was used. This tool is composed of six questions in total, and uses a five-point scale from "rarely" (1 point) to "always" (5 points). The possible score range is 6 to 30, with a higher score indicating a more positive parental style. Cronbach's α, the coefficient of internal consistency of all questions measured in this study, was .84.

Mothers' mental health: Degree of depression. In order to measure mothers' mental health, Kessler and others' (2002) simple depression scale (K6) was used. This tool is a paper-and-pen type of self-reporting questionnaire, measuring given questions from "never feel" (1 point) to "always feel" (5 points), and consists of six questions in total. The possible score range is 6 to 30 points, and a higher score means a mother's degree of depression is higher. The coefficient of internal consistency of all six questions, Cronbach's α, was .91.

Mothers' weight. Mothers' weight, which can be genetically influenced, has been reported to be related to an infant's or a child's growth (Yoon, Ho, & Cho et al., 2004). In this research, taking into consideration the fact that a mother's weight generally increases because of childbirth, the weight before pregnancy was used.

Infants' and parents' general characteristics. The general features of infants measured in this

1) Z score = Observed value - Reference mean value / Reference standard deviation value

study included sex, age in months, and number of siblings. Parents' general characteristics included their age, academic achievement, income level, and employment status of the mother. Also, a child's sex was coded as 1 for a boy and 0 for a girl, and in terms of its parents' educational level, a bachelor's degree or more education was coded as 1 and "other"was coded as 0. In the case of income level, less than two million won in earnings per month, which corresponds to the lower 25% in the income distribution reported by respondents, was coded as 0, and more than that was coded as 1 for analysis.

Data Analysis

The data collected for this research were analyzed with SPSS version 19.0. To analyze the data, descriptive statistics and a T-test were conducted, and Pearson's correlation coefficient was calculated. In particular, measures of an infant's height and weight at birth and at 12 months were compared with the Korean infant growth standard and the WHO child growth standard (hereinafter WHO standard). HAZ and WAZ were compared with the Korean infant growth standard, their standard deviation scores were calculated, and then real number, percentage, mean and standard deviations were presented.

Results

General Characteristics of the Research Subjects

The definition and descriptive statistics of the main variables are shown in Table 1 below. The general features of the research subjects show that relatively equal numbers of male infants (49.7%) and female infants (50.3%) participated. The infants' average age was 13.9 months, and they averaged less than one sibling (.57). Among infants' temperament characteristics, their emotionality was 19.60 points, which can be converted to item average of 3.92 points and shows negative emotions at a slightly lower level than 'generally' within the score range of 1 to 5. Among infants' temperament characteristics, activity was 16.43 points and 3.29 points when converted to item average, which is slightly higher level than 'ordinary' in the range of 1 to 5; that is, they liked moving and were active. The average of children's sleeping habits (3.09) was ordinary, and only 29.3% of the infants were breast-fed. In terms of their father's educational level, 56.9% had at least a bachelor's degree, 43.1% had less than a bachelor's degree, and as for mothers, 47.4% possessed at least a bachelor's degree, and 52.6% did not. Fathers' average age was 34.6 years and mothers' was 32.1, and families with a monthly average income of less than two million won accounted for 13.4% of the total. 30.3% of the mothers were working or studying, while 69.7% were not.

The level of parenting stress of all mothers was 27.13 points on average, which was 2.71 points when converted to item average. This is a little lower than 'ordinary' on the five-point scale from 1 to 5 points, which shows that mothers were under stress because of child rearing. The average of the total for parental style was 23.56 points and 3.93, and they had a positive parental style at a slightly lower level than 'generally' within the score range of 1 to 5 points. The degree of mothers' depression was 11.34 points on average, which is within the "normal" range of 6 to 13 as indicated by Kessler et al. (2002). Degree of depression was 1.89 points in the item average, which was between 'never feel' and 'rarely feel' within the range of 1 to 5 points. The mothers' average weight was 54.63 kg.

Table 1

Characteristics of Research Subjects (N = 1017)

Variables	%	*M (SD)*
Infant		
Gender		
Male	50.3	
Female	49.7	
Age (months)	13.9	
Siblings	0.57	
Temperament (mother's answer: five-point scale, 10 questions)		
Emotionality	29.3	19.60 (2.920)
Activity	70.7	16.43 (1.742)
Sleeping habits (mother's answer: five-point scale, 1 question)		3.09 (1.033)
Breast milk		
Yes		
No		
Family environment		
Father's education level		
≥University	56.9	
<University	43.1	
Mother's education level		
≥University	47.4	
<University	52.6	
Father's age (year)		34.61 (4.087)
Mother's age (year)		32.19 (3.678)
Monthly income (won)		
≥ 2000,000	86.6	
< 2000,000	13.4	
Mother's employment		
Working mother / students	30.3	
Homemakers	69.7	
Mother's parenting stress (mother's answer: five-point scale, 10question)		27.13 (6.400)
Mother's parental style (mother's answer: five-point scale, 6question)		23.56 (2.903)
Mother's mental illness (mother's answer: five-point scale, 6question)		11.34 (4.022)
Mother's weight (pre-pregnant)		54.63 (7.532)

Characteristics of the Physical Growth of Newborn Babies and 12-Month-Old Infants

The result of comparing infants' growth in this study with the Korean infant growth standard and the standard value of the WHO (World Health Organization) is as follows. In terms of height at birth, the average of both male and female infants as the subjects of this research (male 50.58 cm, female 49.81 cm) was higher than the Korean infant growth standard (male 50.12 cm, female 49.35 cm) and the WHO standard (male 49.9 cm, female 49.1 cm). With regard to weight at birth, the average weight of male and female infants in this study (male 3.32 kg, female 3.21 kg) was lower than the Korean infant growth standard (male 3.41 kg, female 3.29 kg) and close to the WHO standard (male 3.3 kg, female 3.2 kg). Both male and female subjects'average height when 12 months old (male 77.82 cm, female 76.73 cm) was lower than the Korean infant growth standard (male 78.22 cm, female 76.96 cm) and higher than the WHO standard (male 75.7 cm, female 74.0 cm). In the case of the weight of 12-month-old infants, the average weight of male subjects (10.42 kg) was similar to the Korean infant growth standard (10.41 kg) but higher than the WHO standard (9.6 kg), and female subjects' average weight (9.74 kg) was lower than the Korean infant growth standard (9.84 kg) but higher than the WHO standard (8.9 kg), as in the males'case (refer to Table 2).

Table 2

Growth of Newborn Babies and 12-Month-Old Infants (N = 1,017)

Variable	PSKC	Korean infant growth standard (2007)	WHO Standards (2007)
	M (SD)	*M (SD)*	*M (SD)*
Birth			
Height (cm)			
Male	50.58 (2.451)	50.12 (2.907)	49.9(1.893)
Female	49.81 (2.589)	49.35 (2.611)	49.1(1.863)
Weight (kg)			
Male	3.32 (.413)	3.41 (.531)	3.3(.482)
Female	3.21 (.404)	3.29 (.498)	3.2(.453)
12 months			
Height (cm)			
Male	77.82 (3.963)	78.22 (3.058)	75.7(2.376)
Female	76.73 (3.986)	76.96 (3.055)	74.0(2.575)
Weight (kg)			
Male	10.42 (1.104)	10.41 (1.153)	9.6(1.049)
Female	9.74 (1.035)	9.84 (1.115)	8.9(1.092)

To evaluate infants' growth, the Z-score value was used as the index of growth derived from height and weight based on the Korean infant growth standard, 2007 (refer to Table 3). The HAZ (*z*-scores for height-for-age) and WAZ (*z*-scores for weight-for-age) were -.10 and -.04, respectively. HAZ was -.13 for males and -.08 for females, and WAZ was .01 for males and -.09 for females, with no meaningful difference by sex. Generally speaking, without distinction by sex, the subject infants' height and weight were similar to that of the reference group (HAZ: -.10, WAZ: -.04), but displayed the developmental characteristic that their weight index was relatively higher than their height index.

Table 3
HAZ and WAZ by Sex

Variables	*M (SD)*	Total
HAZ (height for age *z* score)		
Male	-.13 (1.296)	-.10(1.300)
Female	-.08 (1.305)	
WAZ (weight for age *z* score)		
Male	.01 (.957)	-.04(.943)
Female	-.09 (.928)	

Growth According to Differences in Family environment

Infants were divided into two groups according to parents' academic background, income level, mothers' employment status, and breast-feeding, and the difference in the average scores of HAZ and WAZ was examined through a *T*-test (refer to Table 4 and Table 5).

Table 4

HAZ According to Parents' Educational and Income Level and Whether a Mother Works or not and Breast-Feeds or not

Variable	*n*	*M (SD)*	*t*
Father's education			
≥ University	571	-.09 (1.281)	.50
< University	432	-.13 (1.334)	
Mother's education			
≥ University	479	-.09 (1.288)	.35
< University	532	-.12 (1.305)	
Monthly income			
≥ 2000,000	876	-.08 (1.312)	1.63
< 2000,000	135	-.27 (1.226)	
Mother's employment			
Working mother / students	307	.083 (1.354)	3.04**
Homemakers	750	-.19 (1.263)	
Breast Milk			
No	719	-.09 (1.308)	.66
Yes	298	-.15 (1.281)	

** $p < .05$.

Table 5

WAZ According to Parents' Educational and Income Level and Whether a Mother Works or not and Breast-feeds or not

Variable	*n*	*M (SD)*	*t*
Father's education			
≥University	571	-.08 (.917)	-1.49
<University	432	.01 (.982)	
Mother's education			
≥University	479	-.06 (.931)	-.57
<University	532	-.03 (.956)	
Monthly income			
≥ 2000,000	876	-.02 (.953)	1.79
< 2000,000	135	-.18 (.875)	
Mother's employment			
Working mother / students	307	.14 (.941)	4.03***
Homemakers	750	-.12 (.934)	
Breast Milk			
No	719	.03 (.937)	3.61***
Yes	298	-.21 (.940)	

*** $p < .001$.

The height of infants with working mothers was statistically significantly higher ($p < .05$) than that of those with non-working mothers, and their weight was statistically significantly higher as well ($p < .001$). Breast-fed infants weighed less than non-breast-fed infants to a meaningful degree ($p < .001$). When this is connected to the general phenomenon that significantly more infants whose mothers are working are fed on artificial milk, there is the potential for a mother's work to affect her infant's developmental properties. The difference in HAZ and WAZ between two groups compared by the standard of their parents' educational background or average income per month was not statistically meaningful, yet it is worth paying attention to the fact that HAZ and WAZ were higher

for those with a higher level of education and average monthly income.

The Degree of 12-Month-Old Infants' Growth and the Relationship Between Infants and the Features of Family Environment

As Table 6 shows, weight at birth had a statistically meaningful, positive relation with both HAZ and WAZ, and among infants' temperament features only emotionality had a meaningful, negative relationship with both HAZ and WAZ. Infants' sleeping habits displayed a statistically meaningful positive relationship with WAZ, and WAZ was higher when sleeping habits were well formed. The Pearson coefficients of the correlation between number of siblings and body development index were all negative, but not statistically meaningful.

Table 6
The Correlation Between the Growth of a 12-Month-Old Infant and Its Characteristics

Variable	*n*	HAZ	WAZ
Weight at Birth	989	.167**	.267**
Sleeping Habits	1,013	.025	.081*
Emotionality	1,013	-.062*	-.071*
Activity	1,012	.022	.024
Number of Siblings	1,017	-.001	-.016

*$p < .05$. **$p < .01$.

As shown in Table 7, a mother's parenting stress and an infant's physical growth index are negatively related in a statistically meaningful way, so when a mother experienced less parenting stress, an infant's WAZ and HAZ scores were high statistically. Also, a mother's weight had a meaningful and positive relation with both WAZ and HAZ statistically. A mother's depression and parental style had a statistically meaningful relation only with HAZ statistically.

Table 7
The Correlation Between Growth and the Variable of the Mother's Characteristics

Variable	*n*	HAZ	WAZ
Mother's weight	984	.101**	.113**
Mother's depression	1,013	-.071*	-.031
Mother's parenting stress	1,009	-.064*	-.063*
Mother's Parental style	1,015	.084**	.038

*$p < .05$. **$p < .01$.

Discussion

This research examined 12-month-old infants' growth and the relationship between the characteristics of infants and family environment and their growth, targeting families participating in the second-year survey of the Korean Children Panel. The results of this study can be summarized as follows.

First, at birth, the infants' height for both males and females was greater than the Korean infants' development standard for 2007 and the WHO standard. Their weight was lower than the Korean infants' development standard for 2007, and similar to the WHO standard for both males and females. Both the male and female 12-month-old infants' height was lower than the Korean infants' development standard for 2007 and greater than the WHO standard, and the weight of both sexes was higher than the WHO standard, while the males' weight was similar to the

Korean infants' development standard for 2007, and the females' was lower. This means that the growth of infants from Korea, which joined the panel survey in 2009, was similar at birth for both males and females compared to the WHO standard, but their weight and height were higher by their 12th month. Therefore, 12-month-old Korean infants grew quickly compared to the international standard.

Second, while the 12-month-old infants' physical growth displayed no statistical difference according to their parents' academic background and monthly average income level, there was a correlation between the parents' educational level, monthly average income, and infant height and weight. Whether a mother worked or not and whether she breast-fed or not affected the 12-month-old infants' physical growth. Those with working mothers had greater height and weight than those with non-working mothers, and breast-fed infants weighed less than those who were not breast-fed. Thus, in the respect that a mother's employment position and breast-feeding are related to her infant's growth at the point of 12th month, these results need to be constantly observed in relation to their infants' later growth and development.

Third, the features of children and family environment and 12-month-old infants' growth were investigated. Among the variables of children's properties, their weight at birth and emotionality among temperament features were related to both height and weight, and their sleeping habits were only related to their weight statistically. On the other hand, number of siblings was found to have nothing to do with their growth and development, and this result is different from the results of Park et al.'s (2007) study targeting infants under three, in which the number of siblings was a variable relevant to height and weight. Of the variables related to the characteristics of the family environment, the mother's parenting stress was linked to both the height and weight of the 12-month-old infants, and her parental style and level of depression to their height statistically. In addition, the mother's weight was statistically related to infants' height and weight, both. This indicates that not only a child's properties, but also parents' health condition and family environment, such as a mother's weight, influenced 12-month-old infants' growth. In particular, the fact that the relationship between parents' health and family environment factors was observed even in the first 12 months of infant growth indicates that interventions to help them become healthy adults should begin from an early age. However, further study is needed in order to investigate these relationships, because although the results were statistically meaningful, the value of the correlation coefficient was too small.

In spite of the interesting results related to infants' growth, this research is limited by certain features of its data. First, the researcher did not measure infants' growth directly, but relied on hospital records of parents' visits to hospitals. Second, even though the study results have shown that infants' sleeping habits are meaningfully related to their growth, their sleeping time was not measured exactly by recording it, but instead was based on their parents' reporting. Third, data from the PSKC were valuable in that it they were collected nationwide; however, the shortage of various data relevant to infants' growth and development (for example, in terms of nutrition, the classification among those fed with mother's milk, artificial milk, a combination of both, and the number of mothers nursing) has placed a limit on overall research on infants' growth and development. Despite these limitations, this research is meaningful in that it examined 12-month-old infants' growth and development and diverse variables related to it, and therefore offers base data for exploring the relationship between the features of infants and their family environment, including later breast-feeding, sleeping habits, a mother's parenting stress, parental style, and mental health.

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Coincidence of Child Rearing According to the Status of Parents' Characteristics Consentience and Child Development Characteristics According to Parents' Coincidence of Child Rearing

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This study conducted ANOVA analysis by recoding variables based on the survey results on the 1,904 parents and their children who were the survey objects for the 2009 Panel Study on Korean Children (PSKC) to identify parents' coincidence of child rearing according to the status of parents' characteristics consentience and child development according to parents' coincidence of child rearing. Based on the analysis results, in the coincidence of values regarding a child, the interaction effects of the status of religion consentience and the status of conflict consentience and the interaction effects of the status of satisfaction consentience and the status of conflict consentience were demonstrated considerably. In the coincidence of expectation on a child, the main effects of the status of satisfaction consentience and the status of conflict consentience were clearly shown. In child development, the child's communication, small muscle motion, and problem-solving capability development areas and the main effects of expectation consentience of the child's dietary habit and bowel movement/washing habit were demonstrated well. This study discussed the implications based on such findings.

After birth, a child forms special relationships with his/her parents and lives in love and trust. Parents have the biggest impacts on a child; when the child forms warm and stable relationships with his/her parents, the child grows and develops in a healthy manner. Parents' child rearing includes educating a child to have the attitudes and behavioral patterns required by the parents. In this context, parents' child rearing mode has important impacts on a child's social competence, emotion, adaptation to school, and academic achievements (Collins, Maccoby, Steinberg, Hetheing, & Bornstein, 2000; Go, 2000; Gwon, 2005; Parke & Buriel, 1998).

Parents do their best for their children to lead a happy, healthy life. Note, however, that parents' various ecological variables directly/indirectly affect parents' child rearing attitudes. In examining studies on child rearing behaviors, which have considered variables such as parents' educational and economic levels, occupational characteristics, and satisfaction with marriage, parents with higher educational and economic levels tended to show more affectionate and autonomous attitudes (Hong & Mun, 2007; Kim, 2004). On the other hand, parents with lower educational and economic levels showed less affectionate and more resistant child rearing behaviors (Kim & Hwang, 1997). Occupational change such as the father's unemployment directly and hugely affects the father -- who is responsible for the livelihood of the household -- compared to other family members. Such economic difficulty results in the mother's unstable and depressed physiological state and ultimately has an impact on child rearing attitudes (Kim & Park, 2000). Considering the mothers' low working hour flexibility and the fact that mothers are irregular workers, they experience immense conflict between their work and their role as mothers and show negative child rearing attitudes (Choi & Cho, 2007). Satisfaction with marriage or couple's conflict affects parents' attitude on children: when parents feel dissatisfied with married life, or there are conflicts, they improperly discipline children, and parents' child rearing behaviors are not consistent because of the non-coincidence of expectation or attitude on child rearing (Lee, 2007).

Parents' characteristics directly/indirectly affect child rearing attitudes, which in turn are related to child development. When their child rearing attitudes are affectionate and consistent, parents positively affect the child's sociability development (Sohn & Lee, 2008). When parents' child rearing attitudes are autonomous and affectionate, the child's emotional intelligence increases (Bae, 2004; Gang & Kim, 2006), and a positive concept of self develops (Gwon, 2005). If parents show

supportive child rearing attitudes to a child, the child is positively affected in terms of academic achievements (Martin, Ryan, & Brooks-Gunn, 2007). Such positive child rearing attitudes positively affect a child's capability to adapt to school life in the future (Go, 2003).

Studies on parents' child rearing were carried out centered on the variables affecting parents' child rearing attitudes and the impacts of parents' child rearing attitudes on child development. Since then, with the emerging importance of coincidence of parents' role and attitude, studies on coincidence types and status of consentience have started to be conducted (Bae, 2004; Cho, 2009; Kim & Kim, 2010; Lee, 2006; Martin et al, 2007; Weinfield, 2006). Although parents play a role as parents jointly under the same space of home, they may judge the child's behaviors differently because of the different convictions with regard to parents' role. The process wherein parents share conviction on child rearing and come to an agreement becomes the starting point in deciding the child's socialization and discipline, and it can draw the parents' role successfully (Weinfield, 2006). Parents and children exist within the upper system of family, and they position and function in a mutually dependent lower system; therefore, mother and father offer child rearing as a unified system, instead of them wielding independent influence (Minuchin, 1988). Since parents function as a unified system on child rearing and mutually complement and coordinate, the extent of coincidence of child rearing type crucially affects the child development process. This is because when father and mother have the same conviction and expectation, such translates into parents' coincided and sustainable child rearing.

An examination of the parents' perception on child rearing aids in better understanding of the relationship between child development and couple's child rearing attitudes. Consequently, there is a need to explore how parental characteristics' consentience affects the coincidence of child rearing and what impacts parents' coincidence of child rearing has on child development. This study sought to explore parents' coincidence of child rearing as coincidences of values regarding a child and expectation on a child based on the 2009 PSKC. Among the parents' various characteristics, this study identified the parents' coincidences of values regarding a child and expectation on a child according to the status of parents' religion consentience, which provides a fundamental view of the world on child rearing, and coincidence of perception of couple's relationship offering positive atmosphere and consistency in terms of the relationship with a child. This study also examined how child development evolves according to the parents' coincidences of values regarding a child and expectation on a child.

The resulting study issues are presented as follows:

1. What is the level of the parents' coincidence of child rearing according to the status of parents' characteristics consentience?
   1) What is the level of the coincidence of values regarding a child according to the status of parents' perception consentience on religion and couple's relationship (satisfaction, conflict)?
   2) What is the level of the coincidence of expectation on a child according to parents' perception consentience on religion and couple's relationship (satisfaction and conflict)?
2. What is the level of child development and basic everyday life habits according to parents' coincidence of child rearing?
   1) What is the level of child development according to parents' coincidences of values regarding a child and expectation on a child (K-ASQ)?
   2) How are the basic everyday life habits of a child developed according to parents' coincidences of values regarding a child and expectation on a child?

Method

Study Object

The objects of study were the 1,904 parents and their children who were also the object of the 2009 PSKC carried out by the Korea Institute of Child Care and Education (KICCE). The socio-demographic characteristics of mothers, fathers, and children are presented in Table 1.

Table 1
Socio-Demographic Characteristics of the Study Object – Mothers, Fathers, and Children

Variable	Mother	Father
Age		
20s	22.8 (434)	9.2 (170)
30s	74.6 (1,420)	80.3 (1,485)
40s	2.6 (50)	10.4 (192)
50s	-	0.1 (2)
Education		
No education	.1 (2)	-
Elementary school	. (1)	-
Middle school	.4 (8)	.6 (11)
High school	30.0 (568)	26.4 (497)
Junior college	24.9 (472)	19.5 (366)
University	39.5 (747)	43.2 (812)
Graduate school (Master's degree)	4.7 (88)	8.8 (166)
Graduate school (Doctoral degree)	.3 (6)	1.2 (23)
Status of religion		
With religion	52.7 (997)	43.2 (795)
Without religion	47.3 (896)	56.8 (1,046)
Religion types		
Buddhism	29.5 (287)	34.2 (262)
Protestantism	49.9 (486)	41.6 (319)
Catholicism	19.0 (185)	22.3 (171)
Judaism	0.2 (2)	0.4 (3)
Won Buddhism	0.3 (3)	0.4 (3)
Religion of Jeung San Do	0.4 (4)	0.4 (3)
Religion of Cheondo	0.2 (2)	0.4 (3)
Others	0.5 (5)	0.3 (2)
Status of employment		
Employed	31.4 (593)	97.7 (1,848)
Studying	0.4 (7)	0.4 (7)
Unemployed/Not studying	68.2 (1,287)	2.0 (37)
Household income		
Under 2 million won	14.4 (266)	
2 - under 4 million won	54.8 (1,016)	
4 million or more	30.8 (622)	

Note. No responses and missing responses to the system were excluded. Unit: %, person(s). N = 1,904.

Table 2
Demographic Features of the Study Object – Children (Gender, Age, Order of Birth)

Variable (N = 1,904)	Ratio (f)	Variable	Ratio (f)
Gender		Age (months)	
Boy	50.5(962)	11	.2(3)
Girl	49.5(942)	12	6.4(121)
Order of birth		13	23.5(447)
First child	47.6	14	36.8(701)
Second child	41.2	15	24.7(471)
Third child	9.8	16	7.0(133)
Fourth child	1.1	17	1.3(24)
Fifth child, etc.	0.3	18	.2(4)

Note. Unit: %, person(s). N = 1,904.

Study Tools

The questionnaire used in this study was part of the data of the 2009 PSKC carried out by the Korea Institute of Child Care and Education; satisfaction with marriage, couple's conflict, and values regarding a child and expectation on a child in the questionnaires for mothers and those for fathers were used in this study. To identify the characteristics of child development, K-ASQ and questions on basic everyday life habits were used. For the basic everyday life habits, questions related to development were used; questions on sleeping habits were excluded, and three questions excluding the first question on dietary habit were used. Regarding questions related to bowel movement/washing, they were all used.

Table 3
Details of Questions and Scales

Field	Variable	Questions and sub-variables	Remarks
Couple's relationship	Satisfaction with marriage	Satisfaction with spouse/Satisfaction with married life/Satisfaction as parents	5-point scale; increasing satisfaction with higher score
	Couple's conflict	Argument/criticism/rejection/no respect/meaningless, despite demanding/thinking of another person/loneliness/avoiding	5-point scale; increasing conflict with higher score
Child rearing characteristics	Values regarding a child	Emotional values (value in life/couple's relationship/less lonely), moral values (economic help/obligation/succession of generation/social obligation)	5-point scale; increasing with higher score
	Expectation on a child	Money/reputation/social position/help from others/happy home/hobby or leisure	4-point scale; increasing with lower score
Child development	K-ASQ	Communication area Large muscle motion area Small muscle motion area Problem-solving (recognition) area Personal sociability area	No = 0 Sometimes = 5 Yes = 10
Basic everyday life habit		Dietary habit, bowel movement/washing habit	5-point scale; more independent with higher score

Analysis Methods

This study analyzed data using the SPSS 12.0 program to identify the coincidences of values regarding a child and expectation on a child according to the status of parents' characteristics consentience based on the data offered by PSKC and to find out whether the coincidences of values regarding a child and expectation on a child affect the child's development and basic everyday life habits.

To analyze the results derived from study issue 1, this study processed as 1 when there was no difference in parents' religion and couple's relationship (satisfaction with marriage and couple's conflict) - which are explanation variables - and processed as 2 in other cases. In the case of couple's relationship: First, it was divided into satisfaction with marriage and couple's conflict, with the points of each question for mothers and fathers, respectively, added. The values recoded using the 5-point scale were used. Second, the total points were obtained by converting into 1 when there was a difference in terms of the status of consentience on values regarding a child and expectation on a child by question and into 0 when there was no difference. Therefore, values regarding a child were distributed at 0-7 points, and those in terms of expectation on a child, at 0-6 points. A higher

score means higher consentience. Third, this study conducted three-way ANOVA to find out whether expectation on a child and values regarding a child coincide according to the consentience of parents' characteristics.

For the analysis of the result derived from study issue 2, this study carried out two-way ANOVA to find out whether parents' coincidences of values regarding a child and expectation on a child affect child development (K-SAQ) as well as the child's basic everyday life habits.

Results

Coincidence of Child Rearing According to the Status of Consentience of Parents' Characteristics

The results of the three-way ANOVA on the coincidence of child rearing according to the status of consentience of parents' characteristics are shown in Table 4. The interaction effects ($F_{(1, 1624)}$ = 4.65, $p < .05$) of the status of religion consentience and the status of conflict consentience and the interaction effects ($F_{(1, 1624)}$ = 4.11, $p < .05$) of the status of satisfaction consentience and the status of conflict consentience were demonstrated considerably. These interaction effects are illustrated in Figure 1. Only in the group whose religion coincided was the coincidence of values regarding a child higher in the group where conflict coincided (M = 3.30) than the group whose conflict did not coincide (M = 2.92). Likewise, only in the group whose satisfaction coincided was the consentience on values regarding a child higher in the group whose conflict coincided (M = 3.38) than the group whose conflict did not coincide (M = 3.02).

Table 4
Three-Way ANOVA Table for the Coincidence of Child Rearing According to the Status of Parents' Characteristics Consentience

Variable	*SS*	*df*	*MS*	*F*
Coincidence of values regarding a child				
Status of religion consentience (A)	20.29	1	20.29	7.51**
Status of satisfaction consentience (B)	61.89	1	61.89	·22.90***
Status of conflict consentience (C)	10.95	1	10.95	4.05*
A X B	2.07	1	2.07	.77
A X C	12.56	1	12.56	4.65*
B X C	11.10	1	11.10	4.11*
A X B X C	.00	1	0.00	.00
error	4388.67	1624	2.70	
Coincidence of expectation on a child				
Status of religion consentience (A)	4.16	1	4.16	1.87
Status of satisfaction consentience (B)	24.20	1	24.20	10.87***
Status of conflict consentience (C)	15.26	1	15.26	6.86**
A X B	.45	1	.45	.20
A X C	.12	1	.12	.05
B X C	5.77	1	5.77	2.59
A X B X C	.26	1	.26	.12
error	3614.86	1624	2.23	

* $p < .05$. ** $p < .01$. *** $p < .001$.

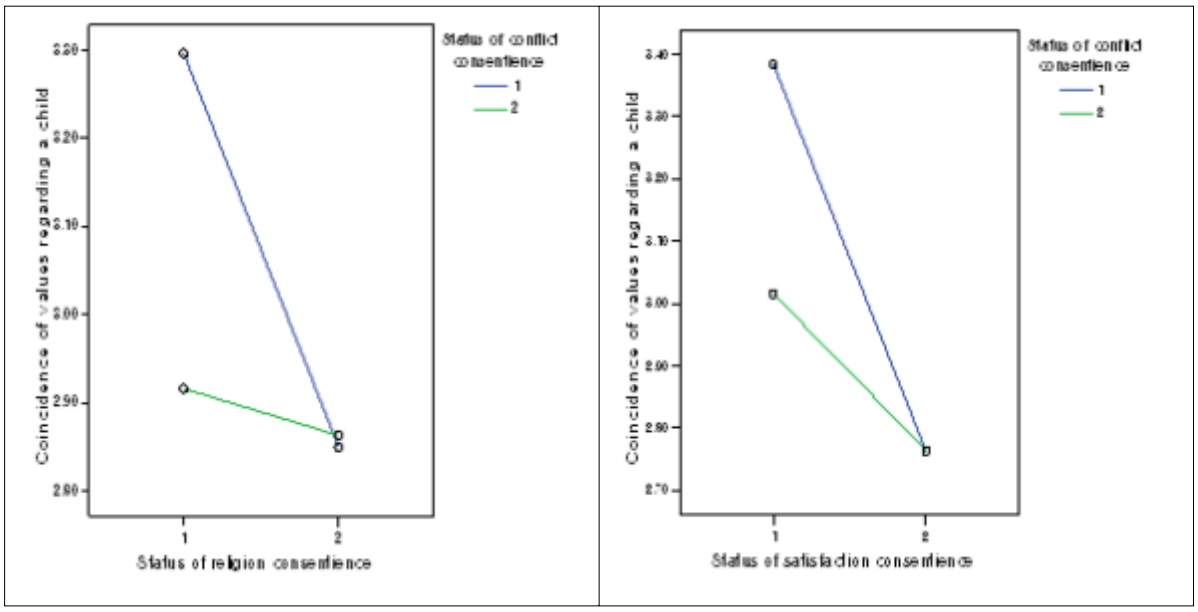


Figure 1. Interaction effects of the status of religion consentience and status of conflict consentience, Interaction effects of the status of satisfaction consentience and status of conflict consentience.

Meanwhile, in the coincidence of expectation on a child, the main effects of the status of satisfaction consentience ($F_{(1, 1624)} = 10.87$, $p < .001$) and the status of conflict consentience ($F_{(1, 1624)} = 6.86$, $p < .01$) were clearly shown. In other words, the group ($M = 3.55, 3.47$) whose satisfaction and conflict coincided had higher coincidence of values regarding a child than the group ($M = 3.22, 3.23$) whose satisfaction and conflict did not coincide.

Child Development According to the Coincidence of Parents' Child Rearing

The two-way ANOVA results on child development and basic everyday life habits according to the coincidence of parents' values regarding a child and coincidence of expectation on a child are shown in Table 5. The main effects of the coincidence of expectation on a child were demonstrated well in communication ($F_{(6, 1848)} = 3.60$, $p < .01$), small muscle motion ($F_{(6, 1848)} = 2.13$, $p < .05$), and problem-solving capability ($F_{(6, 1848)} = 2.20$, $p < .05$). In a child's basic everyday habits, the main effects of the coincidence of expectation on a child were demonstrated considerably in dietary habit ($F_{(6, 1832)} = 2.36$, $p < .05$) and bowel movement/washing ($F_{(6, 1817)} = 2.90$, $p < .05$).

Table 5
Two-Way ANOVA Table on Child Development and Basic Everyday Life Habits According to the Coincidences of Parents' Values and Expectation on a Child

Variable	*SS*	*df*	*MS*	*F*
Communication				
Coincidence of values (A)	950.25	7	135.75	1.07
Coincidence of expectation(B)	2740.17	6	456.70	3.60**
A X B	6013.41	41	146.67	1.16
error	234412.50	1,848	126.85	
Large muscle motion				
Coincidence of values (A)	144.98	7	20.71	.27
Coincidence of expectation(B)	370.23	6	61.71	.79
A X B	2681.77	41	65.41	.84
error	143873.20	1,848	77.85	
Small muscle motion				
Coincidence of values (A)	873.96	7	124.85	.89
Coincidence of expectation(B)	1794.61	6	299.10	2.13*
A X B	5856.07	41	142.83	1.02
error	140.59	1,848	140.59	
Problem-solving capability				
Coincidence of values (A)	738.70	7	105.53	.75
Coincidence of expectation(B)	1855.99	6	309.33	2.20*
A X B	6543.89	41	159.61	1.14
error	259389.50	1,848	140.36	
Personal sociability				
Coincidence of values (A)	937.39	7	133.91	1.12
Coincidence of expectation(B)	605.75	6	100.96	.84
A X B	4736.25	41	115.52	.97
error	221083.70	1,848	119.63	
Dietary habit				
Coincidence of values (A)	63.54	7	9.08	1.48
Coincidence of expectation(B)	87.18	6	14.53	2.36*
A X B	339.62	41	8.28	.07
error	11268.59	1,832	6.15	
Bowel movement and washing habit				
Coincidence of values (A)	79.81	7	11.401	1.33
Coincidence of expectation(B)	149.10	6	24.85	2.90**
A X B	427.75	41	10.43	1.22
error	15587.54	1,817	8.58	

*$p < .05$. **$p < .01$.

Discussions and Suggestions

This study explored the coincidences of parents' values regarding a child and expectation on a child according to the status of consentience of parents' characteristics and child development according to the coincidences of parents' values regarding a child and expectation on a child by analyzing the 2009 PSKC. The results were arranged according to study issues and discussed as follows:

First, there were differences in the coincidences of values regarding a child and expectation on a child depending on the status of consentience of parents' characteristics. The coincidence of parents' values regarding a child was clearly shown in terms of the interaction effects of the status of religion consentience and the status of conflict consentience and interaction effects of the status of

satisfaction consentience and the status of conflict consentience. Regarding parents' coincidence of expectation on a child, the main effects of the status of satisfaction consentience and the status of conflict consentience were clearly shown. Parents' various biological features directly/indirectly affect child rearing attitudes, with religion or couple's relationship causing couples to have different perceptions of values regarding a child or expectation on a child. This results suggests that the internal environment such as religion, which offers a fundamental view of the world on child rearing, couple's satisfaction with marriage, or conflict causes differences between a couple concerning values regarding a child and expectation on a child rather than the external environment such as parents' educational attainment and status of employment. Factors such as parents' educational level, occupation, income, satisfaction with marriage, social support, and quality of life affect the child rearing attitudes (Kim & Park, 2000; Mun, 1998/1999), but these variables do not always affect the coincidence of parents' child rearing attitudes. If parents have higher education and income levels and professional occupations, there are no change in occupation and less depression. When parents believe they have high satisfaction with marriage, social support, and quality of life, they have positive and efficient child rearing attitudes (Kim & Park, 2000; Mun, 1998/1999). Note, however, that the issue on whether parents' child rearing attitudes coincide is related to religion or couple's relationship quality − such as satisfaction with marriage and couple's conflict − rather than the external environment such as educational level or employment.

The quality of couple's relationship such as satisfaction with marriage and couple's cohesion is a factor that can forecast the coincidence of parents' child rearing (O'Leary & Vidair, 2005; Winsler, Madigan, & Aquilino, 2005). When parents have many conflicts in married life, and they are dissatisfied with married life, they have a negative outlook and show non-coincidences in child rearing. Meanwhile, if parents have less conflict in married life, and they are satisfied with married life, they show positive, coincided attitudes on child rearing (Lee, 2007). Parents precisely perceive each other's child rearing attitudes since they have coincided child rearing attitudes. When parents with non-coincided child rearing attitudes see inaccuracy in the other's child rearing attitudes (Winsler et al, 2005), it is important to try to have an opportunity to perceive each other's child rearing attitudes. In other words, coincided child rearing attitudes between the couple are possible by having an opportunity to understand each other's child rearing attitudes. When the couple's positive relationship is maintained, parents have more communication opportunities, sharing thoughts and views together; therefore, the quality of the couple's relationship can be said to affect the coincidences of values regarding a child or expectation on a child.

The coincidence of parents' expectation on a child affected the child's communication capability, small muscle development ability, problem-solving capability, and dietary habit and bowel movement/washing habit. The consentience of parents' child rearing attitudes leads to the child's positive development. When parents' child rearing attitudes showed more coincidences, the child's emotional perception and expression abilities were higher, and the relationship with teachers were good (Bae, 2004). Likewise, the child's sociability and society-friendliness and leadership were higher, and capable attributes were demonstrated among peers (Kim & Kim, 2010). In addition, socially capable attributes were shown, with children positively behaving when they play (Martin et al, 2007). Meanwhile, when parents' child rearing attitudes were not coincided, a child showed negative play behaviors (Shim, 2006), and more problematic behaviors were demonstrated (Lee, 2007). When parents have positive expectation on a child, it means that the mother and father show consistent child rearing behaviors within a family, and parents' consistent roles and behaviors can positively affect a child's development. Coincidence of opinions on child rearing draws more agreement and cooperation for the child's present and future life (Winsler et al, 2005). Thus, both parents can support and bring up children positively, and children can positively develop with positive habits.

This study found out that the status of parents' religion consentience and the status of parents' perception on couple's relationship consentience help parents have coincided opinion on child rearing, and that coincided values regarding a child and expectation on a child affect child

development. Consequently, there is a need to come up with parental education or social support measures so that parents can share the values regarding a child and expectation on a child together by raising the quality of couple's relationship and through communication opportunities. Such support can positively affect child development.

This study had limitations, e.g., the surveyed children are young, K-ASQ, a test for development, is a selective test. This study performed analysis based on the scores of the test results. More and better study findings can be produced if children are older and more precise development tests are conducted. The following suggestions are presented for more developed discussions on parents' child rearing:

First, there is a need to study what variables of parents forecast child rearing attitudes in particular through a structure equation model and to study how they affect child development. More detailed discussions need to be carried out through variables' interaction effects and mediation effects by examining parents' variables' direct/indirect impacts.

Second, more studies on the characteristics of child rearing by mothers and fathers need to be conducted. Consentience of positive and negative child rearing attitudes will be different in terms of impacts on child development. Although parents' child rearing attitudes do not coincide, parents can play a complementing role to each other. For this reason, studies wherein the combinations of the characteristics affect child development need to be conducted.

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A Study on BMI of Infants in Poverty

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The purpose of this study is to compare BMI and the related risk factors and protective factors of infant in poverty with those of infant in non-poverty, to examine the effects of the related factors, and to suggest the practical intervention and the functions of social welfare service. Subjects for this study were 1,904 infants in 10~18months for Panel Study on Korean Children (PSKC). The BMI of infants in poverty showed a little higher point (p < .1) than in non-poverty. In general, male infants got higher BMI than female and it turned out that poverty makes positive influence on BMI. Infants in poverty have bad eating habits, lots of parents' marital conflict, bad parenting style and physical environment comparison with in non-poverty. However, only gender and Y/N for poverty was shown as the factors making effects on BMI, and the other factors did not prove any influential relation. It's the time to take notice of the matter of 'misnutrition' not 'malnutrition' in poor infants based on the result of that the BMI of infants in poverty is higher than in non-poverty. As it turned out that there are differences between households in poverty and non-poverty based on every variable of eating habits, parents' marital conflict, parenting style, physical environment in infants, social service should be offered from pre-infancy, that is fetus period and make an intervention in the whole family members including parents as well as infants; the range of it should be extended to neighborhood communities to improve physical environment. This study has significance of verifying that BMI number is already high in poor infants by actual measurement.

The health of childhood is accumulated as underlying assets influencing on learning during adolescence and working after early adulthood in one's whole life. The situation of poverty during childhood might cause matters of development and adaptation widely beyond economic hardship, it brings about arresting a sense of well-being in a daily life, and leads to bad results in the multi-dimensional ways to adulthood. However, poverty doesn't show an instant effect on health in childhood, but rather influences potentially in various ways through a lifetime after childhood, so it's hard to make an alternative to solve the problem (Kim et al., 2007). Therefore, the greater part of discussions about the health of children in poverty has been concentrated in the area of that is easy to establish a fact or has clear points. Thus, the majority of studies on social welfare fields has been about nutritional shortcomings, stunted growth, developmental delays and the like, while studies have been carried out mainly about infections diseases or malnutrition in the medical area. This phenomenon of concentration in a certain area is a universal feature as well as our own country, so it's already come to the fore to reflect on how unbalanced investment of resources has been made clinging to one or two indicators like the death rate of infants along with the growth of the study on health equity (Lee, 2007. requoted Jean Grand). Now, the study on the poor health of children in poverty should begin from the shift of paradigm from 'the elimination of deficiency', 'the compensation of lack' to 'the pursuit of balance', 'the guarantee of well-being. We are moving toward 'healthy daily life'.

A threatening increasing trend of overweight in developed countries has been eased due to the tendencies of seeking 'Well-bing, Life of Health & Sustainablity (LOHAS)' in developed countries or the rich, by comparison, it's been identified worldwide that overweight has been increasing rapidly in number in developing countries, underdeveloped countries and the poor in developed countries (Nam et al. 2006), and it highlights the matter of health equity since developed countries not only have been exporting the phenomenon of overweight to developing countries, but also led overweight to become 'global disease' from 'advanced country disease' (general meeting of American Association for the Advancement of Science (AAAS), 2002).

Even in our country, the tendency of overweight is more frequent in the poor than the middle class, and this phenomena has been repeatedly verified among school-age children. What was worse, the number of obese teens which has almost doubled 10.8% in 2008 compared with 5.8% in 1997 and has been probed to have a larger increase than the rate of adult obesity rose to 30.7% in 2008 from 26.0% in 1998 (mw.or.kr, 2011). Accordingly, this study intends to see if this consequency appears in infancy too. If there is already a greater tendency of overweight in the poor from infancy, constant intervention should be made in eating and activities from the previous time, prenatal period and right after birth. However, if there is no difference or rather the tendency of overweight is less during infancy, it can be found that the period of infancy and early school age is at a critical time to increase overweight for the children in poverty, so it'll be available to practice intensive intervention based on the evidence.

Theoretical Background

The Overweight of Infants in Poverty

Overweight among other health problems of children in poverty is thoroughly interlinked with many-sided difficulties in poverty like the lack of care caused by low pay and long working hours of their parents related to labor problem of the poor (Prea, 2005), housing environmental problem of poor spatial structure for stable physical activity (Lissau et al., 1992; Burniat et al., 2006; Lee et al., 2000, Hillary et al., 2004), poor families are forced to choose cheap food because of the weakness of price elasticity (Bhattacharya, 2001; Prea, 2005) and so on. Overweight gives rise to teasing, discrimination and rejection (Henry, 2005, Jane 2005); it's worse than racial prejudice (Smith, 2000, requoted Monello & Mayer, 1993; Abudayya, A., 2007, requoted Crandall) and influences on emotional stress and social skills (Hong et al., 2009; An & Park, 2006).

BMI Related Factors in Infants

Eating habits. It's been reported that skipping breakfast, eating disorders, overeating habits, fast eating habits, the preference of flour based food and fast food, the habits of eating more snacks than staple food, choosing foods with low nutrient and high calories and the rest known as eating habits against health, and also, the low accessibility of fresh fruit and vegetables, low eating rate of milk or diary products and etc are making negative effects on health (Park, 2008; Park, 2007; Kim, 2001). It could be helpful to grasp the confusing affect-relation between poverty and overweight by understanding the situation of food insufficiency and food insecurity although many action contents of eating habits to prevent disease are overlapped as risk factors and protective factors for overweight (Bhattacharya, 2000). It causes overweight to have such eating habit of having food as much as can and accumulating it due to food insufficiency in poor families bringing about cyclic disturbance (Alaimo, 2000).

Martial conflict. It's been made certain that the level of martial conflict has higher predictability than the pattern of family structure about emotional, behavioral maladjustment of adolescents according to the results of the study on comparing the degree effect of broken family and marital conflict of teenagers in poverty. That is to say, the hostile atmosphere due to martial conflict, rather than the structural defect itself at home, leads to malfunction of a family and makes more strong effects on adolescents' depression, anxiety and misbehavior (Lee et al., 1993). Besides, it's been informed that children from a family has strong martial conflict shows hight tendency of overweight (Choi, 2008).

Parenting style. In general, the quality of the relationship between parents and children is measured by parents' rearing attitude, and attachment relationship with parents and parents' guiding and supervision is mentioned as a sub-function connected to parental behavior (Lee, 2008; Jeong et al., 2006). It is known that the relationship between parents and children in needy families is

strongly inclined to be dominating and closed rather than being open and affective, and shows more negative actions like refusal and neglect rather than protection (Lee, 1997). It's been certain that a family providing structured parenting and distinct nonverbal and verbal communication with clear rules and expectations leads children's health behavior; it's more dangerous for children to get overweight in a family with lack of communication, democratic parenting (Chen, 2002), the absence of parental support or over-protecting (Lissau et al., 1994). In particular, during late childhood parents' neglect has more influence than parental education or occupational characteristics on overweight (Lissau et al., 1994). On the other hand, Allison et al., (2007) are saying that there were no effects of parenting in relation to the behaviors of the children of the age from 10 to13 in selecting food.

Physical environment. Children living in low-income areas have more problems of physical health than children in middle-class families (Brooks-Gunn et al.). Above all, stunted growth is partly interconnected with the situation of generation in poverty, while overweight is rather related to local and social phenomenon (Crooks, 1999). The lack of close and good personal relationships, insecure neighborhoods, and high crime rates (Burdette, 2004) gives rise to the so-called socio-spatial exclusion providing vulnerable physical environment and unfavorable social changes. Merten brings up the circumstances in which not only problems of shortage of playgrounds, open rooms, weak regional infrastructure, city sprawl matters, but also it's hard for children to ride a bike in the area of overcrowded dwellings (Merten, 2005). Russ Lopez insisted that walk ability is more important than education or income variables after had researched a link between city sprawl and overweight, and cited that schools, sidewalks, controlled intersections, playgrounds as positive environment for physical activities (Prea, 2004). The results of studies in Denmark also suggested that physical environment at home and community level is a more important factor to cause children's overweight than educational level or family purchasing power (Burniat et al., 2006).

Sex distinction. Overweight is appearing more in boys than girls, but the level of mental health was lower in girls than boys (Min, 2007). Even if it's been told that overweight is found in more boys than girls, there is possibilities that the rate of overweight might be higher in girls than boys in some cases since it's more common for girls to stay indoors following cultural norms and this makes them easily access to food (Abudayya, 2007). Based on gender, it shows difference in the way to control weight; usually women go on a diet, but men tries to control weight through exercise in developed countries (Wang, 2001).

Age. There is an ongoing heated debate on the issue of health divide in childhood and adolescence. West (1998, 2004) and Martin et al. (2007) argued that the slope of correlation between socio-economic status and health becomes alike relatively in childhood, and then it gets changed again showing strong correlation in adulthood, whereas Chen(2006) presented the result of study on that the interrelation between low-income and poor health which appears in childhood becomes more distinct in adolescence. In this connection, numbers of other scholars have been constantly producing conflicting results depending on each situational context in their own countries (West, 1998, 2004).

It can be seen that fourth graders in poverty showed slightly high BMI with no significant statistical differences, but for the case of fifth graders in poverty resulted high BMI on the level of $p < .01$ in the comparative study of children in poverty and non-poverty by actual measurement of height, weight of fourth, fifth, and sixth graders.

Method

The Selection of a Target Population and Sample in Study

This study represents a population of the nation’s households with newborn babies born in medical institutions in 2008. It looked at 1,904 households Child care Policy Institute chose from 2,078 households of newborn babies born in sampled obstetrics and gynecology hospitals across the

country by multi-stage stratified sampling for Panel Study on Korean Children (PSKC).

The Definition and Measurement of Variables

BMI. In this study, the actual measurement of height and weight of infants in the panel was used to calculate BMI. Meyer et al.(2009) underlined that it's crucial to get objective data showing that the data height and weight based on self-reports from patients with eating disorders has produced errors of BMI. A number of BMI is taken by converting height into m, and squaring it, and then again dividing by weight; it can cause a big difference with slight errors in height and weight on BMI, so the actual measurement of this panel and the use of BMI with it can be considered as an important data.

Eating habits. The following questions are related to infants' eating habits in the panel: 'Unlike before, my baby keeps food in his or her mouth rather than chewing and swallowing it and eats only what he or she likes, but he or she eats lunch relatively well.' 'My baby can use a spoon to a certain degree when hungry or eating food he or she likes. my baby can use a cup.' 'He or she can put down the cup after drinking or is able to hold it with one hand.' 'My baby can eat by himself although he or she needs help sometimes. The question, 'Unlike before, my baby ~.' seemed to be vague to judge, so it's excluded from those four questions, and then assessed eating habits as risk factors related to children's BMI through conversely coding the remaining three questions.

Martial conflict. The following 8 questions in total have been surveyed on a 5-point scale and took an average with it to use to mark the score of martial conflict: 'My husband and I get into a small argument that ends up becoming a big fight, criticism, swearing, and bringing up the past.' 'y husband criticizes or disregards my feelings, opinions, or wants.' 'My husband tends to think rather negatively of my opinions and words instead of considering my intentions.' My husband is not likely to respect me.', t is no use telling my husband what I really think, feel, or want to change our relationship.', 'I seriously think about how things would have turned out had I married another man.' 'I am not happy with my marriage.', 'We avoid each other after an argument since we do not want to get into another argument.'

Parenting style. The following 6 questions in total: 'I spend time playing with my child.', 'I instantly take proper action if my child gets frustrated or he or she becomes fretful.', 'I perform the actions that my child needs (ex.: feeding, bathing, dressing) very well.','I show positive, affectionate, and warm interest in my child.' 'I am flexible to some degree in regard to my child's behaviors.' and so on. Each one was surveyed on a 5-point scale and took an average with it to use to mark the score of parenting style.

Physical environment. The following 3 questions have been surveyed on a 5-point scale, and took an average with it to use to mark the score of physical environment ; 'Is your neighborhood safe for your child?', 'Is your neighborhood safe for your child regarding accidents such as traffic accidents, fires, falls, etc.?', 'What do you think of your neighborhood in general as a place for raising your child?'

Y/N for poverty. The major institutions or countries take 50% of average earnings as the calculating method of relative poverty line. In this study, the poverty line was regarded as 1,924,000 won, which is 50% of the average monthly income 3,858,000 won per a household (more than two members) based on the data ' The family trend in the first quarter of the year (mw.go.kr. May 20, 2011)' from the National Statistical Office, and 2,000,000 won which was set as the standard of division between poverty and non-poverty groups is the closest to the data of Korea Child Panel surveyed by 500,000 won.

Data Analysis

The analysis methods to analyze the data of this study is below: SPSS 18.0 for Window was used for statistical process.

First, figured out the average and standard deviation of descriptive statistics to look into the

socio-demographic features and general tendencies of the object of study. Second, took a t-test to compare BMI of infants in poverty and non-poverty by sex and Y/N for poverty. Third, took a t-test to compare health risk factors of eating habits, parents' martial conflict and protective factors of parenting styles and physical environment between infants in poverty and non-poverty. Fourth, verified to see the effects of socio-demographic variables, risk factors, protective factors between infants in poverty and non-poverty on BMI through carrying out regression analysis.

Results

General Features and Descriptive Statistics of Key Variables

The gender composition of the infants in the total population of households was alike : female infants accounted for 49.5%, and male infants for 50.5%. Among them, infants in poverty with under 2,000,000 won of monthly income took for 26.2%, and infants in non-poverty for 73.8%. The mean of the age of months of the whole target infants was 14.07 months and the mean of their BMI marked for 16.96. The mean of eating habits marked for 3.07, martial conflict for 2.04, parenting style for 3.89, physical environment for 3.21.

The Comparison of BMI Distinctions in Gender and Y/N for Poverty

Table 1
General Features and Descriptive Statistics of Key Variables

Variables	*f* (%)	*M*	*SD*	Min	Max
Sex					
Male	962 (50.5)	-	-	-	-
Female	942 (49.5)	-	-	-	-
Total	1904 (100.0)	-	-	-	-
Y/N for poverty					
Poverty	496 (26.2)	-	-	-	-
Non-poverty	1397 (73.8)	-	-	-	-
Total	1893 (100.0)	-	-	-	-
The age of months	1904	14.07	1.08	11	18
Bad Eating habits	1891	3.07	0.83	1.00	5.00
Martial conflict	1888	2.04	0.77	1.00	4.88
Parenting style	1901	3.89	0.49	2.00	5.00
Physical environment	1897	3.21	0.71	1.00	5.00
BMI	1116	16.95	1.98	9.50	33.33

The mean of BMI of the target turned out to be 17.32 for male infants and 16.67 for female infants. The mean difference of BMI in gender is 0.56. 'The mean BMI of 6 countries on overweight and overweight children from 2- 18 years old by sex' (Cole et al.,2000) providing the gender standard based on age at six-month intervals also shows that male infants at two years old (24 months old) has 0.4 points higher. Like this panel, in the study of comparing the mean BMI based on actual measurement of height and weight of 4th,5th,6thgraders at elementary school targeting 458 children marked a difference of 0.94 point upon each got 19.55 and 18.61points by gender(Shin, 2011). It presented that the difference of 0.56 in the mean of BMI between females and males in this study is similar to the international standard of 0.4 in infancy, but then later it made a wide gap of 0.94 and showed the difference in gender became bigger according to the specific baseline of 0.1 as compared with the difference of 0.1 in the BMI of 11 years old by gender in 'The mean BMI of 6 countries on overweight and overweight children from 2- 18 years old by sex' (Cole et al., 2000).

It said that the BMI mean of infants in poverty was 17.14 and in non-poverty was 16.89. The mean of BMI of infants in poverty was 0.25 point higher than infants in non-poverty at the

significance level of $p < .1$. Likewise, it showed the statistical difference of 1.09 point at the significance level of $p < .001$ that the BMI mean of poor infants was 19.46 and 18.37 for non-poor infants in the study of comparing the mean BMI based on actual measurement of height and weight of 4th, 5th, 6th graders at elementary school targeting 458children (Shin, 2011). It showed the gap of BMI became wider between infancy and childhood in poor and non-poor children.

Table 2
The Comparison of BMI Distinctions in Gender and Y/N for Poverty

Variables	*f*	*M*	*SD*	*t*
Sex				
Male	556	17.23	1.90	4.817***
Female	560	16.67	2.02	
Y/N for poverty				
Poverty	284	17.14	1.89	1.831†
Non-poverty	824	16.89	2.01	

†$p < .10$. ***$p < .001$.

The mean of bad eating habits, which work as risk factors for the growth and development in children, came out as 3.14 in poor infants and 3.04 in non-poor infants; the mean of martial conflict was 2.13 in poor infants and 1.99 in non-poor infants. Thus, it turned out that poor infants have worse eating habits et al., parents' marital conflict than non-poor infants. In parenting style, poor infants got 3.83 point, which is lower than 3.91 point in non-poor infants, and also in the side of in physical environment, poor infants got lower point of 3.00 than 3.28 point in non-poor infants.

Table 3
The Comparison of the Mean of Several Factors Related to BMI in Poor or Non-poor Infants

Variables	*f*	*M*	*SD*	*t*
Bad eating habits				
Poverty	491	3.14	0.82	2.344*
Non-poverty	1389	3.04	0.82	
Martial conflict				
Poverty	490	2.13	0.83	3.175**
Non-poverty	1388	1.99	0.74	
Parenting style				
Poverty	495	3.83	0.51	-3.327**
Non-poverty	1395	3.91	0.48	
Physical environment				
Poverty	492	3.00	0.70	-7.564***
Non-poverty	1394	3.28	0.69	

*$p < .05$. **$p < .01$. ***$p < .001$.

By multi-regression analysis, it brought about that gender and poverty makes effects on overweight. Accordingly, female infants($\beta = .066$) showed high point of BMI than male infants($\beta = .150$) in poverty. However, it didn't show any affect-relation on risk factors like eating habits, parents' marital conflict and protective factors like parenting style, physical environment in infants.

Table 4
The Factors Influencing on BMI

Variables	BMI		
	B	*β*	*t*
Socio-demographic factor	.577	.150	4.956***
Sex	-.050	-.027	-.886
The age of months			
Y/N for poverty	.291	.066	2.173*
Risk factor	-.049	-.021	-.664
Bad Eating habits			
Martial conflict	.045	.018	.571
Protective factor	-.145	-.037	-1.165
Parenting style			
Physical environment	.114	.041	1.332
Constant	17.534	-	16.271***
R^2		.169	
Adjusted R^2		.029	
F		4.557***	

*$p < .05$. ***$p < .001$.

Conclusions

This study aimed to get theoretical basis to enhance health in infants from poor families and draw practical implications in social welfare practice through examining the inter-related factors of BMI in infants. The process of looking into the BMI of infants in poverty and non-poverty and differences of risk and protective factors influencing on BMI to find the several factors making effect on BMI in infants has suggested that we should strengthen our understanding on the BMI in infants and indicated the point of preventive intervention.

The Findings in the Study

The BMI of infants in poverty showed a little higher point ($p < .1$) as the result of the comparison of the BMI between infants in poverty and non-poverty. In general, male infants got higher BMI and it turned out that Y/N for poverty makes positive effects on BMI based on the research of the effects of socio-demographic, risk, protective factors on BMI in poor infants and non-poor infants. As the result of comparing the mean of several factors related to BMI in poor infants and non-poor infants, infants in poverty have bad eating habits, lots of parents' marital conflict, bad parenting style and physical environment. However, only gender and Y/N for poverty was shown as the factors making effects on BMI, and the other factors did not prove any influential relation.

Implications in the Study

It's the time to take notice of the matter of 'misnutrition' not 'malnutrition' in poor infants based on the result of that the BMI of infants in poverty is higher than in common infants. As it turned out that there are differences between households in poverty and non-poverty based on every variable of eating habits, parents' marital conflict, parenting style, physical environment in infants, social service should be offered from pre-infancy, that is fetus period and make an intervention in the whole family members including parents as well as infants; the range of it should be extended to neighborhood communities to improve physical environment. In the point of that overweight in poor

families is strongly correlated to multi-sided difficulties of working conditions of family members, housing quality, poor diet, the intervention of social welfare should be made from infancy. Within social service, it should be checked out that children keep standard weight and the pace by periods. Various study results of the effects of poverty on overweight in childhood have been mixed in our country so far; this study has significance of verifying that BMI number is already high in poor infants by actual measurement.

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Infant Temperament & Maternal Parenting Stress

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1. Analysis of Relationship Between Infants' Temperament and Parenting Stress in Terms of Moderating Effects of Maternal Factors

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2. Mediating Effect of Maternal Parenting Stress on Maternal Depression and Infants' and Toddlers' Temperamental Negative Emotionality

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3. Relationship Among Infant Temperament, Parenting Stress, Parenting Style and Infant Development: Multigroup Analysis for Gender Difference

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Analysis of Relationship Between Infants' Temperament and Parenting Stress in Terms of Moderating Effects of Maternal Factors

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This study analyzes the relationship between infants' temperament and mothers' parenting stress, by focusing on the interaction between infants' temperament and maternal factors. The subjects used were 1,120 infants and their mothers from a national sample. The Emotionality, Activity and Sociality (EAS) Temperament Survey for Children: Parental Ratings was used to measure infants' temperament, and Parenting Stress Index-Short Form), KMSS (Kansas Marital Satisfaction Scale (PSI-SF) and a survey on socio-demographic variables were used for maternal factors. Two-way ANOVA analyses revealed that parenting stress was statistically significantly different according to infants' temperament. Most importantly there were significant interactions between infants' temperament and maternal factors (education level, employment status and marital satisfaction). The results were interpreted in terms of the goodness of fit model of temperament and parenting.

Based on the fact that, more so than the event itself that causes stress, an individual's cognitive evaluation of how much importance the stress-causing event can vary the degree of how much an individual feels stress, parenting stress can become an important cognitive aspect for predicting parenting behavior (Abidin, 1992). It was shown that the more parenting stress a mother experiences, the less desirable parenting behaviors the mother displays. Furthermore, it was shown that: mothers' parenting stress can have a negative influence on the child's development; as mother reported to experience more daily parenting stress, she tended to act irritated in her interaction with her child and it increased the child's aggressive responses (Patterson, 1983). According to Crnic and Greenberg (1990), mother's stress, which is created in daily interaction with her child, could have influence on the child's problem behavior, and, furthermore, it could damage healthy family function.

Parenting stress is influenced by several variables. Belsky (1984) suggested that children's characteristics, as well as parents' psychological characteristics, and contextual characteristics as factors can have influence on the parents' parenting behavior in his parenting process model. Abidin (1992) also divided them into child factor, context factor, and maternal factor. As for the child factor, he suggested temperament characteristics such as child's adaptability, acceptability, mood, and distractibility. Different temperament generally leads to different reaction from the mother (Bell & Chapman, 1986). He emphasized that the child's temperament influences parenting stress, which the mother recognizes, and, due to this, it has a connection to parenting behaviors. Actually, it has been known that children who have extremely negative emotionality, which makes them vulnerable to get the pip easily, or who anger easily and are difficult to soothe not only make parents tired and exhausted with excessive energy, but also displays problem behaviors and negative development (Buss & Plomin, 1984). Also, among temperaments, it was shown that parenting stress was higher for mothers of children with higher negative emotionality (Jo, 1999; Han, 1996; Oestberg & Hagekull, 2000).

In addition, competence, attachment, depression, repression and health are presented as maternal factors depression and relationship with spouse and social isolation are presented as context factors. Many studies (Jin, 1993; Lee, Yi, Yoo, Cho, 1991; Park, 1997) have reported that socio-demographical factors such as mother's education level or her employment status can have influence on parenting stress. There are some debates on the relationship between education level and parenting stress. Some studies have reported that, when mothers' education level were high, they felt less difficulties in parenting their children, had less stress and psychological damages, and felt less pressured in playing the mother's role (Lee, Yi, Yoo, & Cho, 1991). It has been interpreted as that the higher mothers' education levels, the more plentiful their abilities to utilize resources for themselves and the better they

could understand the reason of stress. However, Oh (2001) has reported that mothers having higher education levels showed higher level of parenting stress. Studies which examined relationship between mothers' employment status and parenting stress also have shown inconsistent results. Park (1993) has shown that employed mothers had higher stress level as they thought that they could not play the role of a parent to their children due to work. On the other hand, Heo and Yun (2002) have shown that employed mothers felt less limit of parenting roles than unemployed mothers.

And, finally, the relationship between marital satisfaction as one of mother's psychological characteristics and parenting stress was considered. Since there were a few precedent studies dealing with marital satisfaction of mothers with their spouses and their parenting stress, it is only possible to examine the relationship indirectly. Cobb (1976) have suggested that social support, which could be provided by close people such as family and relatives, functioned to reduce stress or to make mothers adapt better in situations with high stress. Especially, Jeon and Park (1996) have emphasized the influence of spouse's support among social support systems. They have suggested that spouse's support showed the largest effect in reducing stress, and that the satisfaction level of spouse's support showed negative correlation with parenting stress. Therefore, marital satisfaction can have influence on reducing parenting stress.

This study looked at the variables influencing mothers' parenting stress, especially focusing on the infants' temperament and maternal factors. For maternal factors, mothers' education level and employment status (i.e., socio-demographical characteristics) and marital satisfaction (i.e., psychological factor) were selected. The research questions were as follows:

1. Is the mothers' parenting stress significantly different from infants' temperament (emotionality) and maternal factors (education level, employment status, and marital satisfaction)?
2. Is there any interaction between the infants' temperament and maternal factors (education level, employment status, and marital satisfaction) on infants' parenting stress?

Method

Participants

This study used the data from 1,120 infants from Panel Study on Korean Children (PSKC) were recruited from April 2008 to July 2008 in Korea(Seoul, Gyeongi, Chungcheong, North Gyeongsang, South Gyeongsang and Jeolla provinces). There were 562 (50.2%) boys and 558 (49.8%) girls. The average age of infants was 5.36 months (ranging from 4 months to 10 months). Also, the mean age of the mothers and fathers was 31.36 years (ranging from 19 years to 46 years) and 33.65 years (ranging from 19 years to 51 years), respectively.

Materials

Infant temperament. The Emotionality, Activity and Sociality (EAS) Temperament Survey for Children-Parental Rating, by Buss & Plomin (1984) was used. Three subscales of EAS such as emotionality, activity and sociality were measured but for this study emotionality was primarily focused. Emotionality contains 5 items that were rated on a 5-point Likert scale ("not at all" (1 point) to "extremely" (5 points)). The possible score range for this subscale is 10 points to 25 points and higher scores on the ESA indicate higher levels of negative emotionality such as anger and negative feeling. Cronbach's alpha for the current study was 0.69.

Parenting stress. Parenting Stress Index-short Form (Abidin, 1990) developed and revised by Kim and Kang (1997) were used. It was composed of 8 items rated on a 5-point Likert scale (strongly disagree to strongly agree) and ranged from 8 points to 40 points. Higher scores on the PSI indicate higher levels of parenting stress. Cronbach's Alpha for the total score was 0.93.

Marital satisfaction. RKMSS (Revised-Kansas Marital Satisfaction Scale) revised into KMSS (Kansas Marital Satisfaction Scale) by Chung (2004) was used for assessing the marital

satisfaction. RKMSS contains 4 items rated on a 5-point Likert scale (strongly dissatisfied to strongly satisfied) and ranged from 4 points to 20 points. Higher scores indicate higher satisfaction and lower scores indicate dissatisfaction. Cronbach's Alpha for the total scale was 0.91.

Procedure

This study used the data from 1,120 infants in PSKC. EAS temperament scale was used to measure the temperament for the infants. The mothers were asked to complete questionnaires for temperament as well as questionnaires for education levels, employment status and marital satisfaction. Collected data were analyzed with SPSS WIN 12.0. The mean and the standard deviation were calculated to find the overall tendency for each variable, by using the descriptive statistic and *t*-value was also calculated by t-test to find out the differences on the parenting stress in terms of child temperament & maternal factors. Interaction between infants'temperament and maternal factors (education level, employment status, and marriage satisfaction) on parenting stress was obtained with a 2-way ANOVA. Reliability analyses on each measure were also conducted.

Results

Analyses of mothers' parenting stress in terms of infants' temperament and maternal factors.

Mothers' parenting stress was analyzed in terms of infants' temperament (emotionality) and maternal factors (education level, employment status and marital satisfaction).

Table 1
Parenting Stress by Infants' Temperament and Maternal Factors

Variable	*n*	*M*	*SD*	*t*
Infants' temperament (emotionality)				
Low	443	25.43	6.25	-9.21***
High	677	28.96	6.29	
Education level				
Low	354	28.11	6.57	1.96*
High	759	27.29	6.46	
Employment status				
Employment	303	26.88	6.25	-2.35*
Unemployment	817	27.63	6.16	
Marital satisfaction				
Low	510	29.86	6.78	11.34***
High	608	25.66	5.87	

* $p < .05$. *** $p < .001$.

As shown in Table 1, the mothers' parenting stress was different by infants' temperament (emotionality) (t = -9.21, $p < .001$) and maternal factors such as education level (t = 1.96, $p <$ .05.), employment status (t = -2.35, $p < .05$), and marital satisfaction (t = 11.34, $p <$. 001).

Interaction effects of mothers' parenting stress between infants' temperament and maternal factors.

Interaction effects of mothers' parenting stress between infants' temperament (emotionality) and maternal factors (education level, employment status and marital satisfaction) were analyzed.

Table 2
Interaction Effect Between Infants' Temperament and Mothers' Education Level on Parenting Stress

Variable	*SS*	*df*	*MS*	*F*
Infants' temperament	3459.29	1	674618.8	88.56***
Education level	46.22	1	3459.29	1.18
Infants' temperament X Education level	183.82	1	46.22	4.70*
error	43319.09	1109	183.82	
Total	891793.0	1113	39.06	

* $p < .05$. *** $p < .001$.

The significant differences between infants' temperament and the education levels of mothers on parenting stress were examined. As shown in Table 2, the main effect on parenting stress is statistically significant with infants' temperament ($F = 88.56$, $p < .001$). On the other hand, the main effect on parenting stress is not significant with the education levels of mothers. It is indicated that there are interactive effects between the infants' temperament and mothers' education level ($F = 4.70$, $P < .05$). As shown in the Figure 1, when infants' negative temperament of emotionality is high, the low education level of mother is indicative of synergy effect on parenting stress. Consequently, the infants' temperament and mothers' education level are interactive.

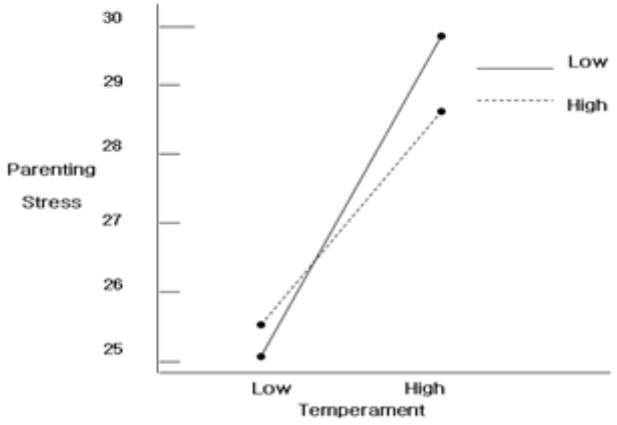


Figure 1. Interaction of infants' temperament and mothers' education levels.

Table 3
Interaction Effect Between Infants' Temperament and Mothers' Employment Status on Parenting Stress

Variable	*SS*	*df*	*MS*	*F*
Infants' temperament	1995.49	1	1995.49	50.96***
Employment Status	40.92	1	40.92	1.05
Infants' temperament X Employment status	224.97	1	224.97	5.75*
error	43700.86	1116	39.16	
Total	898534.0	1120		

* $p < .05$. *** $p < .001$.

The significant differences between the infants' temperament and employment status of mothers on parenting stress were examined. As shown in the Table 3, the main effect on parenting stress is statistically significant with infants' temperament ($F = 50.96$, $p < .001$). On the other hand, the main effect on parenting stress is not significant with the employment status of mother. It is indicated that

there are interactive effects between infants' temperament and employment status of mother (F = 5.75, P < .05). As shown in the Figure 2, when infants' negative temperament of emotionality is high, the Unemployment of mother is indicative of synergy effect on parenting stress. Consequently, the infants' temperament and mother' employment status are interactive.

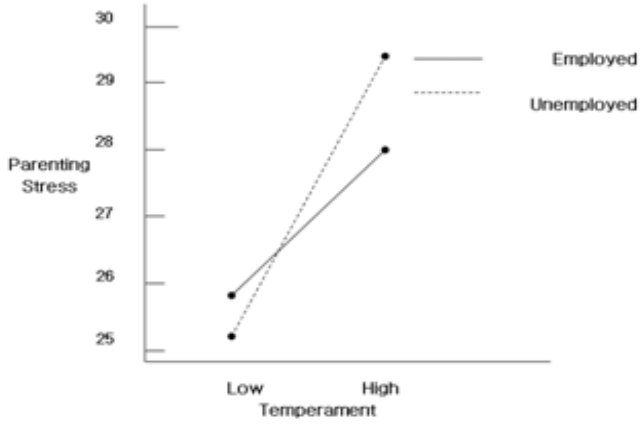


Figure 2. Interaction between infants' temperament and mothers' employment status.

Table 4
Interaction Effect Between Infants' Temperament and Mother's Marital Satisfaction on Parenting Stress

Variable	*SS*	*df*	*MS*	*F*
Infants' temperament	2752.43	1	2752.43	77.31***
Marital satisfaction	3649.60	1	3649.60	102.50***
Infants' temperament X Marital satisfaction	135.34	1	135.34	3.80*
error	39663.57	1114	35.60	
Total	897282.0	1118		

* p < .05. *** p < .001.

The significant differences between infants' temperament and the marital satisfaction of mothers on parenting stress were examined. As shown in the Table 4, the main effect on parenting stress is statistically significant with infants' temperament (F = 77.31, p < .001). The main effect on parenting stress is statistically significant with the mothers' marital satisfaction (F = 102.50, p < .001).It is indicated that there are interactive effects between the infant's temperament and mothers' satisfaction of marriage (F = 3.80, P < .05). As shown in the Figure 3, when infants' negative temperament of emotionality is high, the low marital satisfaction of mothers is indicative of synergy effect on parenting stress. Consequently, the infants' temperament and mothers' satisfaction are interactive.

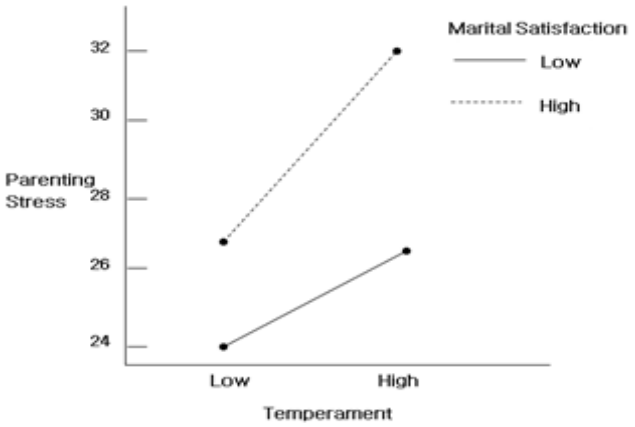


Figure 3. Interaction of infants' temperament and mothers' marital satisfaction.

Findings and Conclusions

This study set out to find out whether there are visible differences in parenting stress, based on infants' temperament and maternal factors such as education levels, employment status, and marital satisfaction. Furthermore, the study specifically targeted to explore the possibility of interactions between, as related to parenting stress, infants' temperament and maternal factors of education levels, employment status, and marital satisfaction. This is an in-depth look at whether the effects that infant temperament such as negative emotionality has on mothers' parenting stress would vary because of the mother's socio-demographics and psychological characteristics. The summary of the study results and discussions are as follows:

First, based on the observation for any differences in parenting stress according to infants' temperament and maternal factors, there was a significant difference. Looking at infants' temperament first, in situations with high negative emotionality of infants' temperament, high levels of parenting stress could be seen. The previous study that showed the mothers of children with difficult temperament, as compared to mothers of children without difficult temperament, having higher parenting stress (Nam, 2003; Han & Park, 1996) was in line with this study. And, the results of a study that showed the mothers of children with less adaptive temperament displaying high levels of parenting stress (Lee & Min, 2007) were consistent with this study. Therefore, strong negative emotional temperament can be seen as an influential factor that has a negative effect on parenting stress.

Looking at the education levels of mothers, mothers with lower education levels, as compared to mothers with higher education levels, perceived parenting stress more highly. This is contradictory to the study (Kim & Yoon, 2000) that has shown the mothers with education levels of college or higher experiencing high levels of parenting stress; this study agrees with a previous study (Yu, 2002; Jin, 1993, Park, 1997) that has shown that the higher the education levels, the lower the parenting stress. As such, due to the inconsistencies with the previous studies, it is difficult to conclude that there exists a relationship between the education levels of mothers and parenting stress. Hence, it is important to look at any potential impact on parenting stress, through the interaction between the education levels and other variables, as addressed by the second question of this study.

Looking at the employment status of mothers, it is shown that unemployed mothers, as compared to employed mothers, perceived parenting stress more highly. This study can be considered as being consistent with - albeit contrary to the study that has shown that employed mothers' feeling discomfort and anxiety because of the fact that they are not doing an adequate job of being a mother (Park, 1993) - the study that has shown that unemployed mothers, as compared to mothers in any occupations, recognized more highly the limitations of parents' roles (Heo & Yun, 2002), and the study that has

shown that unemployed mothers who are entirely responsible for child-rearing and housework have higher parenting stress (Park, 1994; Kim, 2004).

Looking at marital satisfaction, among other maternal attributes, mothers with low marital satisfaction levels, as compared to mothers with high marital satisfaction levels, are found to perceive parenting stress more highly. The study results that mothers with low marital satisfaction levels having higher parenting stress than the mother with high marital satisfaction levels (Kim, 2002; Choi, 2006), and the study results that marital satisfaction levels can uniquely exert influence on lowering of parenting stress (Kim, 2003; Park, 2004; Jeon & Park, 1996) are consistent with the findings of this study. It can be seen that the higher the marital satisfaction levels, the lower the mothers' negative and controlling parenting style and parenting stress (Kim, 2000; Belsky, 1984); it can be argued that high marital satisfaction levels, as result of both parents' sharing of parenting roles and husband's parenting support, can become a support system that can alleviate parenting stress.

Second, there appeared interactive effects between, as related to parenting stress, infants' temperament and maternal factors of education levels, employment status, and marital satisfaction. In cases of mothers with low education levels, when the negative emotionality of infant temperament runs more highly, parenting stress has a rising effect, therefore, exhibiting interactive effects between infant temperament and mothers' education levels. Since there haven't been any studies that considered concurrently the infants' temperament, mothers' education levels and parenting stress, it is difficult to compare the disparate results of this study showing the impact that infants' temperament has on parenting stress according to the education level of the mother. However, it is shown that, generally speaking, children who are quick to feel bad, react quite aggressively or cry when angered, parenting stress of the mother is higher (Kim, 2000; Kim & Cho, 2000; Kim, 2001; Lim & Hyun, 2002; Stoneman, Brody & Burke, 1989). In rearing children with these characteristics, it can be said that mothers'inadequate knowledge about parenting due to low education levels, and poor information and parenting skills can lead to mothers' experiencing even higher parenting stress. In cases of unemployed mothers, based on the higher negative emotionality of infant temperament having a rising effect in parenting stress, it can be inferred that there are interactions between infant temperament and employment status of mothers.

Since housework is relatively unstructured and repetitive, many women feel that the rewards from doing this type of work is in adequate; when combined with the physical fatigue from doing housework, it is reported that the stress from child-rearing can cause unemployed mothers to experience dissatisfactions and frustrations (Kim, 2000). In addition, due to the fact that unemployed mothers spend a lot of time in child-rearing, unemployed mothers lack personal time and feel the fatigue and pressure from parenting, and this can cause stress that can bring about a lot of changes in the traditional lifestyle of a mother and self-satisfaction. These characteristics of unemployed mothers, through the interactive effects with children with difficult emotionality and temperament, can result in a very high parenting stress.

In cases with mothers with low marital satisfaction levels, when their children's negative emotionality is higher, parenting stress has a rising effect it has been shown that there are interactive effects between infant temperament and marital satisfaction levels of mothers. The study that has shown that, in general, the better the relationship between the spouses, and the higher the mutual support for parenting, parenting stress is experienced less (Park, 1994; Crnic, Greenberg, Regozin, Robinson, & Basham, 1983) shows that the quality of inter-spousal relationship is a variable that can exert influence on parenting stress. Low satisfaction levels in spousal support can cause parenting stress (Jeon & Park, 1996; Hirsch & Rapkin, 1986), and also, in cases with children who have strong reaction and are easily irritable, parenting stress can be further exacerbated.

This study, in performing the role of parents, will serve as basic data for exploring parent's difficulties and factors that affect parenting stress. Based on the results of this study, if a suggestion could be made in regard to further studies, it is necessary to verify whether the study results can be generalized enough to a point of applying to the current issues in ever-increasing divorce and re-marriages, unstable families due to absentee parents, primary child-rearer in multi-cultural families.

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Mediating Effect of Maternal Parenting Stress on Maternal Depression and Infants' and Toddlers' Temperamental Negative Emotionality

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The purpose of this study was to investigate the effects of maternal depression and infants' and toddlers' temperamental negative emotionality, and to verify the mediating effect of maternal parenting stress between maternal depression and infants' and toddlers' temperamental negative emotionality. 1904 mothers having from 11-month old to 18-month old infants who had been the participants of Panel Study on Korean Children (PSKC) sponsored by Korea Institute of Child Care and Educations (KICCE) were asked to complete self-administered questionnaires and this study used the scales of maternal depression, infants' and toddlers' temperamental negative emotionality, and maternal parenting stress. The summary of the results was as follows: First, the maternal depression, maternal parenting stress and infants' and toddlers' temperamental negative emotionality were positively related. Second, maternal parenting stress was proved to have significant partial mediating effect on relationship between maternal depression and infants' and toddlers' temperamental negative emotionality. Through this study, we assured that the mediating importance of maternal parenting stress between maternal depression and infants' and toddlers' temperamental negative emotionality.

Infants' and toddlers' temperament is thought to be in nature, but environment and experiences also affects infants' temperament. Bates and Bayles (1984) suggested that infants' difficult temperament is related to the mothers' caring and parenting attitude. Goldsmith, Lemery, Buss, & Campos (1999) emphasized that behavioral genetic studies found, next to significant heritability, a significant contribution of environmental factors. In the period of childhood, temperament has been recognized as an important factor in general social functioning. Rothbart and Bates (2006) said that the earlier children develop fearful inhibition, the earlier they are motivated to avoid potentially threatening situations and the fewer experiences of these situations they will have.

Temperament has been recognized as an important factor in general social functioning and competence, including behavior with peers and peer acceptance for preschool to elementary school children (Eisenberg, et. al., 2003). and adolescents (Sanson, Hemphill, & Smart, 2004). Common dimensions of temperament based on the Thomas, Chess, and Birth (1968) model include activity level, biological rhythmicity, approach-withdrawal, adaptibility, intensity and quality of mood, sensory threshold, distractibility, and persistence.

More recent work utilizing a psychobiological approach (Rothbart & Bates, 2006) views a child's temperament as constitutionaly based individual differences in reactivity and regulation, influenced by heredity, maturation, and experience. The reactivity domain identified by Rothbart and Bates encompasses many of the attributes of the Thomas, et. al., (1968) model, including activity level, rhythmicity, approach-withdrawal, adaptability, intensity and quality of mood, and sensory threshold. The regulatory domain described by Rothbart and Bates is represented by two attention-related characteristics in the Thomas et. al model: namely, an attribute labeled as distractibility, and another one identified as persistence, with flexibility serving as the other "pole" of the second scale. Also, temperament refers to characteristic patterns of emotional reactivity that are relatively stable and at least partially influenced by early-developing biological systems (Rothbart & Bates, 2006).

Two traits that are central to most models of temperament are positive emotionality and negative emotionality. Positive emotionality includes such facets as positive affect, reward seeking and appetitive behavior, sociability (Shiner & Caspi, 2003). Positive emotionality is generally viewed as orthogonal to negative emotionality, which includes such facets as anxiety, sadness, anger, irritability, and negative mood reactivity. In this study, I am interested in infants' and toddlers' temperamental

negative emotionality, because negative emotionality predicts childhood emotional problems (Dougherty, Klein, Durbin, Hayden, & Olono, 2010). In this study, infants' and toddlers' temperamental negative emotionality means that infants and toddlers are likely to cry easily and be angry and irritated very oftenly.

Maternal Depression and Infants' and Toddlers' Temperamental Negative Emotionality

Maternal depression is of concern to pediatricians due to the adverse impact of depression on mother-child interactions and child developmental-behavioral outcomes (Field, 1998). The infant's safety is also a concern as depressed mothers are more likely to have thoughts of harming their children (Brandes, et. al., 2004), and are less likely to practice appropriate preventive care(Field, 1998). The association between maternal depression and poor child outcomes is one of the most robust findings in psychological research (Gross & Shaw, & Moilanen, 2009). Research has consistently found an association between maternal depression and increased risk for psychopathology among children of depressed mothers(Goodman & Gotlib, 1999). Compared to children of nondepressed mothers, children of depressed mothers are six times more likely to suffer from depression (Downey & Coyne, 1990). The risk, however, is not limited to depression or other mood disorders.

Josefsson and Sydsjö (2007) reported that maternal depresion related to the behavioral problems in their four-year-old children, and Gross, Shaw, & Moilanen (2008) suggested reciprocal relations between maternal depressive symptoms and boy's externalizing problems. Furthermore, maternal depression is also associated with alterations in children's psychophysiological systems associated with emotion regulation and expression. Alterations have been found in level of cortical activation, as assessed by EEG, autonomic nervous system activity, and stress hormone levels. Specifically, researchers have found that infants of depressed mothers exhibit reduced left frontal electrical brain activation in a variety of conditions (Dawson, Frey, Panagiotides, et. al., 1999). Studies of preschool children have also found atypical frontal brain activation in children of depressed mothers(Dawson, et. al., 2003). With respect to autonomic nervous system activity, researchers have found that infants of depressed mothers have higher heart rate and lower vagal tone than infants of nondepressed mothers (Dawson, et. al., 2001).

Mediating Effect of Maternal Parenting Stress

Children of depressed mothers also frequently live in a context characterized by high family stress, such as maternal parenting stress. The demands of parenting a young child create significant stress for almost all parents. Abidin(1992, 1995) proposed that parenting stress is created by a mismatch between the perceived demands of parenting and the resources available to meet those demands(Abidin, 1995) and can be defines as the negative mental response attributed to the self and the child created by "a series of appraisals made by each parent in the context of his or her level of commitment to the parent role"(Abidin, 1992, p.410).

Greater stress typically indicates poor outcomes in both the child and parent domains(Crnic & Low, 2002). Increased parenting stress has been repeatedly identified as a risk factor for higher levels of child disruptive behavior problems(Barry, Dunlap, Cotten, Lockman, & Wells, 2005). Although research identifying parenting stress as a risk factor for maladaptive parenting and negative child outcome is prevalent, the mechanism by which parenting stress impacts child outcome is still unclear(Deater-Deckard, 2005). Only there are several hypotheses: maternal depressive symptoms in the post natal period would be associated with long-twrm impairment of mother-child bonding(Moehler, Brunner, Wiebel, Reck, & Resch, 2006), and Van den Akker, Dekovic, Prinzie, & Asscher(2010) identified negative and positive parenting as environmental mechanism that were related to the development of temperament profiles over time.

The purpose of this study is to investigate the effects of maternal depression and infant' temperamental negative emotionality, and to verify the mediating effect of maternal parenting stress between maternal depression and infants' temperamental negative emotionality.

Method

Research Model

In the present study, we try to examine how the maternal parenting stress mediate the association between maternal depression and infants' temperamental negative emotionality. Our research model is as show in Figure 1.

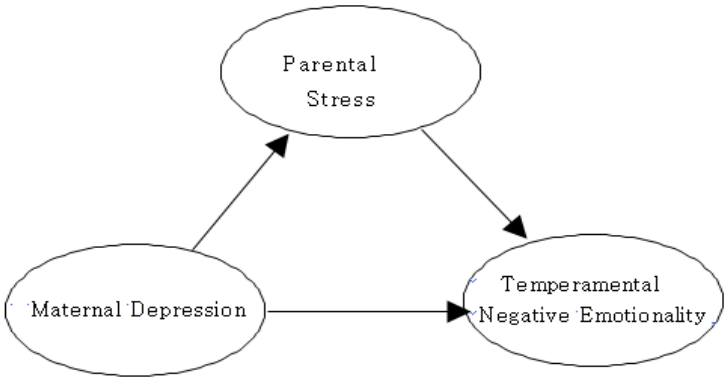


Figure1. Research Model Mediating Effect among Latent Constructs.

Participants

The data used in the present study were collected as part of a Panel Study on Korean Children 2nd year data. Participants were 1904 mothers who had and are caring for 962 boys and 942 girls. Average age was 14.07 months from 11 months to 18months. Mothers were 2 singles, 1363 married (first marriage), 17 married (second marriage), 4 divorced, 1 separated, Mothers' average age was 32.15 years old(from 20 years old to 47 years old).

Measures

Table 1
Category of Parenting Stress

Category	Contents
Parenting Stress 1: Maternal confident stress	I am not sure whether I will become a good parent. I am not sure whether I can raise my child well.
Parenting Stress 2: Emotional burn-out stress	I want to escape my child. My life is not as enjoyable after having my child. I get irritable if my child pesters me to play with him or her when I am tired.
Parenting Stress 3: Perfectional stress	I have difficulty being friendly and warm toward my child. I feel bad because it seems to be my fault when my baby appears emotionally unstable.
Parenting Stress 4: Trend catch-up stress	I feel my child lags behind others because I am not properly performing my role as a parent. I feel confused because there is a lot of child care-related information to choose from. I feel burdened by childcare costs.

Infants' and Toddlers' Temperamental Negative Emotionality Variable

Revised form of emotionality questionnaire (Buss & Plomin, 1984) was used for temperamental negative emotionality. Temperamental negative emotionality was defined as being emotional (T1 variable), getting fretful or frustrated easily (T2 variable), easily slipping into a bad mood (T3 variable) and throwing a tantrum when he or she is angry (T4 variable). It contains 4 items rated on a 5-point scale (Strongly Disagree, Disagree, Not Sure, Agree, Strongly Agree). This measure demonstrates fair reliability (Cronbach α = .69). High score indicate increased negative emotionality.

Maternal Depression Variable

Revised short form of depression questionnaire(Kessler, Andrew, Cople, Hiripi, Mroczek, Normand, Walters, & Zaslavsky, 2002) was used for assessing for maternal depression. Items included lethargic (D1 variable), difficulty in doing anything (D2 variable), persistently sad even if you tried?, many things to cheer up? (D3 variable) and that you are worthless? (D4 variable) in the last 30 days how often have you felt. These 4 items were rated on a 5-pont scale (Never felt, Sometimes not felt, Often not felt, sometimes felt, Always felt), Cronbach α was .80, so in this study, maternal depression variables have a good reliability.

Maternal Parenting Stress Variable

Parenting Stress Index is 4-item scale completed by the mother that was used to assess the source and degree of parenting stress. Items as shown in Table 1 are rated on a 5-point scale (Strongly Agree, Agree, Not Sure, Disagree, Strongly Disagree). This measure demonstrates good reliability (Abidin, 1995). We used the stress raw score (Cronbach α = .87) as an assessment of overall maternal parenting stress where higher scores indicate increased parenting stress.

Results

Variable Characteristics and Intercorrelations

Score range(minimum score and maximum score), means, standard deviations, and skewness, kurtosis and inter correlations among study variables are presented in Table 2 and Table 3.

Table 2
Descriptive Statistics

Variable	Min	Max	*M*	*SD*	Skewness	Kurtosis
Temperament 1 (*n* = 1893)	1	5	3.15	0.80	-0.06	-0.24
Temperament 2 (*n* = 1895)	1	5	2.73	0.91	0.15	-0.41
Temperament 3 (*n* = 1893)	1	5	2.33	0.83	0.63	0.54
Temperament 4 (*n* = 1894)	1	5	2.97	0.97	0.08	-0.45
Parenting stress 1 (*n* = 1897)	1	5	2.50	0.98	0.35	-0.39
Parenting stress 2 (*n* = 1897)	1	5	3.20	0.99	-0.23	-0.62
Parenting stress 3 (*n* = 1899)	1	5	3.65	1.06	-0.53	-0.40
Parenting stress 4 (*n* = 1897)	1	5	3.00	0.94	-0.14	-0.34
Maternal depression 1 (*n* = 1893)	1	5	2.34	1.02	0.42	-0.36
Maternal depression 2 (*n* = 1893)	1	5	1.81	0.81	0.97	0.98
Maternal depression 3 (*n* = 1893)	1	5	1.81	0.81	0.97	0.98
Maternal depression 4 (*n* = 1890)	1	5	1.66	0.73	1.19	2.16

Table 3
Correlations Among Variables

	D1	D2	D3	D4	T1	T2	T3	T4	P1	P2	P3
D2	.68***										
D3	.66***	.63***									
D4	.60***	.54***	.76***								
T1	.09***	.12***	.11***	.10***							
T2	.18***	.19***	.15***	.16***	.31***						
T3	.18***	.18***	.21***	.24***	.34***	.47***					
T4	.18***	.19***	.17***	.18***	.30***	.33***	.38***				
P1	.34***	.29***	.29***	.33***	.05***	.17***	.19***	.12***			
P2	.40***	.38***	.35***	.34***	.12***	.23***	.20***	.19***	.53***		
P3	.44***	.43***	.38***	.39***	.08***	.28***	.23***	.18***	.48***	.60***	
P4	.33***	.32***	.29***	.30***	.10***	.16***	.16***	.14***	.52***	.56***	.47***

Note. D1: maternal depression 1; D2: maternal depression 2; D3: maternal depression 3; D4: maternal depression 4; T1: temperamental negative emotionality 1; T2: temperamental negative emotionality 2; T3: temperamental negative emotionality 3; T4: temperamental negative emotionality 4; P1: parental stress 1; P2: parental stress 2; P3: parental stress 3; P4: parental stress 4.
***p <.001.

Result of Model Fit, Path Coefficients, and Mediation Test

Table 4 shows the results of the confirmatory factor analysis(CFA) on the three variables. The table shows that provided a good fit of the data: chi-square = 453.0, df = 51, p = .001, TLI = .989, CFI =.993 and RMSEA = .064. Table the chi-square was significant and TLI, CFI and RMSEA were reasonable. Table 5 and Figure 2 show that all paths were positive and statistically significant. Maternal depression contributed to parenting stress and infants' temperamental negative emotionality and parenting stress also contributed to infants' temperamental negative emotionality.

Table 4
Measurement Model Fit

χ^2 (df)	p	TLI	CFI	RMSEA
453.0(51)	.001	.989	.993	.064

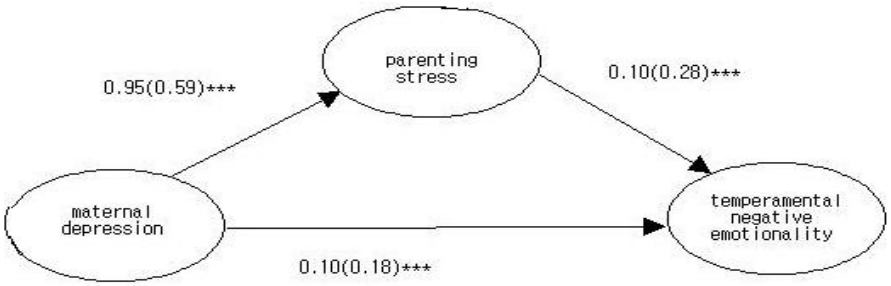


Figure 2. Path coefficients of mediation model.

Table 5
Path Coefficients and Significances

Path	B	B	SD	CR	SMC
Maternal depression → parenting stress	0.952	0.587	0.048	19.707***	0.344
Parenting stress → temperament	0.095	0.283	0.014	6.949***	0.172
Maternal depression → temperament	0.098	0.179	0.021	4.768***	
Temperament → temperament 1	1.000	0.481			
Temperament → temperament 2	0.531	0.649	0.096	15.993***	
Temperament → temperament 3	1.544	0.715	0.095	16.290***	
Temperament → temperament 4	1.379	0.544	0.093	14.830***	
Parenting stress → parenting stress 1	1.000	0.676			
Parenting stress → parenting stress 1	1.526	0.740	0.057	26.695***	
Parenting stress → parenting stress 1	1.186	0.794	0.042	27.945***	
Parenting stress → parenting stress 1	1.327	0.685	0.053	25.125***	
Depression → depression 1	1.000	0.754			
Depression → depression 2	1.091	0.792	0.032	34.184***	
Depression → depression 3	0.998	0.862	0.025	39.667***	
Depression → depression 4	0.469	0.795	0.013	36.367***	

***$p < .001$.

Mediating Test

We tested the Sobel's z test for the statistical significance, and the result of test was 6.42($p < .001$), so mediation effect was tested.

Table 6
Sobel 's Z test of Parenting Stress

	Z
Maternal depression → parenting stress → temperament	6.42

Competition Model Comparison

I compared my partial mediation model with complete mediation model, the differences of χ^2 test(df = 1) was 23.7, and this difference in .05 level was statistically significant, and our model of RMSEA was fitter(difference = .002) than complete mediation model. Therfore, Our partial model was fitter than complete mediation model.

Table 7
Result of Model Competition

Model	χ^2	df	TLI	CFI	RMSEA
Partial mediation	453.0	51	.989	.993	.064
Complete mediation	476.7	52	.989	.993	.066

Discussion

This study aimed to the effects of maternal depression and infants' and toddlers' temperamental negative emotionality, and to examine the mediating effect of maternal parenting stress between maternal depression and infants' and toddlers' temperamental negative emotionality. The finding indicated that maternal depression had effects on both maternal parenting stress and infants' and toddlers' temperamental negative emotionality, It means that preventing and treating maternal depression affects reducing maternal parenting stress and infants' and toddlers' temperamental negative emotionality, so in early period of maternal depression, we should be cautious to find the depression intervening strategies.

In this study, the explaining percentage of maternal depression in parental stress was 34.4%, but the explaining percentage of infants' and toddlers' temperamental negative emotionality in parental stress and maternal depression was 17.2%, so explaining power of infants' and toddlers' temperamental negative emotionality was small, so in future study, the variables for explaining of infants' and toddlers' temperamental negative emotionality is should searched including the genetic, biophysiological, biochemical and prenatal environmental variables such as HPA system, cortisol level, and child prefrontal brain activity (Ashman et al., 2008),

According to this study, maternal parenting stress was the important mediating variable between maternal depression and infants' and toddlers' temperamental negative emotionality, The current findings corroborate and expand upon results from the literature on the maternal stress and the effect of infants' behavior (Beebe, Badalamenti, Jaffe, Feldstein, Marquette, Helbraum, Demetri-Friedman, Flaster, Goodman, Kaminer, Kaufman-Balamuth, Putterman, Stepakoff, & Ellman, 2008), and the program for the reducing maternal parenting stress should be developed for improving the regulation of infants' and toddlers' temperamental negative emotionality. In order to diminish long-term adverse consequences for the mother and the child, there is a great need to recognize and treat women with depression and stress as early as possible.

My study has some limitations. The variable of infants' and toddlers' temperamental negative emotionality was answered through mothers' own survey, but the perception of materal temperamental emotionality to the children could not be perfect, because it reflects their personality or exaggeration of their mis-perception, so in future study, observational study for assessing temperamental emotionality should be took for our results.

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Relationship Among Infant Temperament, Parenting Stress, Parenting Style and Infant Development: Multigroup Analysis for Gender Difference

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The result indicated that parenting style had a mediating effect on infant development while infant temperament and parenting stress had an indirect effect on their infant development through parenting style. The multiple group analysis suggested that the same measurement and structural models were set up for boys and girls. In both boys' and girls' models, the effect of emotionality on the infant development is mediated by parenting stress and parenting style. On the other hand, only in boys' models the effect infant activity on infant development is directly mediated by parenting style. Further analysis is suggested to identify the sex difference in the mediating effect of parenting variable on infant development.

The infant is an important period to build basic development. The development during the infant happens very quickly, and is determined by various environmental factors. For those reasons, the understanding of infant development is important so that we can predict development at trajectories. It is important to understand that infant characteristics play an important role in order to construct an environment which can, in turn, foster positive interaction and development of infants. A mother is the one who has the most affect on the basic development of her infant. The mother parenting behaviors are the most direct and critical factor because she spends the most time nurturing her baby (Seo, 2006; Lee & Seo, 2009). A mother's parenting style has a direct influence on her children's development. For instance, if a baby is raised by a mother who tends to interact her baby, he/she would have the ability to understand vocabulary well (Lee, Park, & Seo, 2008), if frequently by a mother who reacts warmly, tends to have a baby showing positive development (Min & Moon, 2010). On the other hand, mother's parenting style get influenced by her perception of stress of raising babies. In the case when they have a lot of stress due to their babies, it has negative effects on communication between babies and mothers, so mothers express oppressive and rejective behaviors towards their babies. While, in the case that they have little stress due to their babies, mothers tend to be affective and coach them in rational ways.

Parenting style and stress get influenced by infant's sex and temperament. Previous studies showed that a relationship between children's temperamental characteristics and a mother's parenting style is relevant to infant temperament. For example, a difficult infant is connected with his/her parent's controlled, rejective and unreactive parenting behavior. They also said that mothers tend to have more of a reactive attitude towards boys than girls (Leaper, 2002; Weinberg, Tronick, Cohn, & Olson, 1999). According to the study that observed five-month-old infants, mothers communicated more with girls to point or show object's to them (Park, Seo, & Bornstein, 2005), and mothers interactions were more object-oriented towards girls than boys. The studies that explored the interactions between infant's sex and temperament reported that mothers showed mild parenting styles to the difficult boys but not girls (Rubin, Hastings, Chen, Stewart, & McNichol, 1998), and stressed from difficult children, also and mother's negative parenting can be found only towards girl infants. These results show that not only mother's parenting style can be different based on their infant's temperament but also it is affected by the infant's sex. That is, an infant's sex could be an important factor, so we need to understand how sex makes a difference in parenting behavior.

In this study we hypothesized that structural models between infant temperament, parenting stress, parenting style and infant's development, and how these structures make differences according to infant's sex. From this study, we could understand not only the structural relationship of mother's nurturing systems by infant temperament but also examine the sex differences in the structural model.

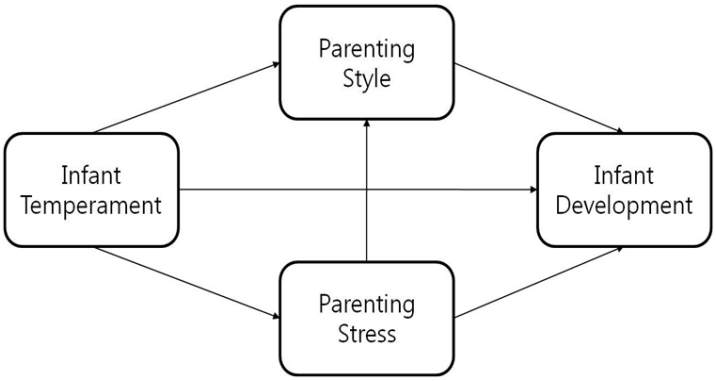


Figure 1. Hypothesized model of the relationship of infant temperament, parenting stress, parenting style and infant development.

Method

Sample

Data for this study were derived from the Panel Study on Korean Children (PSKC), a longitudinal study of a nationally representative sample of South Korean children that was conducted by the Korea Institute of Child Care and Education. In 2009 the PSKC sampled 1,904 to infants using a multistage stratified sampling design. The final sample of 1,895 infants (boys = 958, girls = 937) included children in the second year sample of the PSKC who were not missing any data from the PSKC study.

Measures

Infant temperament. Infant temperament was assessed by their mothers through completion of the EAS Temperament Survey for Children: Parental Ratings (Buss & Plomin, 1984). In this study 10 items of emotionality and activity subscales were selected from the EAS using a 5-point Likert scale. In this sample, internal consistency of the subscales was adequate (Cronbach's alphas were .75 for emotionality and .65 for activity).

Mother's parenting style questionnaire. The Parental Style Questionnaire (PSQ) developed by Bornstein et al. (1996) was used to measure mother's parenting behavior. 6 questions about parenting styles were answered on 5-point Likert scale. The higher score of each factor means parenting behavior is warmer and more reactive. The reliability coefficient was .84.

Mother's parenting stress. To measure mother's parenting stress, Korean version of Kim and Kang (1997)'s Parenting stress index that is based on PSI-SF (Parenting Stress Index Short From, Abidin, 1990) was modified and used. This study accepted 10 items of burden of parent's roles and distress among the "PSI-SF". On 5-point Likert scale on each item, the higher score means the higher level of parenting stress. The reliability coefficient was .85.

Korean-ages & stages questionnaires. The Ages and Stages Questionnaire (ASQ) is a parent completed questionnaire aimed at assessing the developmental status of infants and young children. The ASQ is built as a screening tool, which consists of six questions in each of the five domains of development, namely communication, gross motor, fine motor, problem solving and personal-social skills. The response choices for each item are "yes", "sometimes" or "not yet", which are scored as 10, 5 or 0, respectively. The inventory consisted of 30 items based on Korean-Ages & Stage Questionnaires (Heo, Squires, Lee, & Lee, 2006), and it measured infant development in regard to the following contents: communication (α = .59), gross motor (α = .75), fine motor (α = .60), problem solving (α = .61) and personal-social skills (α = .64).

Results

Table 1
Descriptive Statistics and Correlations Between the Study Variables

Variable	Entire (N = 1895) *M (SD)*	Boys (n = 958) *M (SD)*	Girls (n = 937) *M (SD)*	*t*
Temperament				
Emotionality	2.71(.61)	2.70(.61)	2.72(.63)	- .746
Activity	3.85(.52)	3.87(.51)	3.83(.54)	1.644
Parenting style				
Responsiveness	3.89(.55)	3.88(.54)	3.90(.55)	- .858
Warmth	3.89(.54)	3.89(.53)	3.88(.55)	.376
Parenting stress				
Stress	2.73(.63)	2.72(.63)	2.73(.64)	- .131
Infant development				
Communication	49.25(11.26)	47.48(11.85)	51.07(10.32)	-7.020***
Gross motor	56.56(8.82)	56.31(9.11)	56.82(8.51)	-1.257
Fine motor	47.73(11.87)	47.33(12.26)	48.14(11.44)	-1.485
Problem solving	49.51(11.90)	48.63(12.54)	50.41(11.16)	-3.258**
Personal-social	52.50(10.93)	51.57(11.40)	53.45(10.35)	-3.759**
Total	51.11(7.67)	50.26(8.09)	51.97(7.12)	-4.887**

*p < .05. **p < .01. ***p < .001.

As is shown in Table 1, there are sex differences in infant development subscale and total score. Overall, girls development scores are higher than boys. Bivariate correlations among study variables are shown in Table 2. The correlations suggested greater for boy's development measures than for girls. The infant development measures correlated well for boys, parenting stress and parenting style subscale were negatively correlated. In contrast, all but one of the correlations and all infant development correlations were not significant for girls. Infant emotionality is positively related to the parenting stress but negatively related to both parenting style subscales.

Table 2
Correlations Among the Variables by Sex

	Boys (n = 958)										
Variable	1	2	3	4	5	6	7	8	9	10	11
1. Emotionality	1.00										
2. Activity	.097**	1.00									
3. Responsiveness	-.150***	.094**	1.00								
4. Warmth	-.228***	.101***	.625***	1.00							
5. Stress	.278***	.044	-.368***	-.467***	1.00						
6. Communication	-.047	-.003	.102**	.110**	-.085**	1.00					
7. Gross motor	-.001	.065*	.042	.049	.014	.216***	1.00				
8. Fine motor	-.032	.019	.018	.060	-.049	.378***	.275***	1.00			
9. Problem solving	-.064*	-.005	.038	.066*	-.039	.406***	.294***	.562***	1.00		
10. Personal-social	-.125***	.036	.072*	.118***	-.084**	.407***	.327***	.351***	.429***	1.00	
11. Total	-.079*	.028	.077*	.115***	-.072*	.696***	.555***	.749***	.786***	.714***	1.00

Table 2
Correlations Among the Variables by Sex (continued)

	Girls										(*n* = 937)
Variable	1	2	3	4	5	6	7	8	9	10	11
1. Emotionality	1.00										
2. Activity	.090**	1.00									
3. Responsiveness	-.171***	.059	1.00								
4. Warmth	-.226***	.067*	.635***	1.00							
5. Stress	.301***	-.052	-.409***	-.499***	1.00						
6. Communication	-.049	.093**	.056	.061	-.047	1.00					
7. Gross motor	-.082*	.038	.026	.002	-.046	.180***	1.00				
8. Fine motor	-.056	.027	.030	.043	-.057	.355***	.255***	1.00			
9. Problem solving	-.034	-.004	.053	.077*	-.046	.371***	.229***	.528***	1.00		
10. Personal-social	-.033	.086**	.049	.076*	-.080*	.357***	.288***	.305***	.420***	1.00	
11. Total	-.072*	.068*	.063	.078*	-.081*	.667***	.529***	.740***	.768***	.693***	1.00

Note. 6-11 is infant development measure result (Ages and Stages Questionnaire)
*p < .05. **p < .01. ***p < .001.

Test of Hypothesis Model

First, measurement models were tested using confirmatory factor analysis. CFA examined relations amongst (a) measured variables and (b) latent variables. Acceptable indices were found for this model: χ^2 (55, N = 1895) = 243.554, p < .000, NFI = .971, TLI = .962, CFI = .977, RMSEA = .04 (.03, .05). Standardized factor loadings for indicators of the latent variable were significant (p < .001).

Second, structural equation modeling was used to test the hypothesized model (Figure 1) and examined the paths from influences of infant temperament, parenting stress, and parenting style to infant development. The hypothesized model indicated a moderately good fit to the data, χ^2 (55, N = 1895) = 243.554, p < .001, NFI = .971, TLI = .962, CFI = .977, RMSEA = .04 (.03, .05).

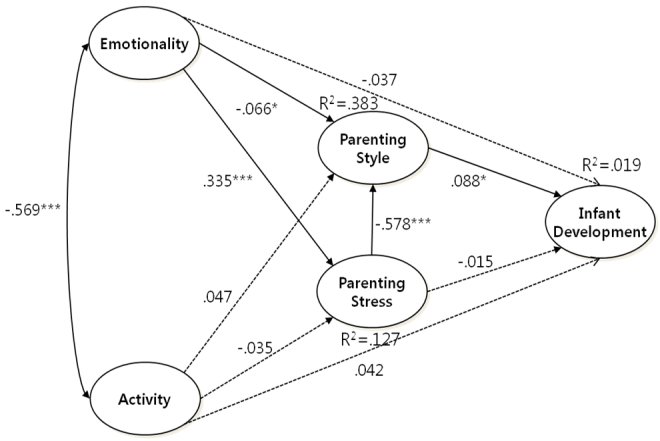


Figure 2. Hypothesis model to infant development.
Note. N = 1895. χ^2 (55) = 243.554; χ^2/df = 4.428; NFI = .971; TLI = .962; CFI = .977; RMSEA = .043 (.037, .048). Dashed lines indicate nonsignificant paths.
*p < .05. **p < .01. ***p < .001.

We also tested a revised parsimonious model eliminating all non-significant paths in the model. In particular, we removed the non-significant path between emotionality and activity and parenting stress and the path between infant developments. The final result was a more parsimonious model (Figure

2) which yielded an increase in validity. Although the chi-square test for the revised model was significant (χ^2 (58, N = 1895) = 250.423, $p < .000$), the model demonstrated a good fit with the data NFI = .970, TLI = .963, CFI = .977, RMSEA = .042 (.037, .047).

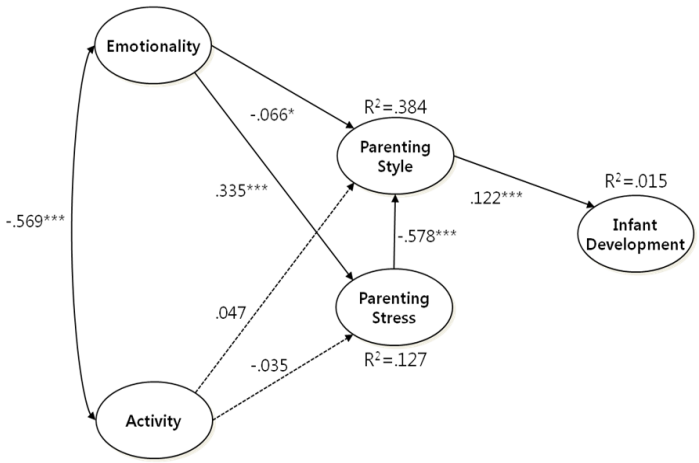


Figure 3. Parsimonious general model to infant development.
Note. N = 1895. χ^2 (58) = 250.423; χ^2/df = 4.318; NFI = .970; TLI = .963; CFI = .977; RMSEA = .042 (.037, .047).
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Multigroup Analysis

To test the hypothesis that the relations between the variables in the model differed between the male and the female groups, we used SEM multigroup analysis. It allows the researcher to set cross-group equality constraints on parameters of interest. A gender difference in parameter estimates will be present if there is a significant improvement in data-model fit in terms of the chi-square statistics when an equality constraint is released. When the equality constraint was relaxed, the decrease in chi-square was significant ($\Delta\chi^2$ = 2.240, $p > .001$, Δdf = 8). For the unconstrained model (χ^2 = 307.046, df = 116, p = .41, NFI = .963, TLI = .963, CFI = .977).

Table 3
Multigroup Model Comparisons for Nested Model

Model	χ^2	*df*	NFI	TLI	CFI	RMSEA	Model comparison	$\Delta\chi^2$	Δdf
1. Unconstrained	307.046	116	.963	.963	.977	.029			
2. Measurement weights	309.286	124	.963	.967	.977	.028	2 vs. 1	2.240	8
3. Measurement intercepts	370.679	137	.955	.962	.971	.030	3 vs. 2	61.393*	13
4. Structural weights	374.892	143	.955	.964	.972	.029	4 vs. 3	4.213	6
5. Structural covariances	377.291	146	.955	.965	.972	.029	5 vs. 4	2.399	3

$^{*}p < .05$.

Multigroup analysis testing for gender differences demonstrated that significant differences did exist (χ^2 (124) = 309.286, χ^2/df = 2.494, NFI = .963, TLI = .967, CFI = .977, RMSEA = .028). The structural coefficients for each of the two gender groups are presented in Figure 4 and 5.

Almost all the paths are the same as the original model. However, the difference is that for boys there are significant paths between activity and parenting style (but not for girls). Differences in the models suggest that there are differences according to the infant sex, with boys benefiting more from parental style.

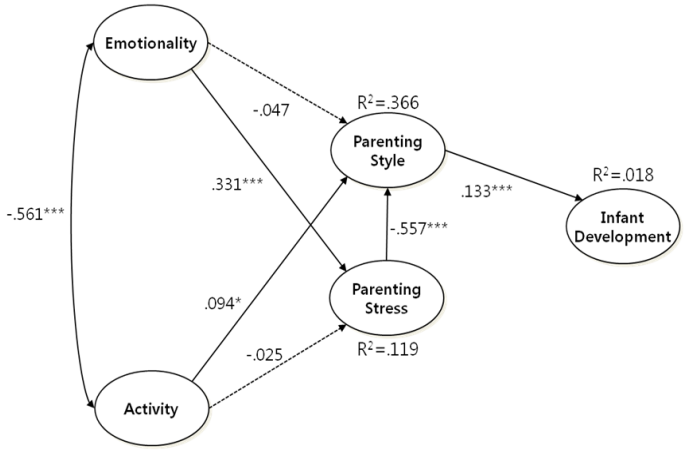


Figure 4. Multigroup analysis: Parenting style mediator model in the boys.
Note. χ^2 (124) = 309.286; χ^2/df = 2.494; NFI = .963; TLI = .967; CFI = .977; RMSEA = .028 (.024, .032).

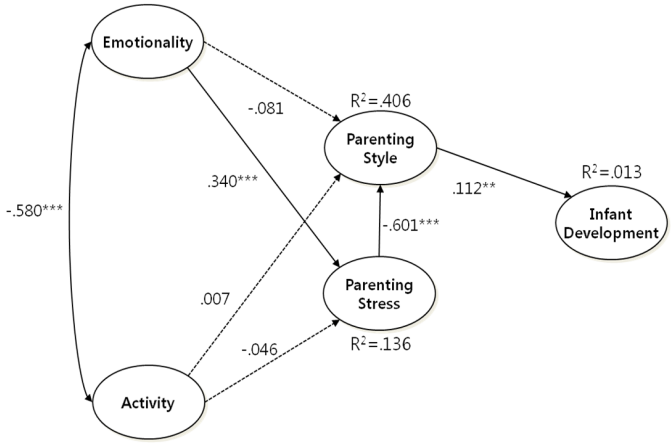


Figure 5. Multigroup analysis: Parenting style mediator model in the girls.
Note. χ^2 (124) = 309.286; χ^2/df = 2.494; NFI = .963; TLI = .967; CFI = .977; RMSEA = .028 (.024, .032).

Discussion

In this study, we examine the structural relationship of infant development according to infant's temperament, maternal parenting stress and parenting style. We also look into how these relationships can be different by infant's sex through multi-group analysis. Below is the summary of the results and discussion.

The Structural Equations Model

It turned out that emotionality, parenting stress and parenting styles which are subordinate of infant temperament have similar connections. As a result of looking through the influence of variables, we found that maternal parenting styles have a direct influence on their infants. On the other hand, infant temperament and maternal parenting stress have an indirect influence on their infants.

Infant development is directly influenced by maternal parenting styles and also indirectly influenced by the factors which influence parenting styles. This result supports the previous study that parenting styles contribute to infant development which cause positive infant development from positive maternal parenting behavior (Lee, Park, & Seo, 2008; Min & Moon, 2010). Furthermore, maternal parenting styles turned out to have a mediating effect between infant emotionality and infant development, and parenting stress and infant development. Infant emotionality and parenting stress influence parenting styles and has an influence on parenting styles which are influenced by emotionality. Thus, mothers tend to show less warmth and reactive parenting behavior with infant emotionality and high parenting stress. As a result, it has negative effects on their infant development.

To look into this based on the result of the study; the more important factors influencing infant development are circumstances such as parenting styles rather than an infant's personal characteristics. Also, parenting styles are directly influenced by their parenting stress. It means that mothers who have less parenting stress show warmer and more reactive parenting behaviors which has positive effects on their infants development. Therefore, to support positive development, an infant multilateral child support policy should be implicated to lower maternal parenting stress.

Gender Difference

To examine the factors influencing infant development directly or indirectly such as infant's temperament, maternal parenting style, parenting stress, we looked into SEM multi-group analysis. The examined the models suggested via model investigation and found differences by sex. When analyzing multigroups, regardless of sex, the models set up for this study have the same measurement path structures and can be applied to both boys and girls. In the hypothesized model, parenting styles have a direct influence on infant development and infant emotionality. And parenting stress has an indirect influence on infant development as a parameter, can be applied to both boys and girls. The route for this process: emotionality → parenting stress, parenting styles → infant's development, turned out to be the same for the boy's group and girl's group. Parenting styles plays a mediating role in infant development, regardless of infant's sex. Parenting stress indirectly influences infant development through parenting styles.

Infant's temperamental characteristics which have an influence on parenting styles have differences between boys and girls. The activity level of boys is involved in infant development because it has a direct influence on parenting styles. On the other hand, the activity level of girls doesn't have any influences on parenting styles and doesn't contribute to their development. This means that mothers with boys that have a high level of activity show reactive and warm parenting styles but the level activity of girls doesn't have any influence on parenting styles. This supports the previous studies that temperament is connected with parent's controlled, rejective, or unreactive parenting behavior (Lim, 1994) and mothers show more reactive behavior to boys than girls (Leaper, 2002; Weinberg, Tronick, Cohn, & Olson, 1999).

In summary, the level activity of boys has a direct influence on parenting styles, and the level activity of girls doesn't have any influence on parenting styles. Thus, boy's activity level plays a major role in their development through the mediation of parenting style. On the other hand, girl's activity level does not play an important role in their development. Moreover, mothers should acknowledge the temperamental differences by their infant's sex and adjust their parenting styles.

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Working Mother

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1. Does Mother's Job-quitting or Keeping Matter for the Cost of Child-rearing and Infant's Development?

   Wanjeong Lee *(Professor, Division of Consumer & Child Studies, Inha University)*

   Seonglim Lee *(Associate Professor, Dept. of Consumer & Family Sciences, Sungkyunkwan University)*

2. A Study on Determinants of Interrupting Female Workers' Career by a Childbirth and Childcare

   Byung In Lim *(Associate Professor, Dept. of Economics, Chungbuk National University)*

   Hyungho Youn *(Research Fellow, Seoul Development Institute)*

3. The Determinants of Parental Stress of Working and Non-Working Mothers

   Hyegum Kim *(Associate Professor, Dept. of Child Care Education, Dongnam Health College)*

Does Mother's Job-quitting or Keeping Matter for Infant's Development?

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Seonglim Lee
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The cost of child rearing was compared between the families with a job-keeping mother and a job-quitting mother. The result of the decomposition of the expenditures in child rearing and other household expenses showed that the job-keeping mothers spent more income on childrearing but less on the other household expenditures than the job-quitting mothers. Social resources, such as father's involvement or social support but not cost for child rearing positively influenced on mother's parenting, which in turn effected on infant's daily routines which are associated with his (her) developmental outcomes.

It has become important to consider the impact of mothers' employment on economic consequences of household and their children's well-being and to assess the factors that may accentuate or mitigate any such impact. There are a number of studies which focus on children's developmental outcomes to mother's employment during early years. Brooks-Gunn, Han and Waldfogel (2002) found negative association between maternal employment during the first year of life and children's cognitive outcomes at age 3 in the National Longitudinal Survey of Youth-Child Development (NLSY) data. Also, Verropoulou and Heather (2007) analyzed 1,129 mothers from Britain national data (NCDS: The National Child Development Study) and found that children's reading ability was slightly poorer where less educated mothers worked in the child's first year of life. In contrast, Belsky, Burchinal, McCartney, Vandell, Clarke-Stewart and Owen (2007) found positive cognitive progress in vocabulary for children having attended high quality day care settings in their preschool years. This paper investigates differences between families with a job-quitting mother and families with a job-keeping mother at their child's first year and whether and how characteristics of two groups are associated with infant's developmental outcomes.

It has been well known that the birth of child demands mother's time for child care and increases women's time value at home. Many of the employed women leave the labor force with the advent of a new baby. From the economic perspective, working mothers with an infant need child care services usually accompanied with the monetary cost. On the other hand, we would expect families with a working mother to spend more money on goods and services that can substitute the time needed for housework.

The first part of this study compares the monetary cost of child rearing between mothers keeping the employed status and mothers leaving the labor force and assesses the additional household expenses for job-keeping mothers. Specifically the effects of social support and community resources which are available outside family as well as inside-family- resources such as family income, mother's knowledge of infant's development, and father's involvement on childrearing, etc. on the economic burden of the child rearing. It has been researched that economical, social, and environmental resources family could use in their life positively influence on child development. And mother's competence on child rearing seems to mediate the relationship between input of these resources and child outcomes. The second part of this study sets out to test the structuring effects of resources which children receive from their environment on mother's psychological characteristics, which in turn predispose mothers to react on their child in positive way between families with a job-quitting mother and families with a job-keeping mother.

Father's involvement (Fletcher, 2009) and social support (Lulsow, Galdera, Pursley, Reifman & Huston, 2002) lessen mother's parenting stress. Living in unsafe neighborhoods or high-poverty neighborhoods influences on parenting practices (Burdette & Whitaker, 2005; Frech & Kimbro, 2011; Klebanov, Brooks-Gunn, & Duncan, 1994). Östberg and Hagekull (2000) found that high workload and low social support related directly to more parenting stress in 1,081 Swedish mothers.

Kiernan and Huerta (2008) examined the extent to which economic circumstances in infancy and mother's mental well-being are associated with child's cognitive development and behavior problems at age 3 years, and what part of parenting behaviors and attitudes play in mediating these factors. In Gassman-Pines's study (2011), stress which low-income working mothers experienced at their working place influenced on harsh and withdrawn mother-child interactions on the same day. Parental personality such as depression has been known to be highly associated with their parenting stress (Crnic & Acevedo, 1995).

Parenting stress influences on children's outcomes in several ways. Parenting stress acts to negatively influence parenting behaviors (Abidin, 1995; Deater-Deckard & Scarr, 1996). Johnson, Cohen, Kasen and Brook (2006) found in their longitudinal study that maternal anxiety and depressive personality were independently associated with problematic maternal behavior in the home during the child rearing years.

Mothers who experience interpersonal stress are likely to express stress in interaction with their child (Anthonya, Anthonya, Glanvillea, Naimanb, Waandersa & Shaffera, 2006; Hummen, 2003). In Frech and Kimbro's research (2011), persistent maternal depression was found to be associated with fewer time investments in play activities with child. Persistent maternal depression is associated with situations in which parents and children create difficult or challenging circumstances through their behavior, expectations, or needs. Cumulative stress indices were proved to be important predictors of parent and child behavior and dyadic interaction (Crnic, Gaze & Hoffman, 2005). Milgrom and McCloud (1996) found that mothers with postnatal depression rated themselves as less competent, less emotionally attached to the child.

Poor parenting behavior is associated with maladjustment in children. Negative parenting behavior, including harsh discipline or rejecting behavior, is often associated with increased problem behaviors in children (Dodge, Pettit & Bates, 1994). Coleman, Trent, Bryan, King, Rogers and Nazir (2002) found that parental behaviors had a detrimental effect on toddlers' ability to perform effectively on the Mental Scale of the Bayley. Even though maternal behavior mediates the relationship between stress and child adjustment, little research has tested this mediation hypothesis. Two studies (Deater-Deckard & Scarr, 1996, Jackson, 2000), measuring all three components, found negative parenting behaviors linked to both higher levels of parental stress and to more behavior problems in children.

The specific research questions of the present study were as following:

First, to investigate the effects of the social and environmental resources outside family as well as socio-economic characteristics of the family on the child rearing expenses and to assess the monetary cost of mother's job-keeping.

Second, to test the structuring effects of family resources on mother's psychological characteristics and parenting style, which are associated with infant's developmental outcomes across families with a job-quitting and job-keeping mother and before, to compare two groups' latent means. Figure 1 illustrates our theoretical model for the second research question.

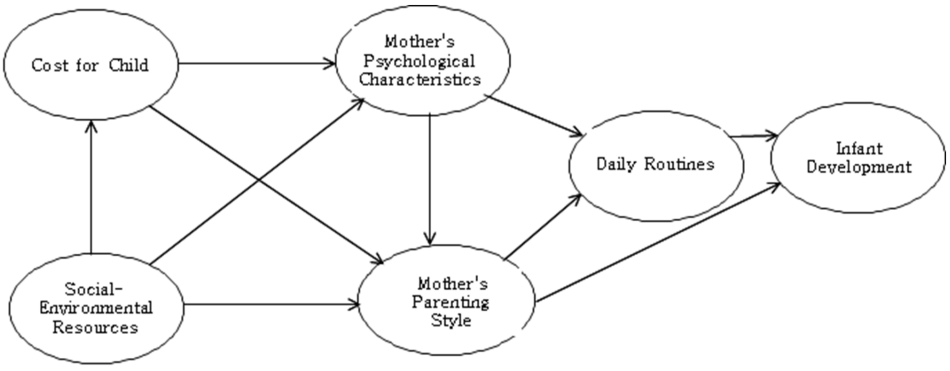


Figure 1. Theoretical models across families with a job-quitting and keeping mother.

Method

Data

The data used in this study comes from the 2009 Panel Study on Korean Children (PSKC). Our sample was restricted to mothers who had been working before childbearing and either stayed at or exited from the labor force due to the childbearing. Excluding the cases with an extremely high monthly disposable income above $30 million KW and dropping the cases having a missing value in the variables used in the analysis, the sample for the analysis included 655 families with an infant aged about one. The descriptive statistics of the sample were presented on Table 1, 2, and 3.

Table 1
Descriptive Statistics of the Sample

Variables	Total (*n*=655)		Job-quitting mothers (*n*=378)		Job-keeping mothers (*n*=277)		χ^2
	n	%	*n*	%	*n*	%	
Working mother	655	(100.00)	378	(57.71)	277	(42.29)	
Child's gender							
Male	328	(50.08)	196	(51.85)	132	(47.65)	1.13
Female	327	(49.92)	182	(48.15)	145	(52.35)	
Child's birth order							
1st	323	(49.31)	181	(47.88)	142	(51.26)	
2nd	270	(41.22)	158	(41.80)	112	(40.43)	1.13
3rd or more	62	(9.47)	39	(10.32)	23	(8.30)	
Mother's education							
Less than high school	176	(26.87)	130	(34.39)	46	(16.61)	
Some college	167	(25.50)	89	(23.54)	78	(28.16)	43.63***
College degree	275	(41.98)	152	(40.21)	123	(44.40)	
Graduate school	37	(5.65)	7	(1.85)	30	(10.83)	
Father's education							
Less than high school	160	(24.43)	113	(29.89)	47	(16.97)	
Some college	127	(19.39)	68	(17.99)	59	(21.30)	21.00***
College degree	300	(45.80)	170	(44.97)	130	(46.93)	
Graduate school	68	(10.38)	27	(7.14)	41	(14.80)	
Couple wife's age ≥ 45							
Father's occupation							
Managerial/professional	189	(28.85)	94	(24.87)	95	(34.30)	
Clerical	173	(26.41)	84	(22.22)	89	(32.13)	
Services/sales	84	(12.82)	52	(13.76)	32	(11.55)	34.44***
Manufacturing/farming etc.	92	(14.05)	63	(16.67)	29	(10.47)	
Operator/labor	74	(11.30)	61	(16.14)	13	(4.69)	
Others	43	(6.56)	24	(6.35)	19	(6.86)	
Housing tenure							
Owning	294	(44.89)	163	(43.12)	131	(47.29)	
Jensei	275	(41.98)	159	(42.06)	116	(41.88)	4.01
Rent	48	(7.33)	34	(8.99)	14	(5.05)	
Others	38	(5.80)	22	(5.82)	16	(5.78)	
Variables	*M* (*SD*)		*M* (*SD*)		*M* (*SD*)		*t*
Family size	2.77(0.87)		2.75 (0.87)		2.80 (0.89)		-0.67
Mother's age	32.21 (3.52)		32.15 (3.52)		32.28 (3.52)		0.65
Father's age	34.60 (3.93)		34.75 (4.06)		34.40 (3.74)		0.26
Disposable income	386 (282)		323 (307)		473 (216)		-7.36***
Net-worth	22260 (60968)		21710 (65066)		23011 (54992)		-0.28

* $p < .05$. ** $p < .001$. *** $p < .000$.

Table 2
Descriptive Statistics of Infant's Social Capital

Variables	Total (N = 655)	Job-quitting mothers (n = 378)	Job-keeping mothers (n = 277)	
	M (SD)	*M (SD)*	*M (SD)*	*t*-value
Mother's know. of infant dev.	9.08 (2.22)	9.04 (2.40)	9.13 (1.96)	- .55
Father's involvement	3.68 (.86)	3.60 (.87)	3.80 (.84)	-2.92**
Social support-emotional	3.90 (.73)	3.88 (.75)	3.92 (.72)	- .70
Social support-instrumental	4.21 (.63)	4.17 (.63)	4.27 (.62)	-2.04*
Social support-informational	3.85 (.77)	3.77 (.81)	3.95 (.71)	-3.05**
Social support-interpersonal	3.92 (.73)	3.86 (.77)	4.00 (.67)	-2.38*
Community resources	3.07 (4.76)	3.04 (.71)	3.11 (.64)	-1.43
Mother's depression	1.89 (.68)	1.97 (.68)	1.79 (.66)	3.29**
Mother's parenting stress	2.68 (.62)	2.75 (.61)	2.60 (.63)	3.05**
Mother's parenting style	3.89 (.50)	3.90 (.50)	3.86 (.49)	1.09

* $p < .05$. ** $p < .001$. *** $p < .000$.

Table 3
Descriptive Statistics of Infant's Outcomes

Variables	Total (N = 655)	Job-quitting mothers (n = 378)	Job-keeping mothers (n = 277)	
	M (SD)	*M (SD)*	*M (SD)*	*t*-value
Daily routines				
Sleeping habits	2.75 (.74)	2.71 (.77)	2.80 (.70)	-1.41
Eating habits	2.81 (.68)	2.81 (.66)	2.80 (.70)	.26
Excretion & bathing habit	2.80 (.74)	2.75 (.74)	2.86 (.74)	-1.88
Infant development				
Communication	48.97 (11.48)	49.38 (11.08)	48.41 (12.01)	1.07
Gross motor	56.50 (9.17)	56.28 (9.46)	56.81 (8.78)	- .72
Fine motor	47.66 (12.05)	47.58 (12.45)	47.76 (11.50)	- .19
Problem-solving	49.03 (12.56)	49.54 (12.40)	48.34 (12.77)	1.21
Personal-social	52.57 (10.91)	52.75 (10.78)	52.33 (11.10)	.49

* $p < .05$. ** $p < .001$. *** $p < .000$.

Analysis

Research question 1. Ordinary least square regression analysis was conducted to examine the effects of the explanatory variables on the cost of child rearing. The dependent variable included the proportion of disposable income shared for child rearing and the level of child rearing expenditures. To assess the monetary cost of mother's job-keeping, we decomposed the differentials of the expenditures for child rearing and the other household expenditures into the portion attributable to different socio-economic and environmental variables and the portion attributable to different marginal propensity to consumption, by applying the Blinder-Oaxaca decomposition technique. The decomposition could be written as

$$\sum B_{j1}\bar{X}_{j1} - \sum B_{j0}\bar{X}_{j0} = \sum B_{j0}(\bar{X}_{j1} - \bar{X}_{j0}) + \sum \bar{X}_{j1}(B_{j1} - B_{j0}) \quad (1)$$

where B_{ji} was a vector of regression coefficients of j for family i where j denoted regression equation of the expenditures for child rearing and the other household expenses, i = 1 denoted job-keeping mother family and i = 0 denoted job-quitting mother family, X_{ji} a vector of explanatory variables, $\sum B_{j1}\bar{X}_{j1}$ the predicted expenditure of the job-keeping mother family at the mean of X_{j1},

and $\sum B_{j0}\bar{X}_{j0}$ the predicted expenditure of the job-quitting mother family at the mean of X_{j0}. The second term on the right side in equation (1) was an estimate of additional expenditure for the job-keeping mother family attributable to structural differences which represented the expenditure differential resulting from the difference in mother's time at home.

Research question 2. Structural equation modeling (SEM) analyses were performed to examine the fit of the theoretical model across the two groups. All model testing was conducted by using AMOS 8.0 software. The assumption of structural equivalence was tested using a multi-group that allows factorial invariance across groups. Table 4 presents the fit indices for the model comparison. Model 1 examined whether the items grouped in accordance with theoretical expectations (χ^2 = 535.84, *df* = 310, *p* = .000, χ^2/df = 1.73, CFI = .94, TLI = .92, RMSEA = .03). Considering the differences of χ^2 ($\Delta\chi^2$) and other fit indices in each model, values of model 2 and model 4 were not changed much compared with those of model 1 and model 3 each. Model 3 was not rejected and told us that we could not claim the groups have unequal intercepts. However, the likelihood ratio test between model 3 and model 4(before and after imposing equality constraints on factor loadings) suggested no substantial loss in model fit (TLI, RMSEA) indicating that measurement equivalence was established between families with a job quitting mother and families with a job keeping mother.

Table 4
Goodness of Fit Statistics for the Multiple-Group Comparison

Model	χ^2	*df*	$\Delta\chi^2$ (Δdf)	CFI	TLI	RMSEA
Model 1	535.84	310	-	.942	.922	.033
Model 2	562.35	324	26.5(14)*	.939	.921	.034
Model 3	876.72	344	314.37(20)***	.865	.835	.049
Model 4	892.10	350	15.38(6)*	.862	.835	.049

Note. Model 1. None (Totally non-invariant); Model 2. Measurement equivalence; Model 3. Measurement and intercepts equivalence; Model 4. Invariance of measurement, intercepts & factor loadings.

* $p < .05$. *** $p < .000$.

Results

Costs of the Childrearing and Mother's Job-Keeping

Table 5 presented that on average families with a job-keeping mother spent more income on child rearing than families with a job-quitting mother by 390 thousand KW a month. The difference in the cost of child rearing mainly came from the difference in the child care cost since the full-time mothers cared their child by themselves and little necessitated purchase of child care services. On the other hand, job-quitting mother spent more income than job-keeping mother on the other child rearing expenses by about 50 thousand KW monthly. The proportion of income shared for child rearing was about 17% for families with a job-keeping mother and 14% for families with a job-quitting mother.

Compared with the household income and expenditure distributions, the expenditure for child rearing was more unequally distributed and the degree of inequality was greater among families with a job-quitting mother than those with a job-keeping mother.

Table 5A
Descriptive Statistics of Household Income and Expenditures (10 thousand KW)

	Total (n = 655)	Job-quitting mothers (n = 378)	Job-keeping mothers (n = 277)	t-value
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	
Disposable income	386 (282)	323 (307)	473 (216)	-7.36***
Total expenditures	285 (174)	240 (157)	346 (178)	-7.93***
Costs for child	54 (43)	37 (36)	76 (40)	13.28***
Child care	19 (32)	1 (4)	45 (36)	20.50***
Other costs	34 (32)	36 (36)	31 (25)	1.99*
Other expenditures	232 (151)	204 (134)	270 (163)	5.53***
% Cost for child	0.15 (0.10)	0.14 (0.10)	0.17 (0.09)	4.56***

* $p < .05$. *** $p < .000$.

Table 5B
Inequality Measurement of the Household Income and Expenditures

	Coefficient of variation			Gini coefficient		
	Total	Job-quitting mothers	Job-keeping mothers	Total	Job-quitting mothers	Job-keeping mothers
Disposable income	0.730	0.951	0.456	0.300	0.311	0.214
Total expenditures	0.610	0.654	0.513	0.258	0.234	0.234
Costs for child	0.798	0.990	0.523	0.371	0.333	0.282
Child care	1.673	-	0.801	0.751	-	0.424
Other costs	0.942	1.003	0.805	0.383	0.336	0.442
Other expenditures	0.650	0.658	0.604	0.279	0.263	0.272

Table 6 presented the results of the regression analysis of the proportion of disposable income shared for child rearing. As expected the share was significantly less for job-quitting mothers than job-keeping mothers other variables being equal. This result indicated that the economic burden of child rearing was greater for job-keeping mother than job-quitting mother. For families with a job-keeping mother, the share of income spent on child rearing was negatively associated with the log disposable income, instrumental social support, and community resources; for families with a job-quitting mother, it was negatively associated with log disposable income and housing tenure of owning a house, and positively with the first-born child dummy variable, father's managerial/professional or operator/laborer occupations, and family size.

Table 6
Regression Analysis of the Share of Income in Child Rearing Expenses (Million KW)

Variables	Total		Job-quitting mothers		Job-keeping mothers	
	B	*SE*	*B*	*SE*	*B*	*SE*
Constant	66.40	(6.64)	51.95	(8.27)	70.50	(11.05)
Job-quitting mother	-7.02***	(0.80)				
Child's gender-male	0.77	(0.69)	-0.16	(0.94)	1.47	(1.05)
Child's birth order-first	4.91***	(0.97)	7.24***	(1.33)	2.33	(1.47)
Mother's education (vs.< High school)						
Some college	-0.57	(1.13)	0.73	(1.41)	-2.84	(2.04)
College degree& more	0.83	(1.16)	2.53	(1.45)	-2.18	(2.10)
Mother's age	-0.04	(0.11)	-0.08	(0.14)	-0.03	(0.17)
Father's education (vs.< High school)						
Some college	0.26	(1.18)	0.92	(1.49)	0.32	(2.07)
College degree	-0.46	(1.16)	-1.45	(1.48)	0.88	(2.00)
Graduate school	2.05	(1.63)	0.35	(2.25)	3.32	(2.60)
Father's occupation (vs. other)						
Managerial/professional	1.85	(1.54)	4.42*	(2.18)	0.81	(2.28)
Clerical	1.91	(1.54)	4.18	(2.17)	0.28	(2.22)
Services/sales	2.02	(1.66)	4.28	(2.24)	-0.42	(2.56)
Manufacturing/farming etc.	1.48	(1.64)	3.62	(2.18)	-0.56	(2.62)
Operator/labor	2.46	(1.71)	4.74*	(2.18)	-0.62	(3.14)
Housing tenure (vs. rent/other)						
Owning	-1.78	(1.16)	-1.59	(1.53)	-1.61	(1.87)
Jensei	-0.98	(1.15)	-1.09	(1.50)	-1.09	(1.89)
Log disposable income	-7.82***	(0.82)	-7.86***	(0.98)	-6.99***	(1.55)
Log net-worth	0.23	(0.17)	0.05	(0.23)	0.45	(0.26)
Family size	0.21	(0.55)	1.64*	(0.78)	-1.35	(0.81)
Social support- instrumental	-1.78**	(0.57)	-1.38	(0.76)	-2.44**	(0.88)
Community resources	-0.09	(0.52)	0.97	(0.68)	-1.62	(0.86)
Mother's know. of infant dev.	-0.05	(0.16)	-0.26	(0.20)	0.40	(0.29)
Father's involvement	0.45	(0.41)	0.49	(0.56)	0.52	(0.63)
R^2	0.26***		0.30***		0.22***	
Adjusted R^2	0.24		0.26		0.15	

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7 presented the results of the regression analysis of the level of child rearing expenses. Job-quitting mothers significantly spent more income on child rearing than job-keeping mothers, other variables being equal. For families with a job-keeping mother, the level of child rearing expenditures were positively related to the log of disposable income, and negatively associated with the instrumental social support, community resources, and family size. For families with a job-quitting mother, the first child dummy variable, father's clerical occupation, and the log of disposable income had a positive effect, but the instrumental social support had a negative effect on the expenses for child.

Table 7
Regression Analysis of the Child Rearing Expenditures (Million KW)

Variables	Total		Job-quitting mothers		Job-keeping mothers	
	B	*SE*	*B*	*SE*	*B*	*SE*
Constant	-0.72	(0.27)	-0.80	(0.32)	-1.45	(0.46)
Job quitting mother	-0.25***	(0.03)				
Child's gender-male	0.01	(0.03)	-0.03	(0.04)	0.04	(0.04)
Child's birth order-first	0.14***	(0.04)	0.19***	(0.05)	0.09	(0.06)
Mother's education (vs.< high school)						
Some college	-0.05	(0.05)	-0.01	(0.05)	-0.12	(0.08)
College degree& More	1.40-E3	(0.05)	0.04	(0.06)	-0.09	(0.09)
Mother's Age	-3.63-E3	(4.-E3)	-0.01	(0.01)	6.06-E4	(0.01)

Table 7
Regression Analysis of the Child Rearing Expenditures (Million KW) (continued)

Variables	Total		Job-quitting mothers		Job-keeping mothers	
	B	*SE*	*B*	*SE*	*B*	*SE*
Father's education (vs.<high school)						
Some college	-0.03	(0.05)	-0.03	(0.06)	0.02	(0.09)
College degree	-0.06	(0.05)	-0.10	(0.06)	0.02	(0.08)
Graduate School	0.04	(0.07)	-0.14	(0.09)	0.17	(0.11)
Father's occupation (vs. other)						
Managerial/professional	0.04	(0.06)	0.10	(0.08)	0.06	(0.10)
Clerical	0.06	(0.06)	0.17*	(0.08)	0.01	(0.09)
Services/sales	0.03	(0.07)	0.11	(0.09)	-0.02	(0.11)
Manufacturing/farming etc.	-0.02	(0.07)	0.05	(0.08)	-0.03	(0.11)
Operator/labor	0.03	(0.07)	0.09	(0.08)	-0.01	(0.13)
Housing tenure (vs. rent/other)						
Owning	-0.04	(0.05)	-0.02	(0.06)	-0.04	(0.08)
Jensei	4.50-E4	(0.05)	0.02	(0.06)	-0.03	(0.08)
Log disposable income	0.31***	(0.03)	0.26***	(0.04)	0.44***	(0.06)
Log net-worth	0.01	(0.01)	1.71-E3	(0.01)	0.01	(0.01)
Family size	-0.01	(0.02)	0.03	(0.03)	-0.07*	(0.03)
Social support- instrumental	-0.09***	(0.02)	-0.09**	(0.03)	-0.10**	(0.04)
Community resources	-0.02	(0.02)	0.02	(0.03)	-0.09*	(0.04)
Mother's know. of infant dev.	1.26-E3	(0.01)	-0.01	(0.01)	0.02	(0.01)
Father's involvement	0.02	(0.02)	0.02	(0.02)	0.03	(0.03)
R^2	0.38***		0.21***		0.31***	
Adjusted R^2	0.36		0.16		0.25	

* $p < .05$. ** $p < .01$. *** $p < .001$.

Tables 8 presented the results of the decomposition of the expenditure differentials between the two types of families. The portion "due to structure" represented the additional expenditure occurring in the families with a job-keeping mother due to working mothers' less involvement in child care and the other housework. The magnitude of the gap in child rearing expenses attributable to the different demand structure amounted about KW250 thousand a month, and for the other household expenses it amounted about minus KW240 thousands a month. This result implied that job-keeping mother spent more income on child rearing by KW250 thousand a month but spent less on the other household expenses by KW240 thousands than the comparable job-quitting mother. Therefore the net additional expenses for job-keeping mother was about KW10 thousands, which was negligible.

Table 8
Summary of Blinder-Oaxaca Decomposition of the Differentials in Household Expenses (10 thousand KW)

	Child Rearing Expenditures	Other Expenditures
Expenses		
Job-keeping mother $\sum B_{j1}\bar{X}_{j1}$	77 (2)	272 (10)
Job-quitting mother $\sum B_{j0}\bar{X}_{j0}$	37 (2)	203 (7)
Gap $\sum B_{j1}\bar{X}_{j1} - \sum B_{j0}\bar{X}_{j0}$	40 (3)	69 (12)
Due to characteristics $\sum B_{j0}(\bar{X}_{j1} - \bar{X}_{j0})$	15 (5)	93 (16)
Due to structure $\sum \bar{X}_{j1}(B_{j1} - B_{j0})$	25 (6)	-24 (18)

Note. Standard errors are in parentheses.

Comparing Latent Means Between and Path Model Across Two Groups

We analyzed how social-environmental resources and expenditures for child rearing influenced on child developmental outcomes. Theoretical models across two groups (families with a job-quitting and keeping mother) were tested. Latent means for job keeping mothers group were calculated with

supposing latent means of job quitting mothers group as 0 to compare two groups' mean differences. Table 9 shows that job-keeping mothers received more supports from others than job-quitting mothers did and that job-keeping mothers spent more expenses for child rearing than job-quitting mothers did. Job keeping mothers had lower scores in their psychological characteristics which were composed of mother's depression and child rearing stress than job quitting mothers did. Cohen's effect size(d) for this variable was very high(.93).

Table 9
Differences of Latent Means in Two Groups

Latent variables	Job-quitting mothers Latent mean	Job-keeping mothers Latent mean	*d*
Social-environmental resources	0	.10*	.29
Cost for child	0	44.59***	.00
Mother's psychological charac.	0	- .14***	.93
Mother's parenting style	0	.05	.23
Daily routines	0	.03	.61
Child development	0	- .41	.00

Note. d = Cohen's effect size.
* $p < .05$. *** $p < .000$.

Theoretical path model was tested to examine relationships of each variable in job quitting mothers and job keeping mothers. To test structural invariance in the model, all path coefficients were constrained to be equal across both groups. The overall fit indices indicated that the assumption of structural invariance was acceptable, χ^2= 549.34, *df* = 320, *p* = .000, CFI = .94, TLI = .92, RMSEA = .03. After imposing constraints on the path coefficients, goodness of fit statistics were little changed as χ^2= 574.931, *df* = 344, *p* = .000, CFI = .94, TLI = .92, RMSEA = .03. The likelihood ratio test between the two structural equation models (before and after imposing constraints on the path coefficients) suggested no substantial loss in model fit, $\Delta\chi 2$ (14) = 25.59, *p* = .03, Δ CFI = 0, ΔTLI = .0, ΔRMSEA = 0.

These findings showed that the final model represented the same underlying psychological constructs and their interrelationships among job quitting mothers and job keeping mothers, and the achievement of structural invariance indicated that there is no moderation effect of job keeping/quitting status on the pathway from family's social-psychological variables to child outputs. Table 10 present factor loadings for the path model and Figure 2 presents path of each variable.

Table 10
Parameter Estimates of Two Groups

Parameters	Job-quitting mothers	Job-keeping mothers
Cost for child ← S.E. resources	-.13 (-.01)	.75 (.01)
Mother's psych. cha. ← S.-E. resources	-.27*** (-.43)	-.21*** (-.32)
Mother's psych. cha. ← Cost for child	.00 (.02)	.00 (-.03)
Mothers' parenting stress ← Mother's pych.	-.67*** (-.54)	-.85*** (-.66)
Mothers' parenting stress ← S.-E. resources	.23 (.30)	.15* (.18)
Mothers' parenting stress ← Cost for child	.00 (.02)	.00 (.01)
Daily routines ← Mother's psych. cha.	-.01 (-.01)	-.10 (-.17)
Daily routines ← Mother's parenting style	.13** (.03)	.04 (.09)
Child development ← Mother's parenting sty.	15.62*** (.43)	10.48** (.29)
Child development ← Daily routines	.68 (.04)	1.57 (.10)

Note. Values are unstandardized estimates. Standardized estimates are presented within parentheses.

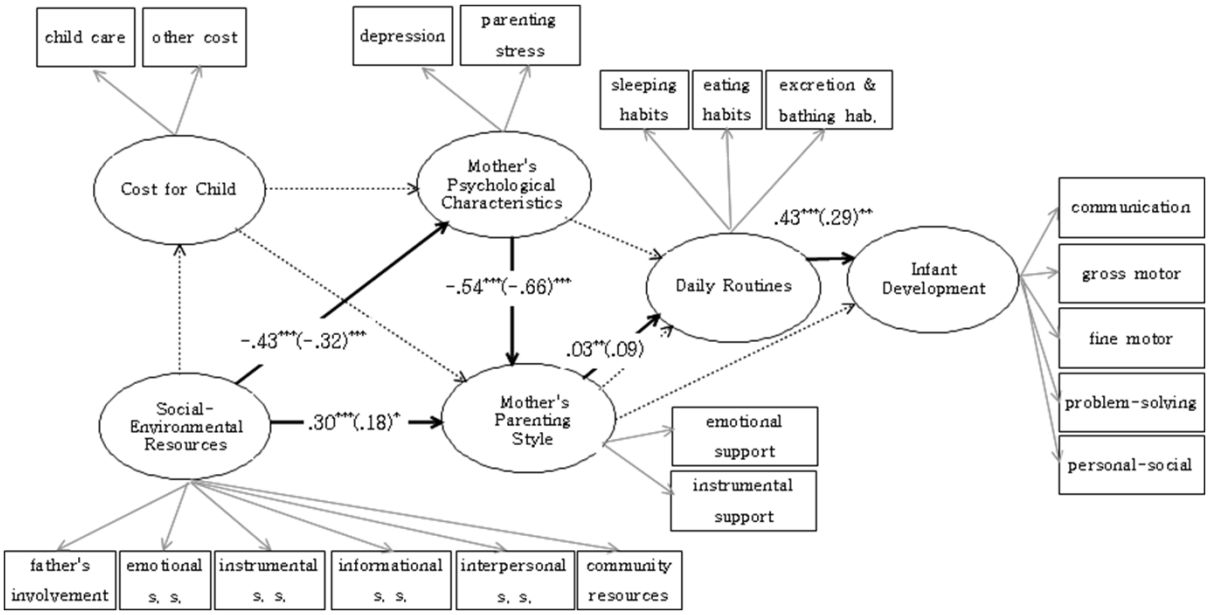


Figure 2. Path model across two groups.
Note. Standardized path coefficients of Job-quitting mothers group (job-keeping mothers group) are shown. Factor loadings and measurement errors are omitted for clarity.

Figure 2 shows the standardized coefficients for each structural path in the model. The strength of social-environmental resources as a predictor of mother's psychological characteristics was equally negative across both groups (β = -.43 for job-quitting mothers group and β =-.32 for Job-keeping mothers group). On the other hand, the strength of social-environmental resources as a predictor of mother's psychological characteristics was equally positive across both groups (β = .30 for Job-quitting mothers group and β =.18 for Job-keeping mothers group). Results showed that social-environmental resources such as father's participation in childrearing, social support, community resources negatively influence on mother's depression or parenting stress and positively influence on mother's parenting style which is composed of emotional and instrumental support. Mother's positive parenting heightened regularity of child's daily routines only in the job-quitting mothers group (β =.03) but not in the job-keeping mothers group. The strength of child's daily routines as a predictor of child development was positive across both groups (β = .43 for Job-quitting mothers group and β =.29 for Job-keeping mothers group).

Discussion

The economic burden of child rearing was greater for families with a job-keeping mother. However the total monetary cost of mother's job-keeping including the additional expenses for child rearing and housework was negligible since job-keeping mother spent less money on the other household expenses than the comparable job-quitting mother and this reduction in household expenses surpassed the increment in the cost of child rearing. Instrumental social support played an important role in reducing the economic burden of child rearing for both job-keeping and –quitting mothers, and its marginal effect was greater for job-keeping mother than job-quitting mother. Job-keeping mothers tended to take advantage of the benefits of the community resources raising their infants.

The job-keeping mothers received more support from husbands and their environment than the job-quitting mothers did, even though they spent more expenses for childrearing than the job-quitting mothers did. And the job-keeping mothers experienced less depression or parenting stress than the job-quitting mothers did in this study. This study tested structural equation model across two groups

regarding the relationship between resources infants received and their developmental outcomes. SEM findings showed that father's participation in child rearing, social support, or other community resources lessened mother's depression and parenting stress, which in turn influenced on positive maternal behaviors toward infant. Mother's positive parenting style was positively related with children's daily routines which effected on positive infant development only in the job-quitting mothers group, but not in the job-keeping mothers group. It seems that job-keeping mothers' infants could be developed alright, if the quality of non-maternal care is high enough, at least in their first year.

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A Study on Determinants of Interrupting Female Workers' Career by a Childbirth and Childcare

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This study is to probe what individual traits or family economic status helps women to return to work after a baby birth or prevent them from it with Panel Study on Korean Children. The important and useful implications are summarized as follows: the more educated, the more doing breast-feeding, the more hiring a baby care giver or using a child-care facility, the higher household income, the higher probability to continue to work after a baby birth they have, irregardless of the model specification. Concludingly. we can say that a breast -feeding and whether a female worker uses a care-giver or a child-care facility may be important and crucial factors in determining her to continue or working after a child birth.

In Korea, it is widely said that a reluctance to have a baby while working has created both a low birth rate and a slow female economic activity. Generally, many women quit working for either a pregnancy or a child-care. As a result, a female economic activity in Korea is said to be low. Actually, the utilization rate of women workforce in Korea has been increasing steadily during the industrializing periods. However, compared with other OECD countries, the gap between men and women in the degree of workforce utilization remains big and a woman employee's career break at child raising period is still common in Korea. For reference, the ratio of career rupture of female workers in Japan has decreased since 1995 and was 9.0% in 2008. Korea has the same trends of the ratio as Japan since 1995 but has been increasing after 2000, and led to 15.8% in 2008 (Kim, et al, 2009).

Our government has introduced and implemented the various women workforce-related policies to improve this situation, the rate of women workforce has been at a near standstill since 2000s. Furthermore, the government makes efforts of laying a legal framework for maternity protection and anti-women discrimination and encourages work places to furnish child care measures so that women can continue to work despite baby birth. Also, there are several policies such as a maternity leave, a reduction of working hours during raising children, and flexible times not to interrupt a career of female workers. Along with these kinds of government policies, some researches were done to see how workplace environments affect a child-bearing of a woman worker (Kim, 2009; Woo 2010). On the contrary, Kim (2004) explored whether female workers would keep them in the workplace or quit after a child birth.

In this context, an increase in a female economic activity can be achieved in two ways. It can be achieved by having women keep working while caring children or helping women out of jobs for child care to return to work. Our study is concerned with the former. We will see what individual traits or family economic status helps women to return to work after a baby birth or prevent them from doing so, using Panel Study on Korean Children (PSKC).

Our work is composed of as follows: **Previous literatures** describes previous literatures, which is followed by data and the model in **Data and the model. Empirical results** explains empirical results from an estimation equation and the odds ratio. We concludes in Section **Concluding remarks**.

Previous Literatures

There seems to be two strands of researches in Korea regarding women’s work and child care. One is focused on a baby birth plan of a female employee. These sorts of researches investigate

whether the corporate policy of the maternal protection or child-care supports of the government helps a female worker to have a new baby (Kim 2009, Woo 2010). These were worked among an atmosphere where our society was concerned with a very low birth rate, which is said to be the lowest level in the world. It was implicitly assumed that an insufficient maternal protection in the work place is a major barrier for a baby birth or another birth by female workers.

Especially, Woo (2010) argued that women working in the public sector would bear more children than those in the private sectors. It reflects that maternal protection or children-care supports well-furnished in public sector leads female workers to have another babies. In contrary, Kim (2009) found that those in an unstable or temporary jobs would have less chance of having babies and also, those in manufacturing sectors would be in a similar situation.

Another kinds of research are interested in knowing whether women would return to work after a baby birth. It investigates how individual traits or a family economic status affects their decision to return to work. This approach is very similar to ours. Kim (2004) was concerned with a work return by women after a baby birth, those being in a maternity leave, not those who are out of job as in our research. She used a data from KLIPS, standing for Korea Labor Income Panel Survey. However, the survey data has some drawbacks for work return research. The survey was targeted for general households, not at females having children, the sample size is small. Nevertheless, Kim (2004) divided a female worker into one returning to work and another not returning, and then applied it to a logit analysis. She found that a female worker would have more chance of returning to work if there is a child care person or she worked more years in the same job.

Meanwhile, there are also studies on the career-interruption of a female worker like Kim, et al. (2009), Min, Oh and Lee (2010), Oh, et al., (2008), to name a few. Kim, et al. (2009) analyzes the effect of socioeconomic policies which affect women workforce utilization including a tax policy, a social security policy, and a policy for balancing between work and family such as maternity protection in addition to women employment policy. Kim, et al. (2009) also suggests a direction for a women employment policy based on research results in oder to improve the structure of a female employment in both a quantitative and a qualitative way. Also some suggestions are made for future tasks of socioeconomic policies to affect women workforce, with applying both KLIPS and a survey on a total of 1100 women aged 25-39 including 500 married working women, 300 married non-working women and 300 unmarried working women to the panel bivariate probit model with the patterns of fertility and work and 2SLS(IV) panel model, we estimate effects of fertility related policy. Min, et al, (2010) probes into re-employment rates and structure of career-interrupted women, and examines the effect of reemployment services which have been recently reinforced with several data like Economic Active Population Survey, of Statistics of Employment Insurance, and of Work-Net. They suggested that a female worker under an interrupted career should be trained more programs before resuming her work and need to build an inclusive and one-stop system of re-employment service. Oh, et al. (2008) examined when and why female workers have left the labor force due to a marriage, a child birth, and a caring and also investigated unemployed female workers' needs toward pursuing the labor force participation. They discussed several government supports and policies for generating a lot of jobs of both public and private sectors toward re-entry of career-ruptured women.

Method

Data and the Model

We use the first wave of 2008 to see what factors have an influence on the career rupture of the female worker. As has been known, PSKC (hereafter, PSKC) surveys demographic features of respondents and their family members, an educational and working status, whether a mother works or not, parenting style in raising a child, a person who looks after children, if respondents hire a

child care-giver or uses a child-care facility, facilities and programs which the child attends, the economy and residential status, and so on. PSKC has the preliminary survey of 2007, the first wave of 2008, and the second wave of 2009, when the first in-depth survey was implemented. Note that PSKC asks a survey respondent whether she returned to work after a baby birth. This is our concern, for it supply us with plentiful personal information that might influenced her work decision.

We use the first wave of 2008 and divide the sample into two sub-sample, which are the group who return to work or plan to do after a baby birth (hereafter, 1st group), another group who does not work any more after a childbirth (hereafter, 2nd group). The number of the former is 562 observations and that of the latter is 443. The items which is not relevant to our categorization are deleted in the sample analyzed.

Table 1
The Summary Statistics of Survey Respondents (Unit: %)

Variable	Total	Women with No Carrier-Interruption (1st Group)	Women with Carrier-Interruption (2nd Group)
	1,005	443	562
Mom's Age	31.3	31.7	31.0
Mom's Education Years	14.5	14.9	14.2
Breast feed (Feed=1)	52.3	33.0	67.6
Husband Employment (Employ=1)	96.2	95.9	96.4
Baby-care giver or using facilities(Hire=1)	32.6	73.8	0.2
Average Household Income (10,000won/m)	349.7	431.7	285.1
Debt (10,000won/y)	3,203.8	3,788.4	2,743.1
Consumption Expenditure (10,000won/m)	180.6	211.8	156.0
Welfare beneficiary (Receive=1)	4.4	5.2	3.7
Owning house (Own=1)	36.4	40.0	33.6

Table 1 summarizes personal traits of two groups. Average age, the average educational years, and the proportion of their spouses' getting a job and owning a house are about 31-years old, 14 years, 96%, approximately 40%, respectively, which are almost the same. However, there is 73.8% for women continuing to work after a childbirth who hire a baby-care giver or use a child-care facilities, while them not working is only 0.2%. The average household income of 1st group is 4,317 thousand won per month, which is much bigger than that of 2nd group, 2,851 thousand won per month. As for the per annum debt, there are also still bigger in 1st group of 37,884 thousand won per month than in 2nd group of 27,431 thousand won per month. This is similar to the consumption expenditure. The proportion of being subject to the low class who had to be received some benefits form the government is 5.2% for 1st group but 3.7% for 2nd group.

Now we discuss the model. Our study attempts to reveal the effects of personal traits on work decision. As is already mentioned, Kim (2004) also investigated whether women who delivered babies returned to a previous job or quit. Like us, she employed individual traits as explanatory variable in a logit model. Compared with her research using KLIPS, our study is based on a more comprehensive data, enhancing reliability of empirical research. We apply the effects of personal traits on work decision to the binomial logit model.

$$y_i^* = \beta_0 + \sum_{j=1}^{k} \beta_j x_{ij} + u_i \qquad (1)$$

The unobserved variable y_i^* is a latent variable but the observable variable. y_i is a binary variable

telling a job carrier continuity. It is known that y_i takes 0 for discontinuity and 1 for continuity after a baby birth.

We pull out 1,005 observations of women who ever had a baby birth from the first wave of 2008 survey. Out of them, 443 women continued work after baby delivery but 562 discontinued (see Table 1). The explanatory variables we use are the age, the squared of an age, the educational years, whether women do a breast -feeding or not, whether her spouse is employed or not, whether she hires a baby care giver or uses a child-care facility or not, the other economic characteristics like the household income, the debt, and the expenditure for a consumption, etc.

Empirical Results

We apply the sub-sample to the binomial logit estimation equation in (1). The empirical results are as follows: First, we look at empirical results of model 1. There are statistically significant variables that influence a decision for continuing to work or not. Education years are statistically significant in the sense that the more educated have more chance to continue work. It implies that highly-educated women has a tendency to have a regular job or higher income. Breast-feeding is also statistically significant, meaning that breast feeders have less chance for continuing to work. The presence of baby care giver or attending her children to a child-care facility is statistically significant in a sense that women can return to work more easily if they have care givers, too. Lastly, the household income is statistically significant, implying that more affluent women are not less likely to continue work.

Second, let's turn to empirical results of model 2. The explanatory variables used in model 1 shows the same direction of the effect on a job continuity. Now we present the effect of the additional explanatory variables only in model 2. The sign of the age is positive but its square is negative. It implies that age effect is negative for returning to work, in other words, the older is likely to face a hardship returning to work but its effect diminishes as she become older. Job status of a spouse is statistically significant, implying that a woman is less likely to resume a work if her husband has a job. The empirical results are compatible to those from previous researches and also economically reasonable.

Finally, odds ratio provides more realistic view of empirical result. Here we explain odds ratios of a statistically significance with 95% confidence level. Let p be a probability of returning to work and 1-p a probability of not returning. Let us begin with the model 1. First, the odds ratio p/(1-p), i.e., 0.349 says the probability that a breast feeder belongs to a household to quit working is less by 65.1% than the probability of continuing to work. Second, a woman with a baby care giver or using a child-care facility would be higher by 62,858.8% than one with none in the probability to continue to work than the probability not to do. Log(average household income) has the similar explanation as the former two variables. Third, her odds would increase by 14.3%, if a woman had one year education more.

Table 2
Estimation Results

Variable	Model 1				Model 2			
	Coeffi. (*SD*)	Odds ratio	95% upper limit	95% lower limit	Coeffi. (*SD*)	Odds ratio	95% upper limit	95% lower limit
Age	-0.557 (0.374)	0.573	0.275	1.192	-0.599** (0.293)	0.549	0.310	0.975
$(Age)^2$	0.009 (0.006)	1.009	0.998	1.021	0.010** (0.005)	1.010	1.001	1.019
Education years	0.134* (0.068)	1.143	1.000	1.308	0.134** (0.058)	1.144	1.021	1.281
Breast feed (Dummy)	-1.052*** (0.271)	0.349	0.205	0.595	-0.990*** (0.223)	0.372	0.240	0.575
Spouse Employment (Dummy)	-0.856 (0.588)	0.425	0.134	1.346	-0.832* (0.475)	0.435	0.171	1.105
Baby-care giver (Dummy)	6.591* (1.017)	728.588	99.227	5,349.8	6.925*** (1.011)	1017.5	140.2	7382.8
Log(Average Household Income) (10,000 won)	1.979* (0.453)	7.234	2.980	17.564				
Log(Debt) (10,000 won)	0.049 (0.175)	1.051	0.745	1.482				
Log(Expenditure) (10,000 won)	0.006 (0.349)	1.006	0.508	1.994				
Welfare Beneficiary (Dummy)	0.324 (0.769)	1.382	0.306	6.234	0.102 (0.666)	1.005	1.003	1.007
Owning house (Dummy)	-0.153 (0.283)	0.858	0.493	1.494	-0.223 (0.238)	1.000	1.000	1.000
Average Household Income (10,000 won)					0.005*** (0.001)	0.999	0.996	1.002
Debt (10,000 won)					0.000 (0.000)	1.107	0.300	4.083
Expenditure (10,000 won)					-0.001 (0.002)	0.800	0.502	1.275
Constant	-5.438 (6.282)				5.345 (4.548)			
Log likelihood	-189.841				-278.237			
LR chi2	611.427				820.988			
N	722				1004			

*$p < .1$. **$p < .05$. ***$p < .01$.

Next, we discuss the second model 2. As for the age, the educational years, the breast-feeding, hiring a baby care giver or using a child-care facility, average household income, there are almost the same estimation results but the odds ratios themselves is a little bit different. Note that there are two more statistically significant variables than model 2, which are the age and the age square.

Concluding Remarks

We have seen what individual traits or family economic status helps women to return to work after a baby birth or prevent them from it with using the subsample from the first wave of PSKC.

The important empirical estimation results are summarized as follows: the more educated, the more doing breast-feeding, the more hiring a baby care giver or using a child-care facility, the higher

household income, they are more likely to continue to work. These results of two models are very similar irregardless of their specifications. These two estimation results and the odds ratio show us that, whether she do breast-feeding and whether she uses a care-giver or a child-care facility is the most important and crucial factors in determining for her to continue to work or quit working after a childbirth and/or a maternity leave.

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The Determinants of Parental Stress of Working and Non-Working Mothers

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The purpose of this study was to investigate factors related to the parental stress. The participants were 593 working mothers and 1,287 non-working mothers who had from 11 month to 18 month children in 2008 and 2009 Panel Study on Korean Child (PSKC) by Korea Institute of Child Care and Education (KICCE). The measure were questionnaire, the Value of Children Scale, the Self-Esteem Scale, the Spousal Childcare Support Scale, the Marital Satisfaction Scale, the Marital Conflict Scale, the Social Support Scale, and the Parental Stress Scale. The data were analyzed by Cronbach's α, frequency, percentile, mean, correlation, and multiple regression using Window 12.0 program. Results showed that the parental stress of both working and non-eorking mothers was correlated value of children, self-esteem, spousal childcare support, marital satisfaction, marital conflict, social support, Self-esteem, marital conflict, and value of child were the strongest predictors of parental stress both working and non-working mothers. .

The period of infants is very important in their life. During this period, an infant experiences rapid physical growth, as well as dramatic growth in motor skills, cognitive and language skills, and social skills. This is a very exciting time for them, as they are experiencing their world for the first time. Infants are born with all five senses active, although some are considerably underdeveloped, they rapidly mature as the infants grow. From birth, infants begin learning about the world around them through their senses. The progression a typically developing child goes through in developing their senses, and describes how adults and caregivers can best support that development. Infant's development is depended on the primary caregiver, mother. If mother interacts with her infant sensitively, mother and infant have stable attachment each other. On the contrary, infant has unstable attachment with mother.

There is evidence that parent-infant interactions have an impact on the child's developmental outcome. Warm, responsive care from the mother helps foster optimal development (Jennings & Connors, 1989). In Bowlby's theory it was proposed that all human infants, however treated, become attached to persons who care for them (Bowlby, 1982). The quality of such attachment relationships varies, however, depending on the quality of care the infant has experienced. Further, the quality of this early experience, and the relationship to which it leads, exercises an important influence on later development. Maternal competence and other psychosocial variables and may play a crucial role in determining parenting behavior and infant psychosocial risk.

However, many mothers of infants and toddlers are having a hard time in taking care of their young children. Infants and toddlers put mothers under a lot of stress when mothers have poor parenting skills. low spousal childcare support, low perception of value of children, and poor social childcare support. No consistent definition of stress has been utlized in the literature, and the distinction between stress and stressors is often overlooked. Stressors are life events, hassles, transitions and related hardships which produce tension that calls for management. When this tention is not overcome, stress emerges. Stress has been defined as a function of the interaction of the subjectively defined demands of a situation and the capacity of an individual to respond to these demands(Straus, 1980).

Parenting by itself can be considered as a stressful life event (Miller & Sollie, 1980). The role of parental stress as a possible antecedent of child abuse has received considerable attention in the literature (Egeland, Breitenbucher, & Rosenberg, 1980; Howze, & Kotch, 1984). Every day difficulties with the infants and toddlers, such as feeding and sleeping problems, excessive crying and recurrent minor infections have been shown to be related to experience of parental stress (Ostberg, Hagekull, & Wettergren, 1997; Wilkie & Ames, 1986). Specially working mothers have

more difficulty than non working mothers (Moon, 2004). Trying to balance work, home, children and marriage is a juggling act that can leave many working mothers feeling like there aren't enough hours in the day. Most of working mothers have parental stress. Mothers who reported greater workloads or levels of interpersonal stress at work were described, by themselves and by independent observers, as being more behaviorally and emotionally withdrawn (Repetti & Wood, 1997). Interpersonal relationship stressors are also associated with greater parent-child tension (Almeida, Wethington, & Chandler, 1999).

Parental stress is thought to have a spillover effect into the parent-child relationship. The more stress mothers experience, the less supportive and more nonsupportive they are in response to children's negative emotions (Nelson, O'Brien, Blankson, Calkins, & Keane, 2009). The learning experiences available to the child through interaction with the parent may be affected by parental perceptions of stress. Darke and Goldberg (1994) reported that higher parental stress in infancy was significantly associated with less positive father-child interactions when the child was 12 months old. A number of important factors, for example, child sex, child age, child birth order, mother's self-esteem, marital satisfaction, marital conflict), and father's childcare support have been linked to the degree of stress experienced by parents. Recently, social support provided to mothers has emerged as having a consistent and strong relationship with mothers' stress (Adamakos, Ryan, & Ullman, 1986; Guralnick, Hammond, & Connor, 2008; Ostberg, Hagekull, & Wettergren, 1997).

This study examined the psychosocial variables(child sex, child age, child birth order, the value of children, self-esteem, marital satisfaction, marital conflict, spousal childcare support, social support) related to the parenting stress of working and non-working mothers. The results of this study would support and activate mothers in their parental role and to create favourable conditions for the overall development of the child.

Method

Participants

The participants were 593 working mothers and 1,287 non-working mothers who had from 11 months to 18 months children in 2008 and 2009 Panel Study on Korean Child (PSKC) by Korea Institute of Child Care and Education (KICCE). Boys were 947 (50.4%) and girls were 933 (49.6%). 11-14 month old were 1,255 (66.9%) and 15-18month old were 622 (33.1%). First child were 870 (46.3%), second child were 796 (42.3%), and over third child were 214 (11.4%).

Table 1
Background of Participants

Variable	Working mother (n = 593)		Non-working mother (n = 1,287)		Total	
	f	%	f	%	f	%
Sex						
Boy	290	48.9	657	51.0	947	50.4
Girl	303	51.1	630	49.0	933	49.6
Age						
11-14 month	367	62.4	888	69.0	1,255	66.9
15-18 month	223	37.6	399	31.0	622	33.1
Birth order						
First	296	49.9	574	44.6	870	46.3
Second	247	41.7	549	42.7	796	42.3
Over third	50	8.4	164	12.7	214	11.4

Measures

The measure were questionnaire used in 2008 and 2009 PSKC by KICCE. In the present study,

Reliabilty of the Value of Children Scale, the Self-Esteem Scale, the Spousal Childcare Support Scale, the Marital Satisfaction Scale, the Marital Conflict Scale, the Social Support Scale, and the Parental Stress Scale was acceptable (see Table 2).

Table 2
The Number of Question and Reliabilty of Measures

Variable	The number of question	Cronbach's α
Value of children	7	.75
Self-esteem	10	.86
Spousal childcare support	4	.80
Marital satisfaction	4	.92
Marital conflict	8	.91
Social support	12	.93
Parental stress	10	.85

Data Analysis

The data were analyzed by Cronbach's α, frequency, percentile, mean, correlation, and multiple regression using Window 12.0 program.

Results

Parental Stress and Psychosocial Variables of Working and Non-Working Mothers

As shown in Table 3, there were significant group differences in mothers' parental stress and psychosocial variables. The scores of self-esteem (t =6.17, p < .001), spousal childcare support (t =3.03, p < .01), and social support (t =2.53, p < .05) of working mothers were higher than those of non-working mothers. On the other hand, parental stress mean score of working mothers was lower than that of non-working mothers (t = -3.89, p < .001). Namely, working mothers of infants and toddlers had more parental stress than non-working mothers.

Table 3
Scores of All Measures for Working and Non-Working Mothers

Variable	Working mother (n = 593) *M (SD)*	Non-working mother (n = 1287) *M (SD)*	t
Value of children	3.54 (.56)	3.51 (.60)	.85
Self-esteem	3.58 (.39)	3.46 (.41)	6.17***
Spousal childcare support	3.73 (.90)	3.59 (.83)	3.03**
Marital satisfaction	3.90 (.78)	3.86 (.79)	1.00
Marital conflict	2.04 (.74)	2.03 (.78)	.18
Social support	3.91 (.62)	3.83 (.65)	2.53*
Parental stress	2.65 (.62)	2.77 (.64)	-3.89***

*p < .05. **p < .01. ***p < .001.

Correlations Between Parental Stress and Psychosocial Variables of Working and Non-Working Mothers

As shown in Table 4 and 5, the parental stress of working mothers was correlated to the value of child (r = -.25, p<.001), self-esteem (r = -.49, p < .001), spousal childcare support (r = -.20, p < 001), marital satisfaction (r = -.30, p < .001), marital conflict(r = .39, p < .001), social support (r = -.24, p < 001),

On the other hand, the parental stress of non-working mothers was correlated to child birth order (r = 06, p < .05), value of children (r = -.25, p < .001), self-esteem (r = -.52, p < .001), spousal childcare support (r = -.22, p < .001), marital satisfaction (r = -.29, p < .001), marital conflict (r = .42, p < .001), social suppor (r = -.30, p < .001),

Table 4
Correlations Between Parental Stress and Psychosocial Variables of Working Mothers

Variable	1	2	3	4	5	6	7	8	9	10
1	1.00									
2	0.02	1.00								
3	0.01	-0.01	1.00							
4	-0.02	0.02	0.14**	1.00						
5	-0.03	-0.01	-0.07	0.20***	1.00					
6	-0.03	-0.01	-0.08*	0.19***	0.15***	1.00				
7	-0.04	-0.07	-0.04	0.27***	0.28***	0.49***	1.00			
8	-0.00	0.03	0.04	-0.19***	-0.37***	-0.40***	-0.61***	1.00		
9	-0.04	-0.04	-0.06	0.18***	0.36***	0.20***	0.21***	-0.24***	1.00	
10	0.01	-0.01	0.07	-0.25***	-0.49***	-0.20***	-0.30***	0.39***	-0.24***	1.00

Note. 1. child sex; 2. child month; 3. child birth order; 4. value of child; 5. self-esteem; 6. spousal childcare support; 7. marital satisfaction; 8. marital conflict; 9. social support; 10. parental stress. $^{*}p$ < .05. $^{**}p$ < .01. $^{***}p$ < .001.

Table 5
Correlations Between Parental Stress and Psychosocial Variables of Non-Working Mothers

Variable	1	2	3	4	5	6	7	8	9	10
1	1.00									
2	0.01	1.00								
3	0.02	-0.03	1.00							
4	0.03	0.00	0.05	1.00						
5	-0.02	-0.01	-0.04	0.23***	1.00					
6	0.00	-0.01	-0.10**	0.17***	0.27***	1.00				
7	0.02	0.02	-0.10***	0.24***	0.34***	0.53***	1.00			
8	-0.02	0.01	-0.07*	-0.21***	-0.46***	-0.44***	-0.61	1.00		
9	-0.04	0.02	-0.01	0.19***	0.49***	0.25***	0.27***	-0.31***	1.00	
10	-0.00	0.02	0.06*	-0.25***	-0.52***	-0.22***	-0.29***	0.42***	-0.30***	1.00

Note. 1. child sex; 2. child month; 3. child birth order; 4. value of child; 5. self-esteem; 6. spousal childcare support; 7. marital satisfaction; 8. marital conflict; 9. social support; 10. parental stress. $^{*}p$ < .05. $^{**}p$ < .01. $^{***}p$ < .001.

Parental Stress Prediction in Working and Non-Working Mothers

As shown in Table 6, in the first step, the three predictors related to child were entered but there was no significant predictors of parental stress of working mothers. In the second step, the six predictors were added to the model. The predictors of self-esteem (β = -.37, p < .001), marital conflict (β = .19, p < .001), the value of child (β = -.12, p < .01) explained 31% of the variance in parental stress of working mothers.

Table 6
Multiple-Regression Analyses Examining Relations Between Psychosocial Predictors and Parental Stress in Working Mothers

Independent variables	Mothers' parental stress			
	Step 1		Step 2	
	B	*β*	*B*	*β*
Child sex	.01	.01	-.01	-.01
Child month	.00	.00	-.01	-.01
Child birth order	.06	.07	.05	.05
Value of child	-	-	-.14	-.12**
Self-Esteem	-	-	-.59	-.37***
Spousal childcare support	-	-	-.02	-.02
Marital satisfaction	-	-	-.02	-.03
Marital conflict	-	-	.16	.19***
Social support	-	-	-.02	-.02
F	.83		28.06***	
R^2	.00		.31	
ΔR^2	-		.31	

**$p < .01$. ***$p < .001$.

As shown in Table 7, in the first step, the three predictors related to child were entered and child birth order was the significant predictor of parental stress of non-working mothers. In the second step, the six predictors were added to the model. The predictors of self-esteem(β = -.37, $p < .001$), marital conflict(β = .22, $p < .001$), the value of child(β = -.11, $p < .001$) explained 32% of the variance in parental stress of non-working mothers. The influential independent variables affecting parental stress

Table 7
Multiple-Regression Analyses Examining Relations Between Psychosocial Predictors and Parental Stress in Non-Working Mothers

Independent variables	Mothers' parental stress			
	Step 1		Step 2	
	B	*β*	*B*	*β*
Child sex	-.00	-.00	-.01	-.01
Child month	.01	.02	.01	.01
Child birth order	.05	.06*	.03	.03
Value of child	-	-	-.12	-.11***
Self-Esteem	-	-	-.58	-.37***
Spousal childcare support	-	-	-.01	-.01
Marital satisfaction	-	-	.02	.02
Marital conflict	-	-	.18	.22***
Social support	-	-	-.05	-.05
F	1.49		67.06***	
R^2	.00		.32	
ΔR^2	-		.32	

*$p < .05$. ***$p < .001$.

Conclusions

This study explored the determinants of parental stress of working and non-working mothers who had 11-18 month infants and toddlers. Results showed that parental stress of working mothers was higher than that of non-working mothers. This result was have something to do with that of Hyuk-Jun(2004). Second, the parental stress of both working and non-working mothers was

negatively correlated the value of children, self-esteem, spousal childcare support, marital satisfaction, marital conflict, social support, self-esteem except marital conflict, Third, self-esteem, marital conflict, and the value of child were the strongest predictor of parental stress both of working and non-working mothers. This result suggests that parental stress factors between working and non working mothers are similar.

The limits of this study were as follows.

First, there were a number of other factors related to parental stress. Various variables related parental stress need to be included in the next research. Second, mothers responded their parental stress using self-report method. Following study needs to be observed mothers' parental stress to be sure objectivity. Despite these limits, this study would be contributed to explore parental stress both of working and non-working mothers. Those results would help develop childcare policy for mothers of infants and toddlers.

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Developmental Risk

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1. A Latent Growth Model of Maternal Depression: Predictors and Effects on Infant's Developmental Outcomes

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2. Variables Related with Continuity of Infant Developmental Risks: Using 1 Year Longitudinal Data

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A Latent Growth Model of Maternal Depression: Predictors and Effects on Infant's Developmental Outcomes

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The current study investigated a developmental pattern of Korean mothers' depressive symptoms, using a LGC model across the first week prenatal to the childbirth to four months postpartum. The effects of predictors of the maternal depression patterns on the developmental outcomes of children, mediated by maternal parenting, were examined employing the path-analysis. Participants included 2,078 and 1,956 infants and their parents in 2008 and 2009, respectively. Maternal depressive symptoms were measured a week prior to the childbirth, at four weeks, and four months postpartum. The main assessments were implemented at four months and 12 months postpartum and included father's marital satisfaction and involvement in child-caring, mother's self-efficacy and parenting style, child's temperament, and developmental outcomes. The father's marital satisfaction and involvement in child-caring, and child's temperament predicted the trajectory of maternal depression and the trajectory, in turn, predicted maternal parenting style. Subsequently, the parenting style estimated child's temperament and communication, problem-solving, and personal-social ability.

Depression is a highly prevalent disorder, especially among women of child-bearing age (Downey & Coyne, 1990). It has been reported that about 8% of mothers are rated to be clinically depressed. The rate increases to 12% in mothers who have recently given birth (O'Hara, 1986). This high prevalence rate suggests that a great number of children are vulnerable to detrimental effects of maternal depression. Maternal depressive symptoms during infancy have pervasive influences on the child's adjustment including delayed reactivity to stress, poor emotional regulation, and impaired cognitive development (Beebe et al., 2008; Molfese et al., 2010). Hence, better understandings of maternal depressive symptoms and their potential effects on the child's adjustment is of great public health significance.

The Development of Maternal Depressive Symptoms

DSM-IV defines the first four weeks after the childbirth as the onset of postpartum depression (APA, 2000). However, previous studies don't share a common onset and lasting time of postpartum depression. Cooper & Murray (1995) reported that most mothers are known to recover from the postpartum depression by six months whereas Campbell et al. (1995) indicated that a significant minority remains depressed one year after the childbirth. Furthermore, Miller (2002) suggested the onset and lasting time for postpartum depression to be from six weeks to eight months. The duration of chronic depression ranges from the first 6 months postpartum (Campbell & Cohn, 1995) to the first 2 years after the birth of children (NICHD, 1999; recited from Shin, 2010).

Shin (2010) investigated developmental patterns of Korean mothers' depression just prior to the childbirth, at four weeks and four months postpartum. She found that the depression symptoms decreased at four weeks and then again increased at four months. Such trend indicates a possibility of prolonged depression-state in postpartum for Korean mothers. Therefore, it would be of a great significance as to study a development of Korean mothers' postpartum depression during the first two years and its effects on the development of their children.

Prenatal and Postpartum Depressive Symptoms and Its Effects on Infants

Despite the fact that maternal depressive symptoms not only influence lives of mothers, but also children's development in immediate and distant future, not much longitudinal research has been accounted for the relations of them. According to Hay et al. (2008), more than half of the women reporting postnatal depressive symptoms had been depressed during pregnancy as well. Such continuity between prenatal and postpartum maternal depression presents significant implications for the fetus development. For instance, Davis et al. (2004) have recently found that maternal anxiety and depression during pregnancy are likely to shape fetal behavioral patterns and predict higher cortisol and norepinephrine and lower Brazelton scores in newborns. These findings suggest that maternal psychological state during pregnancy influences the development of the fetus, presumably through alterations in maternal physiology. Huizink et al. (2004) found that the infants of mothers who reported higher levels of psychological disturbance during pregnancy displayed poorer attention regulation at 3 and 8 months.

Maternal postnatal depression appears to influence the child's adjustment partly through the quality of maternal care. Beebe et al. (2008) examined the relationship between maternal depressive symptoms at six weeks self- and interactive contingency patterns of mothers and infants during face-to-face play at 4 months. They found that early postpartum depression led to disturbances in attention sharing in interactions between mothers and infants. Field et al. (1988) reported that infants of depressed mothers, in comparison to those of non-depressed mothers, show less positive interactive behaviors when interacting with their mothers. This was even true for interaction patterns with strangers. In addition, the adverse effects of maternal postnatal depression on the child's later cognitive functioning have been documented (Murray & Cooper, 2003; recited from Salomonsson et al., 2010).

The Processing Model and Relevant Studies

In the processing model, Belsky (1984) identified three domains of determinants which shape parental functioning directly or indirectly: personal psychological resources of parents, characteristics of the child, and contextual sources of stress and support. Founded on the process model, previous studies have examined various predictors of maternal depression, including mother's interpersonal and contextual risk factors and characteristics of the child. Parent-variables impacting their parenting include parenting values, knowledge, degrees of parenting stress, self-efficacy and self-esteem, marital satisfaction and conflict, and spouse's child-rearing involvement (Choi et al., 2009).

Mother's Self-Efficacy

In social cognitive theory, perceived self-efficacy is a focal mechanism in human agency. Thus, unless people believe that they can produce desired outcomes through their actions, they have little incentive to act or to persevere in the face of difficulties. This is especially so for the first-mothers who are confronted with the difficulty in adjusting to the newly enforced role, mother. Perceived self-efficacy is theorized to be a critical factor in becoming successful mothers. The higher mothers' perceived efficacy, the lesser stress and depression they experience and the more they tend to engage in promotion of their children's developmental opportunities (Jackson & Scheines, 2005).

Father's Marital Satisfaction and Involvement in Child Caring

The recovery of mother's postpartum depression and self-esteem depend greatly on affection and psychological and instrumental supports from her spouse in child-rearing (Conenwett & Wilson, 1983). Mothers who had perceived their husbands involved less in caring for infants suffered greater postpartum depressive symptoms (Fletcher, 2009). Kim and Kim (2007) reported that the paternal parenting involvement, and marital satisfaction and maternal self-efficacy in parenting are

significantly correlated with one another.

Child's Characteristics

Temperaments of infants develop and differentiate over time, which reflect changes with development, experiences, and heredity (Molfese et al., 2010). Dodge (1990) has found that difficult temperament in an infant has been posited as a cause of depression in a mother who became frustrated with the helplessness of rearing a difficult child. Recently, Molfese et al. (2010) studied the effects of infant's temperament, maternal characteristics, and parenting style as contributors to infant's cognitive development. The results indicated that at 12 months, maternal characteristics contributed to determining parenting style and then to cognitive development of infants while infant temperament directly contributed to it. From the study, the interaction of mother's and infant's traits and the process of contribution of infant's temperament to his/her own development became more evident.

Another Common

Characteristic which represents the difficulty in the infant can be his/her extraordinary sleeping pattern. The infant's unusual sleeping routine can disrupt the lifecycle of their own lives, inducing more hardship in adjustment as newly become mothers (Field et al., 2010). In addition, mothers-to-be who are anxious or depressed during pregnancy are more likely to have babies who have sleep problems during infancy (O'Connor, 2007).

Familial Contexts

A substantial body of research has indicated that family income, a financial resource, or the employment status of the father is responsible for undermining or promoting family members' physical and mental health depending on the degree of its deficit or abundance (Ross & Spitze, 1985; recited from Chun & Ok, 2010). Today, most families rely upon the incomes of both mothers and fathers. However, fathers still provide the lion's share of income. Fathers are either the sole earners or the main earners in two-thirds of two-parent households (Burghes et al., 1997). Moreover, fathers' earnings are uniquely linked to many positive results for mothers and children, even when mothers' earnings are taken into consideration. In Korea, the bread-winner role is also perceived as a primary role in father. The impact of father's employment status is as critical as the income level. More specifically, women, being the primary distributor of the financial resource, the lack of resource would mean a higher level of stress, depression, and other forms of adverse psychological state. Dearing, Taylor and McCartney concluded that the lower the income the mother of one-year-old to three-year-old young children has, the greater the depression they experience (Chun & Ok, 2010). However, Hyun Jin Kim (2007) reported no significant relationship between the level of family income or father's employment status and maternal depression. Therefore, the examination of the relation is in order.

The Maternal Parenting Style

Numerous studies using standardized and discriminating observational techniques have delineated the specific problems in parenting associated with maternal depression. Cox, Puckering, Pounds, and Mills found that depressed mothers were less facilitative of social interactions, less adept in responding to their children's cues, and more likely to respond with control when their children were distressed (Rutter, 1990). Somewhat similarly, Rutter (1990) described that women with postpartum depressive symptoms interacted less with their 19-month-old children and were less facilitating. In a study on synchrony in mother-infant interactions, Field et al. (1990) observed the depressed mothers spending more time in the disengaged state but less time in the play state and the infants of depressed mothers spending more time in the protest state, looking away state, and less time in the play state in the dyad interactions

Furthermore, studies have consistently indicated that mothers' parenting behaviors are influenced

by child characteristics. For instance, infants' difficult temperaments were related to rejection and negative parenting behaviors whereas positive emotionality correlated with responsive maternal parenting. (Kiang, Moreno, & Robinson, 2004). Mothers with mild depressive symptoms also tend to report their infants as having more emotion regulation and attention difficulties (Boivin et al., 2005).

Thus, the parenting process is influenced by parent's personal traits (depression and self-efficacy, father's marital satisfaction and involvement in child-caring) and family environment (father's employment status) such that, in turn, affect both maternal interactions with and perceptions of the child, and subsequently influence his/her developmental adjustment. Hence, there exists a small but growing literature, indicating that prenatal maternal depression shapes fetal behavior patterns that persist into the postpartum period, and may have long- term consequences for emotional and behavior development.

The Present Study

Many studies have focused either one of two key sets of relations posited in the basic model of environmental transmission of maternal depression: (a) depression leads to disruptions in parenting and the family environment, and (b) these parenting and family disruptions lead to maladaptive outcomes in the child (Dodge, 1990). However, not many studies have demonstrated a comprehensive model incorporating both relations. Therefore, it is essential for researchers to find a pathway from the risk factors to the child's developmental outcomes. Hence, the present study extends the previous literature: by focusing on (a) developmental patterns of maternal depressive symptoms during the course of prenatal and the first two year postpartum; (b) various levels of predictors including contextual, relational risk factors as well as early temperamental difficulties in babies; and (c) effects of developmental patterns of maternal depressive symptoms on parenting behaviors and subsequently on the child's adjustment. By doing so, early detection of the risk can be possible and intervene early enough to assist in prevention of future child-conduct problems.

Summary of Hypotheses

1. The characteristics of parents (father's marital satisfaction and involvement in child-caring, & mother's self-efficacy), child (child's temperament & sleeping habit), and familial context (father's employment) in the first year would significantly predict the developmental patterns of maternal depression across prenatal time to the first year postpartum.
2. Developmental patterns of maternal depression over a week prior to the childbirth to the first year postpartum would predict mother's parenting styles in the second year.
3. Mothers' parenting styles would predict the child's developmental outcomes and his/her temperament in the second year.

Method

Participants

Families of newborn infants delivered from April to July 2008 in nationwide Obstetrics and Gynecology offices which had given more than 500 cases of parturition in the year 2006 alone in South Korea were invited to participate in the study, using a multi-stage stratified sampling system. The OB/GYN offices which met the recruitment criteria were first screened from the six districts in Korea. Then from each district, a specific number of delivery cases were proportionally allocated. In 2008 (the first year), infants were 4 to 10month-old (M = 5.28, SD = 1.20) with 50.8% boys and 49. 3% girls, total of 2078 infants. Their parents have been married for an average of 49.54 months (SD = 36.70). In 2009, infants were 11 to 18 month-old (M = 14.07, SD = 1.08) with 51.5% boys and 48.5% girls, total of 1956. Ages of the participants are presented in Table 1. Other detailed information is provided in the report of Korea Institute of Child Care and Education (KICCE) (Cho

et al., 2009).

Table 1
Ages of Infants and Their Parents in 2008

	N (Missing)	Range	*M* (*SD*)
Infants	2078 (52)	4-10 (in months)	5.28 (1.20)
Mothers	2077 (19)	19-46 (in years)	31.34 (3.72)
Fathers	1992 (138)	19-51 (in years)	33.88 (4.04)

Procedure

The KICCE involved two major data collections in 2008 and 2009 (at four months and at 12 months postpartum), along with two minor waves for prenatal depression (a week prior to the birth) and postpartum (a month post the birth). Hereafter, the times of assessments are to be referred as Wave 1 (the week prior to the birth), Wave 2 (a month post the birth), Wave 3 (the first year), and Wave 4 (the second year). From January to December of 2008, the first year data were collected via structured questionnaires and child's development screening test (K-ASQ). The questionnaires for mothers and fathers were first mailed and investigators visiting homes for K-ASQ tests. From June to October 2009, in the same manner as the previous year, the second year assessment was conducted from mothers (main caretakers) via home visit-interviews and mailed questionnaires.

In 2008, the recruitment rate was 81.1%, and, the following year, the retention rate in was 91.6% with newly recruited 52 families, resulting in a total of 1,956 families. The families of first and second years were homogeneous in regard to the marriage duration, the mother's age, the father's employment status, the maternal educational background. However, the first and the second-year samples showed a significant differences in the monthly income, which may indicate some bias (the first year M = 321.14 ten thousand won; the second year M = 418.48 ten thousands won).

Measures

The dependent variables, children's developmental outcomes were assessed by K-ASQ tests. Pre-and postpartum maternal depression collected within the first year (3 time points) and maternal parenting style measured in the second year were used as mediators. The original data provided by KICCE included the fourth measure of maternal depression, but the present study excluded the Wave 4 maternal depression assessment in order to avoid the temporal overlap with maternal behavior and the child's outcome measure. In addition, father's marital satisfaction, father's involvement in child-rearing, mother's self-efficacy, child's temperament, family income and father's employment status were taken from the first year (Table 2).

Table 2
Descriptive Statistics for Predictors

Variable	*N*	*M*	*M* (*SD*)
Father's marital satisfaction	1653	4.27	.68
Father's Participation	1860	3.58	.81
Mom's self-efficacy	1858	2.22	.68
Child temperament emotion	2076	2.71	.61
Child temperamen activity	2075	3.21	.39
Child sleep-habit	1864	3.94	.57
Father's employment status	2010	1.04	.35
Employed	1978	-	-
Others	32	-	-
Maternal depression 1	2073	1.90	.66
Maternal depression 2	1635	1.52	.60
Maternal depression 3	1853	1.95	.70

Child's developmental outcomes. The Korean-Ages & Stage Questionnaires, 2nd edition (K-ASQ; Heo, Squires, Lee, & Lee, 2006) was used to assess the developmental outcomes of children at Waves 1 and 2. It was developed as a screening test for young children aged 4 to 60 months to examine five developmental areas: communication, gross motor, fine motor, problem solving, and personal- social. Each area contains six items, totaling 30 items. Parents reported on a three point scale ranged from "yes"(10, infant's target behavior is observed), sometimes (5, beginning to be observed), to "no"(0, cannot carry out the behavior yet). The possible score ranged from 0 to 60 in each area. Cronbach alphas for the communication, gross motor, fine motor, problem solving, and personal-social subscales were .75, .85, .74, .72, and .65, respectively.

Maternal parenting style. Mothers reported on their interaction styles with their infants when the infants were 20-month-old. Six items of the social interaction subscale of the Parental Style Questionnaires (PSQ, Bornstein et al., 1996) were used in this study. The scale was a 5 point scale ("not at all," 1 to "very much so," 5), thus total scores ranged from 6 to 30. Cronbach α was .83.

The maternal depression. The Kessler's Depression Scale (K6, Kessler et al., 2002) was used to assess the depression that mothers experienced from the prenatal to postnatal periods. The scale was adapted from the Structured Clinical Interview Instrument for DSM-IV and included six items of mother-self reports on a five point scale ("Never feel that way", 1 to "Always feel that way",5). Cronbach alphas were .82, .81, .91 for Waves 1, 2, and 3, respectively. Total scores ranged from 6 to 30, with higher scores presenting higher levels of maternal depression.

Father's marital satisfaction. Fathers reported about their marital satisfaction with the Revised-Kansas Marital Satisfaction Scale (RKMSS, Chung, 2004) when the infants were 4-month-old. The original scale was a 7-point scale (Schuman et al., 1983) but was modified as a 5-point scale in the KICCE study ("very dissatisfied," 1 to "very satisfied," 5). Total scores ranged from 4 to 20 with higher scores representing higher levels of fathers' marital satisfaction. Cronbach alpha for Wave 3 was .91.

Father's involvement in child-rearing. Mothers reported on the paternal involvement in child-caring on the Father's Trait Scale (Kang, 1998) in the first year. It consists of four items on a 5 point- scale. The possible range of scores runs from 4 to 20, with the higher scores representing higher levels of fathers' involvement in child-rearing perceived by mothers. Cronbach α for Wave 3 was .77.

The maternal self-efficacy. The Pearlin Self-Efficacy Scale (Mainieri, 2006) was used to assess mothers' overall sense of control over her life when the infants were 4-month-old. Mothers reported their self-efficacy with the four items on a 5 point scale ("not at all," 1 to "very much so," 5). The total scores ranged from 4 to 20 points, with higher scores representing higher levels of maternal self-efficacy. Cronbach α was .81.

Child's early difficulties. The child's trait was assessed using the Temperament Survey for Children-Parental Ratings, Emotionality, Activity, and Sociability (EAS, Buss & Plomin, 1984). For this study, 10 items from the emotionality and activity subscales were used. Mothers reported on a five point scale ("never so",1 to "very much so", 5), total score ranging from 10 to 50. Higher scores indicated higher levels of temperamental difficulties of the child during infancy. Cronbach α for each emotionality and activity of EAS at Wave 3 in the present study were .77 and .69.

Child's sleeping habit. Child's sleeping habit was measured with the Developmental Profiles-Daily Routines (Allen & Martoz, 2003). It was measured with five items on a 5-point scale. The total scores ranged from 5 to 25, with higher scores indicating the development of healthier sleeping habit.

Father's employment status. The father was requested to check their employment status among employed, attending school, full-time housekeeping, unemployed, and others. The response was recoded into either employed (1) or others (0).

Statistical Analyses

The analyses for the present study were two-folds. First, we employed Latent growth curve (LGC) modeling using Mplus 6.1 (Muthén & Muthén, 1998-2010) to examine changes in mothers' depression across the three time-points (a week prenatal, the first month, and 4 months). The mothers' ratings on the depression were used to estimate two latent factors (intercept and slope). The intercept factor represents the initial level and the slope factor represents rate of change in maternal depression over time. In the present study, the intercept factor was centered at Wave 3; because the predictors were assessed at Wave 3. This allowed us to examine prospective predictive patterns of predictors. Thus, the intercept factor can be interpreted as the estimated level of maternal depression at Wave 3. The LGC model was first fitted without predictors to examine overall patterns of maternal depression over time. Second, predictors were then added to examine how the father's marital satisfaction, mother's perceived levels of father's involvement in child-rearing, mother's self-efficacy, child's temperament, family income and father's employment status were related to changes in maternal depression. In addition, mothers' parenting behaviors and the child's outcomes were added to the model to examine how developmental trajectories of maternal depression were related to mothers' parenting behaviors and subsequently to the child's adjustment at 12-months-old. The child's outcome measure was consisted of four indicators including child's active temperament, development of communication, problem-solving, and personal social ability measured at Wave 4.

Results

Descriptive

The means for maternal depression across the three waves were 1.90, 1.52, and 1.95 (Table 2). This suggests that maternal depression tended to decrease at the first month after the birth and then increase again during the first 4 months postpartum. Average depression scores for new mothers in Korea fell in the range of normal and mild scores. Overall, the maternal depression correlated significantly with father's marital satisfaction and involvement in childrearing, mother's self-efficacy, and child's emotional temperament and sleeping habit. Correlations among predictor-variables and three time-point measures of maternal depression are presented in Table 3.

The maternal parenting style significantly correlated with the child's active temperament (r = .088, p < .01), communication (r = .092, p <.01) problem-solving (r = .065, p < .01), and personal-social (r = .088, p < .01) development in the second year.

Table 3
Correlations among Predictors

Variables	1	2	3	4	5	6	7	8	9	10
Father's marital satisfaction										
Father's participation	.20***									
Mom's self-efficacy	-.14***	-.18***								
1st child temperament emotion	-.02	-.04	.21***							
1st child temperament activity	.01	.08***	-.02***	.17***						
1st child sleeping habit	.01	.04	-.06*	-.14***	.00					
Father employed(1)	-.02	-.02	.00	.00	-.03	.01				
Maternal depression 1	-.12***	-.12***	.26***	.13***	-.03	-.02	.00			
Maternal depression 2	-.02	-.08***	.21***	.11***	-.04	-08***	.03	.25***		
Maternal depression 3	-.13***	-.20***	.55***	.21***	-.05*	-07***	.02	.38***	.31***	

*** p < .001.

Developmental Trajectories of Maternal Depression

The maternal depression decreased at a month postpartum suggests that the developmental

trajectories of maternal depression might not be completely linear. Therefore, a linear growth model and a linear spline growth model (Stoolmiller, 1995) were tested to determine the baseline model that captures the developmental pattern of maternal depression across Wave 1 to Wave3. In the linear growth model, the intercept factor loadings were all fixed at 1, and the slope factor loadings were fixed at -.4, -.3, and 0, to correspond with Wave 1, Wave 2, and Wave3, respectively. As expected, the linear model did not fit the data well, $\chi^2(3) = 515.68$, $p = .00$, CFI = .00, TLI = -.06, and RMSEA = 0.29. We, then, fitted the linear spline model in which the intercept factor loadings were all fixed at 1 and the slope factor loading at Wave 2 and 3 was fixed at 0, and at -3, respectively, and Wave 1 was freely estimated. The linear spline model had a significantly better fit, χ^2 (2) = 10.43, $p = .01$, CFI = .98, FLI = .97, and RMSEA = .05. By freeing one parameter, the chi-square statistic was reduced from 515.68 to 10.43, nested $\chi^2(1) = 505.25$, $p < .001$, which indicated a significant improvement of the fit of the linear spline model over the linear model; thus, the linear spline model was used in the remaining analyses.

The means of the intercept and slope factor in the unconditional linear spline model were 1.95 ($p = .00$) and 1.46 ($p = .00$), respectively, indicating that both were significantly different from zero. They represented the average initial levels and growth rates across in the sample. The intercept and slope factor had significant variances of .18 ($p = .00$) and .17 ($p = .00$), respectively. These variances represent the individual variability in the initial level and slope. The significant intercept and slope factor variance indicated substantial individual variability in both the initial level (at Wave 3) and in the growth rates of maternal depression over time. The correlation between the intercept and slope factors ($r = .21$, $p = .00$) was also significant, suggesting that initial status had significant bearing on the rate of change in maternal depression.

Predictors and Outcomes of Maternal Depression

The overall model which included the predictors, mediators and child's developmental outcomes had a fit of χ^2 (59) = 165.59, $p = .00$, CFI = .94, FLI = .92, and RMSEA = .03. The fit indices demonstrated a relatively reasonable fit for the model. Father's marital satisfaction, father's involvement in childrearing, and child's sleeping habit at Wave 3 were negatively related to the intercept factor. It suggests that the higher the scores in father's marital satisfaction scale ($p < .001$), and in father's participation in childrearing ($p < .001$) and the easier child's sleeping habits, the lower the mother's depression was at Wave 3. Whereas, child's emotional temperament and father's employment status were positively related to the interception factor, which implies that the child's difficult temperament and the father being employed lead to higher levels of maternal depression at Wave 3.

Father's marital satisfaction and involvement in child-rearing, and child's sleeping habit were negatively related to the slope factor. It implies that mothers with partners who had higher marital satisfaction and involvement in child-rearing and mothers whose child had easier sleeping habit tended to show less increases in depressive symptoms over time. On the other hand, the child's temperamental difficulties and the father's employment status were positively related to the slope factor, suggesting that mothers with temperamentally difficult babies and whose husband was employed tended to show greater increases in maternal depression over time. In regard to the effects of maternal depression, the intercept factor of maternal depression was not significantly related to mothers' parenting style at Wave 4. The variance of intercept was whereas the change rate of maternal depression across a week prior to the birth to the four month postpartum period had a significant influence on the maternal parenting style ($p < .05$).

Maternal parenting style was significantly related to child's developmental status at Wave 4. This suggests that mothers with warm and responsive parenting styles had infants who were significantly better developed at 12 months old. The predictors accounted for 69.8% and 87% of the intercept and slope factor variance, respectively. Subsequently, the intercept and slope factor each accounted for the variance of maternal parenting style 24.9% and 40.4%. Lastly, maternal parenting style, in turn, explained 37% of variance in the child outcome (Table 4).

Table 4
The Intercept and Slope ON Predictors in the Conditioned Model

Variable	Intercept		Slope	
	Estimate	*SE*	Estimate	*SE*
Father's marital satisfaction	-.15***	.03	-.24***	.05
Father's participation in childrearing	-.23***	.03	-.35***	.06
Child's temperament emotion	.26***	.03	.22***	.04
Child's sleeping habit	-.04+	.03	-.04	.04
Father's employment status	.02	.03	.02	.04

***$p < .001$.

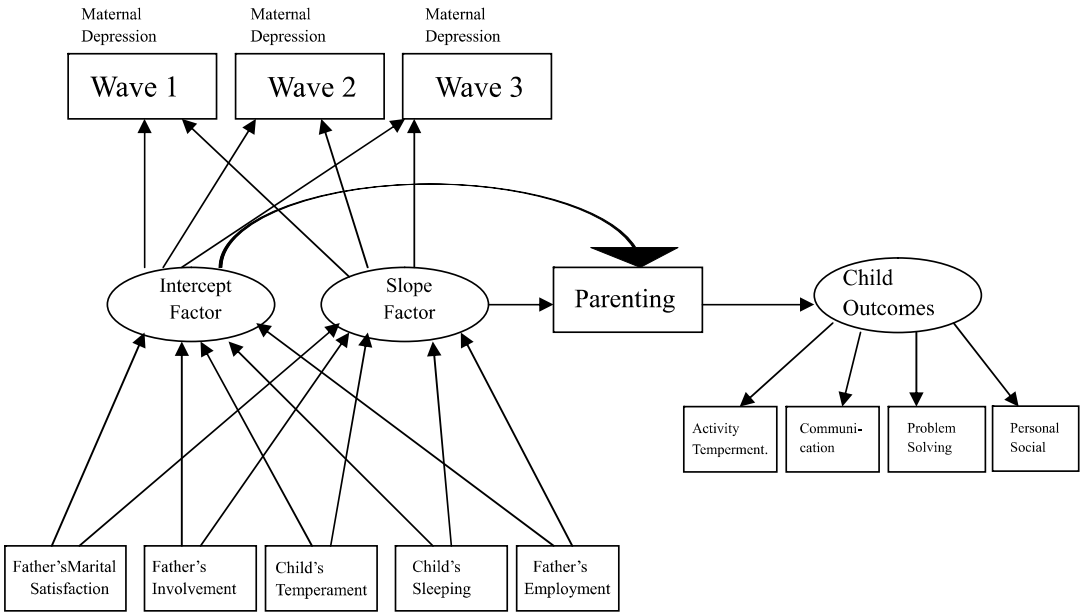


Figure. 1. The final latent growth model.

Discussion

Despite the relatively low means of maternal depression over the three waves, Korean mothers showed an overall developmental pattern of decreased depressive symptoms over the first month of the child's birth but then increased at four months to the level above the prenatal period. This result can be understood in the light of the Korean tradition of having the mothers of original families or other care-persons attending the needs of the new mothers 24 hours a day during the first three weeks after the birth. So it is likely that mothers would feel less depressed during this period. But once they are on their own caring for their new babies, it is likely that they would become overwhelm with the newly acquired tasks, experiencing more depression.

It was also found that father's marital satisfaction and involvement in child-caring and the child's temperament at Wave 3 which corresponds to 4 months of age significantly predicted developmental trajectories of maternal depression. Heo (1992) have also emphasized the critical role of couples' marital satisfaction in the recovery of postpartum depression. In addition to martial satisfaction, the child's own characteristics (i.e., difficult temperament and sleeping habits) appear to exert a significant influence on the developmental trajectories of maternal depression; mothers with infants who were emotionally less irritable and had easier sleeping habit reported lower levels of depression at four months. This is also in line with findings that babies with an intrinsic characteristic of easily provoked irritability/anger cause mothers to perceive more parenting stress and depressive symptoms

(Molfese et al., 2010).

Inconsistent to the findings of previous research, however, mother's self-efficacy and father's income/employment status had no significant effect on the maternal depression trajectories during the first year after birth of babies. This result may be due to the fact that these factors may not have direct effects on the developmental trajectories of maternal depression. Instead, perceived self-efficacy in parenting may exert an influence on maternal depression indirectly through parenting (Ardelt & Eccles, 2001). Similarly, father's income may work indirectly through martial satisfaction (Sussman et al., 1999). Therefore, further examination of mechanisms through which mother's self-efficacy and father's income influence developmental trajectories of maternal depression is warranted. Findings from the present study have also confirmed the significant association between maternal depression and her parenting style. Interestingly, mothers' depression at 4 months (Wave 3) was not related to her parenting style but overall changes during the 1st year of the child life (Wave 1 through 3) was significantly related to mothers' parenting style. This suggests that, rather than one time measure of depression, the developmental process of the maternal depression would better estimate mother's parenting behaviors. For example Lee and Bates (1985) studied longitudinal interactive relationships between child's temperament and mother's depression from infancy to toddlerhood. They found that their longitudinal interactive relationships correlated with the home-observation measures of mother-toddler interaction, maternal parenting, at age 24 months. This suggests that the mother's parenting behaviors are shaped through a process of interactions between infants and their mothers. Hence, to confirm the significant effect of change-process involved in maternal depression on mother's parenting, additional longitudinal assessments of mother's depression are needed.

Mothers' parenting styles at Wave4 was subsequently associated with the child's developmental outcomes and his/her temperament. The significant link between mothers' parenting behaviors and the child' adjustment has been well established in the literature (Molfese et al., 2010). In particular, mothers' warmth, flexibility and expressiveness is important for infants to make sense of and understand objects in the world, express and read basic human emotions for beginning years. Findings from the present study are congruent with these studies that mothers' warm and responsive parenting behaviors have significant effects on children's development of communication, problem-solving, personal-social ability as young as 12 months old of age.

In conclusion, the recently-become-mothers with husbands who participate in child-rearing and have high satisfaction in their marriage and infants possess easy emotionality demonstrate less depressive mood from a week in prenatal period to the first year in postnatal period. The start and change rate of depressive mood during the given period, then, determine the degree of warm and responsive parenting mothers implement. Finally, the warmer and more responsive parenting of mothers result in healthy, normal growth in communication, problem-solving, and personal-social skills of their babies.

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Variables Related with Continuity of Infant Developmental Risks: Using 1 Year Longitudinal Data

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This study examined the variables related with the continuity of developmental risks among 136 infants, aged 4-10 months. Using the Denver Developmental Screening Test (DDST), 136 infants among the first wave of Panel Study on the Korean Children (PSKC), 2978 infants were classified into the developmental risk group. Among the 136 risk group infants, 45 infants stayed in the risk group (continuing risk group) and the other 91 infants moved into the normal group (recovering risk group) after 1 year. Group differences were tested in the levels of infant-, mother-, father-, and environmental variables between these two groups to examine which variables were associated with the continuity of developmental risks for a year. The variables indicating parents' marital relationships, such as the mothers' marital satisfaction and conflict of the first wave and the fathers' marital satisfaction of the second wave significantly distinguished the two group. In addition, there were group differences in the levels of mothers' self-efficacy in the first wave. The levels of the other infant-, mother-, father- and environmental variables were not significantly different between the two groups. The finding suggests that the exposure to marital conflicts during infancy is associated with the continuity of developmental risks.

The first three years after birth are developmentally critical periods. Infants' developmental problems have been found to be continued and are associated with increased risks in child and adolescent adjustment difficulties (Patterson, Capaldi, & Bank, 1989). School achievement problems (Tomblin, Zhang, Buckwalter, & Catts, 2000), social isolation and peer rejection (Wood, Cowan, & Baker, 2002) during childhood and adolescence were associated with developmental problems during infancy. Thus, the implementation of protective programs aimed at infants is important to prevent problems from developing during childhood and adolescence (Greenspan & Wieder, 2006; Qi & Kaiser, 2003; Sameroff, Seifer, Baldwin, & Baldwin, 1993). Clinical Infant Development Program, Interdisciplinary Council for Developmental and Learning Disorders, ZERO TO THREE, which is a manual for diagnosis and evaluation of developmental problems for infants, aged 0-3 years, are representative examples of early intervention (Greenspan & Wieder, 2006). Unfortunately, it is difficult to find such kinds of programs, councils, or manuals and longitudinal studies on infant developmental problems in Korea.

Thus, the purpose of the present study was to investigate variables, which were related with continuing the developmental risks of infants for a year. According to previous studies, infants' and parents' personal and environmental variables are related with infant developmental pathology. Such variables as infants' temperaments, mothers' health states during pregnance, parents' psychological states, marital relationships, delivery contexts, baby feeding contexts, socio-economic status, social supports, and mother-infant attachment are related with infant developmental adjustment (Greenspan & Wieder, 2006; Sameroff, Seifer, Baldwin, & Baldwin, 1993). This study examined which infants' and parents' personal and environmental variables contributed to distinguish the continuing risk group from the recovering one among the risky infants, aged 4-10 months, after a year. It is expected that the current findings are helpful for developing early intervention and prevention programs for developmentally risky children.

The research questions are as follows:

1) Are there group differences in the last levels of infants', parents' personal, and environmental

variables between the continuing risk group and the recovering one?
2) Are there group differences in the current levels of infants', parents' personal and environmental variables between the continuing risk group and the recovering one?

Method

Participants

The participants of the current study were 136 infants (71 boys and 65 girls) who were classified into the developmental risk group in the first measurement wave of the Panel Study on Korean Children (PSKC) (Lee, Shin, & Park, 2010). Using the Denver Developmental Screening Test (DDST), 136 infants among 2978 infants in the first wave were classified into the developmental risk group. Among the 136 risk group infants, 45 infants stayed in the risk group and the other 91 infants moved into the normal group in the second measurement wave after 1 year. We called the 45 infants who still stayed in the risk group in the second wave 'continuing risk group" and the other 91 infants who moved into the normal group 'recovering risk group'. The continuing risk group included 26 boys and 19 girls, in the average age of 5.09 months (*SD* = .76) during the first wave. The recovering risk group included 45 boys and 46 girls, the average age of which was 5.13 months (*SD* =.73) during the first wave.

Measures

Based on the previous findings (Greenspan & Wieder, 2006; Sameroff, Seifer, Baldwin, & Baldwin, 1993), infant-, mother-, father-, and environmental variables, which were regarded as being associated with infant developmental pathology, were selected in the Korea Child Panel Data(KICCE, 2010). The selected personal and environmental variables were classified into 4 categories including infant, mother, father, and environmental variables. Infant variables included gender, birth order, history of treatment in in-patient room or intensive care unit (ICU), and temperament. Mother variables included age, existence of rare or incurable genetic disease, occupation states, physical contacts with baby after delivery, depression before and after delivery, history of drinking or smoking, marital conflict, marital satisfaction, parenting stress, parenting style, values on children, self-efficacy, and self-esteem. Father variables included existence of rare or incurable genetic disease, history of drinking or smoking, marital conflict, marital satisfaction, participation in child rearing, and values on children. Environmental variables included levels of normative family life events, non-normative family life events, and social supports.

Results

To investigate group differences in the infant-, mother-, father-, environmental variables, $\chi 2$ tests were conducted using nominal variables including gender, birth order, infants' history of treatment in-patient room or intensive care unit (ICU), the existence of mothers' and fathers' rare or incurable genetic disease, occupation states, experience of physical contact with baby after delivery, and the mothers' and fathers' history of drinking or smoking. There were no significant variables showing group differences according to χ^2 tests.

To examine group differences in continuous variables including infants' temperament, mothers' self-efficacy, self-esteem, depression, parenting stress, and parenting style, mothers' and fathers' marital satisfaction, marital conflict, and values on children, fathers' participation in child rearing, family life event, and social supports, t tests were performed. Table 1 shows the results on group differences in the variables of the first measurement wave. The mothers' self-efficacy, marital satisfaction, and marital conflict in the first wave were found to be significant variables to distinguish the two groups. The mothers' marital satisfaction levels of the continuing risk group were significantly lower than those of the recovering risk group, whereas the continuing risk group infants'

The maternal self-efficacy and marital conflict levels were significantly higher than those of the recovering risk group.

Table 1
Differences in Wave 1 Variables between Continuing and Recovering Risk Groups

Variable	Continuing risk group (n = 45)		Recovering risk group (n = 91)		t
	$\overline{X}$	*SD*	$\overline{X}$	*SD*	
Infant variables					
Temperament: emotionality	2.80	.57	2.74	.55	-.61
Temperament: activity level	3.18	.36	3.17	.34	-.10
Mother variables					
S0elf-efficacy	2.38	.75	2.13	.62	-2.04*
Self-esteem	2.95	.40	3.03	.42	.99
Depression before delivery	2.04	.56	1.89	.62	-1.30
Depression after delivery	1.46	.55	1.49	.54	.31
Marital satisfaction	3.59	.68	3.92	.64	2.71**
Marital conflict	2.24	.81	1.90	.69	-2.49*
Parenting stress	2.84	.62	2.18	.63	-1.33
Parenting style	4.00	.51	4.01	.48	.08
Values on children	3.56	.58	3.64	.62	.76
Father variables					
Marital satisfaction	4.21	.62	4.38	.55	1.51
Marital conflict	1.95	.61	1.80	.63	-1.30
Participation in child rearing	3.42	.77	3.66	.78	1.67
Value on children	3.79	.53	3.77	.57	-.14
Environmental variables					
Normative family life events	3.78	2.51	3.54	2.25	-.54
Nonnormative family life events	.80	1.24	.46	.62	-1.73
Social supports	3.98	.66	4.12	.55	1.31

*$p < .05$. **$p < .01$.

Table 2 shows the results on group differences in the variables of the second measurement wave. The fathers' marital satisfaction and marital conflict in the second wave were found to be significant variables to distinguish the two groups. Fathers' marital satisfaction levels of the continuing risk group were significantly lower than those of recovering risk group infants', whereas fathers' marital conflict levels of the continuing risk group were significantly higher than those of the recovering risk group.

Table 2
Differences in Wave 2 Variables between Continuing and Recovering Risk Groups

Variable	Continuing risk group (n = 45)		Recovering risk Group (n = 91)		t
	$\overline{X}$	*SD*	$\overline{X}$	*SD*	
Infant variables					
Temperament: emotionality	2.83	.62	2.75	.62	-.71
Temperament: activity level	3.77	.61	3.94	.58	1.51
Mother variables					
Self-Efficacy	2.43	.66	2.29	.59	-1.27
Self-Esteem	2.51	.21	2.52	.22	.17
Marital satisfaction	3.80	.58	3.92	.80	.89
Marital conflict	2.10	.72	1.93	.68	-1.38

Table 2
Differences in Wave 2 Variables between Continuing and Recovering Risk Groups (continued)

Variable	Continuing risk group (n = 45)		Recovering risk Group (n = 91)		t
	$\overline{X}$	*SD*	$\overline{X}$	*SD*	
Parenting stress	2.75	.69	2.68	.60	- .66
Depression	1.91	.78	1.83	.60	- .71
Parenting style	3.88	.47	3.80	.43	.91
Value on child	3.58	.52	3.56	.60	- .14
Father variables					
Marital satisfaction	4.10	.74	4.38	.59	2.34*
Marital conflict	2.15	.71	1.89	.67	-2.05*
Participation in child rearing	3.55	.69	3.62	.83	.56
Value on children	3.87	.51	3.69	.62	1.84
Environmental variables					
Normative family life events	3.69	2.29	3.68	2.30	- .02
Nonnormative family life events	.62	1.01	.42	.72	-1.37
Social supports	3.70	.70	3.92	.58	1.88

*$p < .05$. **$p < .01$.

Discussion

This study examined the variables related with the continuity of developmental risks among 136 infants, aged 4-10 months. Using the DDST, 136 infants among 2978 infants in the first measurement wave of the Child Panel Data were classified into the developmental risk group. Among the 136 risk group infants, 45 infants still stayed in the risk group and the other 91 infants moved into the normal group in the second measurement wave after 1 year. We call the two groups 'continuing risk group' and 'recovering risk group', respectively. To find the variables related with the continuity of infant developmental risks, group differences in infants', parents' personal, and environmental variables were investigated.

Mothers' self efficacy, marital satisfaction, and marital conflict in the first measurement wave and fathers' marital satisfaction and marital conflict in the second measurement wave were significant variables which showed group differences. In the first wave, the mean levels of maternal self-efficacy of continuing risk group was higher compared with those of the recovering risk group. However, from the first to the second wave, the levels of maternal self-efficacy were found to significantly increase only for the recovering risk group. This positive change in maternal perception is likely to be advantageous in challenging situation such as parenting risky children.

Except of the mothers' self-efficacy, the significant variables which were associated with the persistent developmental risks from infancy to toddlerhood were found to be parents' marital satisfaction and conflicts. This results support previous findings suggesting that exposure to negative marital conflicts has been found to elicit negative reactions in children and is more broadly associated with increased risk for child adjustment difficulties(Cummings & Davies, 2010; Rhodes, 2008). The period of infancy has been relatively understudied in the research on connections between marital difficulties and child development. The current findings provide information that such significant relationships between marital conflict and adjustment difficulties could also be found during infancy. Marital conflcit would associate with ineffective parenting by both mothers and fathers, which worse the negative consequences on developmentally risky infants. This process has been operationalized by the concepts of spillover of negativity from the interparental relationship to the parent-child relationship(Gerad, Krishmakmar, & Buehler, 2006). These findings present the possibility that improving the health of the marital relationship would buffer risky infants. Therefore,

family and couple therapy of parents are recommended beside intervention for risky infants.

In the first wave, the mothers' marital satisfaction and conflict were significant variables showing differences between the 'continuing risk group' and 'recovering risk group', whereas the fathers' marital satisfaction and conflict at the time when the continuity of the developmental risks were measured were the significant variables. Previous literature about the transition to parenthood has revealed a decrease in marital satisfaction after childbirth. Maternal marital satisfaction seemed to decline earlier than paternal satisfaction (Wilke & Arms, 1986), because mothers become confronted with the demands of parenting infants and mothers generally undertake the majority of child care tasks. Therefore, maternal marital difficulties might negatively affect many areas of infant's functioning in the first wave. Further research is required to investigate the issues that paternal marital satisfaction and conflict have particularly saliency for the second wave.

Several limitations of the current research should be noted. It should be noted that because these findings were based on t-tests, conclusions about the directionality could not be drawn. Parents who experience marital difficulties may lack the energy or motivation to interact effectively with their children. It is also possible that the stressful and demanding nature of developmentally risky infants would elicit higher marital difficulties of parents. In a future study, it would be informative to investigate this issue longitudinally to determine the direction of effects. Moreover, the current research included a relatively small sample of infants, therefore, replication is needed with large samples for generalization of the results.

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Parenting Style in Families of Children at Risk for Developmental Delay

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Parenting style is considered to be one of the most significant characteristics for children's development. For children with or at risk for developmental delay, parenting style is even crucial. Therefore, to promote children's development, a positive parenting style as the critical tool needs to be studied. This study explored factors that contribute parenting style in families with children with or at-risk for developmental delay. Guided by the Transactional Model of Development, this study addresses the associations between characteristics of parents, characteristics of children, social context characteristics and parenting style. This study is a secondary data analysis of 470 mothers who participated in the second wave of the Panel Study on Korean Children (PSKC) conducted in 2009. This study found an association between five variables (mothers' employment, mother's age, parenting stress, social support, and sufficient child care facilities). There were two implications. First, parents of children at-risk for developmental delay need to be encouraged to reduce stress caused by children's difficult temperaments. Second, the early intervention programs need to provide services to both parents and children for better children's outcomes.

In 2010, a bill regarding the well-being of children with disability, which includes early intervention programs, was submitted by 121 members of the national assembly in Korea. This bill was based on the importance of child development and family capacity to promote child development. In addition, increasing numbers of children with disabilities has lead professionals to give attention to early intervention services for children with or at risk of developmental delay (Kim, et al. 2011). Professionals' emphasis has been placed on the earliest possible diagnosis and intervention in order to achieve better outcomes for children with disabilities. Therefore, researchers have developed theories and conducted empirical studies on factors that promote development in young children, and have developed an effective intervention program based upon their findings.

For young children, under 3 years old, parenting style has been identified as a primary factor impacting development. This has been supported by a large number of theoretical and empirical studies, each emphasizing the positive influence of parenting style on various domains of child development (Kochanska & Aksan, 2004; Landry, Smith, & Swank, 2006). Moreover, the opportunities for parents to interact with their children are greater than those of any other professionals or adults, even though parents may spend as little as two or three hours each day with their chidren (Mahoney & MacDonald, 2007). Therefore, parents have greater a chance to influence their children's development. Given this fact, for children with or at risk for developmental delay, parenting style is crucial.

Despite the importance of parenting style, in homes of children with developmental delay, parenting interaction might be negative. The characteristics of these children might lead to difficults for parents to sustain pleasurable interaction and yield consequent stress and feelings of failure (McConachie, Randle, & Hammal, 2005). In addition, parents of children with developmental delay show a higher rate of directivenss compared to parents of typically developing children (Mahoney, Fors, & Wood, 1990). In other words, instead of being sensitive and responsive (which are key for parenting young children) parents tend to teach or demand tasks to make children meet the expected developmental milestones of their chronological age. However, when children with or at-risk for developmental delay are not capable of conducting these tasks, both children and parents might want to stop their interaction.

This study aims to better understand more about factors which influence parenting style and suggest early intervention programs based upon those factors to minimize negative parent-child interaction and enhance positive parenting style.

Theoretical Framework

The theoretical framework for this study is derived from the Transactional Model of Development (Sameroff & Chandler, 1975). The transactional model proposes that the caregiving environment is critical for child development, particularly the quality and frequency of interaction between parents and children (Meyer, Lester, Boukydis, &Bigsby, 1998).

The Transactional Model of Development has three main premises. First, children's development is influenced by children's experience with their partners in addition to children's own inherent characteristics. Thus, Collins, Maccoby, Steinberg, Hetherington, and Bornstein (2000) postulated that positive parenting style may moderate children's own inherent disposition that put them at risk developmentally. Second, children's characteristics may influence parents' interaction style (Sameroff & Fiese, 1990). According to Korner's study (1971), young children's behaviors and capacity to take in external situations influences the parenting style as parents try to tune in to the children's behaviors. Third, the Transactional Model of Development considers social context such as negative economic factors and lack of social support as crucial factors for parents' interaction with their children (Sameroff & Mackenzie, 2003).

Determinant of Parenting Style

Few investigators have specifically examined the determinants of parenting style in families of children with or at risk for developmental delay, although many researchers have emphasized positive parenting style. However, considering the specific characteristics of parents and children with or at risk for developmental delay under the general frameworks, parenting style can be understood as the extension of parents of typically developing children.

First, parents' psychological well-being, especially depression and parenting stress, is thought to influence the ability to interact with their children effectively. It is because stressed mothers may be more irritable, critical, and several in their interaction with their children (Webster-Stratton, 1990). In addition, symptoms of depression including loss of interest, fatigue, anxiety, and irritability may be associated with parenting difficulties (lovejoy, Graczyk, O'Hare, & Neuman, 2000).

Second, in a manner consistent with the Transactional Model of Development, not only parents but children's characteristics are big contributors to parenting style. That is, parenting style does not function independently of children's characteristics. For example, negative emotionality, children's behavior problems, distress-proneness, low sociability, irresponsibility are considered to be social-emotional problems in early childhood and predictors of parental responsiveness (e.g. Clark, Kochanska, & Ready, 2000). Also, studies suggest that there is a reciprocal or transactional influence that mothers and children's communication have on each (Steelman, Assel, Swank, Smith, & Landry, 2002; Bornstein, Hendricks, Haynes, & Painter, 2007). Several studies present their results that children's enhanced language may encourage the child to engage their parents more, promote joint attention on objects, and active interactions. These children's capacities could inspire positive parenting style (Yoder &Warren, 2001; Steelman, et al., 2002; Bornstein, et al. 2007).

Third, social and environment characteristics such as social support appear to be a key influence on parenting style. Social support includes informal support from intimate relationships such as spouse or parent as well as formal support from professionals. Some professionals have suggested that more positive supportive relationships for parents have been linked to more positive parental functioning like maternal interactive behavior, maternal parenting satisfaction, and maternal life satisfaction (Crnic & Stormshak, 1997).

Based upon aforementioned studies, there are two important points for the present study. Belsky (1984) suggests that parent-child relationship cannot be explained in terms of cause-and-effect relationships. That is, it is impossible to determine which factors precede other factors in certain cause and effect relationships. However, despite these considerations, there are some predictive factors which can be explained with casual relationships. In addition, it is still useful to explore

factors associated with parenting style, because these factors provide a general view of individual differences in parenting style.

The other point is that this study is conceptualized in terms of research on families with typically developing children due to the lack of the studies conducted with families of children with or at-risk for developmental delay. Although this study hypothesized that the determinants of parenting style for parents of typically developing children may be similar to these for parents of children with or at risk for developmental delay, there is uniqueness in this sample. Therefore, the major aim is not to confirm the existing theory, but to explore specific ways related to the relationships between various predictors, focusing on children's developmental issues and parenting style.

Method

Sample

This study used the data from the second wave of the Panel Study on Korean Children (PSKC) conducted in 2009. Among 1904 parents, this study selected 473 cases based on the children's Danver II screening test. Only children who were grouped as "suspicious developing"were included in this study in order to focus on families who have children who are at risk for developmental delay. There were not enough children who have a diagnosis of developmental disability/delay (N = 1). Among 473, three cases were excluded because the respondents were not mothers but grandparents or father. Therefore, this study was conducted with final 470 cases.

Measures

Table 1
Instruments

Variables	Assessment instrument	Measures	Range
Parenting style	Parental Style Questionnaire (PSQ;, Bornstein et.al.,1996)	Social Exchange: 6 items (5 point Likert scale)	6-30 higher scores/positive parenting
Parenting stress	Parenting Stress Index/SF (Abidin, 1990)/Modified by Kim and Kang (1997)	Parenting distress about their roles: 10 items (5 point Liket scale)	10-50 higher scores/higher level of stress
Parental depression	Kessler 6 (K6; Kessier et al., 2002)	Depression: 6 items (5 point Likert scale)	6-30 higher scores/higher level of depression
Child development	The Koran Age & Stages Questionnaires Heo, Squires, Lee, & Lee, 2006)	1) Communication, 2) Gross Motor, 3) Fine Motor, 4) Problem Solving, 5) Personal-Social development, 6) items per sub-domain (yes/10 points, sometimes/5 points, not yet/0 point)	each domain 0-60
Children's temperaments	Emotionality-Activity Sociability-Temperament Survey (Buss & Plomin, 1984)	1)Emotionality 2)Activity: 5 items per sub-domain (5 point Likert scale)	Each domain 5-25 1) emotionality-higher scores/negative emotionality 2) activity-higher scores/active children

Table 1
Instruments (continued)

Variables	Assessment Instrument	Measures	Range
Social support	The instrument developed by Lee & Oak (2001)	12 items (5 Likert Scale)	12-60 higher scores/higher level of social support
Cooperation from a husband with child care	The instrument developed by Kang(1998) & Hong (1995)	4 items (5 Likert Scale)	4-20 higher scores/higher level of cooperation from a husband
Sufficient child care facilities		1 item (5 Likert Scale)	1-5 higher scores/more sufficient
Demographics		Mother's age & Income Marital Status Mother's education Mother's employment	Continuous Married/non married High school or under/ higher Employed and stay at home

Results

Demographics

The mothers in this study were between 21 and 46 years old, M = 32.12, SD = 3.72. The majority of mothers were married, n = 468, and from middle-class backgrounds. Sixty five percents of the mothers (n = 304) had at least an associated degree and a hundred twenty mothers (25.5%) were employed. The children (286 male and 184 female) were between 12 and 18 months old, M = 13.91, SD = 1.10.

Preliminary analysis. Prior to analyzing the data, bivarate correlations of all variables were conducted to examine the associations between parenting style and independent factors and to assess multicollinearily among independent variables. First, among demographic factors, only mother's age was weakly associated with parenting style (r = .14, p < .00). Second, an examination of the bivariate correlation analysis among children's characteristics showed that children's emotional temperaments (r = -.26, p < .00) and personal-social development (r = .12, p < .05) were correlated with parenting style. Third, parenting style was moderately correlated with parent's characteristics, Specifically parenting stress (r = -53, p < .00) and parent's depression (r = -.35, p < .00). Lastly, characteristics of social context including social support (r = .33, p < .00), cooperation from husband in child care (r = .15, p < 00), and neighborhood to raise children (r = .15, p < .00) were correlated with parenting style. There were no multicollinearity problems with these independent variables.

Predictor of parenting style. Hierarchical multiple regressions were conducted to test the relative influence of three types of factors on parenting style: characteristics of parents, children, and social context characteristics. Table 2 shows the changed results when the set of variables was entered hierarchically into a multiple regression analysis. Model 4 explained 37.5% of the variance in parenting style in family of children with developmental risk. This proportion of variance was statistically significant (F = 13.40, p = .00). When parent's characteristics were entered in the model, the largest increase occurred in explained variance (Incremental R^2 = .194, p < .00).

The relative importance of variables in predicting parenting style was reported by standardized regression coefficients (β). Among the 18 predictors entered in this model characteristics, five variables significantly explained parenting style; parent's employment status (β = -.17), mother's age (β = .13), mother's stress (β = -.40), social support (β = .18), sufficient child care facility (β = -.12).

Table 2

Hierarchical Regression Analysis Summary

Variables	Model 1			Model 2			Model 3			Model 4		
	B	*SE*	*β*	*B*	*SE*	*β*	*B*	*SE*	*β*	*B*	*SE*	*β*
Education	.68*	.31	.11	.66*	.30	.10	.41	.27	.07	.30	.26	.05
Employment	-.70*	.33	-.10	-.96**	.32	-.14	-1.01***	.28	-.15	-.14***	.28	-.17
Mother's age	.10**	.04	.14	.11**	.04	.14	.09**	.03	.12	.10**	.03	.13
Household monthly income	.00	.00	.07	.00	.00	.06	.00	.00	.03	.00	.00	.03
Marriage status	-1.3	2.86	-.02	-2.73	2.79	-.05	-2.64	2.47	-.04	-2.49	2.41	-.04
Children's communication				.01	.01	.03	.01	.01	.03	.01	.01	.04
Children's gross motor				.00	.00	.02	.00	.00	.04	.00	.00	.05
Children's fine motor				-.01	.01	-.06	-.02	.01	-.07	-.02	.01	-.08
Children's problems solving				-.01	.01	-.03	.00	.01	-.00	-.00	.01	-.02
Children's personal/social development				.02	.01	.10	.02	.01	.09	.02	.01	.08
Temperament-emotionality				-.24***	.04	-.25	-.07	.04	-.07	-.08	.04	-.09
Temperament-activity				.13**	.05	.13	.09*	.04	.09	.08	.04	.08
Parenting stress							-.19***	.02	-.43	-.18***	.02	-.40
Parental depression							-.06	.03	-.09	-.03	.03	-.04
Cooperation from husband in child care										.05	.04	.06
Social support										.06***	.02	.18
Sufficient child care facility										-.36**	.14	-.12
Neighborhood to raise children										.13	.16	.03
R^2	.045			.140			.334			.375		
ΔR^2	.045			.095			.194			.041		
F	3.94** (p = .002)			5.53*** (p = .000)			14.55*** (p = =.000)			13.39*** (p = .000)		

*p < .05. **p < .01. ***p < .001.

The relationships between children's temperaments and parenting style were mediated by parenting stress. When parenting stress and parent's depression exist in the model, children's temperament variables was less highly associated with the parenting style (Baron & Kenny, 1986).

Discussion

The purpose of this study was to explore the factors that predict parenting style in families of children at risk for developmental delays. One of the most surprising finding from this study was the failure to find evidence that children's development including children's communication development, gross/fine motor development, and problem solving skills did not explain parenting style. It is commonly believed that children's developmental issues interfere with the ability and motivation of mothers to parent effectively with their children. However, this study found that children's development was generally unrelated to parenting style.

One possible explanation for this finding is that some parents may believe that their role is to help their children with difficulties and that with their efforts their children's development problems may diminish over time. In this case their children are only two years old and there are lots of opportunities for growth. On the other hand, other parents may allow their children's difficulties to affect their parenting style. To the extent that these two processes might be operating in this population of parents, it is difficult to detect a linear relationship between children's developmental functioning with their parenting style.

Another unexpected result was the negative influence of sufficient child care facilities on parenting style. Several studies have found that child care serves as a social support which gives parents respites from responsibility of child. This support might lead to positive parenting style. However, this study did not support previous findings of a relationship between child are services and parenting style. This inconsistent finding might be explained by the possible belief that if there is not enough child care, mothers might try to take more responsibility for their children, particularly, when their children are too young for child care.

The strongest finding from this study was that parenting stress and social support were associated with parenting style, consistent with previous studies. In addition, this study found that parenting stress and social support mediated the relationships between children's temperaments and parenting style. It could be interpreted that parents are stressed out when they cannot handle their children's difficult temperaments.

Findings of this study suggest that early intervention programs should provide services to both children and parents, although most early intervention programs provide services only to children to promote child development. Children’s temperaments could be impacted by their level of development. For example, when children cannot express what they want, they express negative temperaments which make parents stressful and feel like a failure. Therefore, professionals need to help parents become aware of the possible reasons of children’s difficult temperament and to reduce parenting stress in order to encourage a positive parenting style. It is important to note that literature suggests parenting style tends to be stable over time (Dallaire & Weinraub, 2005). Therefore, establishing a positive parenting style when children are young before their relationships become dysfunctional is crucial.

In addition, to the extent that parents are the more potent agents in the establishment of relationship with their children, parents need to receive necessary services to encourage positive relationships. This suggestion is consistent with the other findings about parent’s need of social support. When parents receive enough informational support, they show more positive parenting

style.

In this study, there are two major limitations. First, because the children are young, the gap in child's development between children at risk of developmental delay and typically developing children may not big enough to influence parenting style. Therefore, follow- up research with older children is necessary. Second, parenting style would be more accurately measured with standardized parent-child interaction observation. These observations will provide fully informed the strengths and areas needing improvement about parenting style.

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Parenting

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1 The Relationship Between Father's Parenting Support, Mother's Parenting Knowledge and Mother's Parenting Styles: Mediation Effects of Mother's Parenting Stress on First Born Children Development

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2. The Effect of Mothers' Participation in Instructions for Desirable Rearing Method on Rearing Style

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3. The Effect of Mother's Drinking on Marital Satisfaction and Marital Conflict

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The Relationship Between Father's Parenting Support, Mother's Parenting knowledge and Mother's Parenting Styles: Mediation Effects of Mother's Parenting Stress on First Born Children Development

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This study investigates the relationship between father's parenting support mother's parenting knowledge, mother's parenting stress and mother's parenting style. The mother's parenting stress is closely related to father's parenting support and mother's parenting knowledge and play a mediating role in mother's parenting styles intervening variable. Also, it examines the direct or indirect impact of father's parenting support and mother's parenting knowledge on parenting behaviors. Data from Panel Study on Korean Children (PSKC) (2008, 2009) are used prove the hypothesis of this study. For the structural model(hypothec), the first year data(2008) of mother's parenting knowledge, father's supportive participation in parenting and mother's parenting stress and the second year data(2009) of mother's parenting styles were used. The results indicated father's parenting support wields a direct influence on mother's parenting style. Mother's parenting knowledge has an indirect influence on mother's parenting style through mother's parenting stress. Implication of the present study for the research on the mediation effect of mother's parenting stress are outlined.

In general, parenting knowledge on parenting plays an important role in deciding what environments they should provide their children and how they raise them. Parenting knowledge can be generally defined as a basic knowledge or information that helps parents support and direct their children in development. Prior research has shown that parenting knowledge is an important variable that has influence over parenting attitude, stress, behavior and even on child development (Yoon, & Cho, 2004; Lee, 2009). Mothers sometimes experience problems in bringing up their children due to the ignorance about what their children want and how to react to their behaviors. When such experience is accumulated, it can cause parents to have a guilty conscience that they haven't sufficiently fulfilled their roles as a parent and lead to parenting stress (Lee, 2009). Particularly for a mother who raises her first child, her precise parenting knowledge can produce confidence in raising her child and consequently has a positive impact on her child's development. In the meantime, however, motherhood can cause confusion and be a burden that may give her some raising her child. Therefore, parenting knowledge may depend upon amount of experience the mother has child.

In addition, a good conjugal relation is the most important and supportive system which helps parents take good care of their children. And mother's perception and satisfaction about the availability of her spouse's support have a great effect on her parenting knowledge, attitude and behavior (Belsky, 1984). A supportive relationship exerts metal comfort and releases stress from psychological tension and suppression caused from parenting while resulting in supportive matrimonial attitude on the basis of mutual respect and love (Lee, 2010). Parenting support of a husband is expected to reduce wife' parenting stress as an important source of support. Thus, the relationship between father's supportive parenting and mother's parenting knowledge and its impact on children needs to be emphasized. The more a mother perceives parenting stress, the more she poses an oppressive and rejectable attitude toward her children (Park, Jeon, & Han, 1996; Shin, 1997; An & Park, 2002). It has been reported that when parents have lower parenting stress, parents have more reasonable and affectionate parenting behavior for their children (Kim, Moon, 2005). Also, mothers of the group in which fathers participate more in parenting show a higher level of affectionate, self-controlling, accomplishing and reasonable behaviors in parenting then those of the group with low parenting of fathers (Lee, 2003).

However, the studies on father's parenting support have been mainly conducted on the areas related to mother's parenting stress and styles (Kim, 2011; Lee, 2007; Lee, 2003) and its impact on infants (Woo, 2011; Lee, 2003; Lee, 2005; Han, 2003). Therefore, the relationship between father's supportive parenting and mother's parenting knowledge has not been clarified yet. Hence, this study investigates

the influence of father's parenting support on mother's parenting style. On the basis of the previous literatures, this hypothetical builds up a study model in which the mother's parenting stress closely related to father's parenting support and mother's parenting knowledge is set as an intervening variable. Also, it examines the direct or indirect impact of father's parenting support and mother's parenting knowledge on parenting behaviors. Because mothers with only one child lack in parenting experience, mother's parenting knowledge, parenting stress and father's supportive participation in parenting can have a great effect on mother's parenting styles. Therefore, this study chose 743 mothers who had only one child after excluding non-respondents for the analytical experiment. Thus, this study looks to finds if father's parenting support wields a considerable influence over mother's parenting. Furthermore it will encourage father's participation in parenting support and provide substantial information for the sake of parents' education and parenting support, which can be practically used for would-be mothers as well as mothers raising their first child.

Hypothetical Model

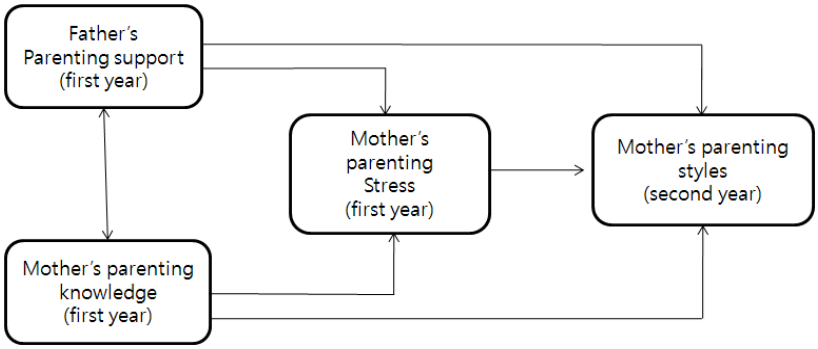


Figure 1. Hypothetical model.

Method

Sample

Data from PSKC (2008, 2009) are used to examine the hypothesis of this study. To find what effect mother's parenting knowledge, father's supportive participation in parenting and mother's parenting stress have on mother's parenting styles afterwards, the first year data (2008) of mother's parenting knowledge, father's supportive participation in parenting and mother's parenting stress and the second year data(2009) of mother's parenting styles were used.

The general characteristics of the study samples are described in Table 1.

Table 1
Characteristic Data (N = 743)

Variable	Mother		Father	
	f	%	*f*	%
Level of education				2
Below high school graduate	196	26.4	176	23.7
2 years college	200	26.9	178	24.0
University graduate or above	339	45.6	372	50.1
Nonresponse	8	1.1	17	2.3
Income activity				
Office worker	253	34.1	721	97.0
Student	4	.5	3	.4
A full-time homemaker	475	63.9	2	.3
Inoccupation	4	.5	7	.9
Nonresponse	7	.9	10	1.3

Table 1
Characteristic Data (N = 743) (continued)

Variable	Mother		Father	
	f	%	*f*	%
Age				
Minimum-maximum	20~47		20~51	
M(SD)	30.92(3.64)		33.33(3.93)	
Married years				
Minimum-maximum	0~14			
M(SD)	2.44(1.78)			

Measures

Mother's parenting knowledge. KIDI (The Knowledge of Infant Development Inventory, MaPhee, 2002) was borrowed to measure mother's parenting knowledge. KIDI is a standardized assessment tool to evaluate mother's knowledge of infant development process. This panel analysis used only 13-items of the total KIDI's 15-items regarding the development direction were used. Rather than using a percentage of right answer of the total items, this study used the total sum of the right answer(1 for a right answer and 0 for a wrong answer) as the score of parenting knowledge. It can be interpreted that the higher score is higher level of mother's right knowledge on infant parenting. The reliability coefficient of the measures was .577

Father's parenting support. Father's parenting participation was measured by 4 questions about the extent of his support for mother's parenting(Ann, 2010). In order to measure father used a 5-point Likert scale(1 = "it is not true at all" to 5 = "definitely it is true"). The higher score means the higher level of father's participation in supportive parenting. The reliability coefficient of the questions on father's parenting participation showed .812.

Mother's parenting stress. To measure mother's parenting stress, Korean version of Kim and Kang (1997)'s "Parenting Stress Measures" that is based on PSI-SF(Parenting Stress Index Short From, Abidin, 1990) was modified and used. In this study accepted 10 items of "burden of parents' roles" and "distress" among the "Parenting Stress Measures" were used. On 5-point Likert scale on each items, the higher score means the higher level of parenting stress. The reliability coefficient .851

Mother's parentint style. The Parental Style Questionnaire(PSQ) developed by Bornstein et al. (1996) was used to measure mother's parenting behavior. 6 questions about parenting styles of PSKC data were factorized into 2 items: warmth and reactivity. Each factor consists of 3 items and each item was answered on 5-point Likert scale. The higher score of each factor means parenting behavior is more warm and more reactive. The reliability coefficient was .843

Data Analysis

For this study, PASW 18.0 and AMOS 18.0 were used as statistical tool and the analytical process are as followed. First, frequency, percentage and descriptive statistics were calculated to investigate the general characteristics of the study objects. Second, mean and standard deviation were calculated to identify the relationships among major variables and Pearson's correlation coefficient was produced through correlation analysis. Third, this study used a structural equation modeling (SEM) to examine the hypothesis. As for mother's parenting style(latent variable) a couple of its sub-factors were set as measured variable. Also 2 or 3 testlets were used to form measured variables for mother's parenting knowledge, father's supportive(participation in) parenting and mother's parenting stress. Fourth, The goodness of fit statistics was calculated to test the hypothetical model and attentive models. TLI > .90, CFI > .90, NFI > .90, RMSEA < .05 were chosen for Goodness-of-Fit Index (GFI) (Lee, 2009; Hong, 2000).

Results

Correlations Among Measured Variables

Correlations among the variables are shown in Table 2. Mother's parenting stress has a negative correlation with mother's warmness (r = .327, p < .001), reactivity (r = .411, p < .001), and total scores (r = -.407, p < .001) of mother's parenting styles. Mother's parenting knowledge (r = .104, p < .01) and father's parenting support (r = .217, p < .001) were moderately related to mother's parenting style.

Table 2
Variable Correlations (N = 743)

Variable	1	2	3	4	5	6
Mother's parenting knowledge	1.00					
Father's parenting support	.067	1.00				
Mother's parenting stress	-.109**	-.234***	1.00			
Mother's parenting style						
Warmness	.064	.193***	-.327***	1.00		
Reactivity	.125**	.201***	-.411***	.648***	1.00	
Total	.104**	.217***	-.407***	.906***	.909***	1.00
M	8.56	3.71	2.64	3.98	3.90	3.94
SD	2.05	.79	.60	.55	.56	.51

*p < .05, **p < .01, ***p < .001.

Structural Model Analysis on Variables Related to Mother's Parenting Styles

Compared with model. The goodness of fit statistics was investigated for the measure model: $x^2(21)$ = 23.680, x^2/df = 1.128, GFI = .993, AGFI = .985, CFI = .998, TLI = .977, NFI = .984, RMSEA = .013. The correlation between the factor loadings of this measurement model and the latent variables shows that the factor loadings of observed variables for latent variables have a valid factor loading >.4 and the correlation coefficient among latent variables <.9 . , Indicating this has discriminative validity.

Meditating model. On the basis of the above measurement model, GFI was calculated to verify the mediating effects of this study model, as shown in Table 3. In hypothetical model, mother's parenting stress was set as intervening variable in the path including father's parenting support and mother's parenting knowledge, And all possible path are included.

As for the model 1, the path of father's parenting support to (->) mother's parenting style was eliminated from the hypothesis model. In the model 2, the path of mother's parenting knowledge to (->) mother's parenting style was taken out. In the full mediation mediating model, father's supportive parenting participation to (->) mother's parenting style and mother's parenting knowledge to (->) mother's parenting style were removed. The goodness of fit indexes of the models and are shown in Table 3.

Table 3
Goodness of Fit of the Hypothetical Model and Mediating Model

	χ^2 (*df*)	GFI	AGFI	CFI	TLI	NFI	RMSEA	χ^2/df
Hypothetical Model	23.680 (21)	.993	.985	.998	.977	.984	.013 (.000~.035)	1.128
Alternative Model 1	29.395 (22)	.991	.982	.995	.994	.982	.019 (.000~.038)	1.259
Alternative Model 2	27.706 (22)	.992	.983	.996	.999	.977	.019 (.000~.038)	1.259
Full mediation model	34.530 (23)	.990	.980	.992	.988	.998	.026 (.000~.043)	1.501

Note. Alternative Model 1: father's parenting support → mother's parenting style elimination; Alternative Model 2: mother's parenting knowledge → mother's parenting style elimination; Full mediation model: Alternative Model 1, Alternative Model 2 elimination.

When the hypothetical model and the mediating model of 1, 2 and 3 were compared, $\Delta\chi^2$ didn't significantly increase : $\Delta\chi^2(1) = 5.715$(ns) of the model1, $\Delta\chi^2(1) = 4.026$ (ns) of the model 2 and $\Delta\chi^2(2) = 11.060$ (ns) of full mediation model. Therefore, the complete mediating model proved to be best of hypothetic model.

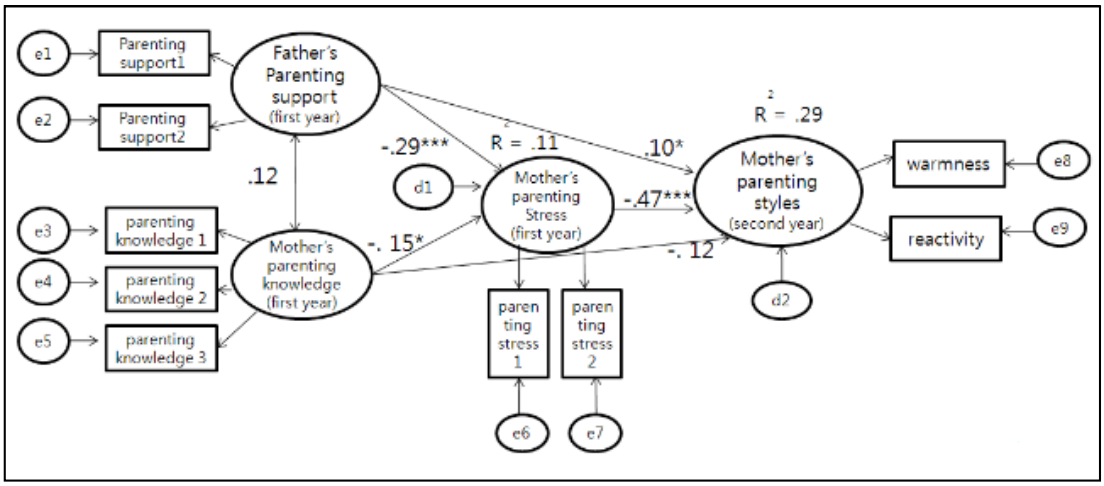


Figure 2 Meditating model analysis result.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

As shown in Figure 2 and Table 4, these variables have an explaining power $R^2 = .29$ of mother's parenting style. The path of father's parenting support to mother's parenting style($\beta = .10$, $p < .05$) turns statistically significant at the $\alpha = .05$ as well as the path of mother's parenting stress($\beta = -.29$, $p < .001$) to mother's parenting style($\beta = -.47$, $p < .001$) is also statistically significant at $\alpha = .001$. This result tells us that both indirect and direct influence of father parenting support to mother's parenting style through mother's parenting stress is significant. And the path from mother's parenting knowledge through mother's parenting style($\beta = -.47$, $p < .001$) to mother's parenting stress($\beta = -.15$, $p < .05$) turns out to be significant at the level of $\alpha = .001$. The path of mother's parenting knowledge to mother's parenting style($\beta = .12$, $p < .05$) turns no significant. It means that as for mother's parenting knowledge, mother's parenting stress has an indirect effect on mother's parenting style.

Also, father's parenting support through mother's parenting stress has a partial mediating effect on mother's parenting style. In addition, mother's parenting know ledge has effect on mother's parenting style through mother's parenting stress, which means mother's parenting stress has a full mediating effect for the path.

Table 4
Significant Pathways and Indirect, Direct Effect among Variables in the Mediating Model

Predictors	Estimate	S.E	C.R	Total effects	Direct effects	Indirect effects	R^2
Mother's parenting stress							
Father's parenting support	-.241	.039	-6.150	-.285	-.285***	.000	.114
Mother's parenting knowledge	-.225	.101	-2.231	-.151	-.151*	.000	
Mother'parenting style							
Father's parenting support	.063	.026	2.387	.233	.100*	.133	.294
Mother's parenting knowledge	.131	.068	1.936	.189	.119	.170	
Mother's parenting stress	-.347	.044	-7.965	-.467	-.467***	.000	

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Discussion

This goal of this study was to find a specific path of the relationship of father's parenting support and mother's parenting knowledge to mother's parenting style. The summary and the findings of the study are followed.

First, it was verified that mother's parenting stress is the important variable to explain the effect on mother's parenting style. Mothers who are stressed out for parenting, show more positive behavior they have for parenting. On the other hand, mothers with high level of the stress show low level of active and positive behavior. These findings are in accordance with the results of the previous studies(Kim, Park, 2008; An, Park, 2002; Huth-Bocks & Hughes, 2008; Luster & Okagaki, 1993)

Second, it was shown that father's parenting support wields a direct influence on mother's parenting style. The more fathers participate in parenting, the more positive behavior mothers possess. Also father's parenting participation has an indirect impact on mother's parenting style through mother's parenting stress. It means that the more fathers are cooperative with mother's parenting, the less mothers are stress out in parenting and as the result the more positive behavior mothers have in parenting. This finding supports the previous study asserting that father's cooperative parenting exerts influence on mother's parenting stress and the more fathers join in parenting, the better mothers display positive parenting behavior.

Third, mother's parenting knowledge has an indirect influence on mother's parenting style through mother's parenting stress. This finding is in the same vein as the previous studies that note that mother's parenting knowledge helps mothers better understand and interact with their children(Choi, 2006; Hong, Kim, 2008). That is, the knowledge of mothers on child development reduces the stress caused by parenting and as a result they display better parenting behavior.

Subsequent research is suggested on the basis of these finding. Mother's parenting styles depend on child development and the characteristics of a family. Therefore, a longitudinal study in the future would be a great chance to more deeply understand mother's parenting styles by age development.

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The Effect of Mothers' Participation in Instructions for Desirable Rearing Method on Rearing Style

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This research was conducted to investigate the effect of mothers' participation in instructions for desirable rearing method, which is a kind of parental education, on rearing style. In particular, this research tried to examine that mothers in poverty get some substantial help through the instruction for mothers. The main findings of this study are as follows. First, the style of child-rearing differs by the socioeconomic background. In particular, mothers in poverty have difficulty in getting a good rearing style. Second, mother's psychological characteristics such as self esteem and self-efficacy of child-rearing have relatively larger effects on rearing style. In particular, these variables mediate the effect of mother's education on rearing style. Third, participation in instruction for child-rearing has significantly positive effects on rearing style, especially for mothers in poverty. Based on this findings, we suggest that well-prepared instructions be provided to mothers in poverty, and it is needed to attract voluntary participation in instructions for child rearing from parents.

Parental child rearing attitudes and behavior are receiving the spotlight as important factors in the healthy development of children (Do et al., 2009). That parents form the child's first environment and thus provide the child's source of knowledge and basis for socialization is widely understood. Children, especially pre-schoolers, spend a majority of their time with their parents, which is why parental influence on children is near absolute (Kim and Ahn, 2010).

Many previous studies have demonstrated the direct effect of parental rearing style and behavior on child development. These researches show that children whose parents exhibit compassionate, receptive and rational child rearing attitudes appear to be more settled and form more positive peer relations and in some cases more pronounced language and cognitive abilities compared to children of parents who do not demonstrate such qualities (Park & Lee, 2001; Wasik et al., 1990). However, child rearing methods, which are critical to child development, tend to vary by socio-economic status (Brooks-Gunn & Duncan, 1997; Lareau, 2003). To put it concretely, parents with high socioeconomic status tend to display compassion and are more responsive towards their children, and exhibit greater consistency in their child rearing methods. In contrast, parents from socio-economically disadvantageous positions have a lower understanding of the most fitting child rearing method to develop their child's cognitive abilities and ethics due to their systemic limitation. Also, they seem to have a passive interaction with their children.

For this reason, child rearing methods may form the starting point of, or stimulus for, an educational gap among children. As described above, parental child rearing methods have a significant influence on the early stage development of a child, and this development is systemically linked to a child's educational performance. In this context, interventional programs such as training in parenting may assist parents from low socio-economic backgrounds in developing sound child rearing techniques. This in turn would alleviate the educational gap among children during the early developmental stages.

Despite its potential positive effects, research on parental education is relatively sparse. There have been a number of studies investigating the effect of parental education but they were largely limited to parents of school-age children (Na, Kim & Ahn, 2005; Jacobson & Engelbrecht, 2000). This study focuses on the effects of parental education on parental child rearing style among parents of children in their early stage of development. Furthermore, it closely examines whether parental education is more differential for socially disadvantaged parents than parents who are not. The outcomes of this

study's findings will provide an in-depth insight into the decision factors of parental child rearing, which factor as a cause of the gap in early development among children.

Theoretical Background

Factors Affecting Parents' Rearing Style

There are a number of factors affecting parental child rearing style. Previous studies have shown that parents' educational level and socio-economical background are a few of the critical factors. In the course of this study, it has shown that a majority of parents from higher educational and socio-economical background demonstrate desirable child rearing behavior (Moon, 1999; Suh, 2004). On the other hand, parents from lower socio-economic strata commonly resort to corporal punishment or yelling, which put them in stark contrast with well-educated parents (Hoff, Laursen and Tardiff, 2002). Among the various reasons for child rearing differences, one is experience, i.e., socio-experiential differences bring about disparity in parental education (Kohn, 1981). A compelling reason for this is that low earning levels of disadvantaged parents result in a different child rearing attitude. There is a more realistic reason— low income and poverty take a toll on the mental health of parents and pose a threat to the family's livelihood, further burdening child rearing activities (Ku and Plotnick, 2003).

Another reason mentioned in previous studies is the effect of parents' internal and psychological characteristics, such as child rearing effectiveness and stress from child rearing, on child rearing style (Do et al., 2009). Parents with high child rearing effectiveness attempt to solve problems through interpersonal contact, whereas, parents who have low child rearing self-confidence and high stress levels were shown to employ inappropriate child rearing measures (Abidin, 1990). Moreover, parents who receive less stress from child rearing and have higher child rearing self-confidence show loving and reasonable child rearing behavior, and their children are either active participants in the parents' child rearing methods or show higher levels of consistency (Kim & Do, 2004).

Parental Education and Parents' Rearing Style

Parental education provides child rearing techniques and specific knowledge about children to parents or the main caregiver of a child. It is designed to improve the parent-child relationship and acquire knowledge and techniques related to child rearing(Lee and Park, 2010). A number of previous studies on the relations between parental education and child rearing attitude reveal that parental education has a positive effect in forming effective child rearing attitude. According to Ahn (2005) showed mothers who received parental education had increased levels of effectiveness in child rearing and decreased levels of uncertainty as parents. Research on mothers of toddlers with aggressive behavior also demonstrated that mothers who received parental education felt less stressed about their child's particular behavior compared to mothers who did not enter the program (Kim, 2008). Designing an experiment to study the relation between parental education and child rearing attitude, Lee & Park (2005) showed that the group that received parental education produced more positive outcomes, i.e., increase in affection and consistency in what is permissible and decrease in ordering, control, denying and hostile behavior. These previous studies mentioned above indicate commonly that becoming a good parent is possible through parental education and hard work.

Method

Sample

In this study, we used a nationally representative sample from the Panel Study on Korean Children (PSKC) conducted by the Korea Institute of Child Care and Education (KICCE) Under the Prime

Minister. The PSKC was designed to provide plentiful longitudinal information about children's early developmental experiences from birth to 12 years old.

The population of the PSKC is all households having a infant born at a hospital in 2008. The PSKC used a stratified sampling design in which all hospitals for delivery whose total number of deliveries per year is over 500 was stratified by region. Through this process, 30 hospitals were selected across the nation and 2,561 infants were sampled as a preliminary sample. The first wave of the PSKC was implemented in 2008 with 2,078 respondents and the second wave was implemented in 2009 with 1,904 respondents.

In this analysis, we used the first wave data. Due to the missing cases on major variables in our analysis, the final sample came to be 1,020 respondents.

Variables

Dependent variable. The dependent variable is rearing style. This variable is measured by the mean-value of 4 items which are related to mother's rearing style. This question was given to mothers with 5-points Likert scale(1= Strongly disagree, 5= Strongly agree). The concrete questionnaire are like these. ① I spend much time playing with my child. ② I react properly when my child feels hard or uncomfortable. ③ I show positive, affective and warming interest to my child. ④ I know what my child wants and how my child feels.

Socioeconomic and demographic characteristics of infants and parents. In assessing the effect of the participation in instructions for desirable rearing method on rearing style, we controlled socioeconomic and demographic characteristics of infants and parents such as mother's education, household income, poverty, mother's age, housewife, sex of infant, birth order of infant. Mother's education means a mother's total years of schooling. In the baseline survey, mothers reported their final educational attainment into one of 8 school categories which are non-educated, primary school, middle school, high school, two or three-year college, four-year university, master's degree, doctor's degree. We gave 0, 6, 9, 12, 14,5, 16, 18, 21 to each category and included as a continuous variable into our model. Family income was indicated by the logarithm of the total monthly income because of its positive skewness. Poverty is a dummy variable in which the reference group is a non-poverty group that is composed of non-beneficiaries of the National Basic Livelihood Security System. Mother's age is also included in our model as a dummy variable. We separated mothers in our sample into 3 groups according to their age and make under 26 years olders as a reference group to 27-35 years olders and above 36 years olders. Housewife is a dichotomous dummy variable in which non-housewife, namely working mom is a reference group.

In relation to characteristics of infants, sex and birth order of infants are included in our model. Sex of infant is a dichotomous dummy variable in which reference group is a female. Birth order of infant is also a dummy variable. We separated the first born infants to the second and after third born infants.

Parent's psychological characteristics and father's help for rearing. In addition to socioeconomic and demographic characteristics of infants and parents, we controlled the parent's psychological characteristics and the father's help for child rearing. Self-esteem is the mean of 4 items that measure the degree of self-esteem with 5-point Likert scale (1 = strongly disagree, 5 = strongly agree)[1]. The degree of marriage satisfaction also the mean of 4 items that ask to mothers how they are satisfied with their marriage using 5-point Likert scale (1 = strongly unsatisfied, 5 = strongly satisfied[2]. Value awareness of children is the mean of 4 items that ask about parent's awareness of children's value

1) The concrete questionnaire are like these. How much agree do you the following statement? ① I feel myself as valuable as others. ② I feel that I have a lot of merits. ③ I have a positive attitude to myself. ④ I am satisfied with myself in general.

2) The concrete questionnaire are like these. How satisfied are you with your marriage life? ① How satisfied are you with your husband as a spouse? ② How satisfied are you with your marriage life? ③ How satisfied are you satisfied with the relationship with your husband? ④ How satisfied are you with your husband as a father?

of their life using 5-point Likert scale (1 = strongly disagree, 5= strongly agree[3]). We included the answers of mother's and father's respectively in our model. Self-efficacy of child-rearing is the mean of 5 items which ask to mothers about the difficulty in child-rearing. We recorded the answers inversely and included in our models[4]. Father's help for child-rearing is the mean of 4 items which ask to mothers about the degree of father's help for child-rearing[5].

Participation in parent's instruction for child-rearing. Our main interest in this research is the effect of mother's participation in instruction for desirable rearing method on rearing style. To investigate this effect, we makes the mother's participation in parent's instruction for child-rearing the main independent variable. This variable is a dummy variable. We gave 1 if a mother participated in instruction for child rearing and 0 or not. Table 1 shows the descriptive statistics of these variables.

Table 1
Descriptive Statistics of Variables

Variables	Min	Max	*M* (or %)	*SD*
Rearing style	2.25	5.00	4.08	.53398
Mother's education	9.00	21.00	14.40	1.91569
Household income (logarithm)	.00	6.91	5.68	.47306
Poverty (yes = 1, no = 0)	.00	1.00	.03	-
Mother's age				
27 - 35 = 1, below 26 = 0	.00	1.00	.79	-
Above 36 = 1, below 26 = 0	.00	1.00	.13	-
Housewife (yes = 1, no = 0)	.00	1.00	.70	-
Sex of infant (male = 1, female = 0)	.00	1.00	.52	-
Birth order of infant				
Second = 1, first = 0	.00	1.00	.43	-
After third = 1, first = 0	.00	1.00	.11	-
Self esteem	1.25	4.00	3.02	.47
Degree of marriage satisfaction	1.00	5.00	3.83	.76
Mother's value awareness of children	2.00	5.00	4.28	.57
Father's value awareness of children	1.50	5.00	4.33	.56
Self-efficacy of child-rearing	1.00	5.00	3.44	.70
Father's help for child-rearing	1.00	5.00	3.60	.80
Participation in instruction for child-rearing (yes=1, no=0)	.00	1.00	.70	-

Note. N = 1,020 for all the variables.

Results

Table 2 shows estimates obtained from 4 sequential multiple regression models in which the dependent variable is rearing style.

The first model includes some variables indicating socioeconomic and demographic characteristics of infants and parents. As shown in the first column in Table 2, mother's education, poverty, housewife, birth order of infant have a significant effect on rearing style. To put it concretely, more educated mother and housewife against working mother gets a better rearing style. But mother in poverty has a difficulty in getting a good rearing style. These result show that style of child-rearing is dependent

3) The concrete questionnaire are like these. How do you think about the following statement? ① To be a parent is valuable in life. ② Children make the relation of husband and wife strongly. ③ People having children are less lonely in old age. ④ Married couple must have children.

4) The concrete questionnaire are like these. How much do you agree the following statement? ① I am not confident of becoming a good parent. ② I am not confident of good child-rearing. ③ I feel that my child is left behind because of my faulty role. ④ It is difficult for me to treat my child kindly and warmly. ⑤ I am distressed because the reason of emotional unstableness of my child seem to be resulted in my fault.

5) The concrete questionnaire are like these. How much do you agree the following statement? ① My husband buys some goods and toys for child. ② My husband instructs the habit to child with interest. ③ My husband gives a baby bath or bottle-feeding. ④ My husband often plays with child.

on socioeconomic background. Further, it implies that mothers in poverty have a difficulty in getting a good child-bearing method and it come to be a cause of problems appearing in period after infant. Meanwhile, the second and after-third birth order against first has a negative effect on rearing style. This result may comes from dispersion of mother's energy who has more than 1 child. But household income, mother's age, sex of infant has no significant effect.

We constructed the second model adding 6 variables relevant to parent's psychological characteristics and husband's help for rearing to the first model and omitting 3 variables of the first model which are not insignificant. As shown in the second column in Table 2, all variables, except for degree of marriage satisfaction, which are put on the second model additionally have positive significant effects. In particular, mother's psychological characteristics such as self esteem (β = .188) and self-efficacy of child-rearing (β = .240) have larger effects than other variables'. Meanwhile, mother's education which has a significant effect in the first model doesn't has a significant effect. This means that the effect of mother's education on rearing style is mediated by other variables such as self esteem and self-efficacy of child-rearing. Further, it implies that it is need to raise self-esteem and self-efficacy of child rearing for mothers, in particular who has low educational attainment.

The third model shown in the third column of Table 2 shows that participation in instruction for child-rearing has a positive effect on rearing style. But it's relative effect (β = .061) isn't large. At the same time, all other variables except for father's help for child-rearing also have significant effects. This means that while participation in instruction for child-rearing contributes to get a good child-rearing style, it's effect isn't large enough to reduce the effect of socioecomic background such as poverty on rearing style sufficiently.

Finally, we constructed the fourth model adding interaction term between poverty and participation in instruction for child rearing to the third model. As shown in the fourth column of Table 2, the interaction term has a significant effect on child-rearing style controlling all other variables and it's relative effect (β = .111) is larger than that of participation in instruction in instruction for child-rearing (β = .051). This means that if mothers in poverty participate in instruction for child-rearing, they can get a good child-rearing style. Further, this results implies that a well-prepared instruction for mothers in poverty can be a method for reducing the educational gap resulted by difference from rearing style across socioeconomic status.

Table 2
The Results of Ordinary Least Squares Regression Analysis

Variables	Model 1			Model 2			Model 3			Model 4		
	B	*SE*	*β*	*B*	*SE*	*β*	*B*	*SE*	*β*	*B*	*SE*	*β*
(Constant)	3.282***	.241		1.709***	.188		1.831***	.159		1.842***	.159	
Mother's education	.025**	.009	.091	.012	.008	.042	-	-	-	-	-	-
Household income	.073	.039	.065	-	-	-	-	-	-	-	-	
Poverty	-.210*	.093	-.069	-.187*	.083	-.061	-.196*	.082	-.064	-.488**	.163	-.159
Mother's age: 27-35	.008	.059	.006	-	-	-	-	-	-	-	-	-
Mother's age: above 36	.039	.074	.024	-	-	-	-	-	-	-	-	-
Housewife	.213***	.039	.183	.208***	.033	.179	.198***	.032	.170	.198***	.032	.170
Sex of infant	-.003	.032	-.003	-	-	-	-	-	-	-	-	-
Birth order of infant: second	-.244***	.034	-.226	-.185***	.031	-.172	-.175***	.031	-.163	-.180***	.031	-.167
Birth order of infant: below third	-.268***	.056	-.157	-.233***	.049	-.137	-.230***	.049	-.135	-.236***	.049	-.139
Self esteem	-	-	-	.212***	.036	.188	.206***	.035	.182	.204***	.035	.180
Degree of marriage satisfaction	-	-	-	-.027	.024	-.038	-	-	-	-	-	-
Mother's value awareness of children	-	-	-	.140***	.028	.149	.139***	.028	.148	.140***	.028	.149
Father's value awareness of children	-	-	-	.060*	.027	.063	.055*	.027	.058	.056*	.027	.059
Self-efficacy of child-rearing	-	-	-	.182***	.023	.240	.177***	.023	.233	.179***	.023	.236
Father's help for child-rearing	-	-	-	.040†	.022	.060	.028	.019	.043	.027	.019	.040
Participation in instruction for child-rearing	-	-	-	-	-	-	.071*	.032	.061	.060†	.032	.051
Poverty participation in instruction for child-rearing	-	-	-	-	-	-	-	-	-	.391*	.189	.111
R^2	.090			.279			.280			.283		
Adj. R^2	.082			.271			.273			.275		

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Conclusion

According to the previous researches, the raring style is a key factor affecting the sound development of children (Do et al., 2009; Kim & Ahn, 2010; Wasik et al, 1990). At the same time, many researchers show that the raring style is affected by the parent's socioeconomic status (Brooks-Gunn & Duncan, 1997; Lareau, 2003). Thess results imply that the educational gap may be embeded at the beginning of one's life. In this context, this research was conducted to investigate the effect of mothers' participation in instructions for desirable rearing method on rearing style. In particular, this research tried to show that mothers in poverty get some substantial help through the instruction for mothers.

Major findings and policy suggestions are like these. First, the style of child-rearing is dependent upon the socioeconomic background. In particular, the mother's education has positive effects on a good rearing style directly or indirectly. And mother in poverty has significant effects on good rearing style negatively through all models in our research. This result implies that the educational gap may be bring about at the beginning of one's life by the differences of rearing style across status.

Second, mother's psychological characteristics such as self esteem, self-efficacy of child-rearing have relatively larger effects on rearing style. In particular, these variables mediate the effect of mother's education on rearing style. This result implies that various efforts for raising the self-esteem and self-efficacy of child rearing for mothers, in particular who has low educational attainment are necessary to reduce the rearing style difference across status. Therefore, the instruction for mothers must include not only skills for child-caring but also proper contents for boosting up the self-esteem and self-efficacy.

The third finding is what is relevant to the instruction for mothers. From our analysis, we ascertain that participation in instruction for child-rearing has somewhat positive effects on rearing style, in particular mothers in poverty. This result was extracted from the analysis on the effect of interaction term between poverty and participation in instruction for child rearing which has a significant effect. This result implies that a well-prepared instruction for mothers in poverty can be a substantial help to get a good child-rearing. Further, it implies that a instruction for mothers can be an useful method to reduce the educational gap caused by difference from rearing style across socioeconomic status. But it is important to note that the ratio of participation in instruction for mothers in poverty is very low. Therefore, it is urgently needed to reveal the causes of the low participation of mothers in poverty, and to raise the ratio of participation in instruction for them.

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The Effect of Mother's Drinking on Marital Satisfaction and Marital Conflict

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The purpose of this study was to examine how the drinking of mother influences mother's marital satisfaction and conflict with her husband. This study used hierarchical regression analysis in order to investigate the effect of mother's 'drink or not' and 'drinking' (drinking frequency and drinking capacity) on marital satisfaction and marital conflict after controlling for couple's educational background, couple's age, the period of marriage, mother's parenting stress, mother's parenting type, mother's self-esteem, and mother's self-efficacy. The subjects of this study were 1751 mothers who were participated in second survey of Korean Children Panel. According to results, both two variables (drink or not and drinking) predicted significantly marital satisfaction and 'drink or not' predicted marital conflict significantly. But, 'drinking' could not explain marital conflicts significantly. The implications of this study were discussed by considering the follow-up study and practical application.

Nowadays, problems that are related to drinking have a strong influences on not only individual but also family and society. In addition, the drinking rate of women increase rapidly due to increased the entry of women in public affairs and open culture. As following this trend, according to study from Ministry of Health & Welfare (2008), the monthly drinking rate of women had increased from 36.9% in 2005 to 44.9% in 2008. Also, the drinking rate of high-risk women who drink more than once a month had risen 6.4% from 22.3% in 2005 to 28.7% in 2007. Because women are more vulnerable to alcohol physically than men, women go through more serious problems that are caused by drinking. Unlike male alcoholics, most of problems of female alcoholics are not at issue and also most of female alcoholics keep their marriage life. Because of this, their problems that are from alcoholism directly and indirectly influence not only themselves but also their family. Thus, as a society, we need to pay attention to the female drinkers (Song, 2002).

More than 800 studies that were dealt with alcohol were published in Korean studies Information Service System (KISS) and Research Information Sharing Service (RISS). However, most of medical research only focused on the male alcoholics. And even studies targeting women alcohol problems only dealt with female alcoholics rather than general women drinkers. Recently, alcoholism was called as a family disease because it had a big impact on functions and roles of other family members (Kim, 2004). Due to this reason, the current trend of research that focused on alcoholism is to explain the alcohol problems in the aspects of family relationships. However, researchers of these studies examined the male alcoholics who were in the hospital and their marital relationships. For example, the effects of marital conflicts on male's drinking was studied. Only around 15 studies examined mother's drinking problems and parent-child relationships using elementary school students and adolescents. There were few studies that focused on the experiences of mother who were drinking and had infants. That is, studies that investigated the effects of mother's drinking on marital relationships and parent-child relationships were not enough.

Studies that examined the effects of parental alcoholism on children in hospital setting showed that parents' drinking could cause the absence of parental roles or role reversal (Werner, 1986). Also, Werner (1986) concluded that parental drinking was related to various behavioral and emotional problems of their children. Robinson & Rhoden (1998) suggested that problematic drinking had a big impact on inconsistent and unpredictable parents' roles. Alcoholic parents could not harmonized with their children and their parent-child relationship had some serious problems (Park, 2010). Especially, mother-child relationship had a more important influence on child's mental health and mental problem than father-child relationship (Oh, 1993). Thus, it is needed to examine the differences in experiences as parents that are related to drinking in order to understand children's mental health (Son, 2008).

Alcoholic women experienced negative emotions about them such as, negative self-rating, sense of guilt, regret, self-hatred, and so on (Shin, 2008). Olenick & Chalmers (1991) reported that women drinkers who had problems of alcohol had low self-esteem. Women alcoholic were abnormally obsessed with alcohol rather than interpersonal relationships in consequence of regression caused by weakening ego (Fine & Juni, 2001). Gross & Adlers (1979) found that alcoholics had low levels of self-esteem and recognized themselves negatively. However, there were few studies that examined variables that were related to ego of alcoholics and women drinkers.

There were some studies that investigated the relationship between male's drinking and marital conflicts but the results were inconsistent. Marshal (2003) showed that there were significant relationships between drinking and marital dissatisfaction, negative interaction, domestic violence, and divorce rate. Temple (1991) found that divorce and marital dissatisfaction caused the drinking problems. However, Perreira & Sloan (2001) did not find that divorce affected the alcohol consumption. Other studies showed the effects of alcohol on divorce. According to Testa, Quigley, & Leonard (2003), serious drinking problem caused destructions of marriage life. However, Graham & Braun (1999) did not show that there were significant relationships between drinking and marital satisfaction. Like as, it was very hard to make a conclusion whether there was a causal relationship between alcoholism and family problems (Yoon, 1997). It was also unclear either marital conflicts and marital dissatisfaction led to drinking problems or drinking problems led to marital conflicts and marital dissatisfaction (Whisman & Uebelacker, 2006). However, there were evidences that drinking might be an important consideration for women drinkers (Haber & Jacob, 1997). Kelly, Halfored, & Young (2002) found that women drinking predicted unsatisfied marriage life and unstable couple relationships. Women drinkers who had problems were more likely to divorce than men drinkers (Olenick & Chalmers, 1991). The result of interpersonal relationship from women drinking led to conflicts with husband (Choi, 2003). In addition, there was a possibility that mother's drinking could influence children's development. Thus, mother's drinking has to be studied in order to understand healthy family life with infants.

Age and educational background significantly influenced the adaptation of drinking couples. In addition, income level, the period of marriage, job, unstable job status, the number of family member, and unemployment also affected the adaptation of drinking couples (Yoon, 1997). This study examined the effects of drinking on marital satisfaction and marital conflicts after controlling for age, educational background, the period of marriage, self-esteem, self-efficacy, parenting stress, and parenting type. The results of this study will be able to be used a basic research that help to improve the drinking culture and recover the right functions of family by investigating the effects of mother's drinking on couple's relationship and parent-child relationship using data from Korean Children Panel study.

Concrete research questions are the following.

First, how do 'drink or not' and 'drinking' (drinking frequency and drinking capacity) influence marital satisfaction after controlling for age, educational background, the period of marriage, parenting type, parenting stress, self-esteem, and self-efficacy?

Second, how do 'drink or not' and 'drinking' (drinking frequency and drinking capacity) influence marital conflict after controlling for age, educational background, the period of marriage, parenting type, parenting stress, self-esteem, and self-efficacy?

Method

Subjects

The present study reports on data from 1751 mothers who were subjects of Panel Study on Korean Children (PSKC) (2009) of Korea Institute of Child Care and Education (KICCE). The participants' ages ranged from 20 to 47 years. 20.8 % of participants are in their twenties and 74.6% of participants are in their thirties. When considering about educational background, the most participants (39.5%) reported they graduated undergraduate, followed by high school (30%), and community college (29.4%).

The period of marriage ranged from 0 to 20 years. Most of participants (72.5%) reported their marriage period was below 5 years.

Materials

Drink or not and drinking. The questions of 'Drink or not', 'Drinking frequency' and 'Drinking capacity' in surveys targeting mother of Korean Children Panel were used. In order to check whether drink or not, "Do you usually drink?" was used. In addition, "How often do you drink?" and "How many glasses do you usually drink?" were used to investigate the drinking frequency and drinking capacity. In this study, two variables, "Drink or not' and 'Drinking' (drinking frequency and drinking capacity), were analyzed separately. Because these two variables used different samples. That is, while every subject answered 'Drink or not' question, only women who answered they drink could answer drinking frequency and drinking capacity question. In this study, the question of 'Drink or not' was done reverse coding (1-Never drink, 2-Usually drink but now do not drink due to pregnancy and nursing, 3-Drink) and was converted as dummy variables (Dum 1: Group 1 = 1 & Group 2, 3 = 0; Dum 2: Group 2 = 1 & Group 1, 3 = 0; Dum 3: Group 3 = 1 & Group 1, 2 = 0). In addition, 'Drinking' variable included drinking frequency (1-Once a month, 2-Twice or four times a month, 3-Twice or 4 times a week, 4-everyday) and drinking capacity (1-One or Two glasses, 2-Three or Four glasses, 3-Five or Six glasses, 4-Seven or Nine glasses, 5-Ten or Over glasses) because the drinking frequency and the drinking capacity play important roles to diagnose the alcoholism (Ahn & Im, 2010). Answers were summed and a higher score meant that a mother drinks often and a lot.

Parenting type. Parental Style Questionnaire (PSQ) that consisted of six items was used. These 6 items were rated on a 5-point scale, from 1 (Never) to 5 (Always). A higher score meant that a mother has positive bringing-up style. The Cronbach alpha was .833 in this study.

Parenting stress. The Parenting Stress Questionnaire was developed by Kim & Kang (1997) as revised Parenting Stress Index Short Form (PSI-SF) suitably Korean situation. Among the Parenting Stress Questionnaire (Kim & Kang, 1997), 'Pressure about parent's roles' and 'Distress' were used in this study. This scale consisted of ten items rated on a 5-point scale, from 1 (strongly disagree) to 5 (strongly agree). This scale was done reverse coding and then a higher score meant a mother has a low level of parenting stress. The Cronbach alpha was .850 in this study.

Marital satisfaction. Revised-Kansas Marital Satisfaction Scale (RKMSS) was used in this study. This scale consisted of four items rated on a 5-point scale, from 1 (Very dissatisfied) to 5 (Very satisfied). A higher score meant that a respondent has a higher level of marital satisfaction. The Cronbach alpha was .917 in this study.

Marital conflict. The Marital Conflict Scale was used. This scale consisted of 8 items rated on a 5-point scale, from 1 (Strongly disagree) to 5 (Strongly agree). A higher score meant that a respondent has a serious conflict with her husband. The Cronbach alpha was .908 in this study.

Self-esteem. The Self-esteem scale that consisted of 10 items were used in this study. These 10 items were rated on a 4-point scale, from 1 (Strongly disagree) to 4 (Strongly agree). Four items that were stated negatively were done reverse coding. Thus, a higher score meant that a respondent has a positive self-esteem. The Cronbach alpha in this study was .848.

Self-efficacy. Pearlin Self-fficacy Scale was used in this study. This scale consisted of 4 items rated on a 4-point scale, from 1 (Strongly disagree) to (Strongly agree). Each item was done reverse coding. Thus, a higher score meant that a respondent has a high level of self-efficacy. The Cronbach alpha was .817 in this study.

Results

Correlations

The correlations among independent variables, dependent variables, and 'Drink or not' are presented in Table 1. Marital satisfaction was positively related to parenting type (r = .21, p < .001) and parenting stress (r = .30, p < .001). These results meant that a woman who had higher level of marital satisfaction had more positive

Table 1
Correlations Among Independent Variables, Dependent Variables, and 'Drink or Not' (N = 1756)

	1	2	3	4	5	6	7
1. Marital satisfaction	1.00						
2. Marital conflict	-.60***	1.00					
3. Parenting type	.21***	-.26***	1.00				
4. Parenting stress	.30***	-.41***	.48***	1.00			
5. Self-efficacy	.34***	-.47***	.30***	.47***	1.00		
6. Self-esteem	.31***	-.42***	.41***	.48***	.51***	1.00	
7. Drink or not	-.10***	.11***	-.05*	-.09**	-.04	-.03	1.00

*p < .05. **p < .01. ***p < .001.

parenting style and experienced less parenting stress. In addition, there were positive relationships between marital satisfaction and self-efficacy (r = .34, p < .001) and self-esteem (r = .31, p < .001). These meant that a woman who were satisfied with her marriage life had higher level of self-efficacy and self-esteem. Marital satisfaction was negatively related to 'Drink or not' (r = -.10, p < .001). Dummy variable (Dum 3) was used in this analysis for 'Drink or not' variable. That is, people who drink alcohol was labeled '1' and people who do not drink was labeled '0'. This indicated that a woman who drank had lower level of marriage satisfaction.

Marital conflict was negatively related to parenting type (r = -.26, p < .001) and parenting stress (r = -.41, p < .001). These showed that a woman who experienced more conflicts in her marriage life had more negative parenting style and received more parenting stress. Also, marital conflict was negatively correlated with self-efficacy (r = -.47, p < .001) and self-esteem (r = -.42, p < .001). These results indicated that a woman who had more severe marital conflicts had lower level of self-efficacy and self-esteem. Moreover, there was a positive relationship between marital conflict and 'Drink or not' (r = .11, p < .001). This meant that a woman who drank had higher level of marriage conflict.

The correlations among independent variables, dependent variables, and 'Drinking (Drink frequency and drink capacity) are presented in Table 2. There was positive relationship between marital satisfaction and 'Drinking' (r = -.18, p < .001). This indicated that a woman who had higher level of marital satisfaction drank less. In addition, marital conflict was positively related to 'Drinking' (r = .10, p < .05). This result showed that a woman who experienced more severe conflict with her partner drank more.

Research Question 1

First research question is whether 'drink or not' and 'drinking' influence marital satisfaction after controlling for age, educational background, the period of marriage, parenting type, parenting stress, self-esteem, and self-efficacy. Two hierarchical regression analyses were conducted in order to test research question 1.

Table 2
Correlations Among Independent Variables, Dependent Variables, and 'Drinking' (N = 607)

	1	2	3	4	5	6	7
1. Marital satisfaction	1.00						
2. Marital conflict	-.59***	1.00					
3. Parenting type	.18***	-.22***	1.00				
4. Parenting stress	.24***	-.37***	.44***	1.00			
5. Self-efficacy	.31***	-.44***	.26***	.41***	1.00		
6. Self-esteem	.33***	-.44***	.40***	.50***	.50***	1.00	
7. Drinking	-.18***	.10*	-.03	-.00	-.04*	-.10*	1.00

*$p < .05$, **$p < .01$, ***$p < .001$

First analysis. In the first hierarchical analysis, 'drink or not' was independent variable and marital satisfaction was dependent variable. 'Drink or not' variable was converted as dummy variables, D1 and D2. Couple's age, couple's educational background, the period of marriage, mother's parenting type, mother's parenting stress, mother's self-esteem, and mother's self efficacy were controlled.

The result of hierarchical regression showed that 'drink or not' significantly predicted marital satisfaction after controlling for age, educational background, the period of marriage, parenting type, parenting stress, self-esteem, and self-efficacy (Table 3). That is, 'drink or not' was a significant predictor of marital satisfaction ($R^2 = .004$, $F(2,1726) = 4.12$, $p < .05$). And according to results from dummy variable, 'Never drink' and 'Usually drink but now do not drink due to pregnancy and nursing' were more positively related to marital satisfaction ($B = .44$, $p < .01$; $B = .37$, $p < .05$).

Second analysis. In the second hierarchical analysis, 'drinking' was independent variable and marital satisfaction was dependent variable. Couple's age, couple's educational background, the period of marriage, mother's parenting type, mother's parenting stress, mother's self-esteem, and mother's self efficacy were controlled.

The result of hierarchical regression indicated that 'drinking' significantly predicted marital satisfaction after controlling for age, educational background, the period of marriage, parenting type, parenting stress, self-esteem, and self-efficacy (Table 4). That is, 'drinking' was a significant predictor of marital satisfaction ($R^2 = .017$, $F(1,596) = 12.10$, $p < .01$).

Research Question 2

Second research question is whether 'drink or not' and 'drinking' influence marital conflict after controlling for age, educational background, the period of marriage, parenting type, parenting stress, self-esteem, and self-efficacy. Two hierarchical regression analyses were conducted in order to test research question 2.

First analysis. In the first hierarchical analysis, 'drink or not' was independent variable and marital conflict was dependent variable. 'Drink or not' variable was converted as dummy variables, D1 and D2. Couple's age, couple's educational background, the period of marriage, mother's parenting type, mother's parenting stress, mother's self-esteem, and mother's self efficacy were controlled.

The result of hierarchical regression showed that 'drink or not' significantly predicted marital conflict after controlling for age, educational background, the period of marriage, parenting type, parenting stress, self-esteem, and self-efficacy (Table 5). That is, 'drink or not' was a significant predictor of marital conflict ($R^2 = .004$, $F(2,1671) = 7.63$, $p < .01$). And according to results from dummy variable, 'Never drink' and 'Usually drink but now do not drink due to pregnancy and nursing' were more negatively related to marital conflict ($B = -1.06$, $p < .001$; $B = -.94$, $p < .01$).

Second analysis. In the second hierarchical analysis, 'drinking' was independent variable and marital conflict was dependent variable. Couple's age, couple's educational background, the period of marriage, mother's parenting type, mother's parenting stress, mother's self-esteem, and mother's self efficacy were controlled.

Table 3
Hierarchical Regression Predicting Marital Satisfaction with Age of Couples, Educational Background of Couples, Period of Marriage, Parenting type, Parenting Stress, Self-Esteem, Self-Efficacy, and 'Drink or Not' (N = 1737)

Variable	R^2 added	*B*	*SEB*	*Beta*
Step 1				
Age of M		-.03	.03	-.03
Age of F	.020***	.00	.03	.00
Education of M		.21**	.08	.06***
Education of F		.01	.01	.02*
Period of marriage		-.07*	.03	-.06*
Step 2				
Parenting type		.04	.03	.04
Parenting stress	.145***	.05***	.01	.11***
Self-esteem		.10***	.02	.12***
Self-efficacy		.24***	.03	.21***
Step 3				
D1	.004*	.44**	.16	.07**
D2		.37*	.19	.05*
(constant)	-	13.91***	.86	-

Note. Age of M: mother's age; Age of F: father's age; Education of M: mother's educational background; Education of F: father's educational background; D1: never drink vs. drink; D2: usually drink but now do not drink due to pregnancy and nursing vs. drink. Cumulative R^2 = .169; adjusted R^2 = .164.
*p < .05. **p < .01. ***p < .001.

The result of hierarchical regression indicated that 'drinking' did not predict marital conflict after controlling for age, educational background, the period of marriage, parenting type, parenting stress, self-esteem, and self-efficacy (Table 6). 'Drinking' was not a significant predictor of marital conflict (R^2 = .003, F (1,577) = 1.99, p = .16).

Table 4
Hierarchical Regression Predicting Marital Satisfaction with Age of Couples, Educational Background of Couples, Period of Marriage, Parenting Type, Parenting Stress, Self-Esteem, Self-Efficacy, and 'Drinking' (N = 607)

Variable	R^2 added	*B*	*SEB*	*Beta*
Step 1				
Age of M		-.05	.05	-.06
Age of F	.026**	.02	.04	.03
Education of M		.23	.12	.07
Education of F		.01	.03	.02
Period of marriage		-.05	.05	-.05
Step 2				
Parenting type		.01	.04	.01
Parenting stress	.119***	.03	.02	.06
Self-esteem		.13***	.04	.18***
Self-efficacy		.21***	.05	.18***
Step 3				
Dringking	.017**	-.32**	.09	-.13**
(constant)		7.90***	1.66	

Note. Age of M: mother's age; Age of F: father's age; Education of M: mother's educational background; Education of F: father's educational background. Cumulative R^2 = .163; adjusted R^2 = .149.
*p < .05. **p < .01. ***p < .001.

Table 5
Hierarchical Regression Predicting Marital Conflict with Age of couples, Educational Background of Couples, Period of Marriage, Parenting Type, Parenting Stress, Self-Esteem, Self-Efficacy, and 'Drink or Not' (N = 1682)

Variable	R^2 added	*B*	*SEв*	*Beta*
Step 1				
Age of M		.04	.05	.02
Age of F		-.01	.05	-.01
Education of M	.015***	-.19	.14	-.03
Education of F		-.02	.02	-.01
Period of marriage		.10*	.05	.05*
Step 2				
Parenting type		-.04	.05	-.02
Parenting stress	.275***	-.16***	.03	-.17***
Self-esteem		-.27***	.04	-.18***
Self-efficacy		-.62***	.06	-.28***
Step 3				
D1	.006**	-1.06***	.29	-.09***
D2		-.94**	.33	-.07**
(constant)	-	20.10***	1.68	

Note. Age of M: mother's age; Age of F: father's age; Education of M: mother's educational background; Education of F: father's educational background; D1: never drink vs. drink; D2: usually drink but now do not drink due to pregnancy and nursing vs. drink. Cumulative R^2 = .296; adjusted R^2 = .291.
*p < .05. **p < .01. ***p < .001.

Table 6
Hierarchical Regression Predicting Marital Conflict with Age of Couples, Educational Background of Couples, Period of Marriage, Parenting Type, Parenting Stress, Self-Esteem, Self-Efficacy, and 'Drinking' (N = 588)

Variable	R^2 added	*B*	*SEв*	*Beta*
Step 1				
Age of M		.00	.09	.00
Age of F		-.06	.08	-.04
Education of M	.022*	-.31	.23	-.05
Education of F		.02	.05	.01
Period of marriage		.17	.09	.08
Step 2				
Parenting type		.02	.08	.01
Parenting stress	.243***	-.15***	.04	-.15**
Self-esteem		-.33***	.07	-.23***
Self-efficacy		-.55***	.09	-.25***
Step 3				
Drinking	.003	.24	.17	.05
(constant)		41.48***	3.07	

Note. Age of M: mother's age; Age of F: father's age; Education of M: mother's educational background; Education of F: father's educational background. Cumulative R^2 = 268; adjusted R^2 = .255.
*p < .05. **p < .01. ***p < .001.

Discussion

Until now, most of studies whose subjects were women alcoholics examined the effect of marital conflict on women's drinking problem. However, this study investigated how women's drinking influenced marital satisfaction and marital conflict after controlling for educational background, age, the period of marriage, parenting type, parenting stress, self-esteem, and self-efficacy.

The main results of this study were the following.

First, marital satisfaction was positively related to parenting type and parenting stress. Also, marital conflict was negatively correlated with parenting type and parenting stress. These results supported study of Jeon & Park (1996) that marital satisfaction improved and marital conflict decreased if a woman had a positive parenting type and a low level of parenting stress. The birth of a child could lead to marital conflicts between couples. However, if couple communicated in a relaxed atmosphere in order to deal with their conflicts, this favorable atmosphere played a more important role than marital conflict and caused marital satisfaction because marital satisfaction was strongly related to couple's communication pattern (Fincham & Beach, 2007). In addition, parenting type was not significantly related to 'drink or not' and 'drinking'. Moreover, there was a weak negative relationship between parenting stress and 'drink or not'. These results supported the study of Yoon (1997) that showed couple who drink alcohol experienced more serious family stress than couple who abstained from alcohol. These results might be assumed that people tried to satisfy and resolve their frustrated desires and stress through drinking.

Second, marital satisfaction was positively related to self-esteem and self-efficacy. In addition, marital conflict was negatively correlated with self-esteem and self-efficacy. Theses results showed that marital satisfaction increased and conflict between couple decreased if woman had a higher level of self-esteem and self-efficacy. These results supported the studies of Ha (2007) and Sternberg (1993) that found the effect of self-esteem on marital conflict. In addition, these results were equal to research of Ji (2006) and Sacco & Phrases (2001) that showed the level of self-esteem significantly predicted marital satisfaction. Moreover, these results confirmed the study of Sevigny & Loutzenhiser (2010) that displayed the positive relationship between wife's self-efficacy and marital satisfaction. This meant that people who had a higher level of self-esteem could form a close relationship in marriage life because they had a confidence of themselves, were active, and had skills to keep an amicable relationship with others. And 'drink or not' was not significantly related to self-esteem and self-efficacy. However, 'drinking' was weakly related to self-esteem and self-efficacy. These results supported the study of Olenick & Chalmers (1991) that found the relationship between drinking and self-esteem. It was explained that people who had a higher level of self-esteem did not depend on drinking because they had a confidence of themselves, felt heavy responsibility of their partner, were interested in other's happiness, and had positive perspectives about their life (Culp & Beach, 1993).

Third, 'drink or not' and 'drinking' significantly predicted marital satisfaction after controlling for age, educational background, the period of marriage, parenting type, parenting stress, self-esteem, and self-efficacy. This result confirmed the study of Whisman & Ubbelacker (2006) that showed the use of alcohol predicted marital dissatisfaction in community and hospital settings. However, it did not support the result from Noel & McCrady (1993) that found couples who had drinking wife showed more communication and higher marital satisfaction than couple who had drinking husband. In addition, it did not confirm the study of Kearns-Bodkin & Leonard (2005) that found there was no effect of partner's drinking on marital satisfaction. It could be explained that these differences were caused by either the surveys were conducted in community settings or in hospital settings.

Finally, 'drinking' did not predict marital conflict significantly but 'drink or not' significantly predicted marital conflict. This supported the result from Halford & Osgarby (1993) that showed the use of alcohol was a cause of marital conflict. Most of couples experienced conflicts between partners because of parenting. If a mother who took charge of education and socialization of child could not carry out this role well due to her drinking, not only function of a mother but also function of a family could be weakened and be dissolved. Because of this reason, mother's drinking could lead to marital conflict. On the other hand, 'drinking' of wife did not significantly predict marital conflict. It did not support the result of Matthew (2010) that found the negative relationship between the consumption of alcohol of partner and adaptation of couple. It could be explained that mutual pattern of drinking (that is, same drinking pattern between partners) was a more important factor that influenced the relationship between the use of alcohol and marriage life than each partner's drinking pattern in our society where the use of alcohol was very common.

The limitations of this study and suggestion for follow-up study are the following.

First, this study used only 'drink or not' and 'drinking' as independent variables and age, educational background, the period of marriage, self-esteem, parenting type, and parenting stress as control variables. Although these variables were important factors, they were limited in order to analyze wholly. Thus, it is needed to use more various variables (depression, the birth of first child, number of children, expectation about marriage, and so on) as independent variables and control variables in order to understand the relationship between drinking and marriage life clearly.

Second limitations was that this study used only three questions in order to measure 'drink or not' and 'drinking'. Thus, it is necessary to use more detailed scales that measure drink and drinking pattern more clearly.

Third, most of subjects were in the early stage of their marriage because this study used parents who had from 11 month to 18 month infants and who were in their twenties to forties. If the couple's marriage lasted for long and then the character of family changed, marriage satisfaction and marriage conflict could change. Thus, it was hard to generalize these results to couples who had a long enough marriage life or remarried. A longitudinal study that examine changes in the relationship between drinking and marriage life when couples become middle-aged will be interesting.

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Child Care Support Services

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1. Analysis of Factors to Forecast Parents' Decision Making on the Plan to Use Early Childhood Education and Care Settings

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2. The Use of Child Care Centers for Infants of Dual-working Families: A Korean Study

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Analysis of Factors to Forecast Parents' Decision Making on the Plan to Use Early Childhood Education and Care Settings

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This study examined the impacts of the parents' demographic and socioeconomic variables on the plan to use early childhood education and care (ECEC) settings using the second-year data of Panel Study on Korean Children (PSKC). The most important factor affecting decision making on the plan to use ECEC settings for children aged 2 to 7 is the mother's educational attainment. Mothers with higher educational attainment select child care centers less and chose Hakwon (Art, Taekwondo, etc.) less when children reach the age of 7. Income activity and employment/studying status of mothers is the factor affecting decision making with regard to the plan to use ECEC settings for children aged 2-4. In the case of working or income activity, child care centers are selected less. In planning to use ECEC settings, the father's demographic and socioeconomic variables do not prove to be a decision -making factor. Although not statistically significant, higher probability to select private academies when children reach 4 years is observed among older fathers.

Nowadays, the need for and importance of child education and care have been growing due to social changes, such as family type change and two-income earner households. People expect kindergartens and child care centers to play a role in nurturing creative, capable, and talented people for the future as well as supplementing the weakening family's educational function - owing to the trend of nuclear family and reduction in the number of siblings - and helping build children's upright character. In line with such social demand, the number of child care centers has been increased about from 28,367 centers in 2005 to 38,021 centers in 2010, the ratio of 4-year-old children using child care centers has been dramatically increased from 37.4% in 2005 to 72.6% in 2010 (Ministry of Health and Welfare, 2005; 2010). In case of 7-year-old children, the ratio of using early childhood education and care settings also has been increased from 79.1% (47.2% of total in kindergartens and 31.9% of total in child care center) to 91.4% (56.4% in kindergartens and 35% in child care centers), as well (KEDI, 2005; 2010; Ministry of Health and Welfare, 2005; 2010). This shows that the number of children using early childhood education and care settings rises, and that increasingly younger children are doing so.

In addition, the number of Hakwon teaching English, Math, etc., as well as kindergartens and child care centers is rapidly surging because of the excessive early age education fever. Kwon, K. (2011) studied a nationally representative sample of 530 households with five-to-seven-year-old children from the 2008 Korea Labor and Income Panel Study (KLIPS). The research reported that 74.5% of five-to-seven-year-old children participated in private tutoring such as Hakwon, private group tutoring, workbooks, language institutes, culture centers, and paid educational service on the internet, and average monthly expenditure on private tutoring was KRW 305,200. Moreover 16.4% of the PSKC consisting of those below 2 years regularly participated in 1~2 or up to 4 programs such as sensitivity, manipulation, and music (Lee, et al., 2010); this implies that early age education begins at a very young age.

Early childhood is the optimal development period and on which the environment has the most impact. The child care and education experiences of children affect development considerably during early childhood. When children are adequately supported in terms of opportunities for learning and development based on stable, reliable relationships with teachers, their intelligent, language, and cognitive development is realized. Likewise, the high quality of early childhood education and care experiences directly affects children's wellbeing, developing skills, and sub-sequent adjustment (Phillips & Adams, 2001). During the very first 5 years of children, the basic parts of brain are developed, so that it is necessary to give flourishing environments and remove negative factors such as stressful

situation (Melhuish, 2007, Jung., Na, Park, & Ha, 2008, recited p. 117). Meanwhile, excessive private education during early childhood makes children' brain highly stressed and disrupts the child's brain development (OECD, 2006, Jung, Park, Huh, Kwon, & Lim, 2007, recited p. 72). Consequently, what experiences children will have from what kind of ECEC settings is a very critical issue.

In view of the characteristics during early childhood, children do not have a right to decide on ECEC settings even as the participants of those are children. Lim (2008), in examining who decides ECEC settings for children, found mothers to be the most influential people, followed by both parents. The child's educational experiences vary depending on parents' expectation on ECEC settings and selection of the settings in terms of curriculum and teachers. Likewise, the roles of teachers, experts, and policy decision makers of guiding parents - who play a pivotal role in selecting those settings - in selecting high-quality ECEC settings are emphasized further (Lim, 2008; Howes & Hamilton, 1993). Toward this end, there is a need to understand the preferences of parents with regard to ECEC settings and to find out the variables of parents.

Few studies have systematically identified the factors affecting the selection of ECEC settings by families with children. To date, studies on parents' perception and selection of early childhood education and care settings where children currently go and satisfaction with the selected early childhood education and care settings have been conducted (Ahn, & Kim, 2010; Cho, 2004; Gang, & Han, 2010; Kim, 2004; Lim, 2008; Jung, 2010). Note, however, that these studies targeted mostly parents of children using ECEC settings. Therefore, their choice can hardly be said to be a true selection at all times. Instead of the true selection by parents of their desired institutions, due to the expenses of their preferred institutions or lack of institutions with easier access, their children tend to use the remaining services following a process of elimination of unavailable services (NICHD Early Child Care Research Network, 1997). Meanwhile, in the second-year data of PSKC, as children grow, the parents' true preference is reflected on the plan of using ECEC settings in the future, and the family's reality is reflected less. Through this, the factors affecting the parents' selection of early childhood education and care settings according to the true needs of parents can be forecast by age before their children go to elementary school.

Consequently, this study looked into the demographic and socioeconomic variables affecting decision making on the plan to use ECEC settings by parents as persons having the most influence on the decision of selecting ECEC settings where children will go based on the second-year survey data of PSKC. In addition, this study seeks to determine the direction of desirable early childhood education and care policy establishment.

This study set the following issues to identify the demographic and socioeconomic variables affecting parents' decision making with regard to the plan to use ECEC settings according to children's age:

1. What are the parents' decision-making plans with regard to the selection of ECEC settings by child's age?
2. What are the parents' decision-making factors with regard to the selection of ECEC according to the parents' demographic and socioeconomic variables?

Method

This study examined the impacts of the parents' demographic and socioeconomic variables on the plan to use ECEC settings using the second-year data of PSKC.

Participants

This study targeted 1,904 children in the general survey data for the second-year PSKC carried out by the KICCE (2009), 962 of whom were boys (51.5%) and 942 were girls (48.5%). With regard to birth order, first-born children made up 47.6%, with second-born children accounting for 41.2% and third-born and so on for 11.2%. In terms of age, 84.1% were 3~15 months old; the average age was 14.07 months as of the survey date.

Table 1
Targeted Families' General Characteristics (N = 1,904)

	Mother			Father
	Working/studying	Non	Total	Total
Age (year)	32.2	32.1	32.9	35.4
Educational attainment (%)				
High school degree	18.8	35.0	29.7	27.2
College degree	24.0	25.3	24.8	18.9
University degree	45.9	35.9	39.2	42.4
Masters' degree	10.3	3.1	5.4	9.6
Doctoral degree	0.8	-	0.3	1.3
Economic status of family (1, 000 KRW)				
Monthly income	504.16	365.07	409.08	
Monthly expenditure	219.78	172.67	187.43	
Expenditure for children	58.32	29.11	38.51	
Absolute poverty (%)	1.2	1.1	1.1	
Second highest poverty (%)	4.1	4.8		

The average age of the children's mothers is 32.91 years, and that of fathers is 35.36 years. As of the survey date, 31.3% mothers are working in the last 6 months, whereas 68.4% of them are not working or are not at school to study. Mothers with University degree are 39.2% and fathers who holding University degree are 42.4%. The average monthly income of the targeted children's households was KRW 4,090,800. Expenditure for children was KRW 385,100 on the average. At least 88.2% of the households were parents and children, with three-generation households accounting for 7.8%.

Variables

The variables used for the analysis were mothers and fathers' age, education, income activity and employment/studying, families' monthly income & expenditure, and plan to use ECEC settings according to the child's age.

Data Analysis Method

To grasp the general background of the study object, this study calculated frequency and percentage. To examine the factors related to decision making with regard to the selection of ECEC settings according to the parents' demographic and socioeconomic variables, this study used the multinomial logic model.

Results

Plan to use ECEC Settings According to the Child's Age

The survey results regarding the plan to use ECEC are settings beginning 2009 when most children will turn 2 years old until 2014 before when they enter elementary school are presented in (Table 2).

Table 2
Plan to Use ECEC Settings According to the Child's Age (%)

	Aged 2 (2009)	Aged 3 (2010)	Aged 4 (2011)	Aged 5 (2012)	Aged 6 (2013)	Aged 7 (2014)
Child care center	14.1	38.1	67.6	50.9	17.5	8.6
Kindergarten	0.2	0.1	2.3	33.7	69.7	77.8
Hakwon (english class)	-	0.2	1.1	3.1	5.4	6.5
Play institutes	0.3	2.3	3.6	2.0	0.7	0.3
Christian institutes	0.1	0.2	0.8	0.7	0.6	0.3
Hakwon (art, taekwondo, etc.)	0.1	0.4	1.0	1.1	0.9	1.7
Others	0.5	0.4	0.2	0.1	0.1	-
Not to use	83.4	54.7	18.8	3.8	0.8	0.4
Don't know yet	1.3	3.6	4.6	4.6	4.3	4.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

The ratio planning not to use ECEC settings when children reach 2 years of age was 83.4%, and that when children reach the age of 3 was 54.7%. After that, the plan not to use ECEC settings gradually decreased. Almost all parents planned to use ECEC settings when children reach 6-7 years of age.

Looking into the use plan of ECEC settings, child care centers would be mainly used before children reach 5 years of age (67.6%), after which 33.7% would use kindergarten. The ratio planning to use kindergartens rose 77.8% or approx. 2.32 times at age 7. Meanwhile, the plan to use child care centers at age 5 fell 50.9% and dropped 8.6% or about 7 times at 7 years. Regarding the plan to use an Hakwon (English class), the ratio rose about 2.24 times from 3.1% at age 5 to 6.5% at age 7. The plan to use Christian institutes recorded the highest increase at age 4, and then fell. The plan to use Hakwon (Art, Taekwondo, etc.) gradually rose according to the child's age. The ratio of those who responded "Don't know yet" after the child turns 4 was about 4.5%. This seemed to be attributable to the fact that the parents have yet to make a decision on ECEC settings where their children will go in the future, since their children are young.

Table 3
Plan to Use ECEC Settings According to the Child's Age and Mothers' Employment

	Aged 2 (2009)		Aged 3 (2010)		Aged 4 (2011)		Aged 5 (2012)		Aged 6 (2013)		Aged 7 (2014)	
	Work	Non	Work	Non	Work	Non	Work	Non	Work	Non	Work	Non
Child care center	31.3	7.4	57.1	30.2	78.6	64.7	49.4	54.1	16.7	15.7	8.9	6.8
Kindergarten	-	0.2	0.1	0.2	3.6	2.7	37.8	31.4	71.5	71.9	75.9	81.2
Hakwon (english class)	-	-	0.2	0.2	1.0	0.7	3.9	2.3	6.5	4.8	8.9	5.1
Play institutes	0.5	0.2	1.8	2.2	3.1	3.4	1.8	2.1	0.7	0.8	0.2	0.5
Christian institutes	-	0.1	-	0.2	0.7	0.9	0.5	0.8	-	0.7	-	0.4
Hakwon (art, taekwondo, etc.)	0.1	0.2	-	0.5	-	1.0	0.3	1.3	0.2	1.4	1.3	2.0
Others	0.6	0.4	0.5	0.3	0.2	0.2	0.2	0.1	0.0	0.0	-	-
Not to use	66.0	90.0	37.4	61.9	9.6	21.7	2.1	4.0	0.3	1.2	0.2	0.5
Don't know yet	1.5	1.5	2.9	4.3	3.2	4.8	4.0	4.0	4.1	3.5	4.6	3.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The survey results regarding the plan to use ECEC settings, according to the mother's employment, are presented in (Table 3). The ratio planning to use child care centers when children reach age 5 declines the most, whereas the plan to use kindergarten shows a rising trend. Although the working

mothers' plan to use child care centers is relatively higher than that of the non-working mothers, the difference is small. At least 37.8% of working mothers plan to use kindergarten when children reach 5 years, whereas 31.4% of non-working mothers have the same plan. On the other hand, 71.5% of the working mothers plan to use kindergarten after children reach 6 years of age, with only 8.9% planning to use child care centers.

Through all this, greater need for education rather than for child care when children reach kindergarten age is demonstrated. Moreover, the increase is larger beginning age 6. The ratio using ECEC settings when children reach 2 years of age is 15.2%, but it rises to 41.7% at age 3 and 76.6% at age 4. This implies that the needs of parents for their children's education and care begin from a very young age of their children.

Decision-Making Factors with Regard to the Selection of ECEC Settings According to Parents' Factors

To find out parents' demographic and socioeconomic variables affecting parents' decision-making on the use of early childhood education and care settings, this study used the multinomial logit analysis. As a result, factors with huge effect on the parents' decision making with regard to the plan to use ECEC settings by age are presented below.

Parents' decision-making factors with regard to the plan to use ECEC settings for children aged 2.

In 2009 when children turned 2 years old, the important decision-making factors with regard to the plan to use ECEC settings are the mother's employment/study status and education background; the results are shown in (Table 4).

Table 4

Parents' Decision-Making Factors with Regard to the Plan to Use ECEC Settings for Children Aged 2

Variables	Mother's education background			Mother's employment/study status		
(by 'Don't know yet',)	*B*(*SE*)	Wald	Exp (*B*)	*B*(*SE*)	Wald	Exp (*B*)
Child care center	- .70(.24)	8.28**	.50	- .76(.23)	10.91**	.47
Kindergarten	- .94(.85)	1.24	.39	8.28(509)	.00	>999.
Hakwon (english class)	-	-	-	-	-	-
Play institutes	.20(.50)	.17	1.23	- .35(.46)	.58	.71
Christian institutes	- .94(.85)	1.24	.39	8.28(509)	.00	>999.
Hakwon (art, taekwondo, etc.)	-1.29(.85)	2.32	.28	- .60(.78)	.61	.55
Others	- .03(.52)	.00	.97	- .26(.48)	.30	.77
Not to use	- .19(.23)	.67	.83	.25(.22)	1.30	1.29

** $p < .01$.

Looking into the plan to use ECEC settings, mothers with higher educational attainment tend to select child care centers less when children turn 5 years old while they are working / studying. Similarly, when the mother's educational attainment is higher, the odds ratio to select play institutes is 1.2 times higher compared to the "Don't know yet" response. Cases of no intention to use ECEC settings are 1.3 times higher according to the mother's employment status. The mother's other variables and father's' variables do not show significant results.

Parents' decision-making factors with regard to the plan to use ECEC settings for children aged 3

In 2010 when children turned 3 years old, the important decision-making factors with regard to the plan to use ECEC settings are the mother's income activity status and education background; the results are shown in (Table 5).

Table 5
Parents' Decision-Making Factors with Regard to the Plan to Use ECEC Settings for Children Aged 3

Variables (by 'Don't know yet',)	Mother's education background			Mother's employment/study status		
	B(*SE*)	Wald	Exp (*B*)	*B*(*SE*)	Wald	Exp (*B*)
Child care center	-.50(.15)	10.73**	.61	-.61(.16)	14.37***	.54
Kindergarten	.38(.71)	.29	1.47	.31(.78)	.16	1.36
Hakwon (english class)	-.45(.57)	.62	.64	.32(.75)	.18	1.37
Play institutes	.28(.24)	1.32	1.32	.10(.25)	.17	1.11
Christian institutes	-.78(.66)	1.41	.46	3.69(1.30)	8.08**	40.12
Hakwon (art, taekwondo, etc.)	-.39(.57)	.48	.68	1.29(1.61)	.64	3.64
Others	-.10(.47)	.05	.90	-.71(.46)	2.42	.49
Not to use	-.19(.15)	1.68	.82	.04(.16)	.05	1.04

**$p < .01$. ***$p < .001$.

Looking into the plan to use ECEC settings, the selection of child care centers when the children turn 3 years old is mainly influenced by the mother's educational attainment. In other words, mothers with higher educational attainment select child care centers less. Working mothers select child care centers less and select Christian institutes more. According to the mother's educational attainment, the odds ratio to select kindergarten is 1.47 times higher compared to the "Don't know yet" response. By income activity, the odds ratio of Christian institutes is very high, i.e., 40 times higher than the "Don't know yet" response. Note, however, that the number selecting Christian institutes is very low at 4 out of a total of 1,904 mothers. The mother's other variables and father's variables do not show significant results.

Parents' decision-making factors with regard to the plan to use ECEC settings for children aged 4.

In 2011 when children turned 4 years old, the important decision-making factors with regard to the plan to use ECEC settings are the mother's education background, income activity status, age and the father's age and; the results are shown in (Table 6).

Table 6
Parents' Decision-Making Factors with Regard to the Plan to Use ECEC Settings for Children Aged 4

Variables (by 'Don't know yet,)	Mother's education background			Mother's employment/study status			Mother's age			Father's age		
	B(SE)	Wald*	Exp(B)	B(SE)	Wald	Exp(B)	B(SE)	Wald	Exp(B)	B(SE)	Wald	Exp(B)
Child care center	-.42(.14)	9.00**	.66	-.44(.15)	9.15**	.64	-.01(.03)	.13	.99	-.05(.03)	3.10	.95
Kindergarten	-.39(.21)	3.63	.68	-.51(.20)	6.38*	.60	-.08(.05)	2.44	.92	-.04(.05)	.76	1.00
English Kindergarten	.59(.41)	2.04	1.80	-.01(.37)	.00	.99	-.13(.10)	1.67	.88	-.12(.08)	2.19	.89
Play Institutes	.07(.21)	.10	1.07	-.26(.21)	1.62	.77	.06(.05)	1.49	1.07	-.00(.05)	.01	1.00
Christian institutes	-.17(.35)	.24	.84	-.39(.35)	1.26	.69	.03(.09)	.08	1.03	.05(.07)	.51	1.05
Hakwon (Art, Taekwondo, etc.)	-.65(.33)	3.86*	.52	.66(.61)	1.15	1.93	.18(.08)	4.90*	1.20	.13(.07)	3.29	1.14
Others	-.15(.68)	.05	.86	-.36(.64)	.32	.70	-.16(.18)	.79	.86	-.04(.14)	.09	1.04
Not to use	-.27(.15)	3.23	.76	.08(.17)	.23	1.08	.072(.04)	3.55	1.07	.03(.03)	1.14	1.04

*$p < .05$, **$p < .01$

Looking into the plan to use ECEC settings, the plan to use child care centers when the children turn 4 years old is influenced by the mother's income activity status. The mother's educational attainment also affects the selection of ECEC settings. As in the cases of 2 and 3 years of age, the higher the mothers' educational attainment is, the less the mothers selected child care centers when children turn 4 years old; a small number of those with higher educational attainment chooses Hakwon (Art, Taekwondo, etc.) teaching art and Taekwondo, etc. In the case of working mothers, they select child

care centers and kindergarten less; the odds ratio of Hakwon (Art, Taekwondo, etc.) selection is 1.92 times higher compared to the "Don't know yet" response.

Although the father's age is a variable affecting the plan to use ECEC settings, it is not statistically significant among the individual coefficient estimate values in the estimation model. With older fathers, the odds ratio to select Hakwon (Art, Taekwondo, etc.) is 1.14 times higher compared to the "Don't know yet" response. Mother's other variables and father's other variables do not show significant results.

Parents' decision-making factors with regard to the plan to use ECEC settings for children aged 5

In 2012 when children turned 5 years old, the important decision-making factor with regard to the plan to use ECEC settings is the mother's education background; the results are shown in Table 7.

Table 7

Parents' Decision-Making Factors with Regard to the Plan to Use ECEC Settings for Children Aged 5

Variables (by 'Don't know yet,)	Mother's education background		
	B (*SE*)	Wald	Exp (*B*)
Child care center	-.38(.15)	6.94**	.68
Kindergarten	-.16(.15)	1.23	.85
Hakwon (english class)	.28(.22)	1.52	1.32
Play institutes	-.05(.24)	.04	.95
Christian institutes	-.56(.39)	2.07	.57
Hakwon (art, taekwondo, etc.)	-.81(.31)	6.92**	.44
Others	-.54(.77)	.50	.58
Not to use	-.04(.22)	.03	.96

** $p < .01$.

Looking into the plan to use ECEC settings, mothers with higher educational attainment tend to select various Hakwon (Art, Taekwondo, etc.) and child care centers when the children turn 5 years. The mother's other variables and father's other variables do not show significant results.

Parents' decision-making factors with regard to the plan to use ECEC settings for children aged 6

In 2013 when children turned 6 years old, the important decision-making factor with regard to the plan to use ECEC settings is the mother's education background; the results are shown in (Table 8).

Looking into the plan to use ECEC settings, mothers with higher educational attainment tend to select less the child care centers, kindergartens, and Hakwon (Art, Taekwondo, etc.). Although not statistically significant, the odds ratio of selecting an Hakwon (English class) is 1.16 times higher compared to the "Don't know yet" response, and that of selecting kindergarten is 0.66. The mother's other variables and father's other variables do not show significant results.

Parents' decision-making factors with regard to the plan to use ECEC setting for children aged 7.

Table 8
Parents' Decision-Making Factors with Regard to the Plan to Use CCFEI for Children Aged 6

Variables (by 'Don't know yet,)	Mother's education background		
	B (*SE*)	Wald	Exp (*B*)
Child care center	- .51(.17)	9.12**	.60
Kindergarten	- .41(.16)	6.72**	.66
Hakwon (english class)	.14(.20)	.52	1.16
Play institutes	- .34(.38)	.83	.71
Christian institutes	- .40(.49)	.66	.67
Hakwon (art, taekwondo, etc.)	-1.09(.33)	10.93***	.34
Others			
Not to use	- .65(.41)	2.48	.52

**p < .01. ***p < .001.

In 2014 when children turned 7 years old, the important decision-making factor with regard to the plan to use ECEC settings is the mother's education background; the results are shown in (Table 9).

Table 9
Parents' Decision-Making Factors with Regard to the Plan to Use CCFEI for Children Aged 7

Variables (by 'Don't know yet,)	Mother's education background		
	B (*SE*)	Wald	Exp (*B*)
Child care center	- .59 (.18)	10.60**	.56
Kindergarten	- .50 (.16)	10.30**	.61
Hakwon (english class)	.17 (.19)	.79	1.18
Play institutes	-1.12 (.48)	5.38*	.33
Christian institutes	.49 (.70)	.49	1.64
Hakwon (art, taekwondo, etc.)	-1.07 (.27)	16.26***	.34
Others			
Not to use	- .90 (.65)	1.90	.41

*p < .05. **p < .01. ***p < .001.

Looking into the plan to use ECEC settings, mothers with higher educational attainment are least likely to select play institutes, Hakwon(Art, Taekwondo, etc.), and child care centers when the children turn 7 years old. Although not statistically significant, the odds ratio of selecting Hakwon(English class) is 1.18 times higher compared to the "Don't know yet" response, and that of selecting kindergarten is .61. The mother's other variables and father's other variables do not show significant results.

As shown above, the most important factor affecting decision making on the plan to use ECEC settings for children aged 2 to 7 is the mother's educational attainment. Mothers with higher educational attainment select child care centers less and chose Hakwon(Art, Taekwondo, etc.) less when children reach the age of 7. Income activity and employment/studying status of mothers is the factor affecting decision making with regard to the plan to use ECEC settings for children aged 2-4. In the case of working or income activity, child care centers are selected less. In planning to use ECEC settings, the father's demographic and socioeconomic variables do not prove to be a decision-making factor. Although not statistically significant, higher probability to select private academies when children reach 4 years is observed among older fathers.

Discussion and Conclusions

This study examined the impacts of the parents' demographic and socioeconomic variables on the plan to use ECEC settings using the second-year data of PSKC. Based on the results, the directions of desirable early childhood education and care policy are suggested as blow.

First, the ratio not planning to use ECEC settings when children reach the age of 2 and 3 was more than the majority, but the ratio planning to use ECEC settings after 4 years of age rose rapidly. Moreover, in this study, Child care centers were selected less by mothers with higher economic activity when children reach age 2-3. In the study of Gang (2010) who surveyed the children's age for using child care centers targeting mothers with children aged 12 months, the ratio planning to use child care centers for children aged 2-4 was very similar to the ratio drawn in this study. The reason reported is that parents think 0-3 year-old children are too young to stay at child care centers and want to rear at home environment until children are 3, even if parents do not mainly take care of their children (Ahn, J., et al., 2010).

The ratio planning to use child care centers at 4 years of age rose rapidly and reached 67%, but the ratio planning to use child care centers from the age of 5 - which can be considered kindergarten age - declined, whereas the ratio planning to use kindergarten rose. In addition, the ratio planning to send their 4-year-old children to kindergarten was 2.3%, although they were not the regular admission age. Although the lack of perception of parents on the kindergarten admission age seemed to be at play, the parents' needs for children's kindergarten education seemed to increase at children's age 4. Jung et al. (2008) also reported that educational needs of parents with 4-year-old children were high and that there were 4-year-old children already using kindergartens even thought they were not regular admission age. Through all this, parents' interest in children's education is forecast to rise. All in all, parents' educational needs for children aged 4 - who are not included in the current kindergarten education age - should be reconsidered in the current educational policy in ways that extend admission age of kindergarten at least 4 to 7-year-old or that place affiliated 4-year-old classes with current kindergartens (Jung et al., 2008).

In this survey wherein parents' expectation and perception on child care and education have been demonstrated, the selection of kindergarten from child care centers by working mothers was confirmed to begin when their children reach the age of 5. Mothers having higher educational attainment and engaging in economic activities tended to select child care centers less. The government's support to establish the child care centers' status as public service to improve married women's economic activity participation and birth rate. However, based on this trend, the needs of parents for institutes to be responsible for children's education on their behalf rather than child care centers can be said to increase in the case of women engaged in economic activities. Consequently, a policy to support high-quality early childhood education for every children and additional early childhood care only for children required can be a means of meeting parents' needs(Shin & Jung, & Park, 2009).

Second, among the parents' demographic and socioeconomic variables, important decision-making factors influencing the plan to use ECEC settings are the mother's education background, income activity status, and employment/study status. Mothers with higher educational attainment tended to select child care centers or Hakwon (Art, Taekwondo, etc.) less in all ages of the children (2-7 years of age). Child care centers were selected less by mothers with higher economic activity when children reach age 2-3. This could be interpreted to mean that working mothers have higher educational attainment and higher household income than non-working mothers (Lee & Lee, 2010).

A trend of selecting kindergarten less when children are 6 and 7 years old according to the mother's variables influencing decision-making was observed. As parents' interest in and needs for children's education rise, the plan to use other types of institutes such as Hakwon (English class) presumably increases. The excessive early age education fever has negative influence on children's brain development therefore it is necessary to educate parents to make them make right decision for their children with regard to the plan to use ECEC setting. Still, 77.8% of parents had plans to use kindergartens when their children were 7-year-old, and 69.7% of them were planning to use

kindergartens when their children were 6-year-old. This educational needs of parents also presented in the survey of requirement about the preschool free service model (Shin et al., 2009). 91% of parents participated, including both from kindergartens and child care centers, replied the preschool free service model was very required and 78% of the parents agreed that the preschool needed to be the part of school system under the Ministry of Education, Science, and Technology. Therefore the government needs to realize the policy supporting all 7-year-old children free early childhood education from 2012 and extend the policy to all 6-year-old children, so that every child can experience high quality education.

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The Use of Child Care Centers for Infants of Dual-working Families: A Korean Study

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Using the first and second wave data of the Panel Study on Korean Children (PSKC), this study explores whether and when dual-working families placed their infants in child care centers and what factors influenced the family's selection process. Among the 2,078 families in the PSKC, 466 dual-working families using any kind of nonparental care arrangements for their infants at the time of the second survey were included in the analysis. Since our research questions addressed whether and when events occurred, an event history analysis was also conducted. The results show that 32.4% of the families placed their infants in a child care center prior to the second interview. Family structure and income variables (number of children, nonparental adults in the household, and household income), mother's education level, and the number of working hours of the mother were significantly related to the probability of child care use for infants. Policy and practice implications are discussed.

A child's first years of life are fundamental for healthy development, including physical, cognitive, emotional and social changes that occur during this period. Among the factors influencing growing children, primary caregivers who take principal responsibility for the child's care have the most important influence during these early years. There is no doubt that parents, particularly mothers, traditionally have played the role of primary caregiver in families. In the past several decades, however, the increasing number of women in the labor force has been quite dramatic. Therefore, governments that try to support women in the workforce have begun to play a significant role in solving child care issues, because having children reduces the likelihood that a woman can successfully participate in the labor force (Leibowitz, 1996).

Child care policies have evolved relatively independently in two streams in many countries (Houston, 2008). The first stream of child care policies supported parental care for very young children by supporting temporary suspension of employment such as family leaves. The second major policy trend has been to cover some or all of the cost of child care through subsidies and tax credits.

Between these two political directions, the government of Korea, where the rate of female workers has steadily increased, has mainly focused on the second stream, although the government also recommends that companies invest in family-friendly policies for working families with young children and assure mothers that they can return to work after a child-related absence (OECD, n.d.). Korea may have focused on this second stream because juggling work and family commitments is challenging for Korean families and companies that expect longer work service based on a strong emphasis on competition and productivity. This imbalance between work and family life is a societal-level characteristic which is projected to be difficult to change. Therefore, the Korean government has actively participated in the child care domain rather than in political efforts so they can bring about prompt solutions such as promoting a family-friendly work environment through effective paid parental leaves.

In particular, the Korean government has made considerable efforts to support child care focusing mostly on enhancing accessibility to child care "centers." In other words, instead of political efforts to support at-home care through child care benefit payments, subsidizing individual care, or dispatching individual care providers for families requiring nonparental care, the government has increased the number of child care centers and has subsidized expenses for the services at centers to alleviate the parents' financial burden. In accordance with these efforts, there were 1,279,910 children in 38,021 child care centers nationwide by the end of 2010 with 45.9 percent of children

under age 5 using center-based care services (Korean Ministry of Health & Welfare, 2010). These figures have increased immensely compared to the total of 930,252 children in 2004 (Korean Ministry of Gender Equality, 2005) when the 1991 Korean Child Care Act was totally amended to facilitate child care.

There are troubling issues, however, concerning the tremendous growth in the number of infants and toddlers attending child care centers as supported by the Korean government. Parents and professionals studying infancy have worried that entering child care centers in the early years is a risk factor for these children's development, although the negative influences of placement in center-based care per se cannot be certainly verified (Clark- Stewart & Miner, 2008; Sylva et al., 2011). In Korea traditional gender roles in a family are still common including viewing fathers as breadwinners and mothers as being in charge of taking care of their children. When both parents work, it is still common for the mother to keep her children at home until they are at least toddlers and then to use outside care during the preschool years. Despite this traditional view, there has been considerable growth in the number of infants being sent to child care centers due to the drastic increase in financial support from the Korean government for center-based child care, even though at-home care tends to be the first choice for parents with young children.

Characteristics of Nonparental Care in Korea

Types of child care arrangements. Child care is used as an umbrella term referring to any form of nonparental care that occurs on a regular basis (Huston, Chang & Gennetian, 2002). The types of child care arrangements are categorized into home-based care and center-based care. Specifically, home-based care is child care provided in the parents' own homes or relative care or babysitter/nanny care in someone else's home which is typically family-based child care. Center-based care is child care provided in a public or privately owned center (Clark- Stewart & Miner, 2008). Among various types of child care arrangements, it is well known that parents select the type of care based on the age of the child, so use of nonparental care is much less frequent for infants and toddlers than for preschoolers (Chernoff, Flanagan, McPhee & Park, 2007; Flanagan & West, 2004; Johansen, Leibowitz, & Waite, 1996; Mulligan & Flanagan, 2006).

Similar to other countries, in Korea, the use of center-based programs for infants and toddlers is much lower than that of preschoolers, and the preferred nonparental care option for infants is home-based care as shown in Table 1. However, the data in Table 1 should be interpreted carefully because types of the arrangements may be quite different than in Western countries, even though the patterns of using child care arrangements by age are similar. First, an unlicensed family child care home in which an adult cares for a small group of children of various ages does not exist in Korea. As a substitute, Korea has "home child care centers," which are officially licensed as a type of "center" for a small number of children (5 to 20 children) mostly at a house or apartment. Because home child care centers are a type of child care center in Korea, directors and teachers should be certified in accordance with their positions, be established in accordance with setting standards, follow government regulations and supervision based on related laws and regulations, and provide care and education services with formal curriculum.

Table 1
National Korean Statistics on Enrollment Rates in Center-Based Programs (2010)

		Children Enrolled in Center-Based Programs		Enrollment Rate in Center-Based Programs[c]		
Age	Population	Child Care Centers[a]	Kindergartens[b]	Child Care Centers	Kindergartens	Total
0	448,516	125,133	-	27.90	0.00	27.90
1	443,963	229,486	-	51.69	0.00	51.69
2	465,564	331,637	-	71.23	0.00	71.23
3	493,452	243,264	111,482	49.30	22.59	71.89
4	448,200	180,542	181,441	40.28	40.48	80.76
5	435,281	149,278	244,654	34.29	56.21	90.50

Note. Formal primary education begins at age 6 in Korea. Child care centers and kindergartens are formal programs with government licensing among various center-based programs in Korea.

[a]Child care centers are official full-day services for children ages 0 to 5. Both public and private are available.

[b]Kindergartens are official half- or full-day services for children ages 3 to 5. Both public and private are available.

[c]The values represent the percentage of children out of the population enrolled in kindergarten or child care centers by age.

Source. Child care statistics (Korean Ministry of Gender Equality, 2005, 2006, 2007; Korean Ministry of Health & Welfare, 2008, 2009, 2010), Statistical yearbook of education (Korean Ministry of Education and Human Resources & Korean Educational Development Institute, 2005, 2006, 2007; Korean Ministry of Education, Science and Technology & Korean Educational Development Institute, 2008, 2009, 2010), Summary of census population (Korean Statistical Information Service, 2005, 2006, 2007, 2008, 2009, 2010).

Because home-based child care centers are regulated by the government, the Korean government can provide financial support which is only available to child care centers, but not to home care arrangements. Child care support in Korea is mostly in the form of subsidies that families are fully or partially paid for individual children, children of low-income families, children with disabilities, and children from multi-cultural families when they attend child care centers. Another unique child care support program for infants and toddlers in Korea is “basic subsidies” sent directly to the child care centers. These basic subsidies are designed to pay for children in the early years because program fees for infants and toddlers are typically extremely expensive. Thus, the Korean government pays a certain portion of the child care center costs for infants and toddlers regardless of the parents’ household income. However, this support is not sent to individual families but directly to the child care centers according to the number of registered infants and toddlers, so parents often do not recognize that they are recipients of basic subsidy programs and tend to feel the cost for child care centers is not so expensive.

Home child care centers, which take place in home settings but have the same child care programs and government financial supports as other child care centers, have characteristics between family child care in the US and center care. The use of these home child care centers has become very prevalent among families with infants and toddlers in Korea. For example, Figure 1 shows that up to 70% of infants at age 0 in child care centers were in home-based child care centers after 2007, whereas only 47% of infants in child care centers were in home-based child care centers in 2005 (Suh et al., 2010). In other words, the age of the child has been widely accepted as the most important factor when choosing the type of care for nonparental care because parents are least likely to receive center-based care for very young children. Although the percentage of women participating in the labor force in Korea is only about 50%, it is interesting to note that more than half of Korean children from 0 to 2 are in formal child care as shown in Table 1. This implies that the establishment of home-based child care centers has encouraged even non-working mothers to use nonparental care. Accordingly, the number of infants and toddlers enrolled in child care centers has increased since

2005, while the enrollment of preschool age children who have other options besides formal settings such as kindergartens has decreased as shown in Figure 2.

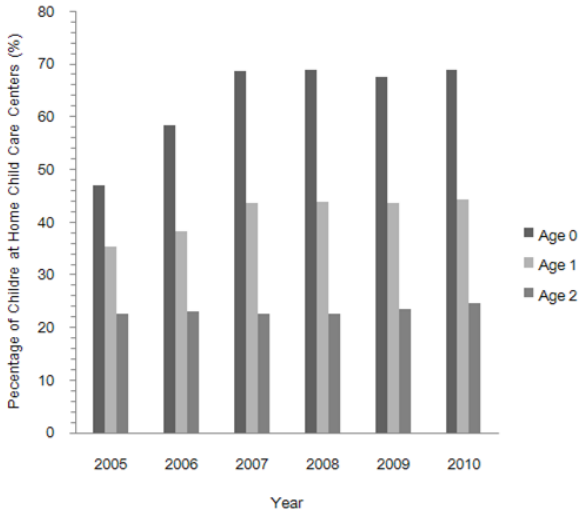


Figure 1. Rate of infants and toddlers in home-based child care centers.
Note. The values represent the percentage of children from 0 to 2 years of age in home-based child care centers out of all children attending child care centers by age. Source: Child care statistics (Korean Ministry of Gender Equality, 2005, 2006, 2007; Korean Ministry of Health & Welfare, 2008, 2009, 2010).

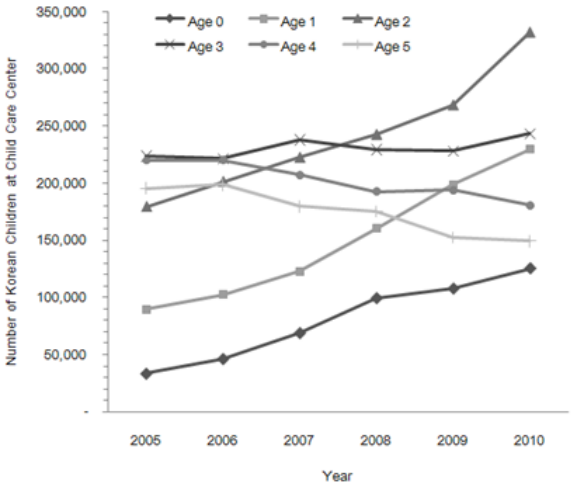


Figure 2. Number of children in child care centers (2005-2010).
Note. Source: Child care statistics (Korean Ministry of Gender Equality, 2005, 2006, 2007; Korean Ministry of Health & Welfare, 2008, 2009, 2010).

Although there has been a significant increase in the number of infants and toddlers in organized child care centers which are operated for a group of children in a government-licensed facility – either in a home or in a center – this increase does not seem to offset the traditional preference for personal case at the child's home. As of 2010, for example, results of a national survey on nonparental care of employed mothers showed that the number of families using personal care for their children at home decreased moderately by age, whereas the percentage of children attending center-based care dramatic increased by age as shown in Table 2. In particular, care by grandparents was reported as the most preferable caregiver at home implying that Korean families who require nonparental care prefer that their children be taken care of by family members such as grandparents.

Table 2
Percentage of Nonparental Care Arrangements for Children with Employed Mothers (N = 1,110)

Child care arrangements	Age 0 (*n* = 142)	Age 1 (*n* = 159)	Age 2 (*n* = 189)	Age 3 (*n* = 190)	Age 4 (*n* = 204)	Age 5 (*n* = 216)
Home-based care[a]						
Grandparents	57.0	51.7	44.9	41.2	36.2	35.2
Other relatives	4.9	4.4	5.9	2.6	5.9	3.7
Nonrelatives	11.2	6.9	3.7	3.2	3.9	5.6
Center-based care[b]						
Child care centers	14.7	55.3	79.3	68.4	49.0	38.1
Kindergartens	0.0	0.0	.5	21.7	41.7	56.0
Others[c]	2.8	10.0	5.8	11.0	24.5	38.5

Note. Results of multiple responses when multiple care arrangements are used by a family.
[a]Home-based care refers to care given to children by primary caregivers who are not their parents. Multiple answers among types of caregivers were not allowed.; [b]Center-based care refers to more than half-day programs for young children. Multiple answers among types of center-based programs were allowed.;[c]Others are private programs which provide their own formal services but are not officially licensed. Source: 2009 National survey on current status of child care in Korea: A household survey report (Suh et al., 2010).

Another result of the same national survey (Suh et al., 2010) on parental opinions about the ideal type of nonparental care arrangement for children demonstrates strong preferences for personal care by grandparents for children under age 2, as shown in Table 3. Interestingly, the findings show that the percentage of home-based care by grandparents is still substantial for preschool children even though many parents prefer center-based care for older children. Comparing the results on parental values for nonparental care arrangements with the enrollment rate at child care centers, the type of nonparental care of working parents does not necessarily reflect the parents' preference because they may not be able to choose their ideal care arrangement. Rather, it could be a reflection of the current characteristics and circumstances through the process of eliminating unavailable services. Accordingly, in addition to examining whether children are placed in child care centers, it would be necessary to explore when children enter center-based programs and what factors influence the family's selection process.

Table 3
Ideal Care Arrangement for Children with Employed Mothers by Age (N = 4,898)

Child care arrangements	Age 0	Age 1	Age 2	Age 3	Age 4	Age 5
Home-based care						
Grandparents	66.8	64.6	52.5	26.6	8.12	2.5
Other relatives	5.7	6.1	5.9	2.9	1.1	.5
Nonrelatives	2.7	2.9	2.7	1.5	.5	.2
Center-based care						
Home child care centers[a]	5.1	7.2	10.9	9.7	4.8	1.0
Other child care centers[b]	3.3	5.2	16.3	46.2	55.8	17.4
Kindergartens	.0	.0	.2	4.4	25.1	76.3
Others[c]	16.6	13.9	12.0	8.7	4.6	2.0

Note. [a]Home child care centers are unique types of child care centers in Korea.; [b]Other child care centers include various types of child care centers excluding home child care centers. *Public,* private, non-profit, parent co-op, and employer-supported child care centers are included.; [c]Others include various types of private programs, don't know, and only parents. Source: 2009 National survey on current status of child care in Korea: A household survey report (Suh et al., 2010).

Predictors of Selecting Child Care Arrangements

Researchers have investigated the factors related to parents' selection of a particular type of nonparental care, including the choices between various types of home-based care versus center-based care. Many studies show that numerous factors at different levels play a role when parents make this choice.

Child characteristics. It has been widely accepted that the selection of the type of child care arrangement varies by the child's age. In general, enrollment in center-based programs is much less frequent for infants and toddlers than for preschoolers, and at-home care is preferred over child care centers for infants and toddlers when the child needs nonparental care.

A U.S. representative longitudinal study on early child care, which was set up in 1991 by the National Institute of Health and Child Development (NICHD), categorized types of child care into home-based care and center-based care. According to results of the NICHD research team (NICHD Early Child Care Research Network, 1996), 65 % of the comprehensive sample used a nonmaternal care arrangement at 6 months. Except for families whose child was cared for by the father, 43% of the infants with nonparental care were in a child care home, 20 % were with their grandparent, and 15% were with an in-home sitter/nanny. While 78% of infants in nonparental care were in home-based settings, 22% were in center-based programs.

In a follow-up report by Mulligan and Flanagan (2006) examining 14,000 children in the Early Childhood Longitudinal Study-Birth cohort (ECLS-B), another longitudinal study of American children born in 2001-02, 49% of the children at age 2 had regular nonparental care arrangements. In particular, relative care was the first choice for the infants and toddlers whose mothers worked full-time; 30 % of the babies were cared for by their relatives at their home. However, the percentages of center-based care and non-relative care were close behind with 27% and 26%, respectively.

As shown in Table 1, the Korean national data show that the enrollment rate at center-based programs in Korea dramatically increased from 28% at age 0 to 91% at age 5 as of 2010. In particular, 73% of children at 0 were cared for at home mainly by their grandparents while only 15% were in child care centers according to the results of the national survey on child care implemented in 2009 (Suh et al., 2010). Many other Korean studies (Ahn & Kim, 2010; Kim, 2004; Lee & Kim, 2009), have also revealed that home-based care is less prevalent as children get older. Considering that family child care is unavailable in Korea, such results show that parents value personal care as more appropriate for infants and toddlers while interaction in a group setting with peers is better for preschoolers.

Maternal characteristics. Initial research on the determinants at the maternal level on the types of nonparental care focused on maternal employment (Leibowitz, Klerman, & Waite, 1991) because mothers have been regarded as the primary caregivers of children in the family. Obviously, children of working mothers are more likely to receive nonparental care. Thus, multiple factors related to mothers' employment have also been investigated with Korean populations (Baek & Cho, 2005, Kim, 2004). The attribute most frequently cited as influencing parents' choices of child care type for their infants is the amount of working time and employment status.

As for working time, it has been consistently revealed that longer working hours of mothers could lead to a higher chance of not using center-based care, but instead using at-home care. Atkinson (1994) and Larner (1996) showed that family day care providers are more likely than centers to take children who need care early and late in the day. These arrangements may be better for the parents because operation hours of child care centers do not usually accommodate full-time and overtime working mothers. Recently, Ahn and Kim (2010) who used national representative panel data also reported Korean mothers with longer working hours were most likely to use personal caregivers for their preschool age children, but few Korean researchers have attempted to investigate the influence of working time on parents' selection of child care arrangements.

Employment status has also been recently examined as a factor affecting use of care and primary care type. Mothers who worked relatively fewer hours were more likely to have informal care arrangements at home, whereas mothers who worked more hours were relatively more likely to place their children in family child care or center care (Fuqua & Labensohn, 1986; Seo, 2003). To date,

however, very little research has been conducted to investigate the influence of working time on parents' selection of child care arrangements with Korean populations.

There are several studies on a mother's education level as a determinant of child care choice. Singer, Fuller, Keiley and Wolf (1998), who used survival analysis to consider predictors of age of entry into nonparental care, found that more educated mothers and younger mothers were more likely to place their children in care. Specifically speaking in terms of care arrangements, more educated mothers were likely to select child care centers while less educated mothers preferred care at home (Fuller, Holloway, & Liang, 1996). Johansen et al. (1996), in contrast, found that highly educated mothers are more likely to select family day care than child care centers when they differentiated personal care at home provided by relatives vs. others, and care in their own homes vs. others' homes. As for the reason for inconsistent results, Folk and Yi (1994), who examined child care selections of families with preschoolers, found that mothers with more education were more likely to use multiple care arrangements implying that there are complex circumstances surrounding care choices for children of working mothers.

Family characteristics. The main research interest here is what family characteristics predict parents' likelihood of enrolling their younger children in a center. Previous research has drawn heavily from household economic traditions, emphasizing the influence of child care costs and family income. Interestingly, however, the effects of family income on preferred care arrangements are inconsistent. For example, Hofferth and Wissoker (1992) revealed that parents with higher incomes were more likely to choose child care centers. In contrast, Johansen et al. (1996) found that parents whose professions and wages were high were less likely to choose child care centers due to their lack of flexibility in terms of operation hours. Some studies (Early & Burchinal, 2001; Erdwins & Buffardi, 1994) also showed that household income did not emerge in the analyses of parents' selection of child care, so the influence of economic circumstances on child care decisions interact with other characteristics in a complex way. This may be because relative prices of different forms of child care appear to be associated with selection decisions, but the effects of this factor are relatively small because many low-income and working-poor families receive subsidies that largely offset the personal cost for the family.

The number of adults in a household is another determinant of care choice. According to Singer et al. (1998), resident kin members may allow mothers with young children to participate in the labor force by assisting with child care. Accordingly, it has been consistently found that the number of adults in a household seem to be positively associated with higher chances that a relative cares for the child at home and with a lower enrollment rate in child care centers in the US (Johansen et al., 1996; NICHD Early Child Care Research Network, 1996) and in Korea (Ahn & Kim, 2010; Baek & Cho, 2005).

Another possible relationship with child care choice is birth order, but recently, Sylva et al. (2007) showed that birth order was not related to the use of child care at 3 months. Families tended to start child care for the first-born child between 4 and 10 months and later for second- or later-born children in a British national sample. That is, birth order of children or number of children in a family may be associated with their experience with nonparental care because of human and financial resources

Community characteristics. Accessibility is one of the most critical factors when choosing individual care services. It has been assumed that parents choose family day care, which is a sort of home-based care, over center-based care because centers may not be conveniently located, especially in rural areas, but family child care is usually in the parents' neighborhoods (Atkinson, 1994; Johansen et al., 1996; Larner, 1996). Surprisingly, little empirical work has examined, in detail, the relationship between primary child care arrangements and community characteristics such as the supply of child care centers; rather, many studies using national data have only examined the geography of families in the US (Herbst & Barnow, 2008; Leibowitz, Waite, & Witsberger, 1998), and little knowledge is available about the Korean population.

The Current Study

Entering child care centers during infancy is a significant life change that could alter developmental trajectories as well as family life. According to Edler (1998), who conceptualized the life course theory,

stated "some individuals are able to select the paths they follow, but these choices are not made in a social vacuum. That is, all life choices are contingent on the opportunities and constraints of social structure and culture" (p. 2). Considering the fact that many parents worry about possible negative effects from center-based care during very early years and are more likely to place their children in child care centers at an older age, it can be assumed that there are systemic characteristics of selecting child care centers when nonparental care is necessary. Lowe and Weisner (2004), who conducted qualitative research using ethnographic interviews, proposed that child care choices have to personally and culturally "make sense" given parental goals and values as participants in a local community. Therefore, it would be beneficial to implement a comparative study with the Korean population in order to expand our understanding of the features of child care decisions that parents make for their infants, particularly focusing on center-based care which has dramatically increased in Korea.

National data on the current status of child care in Korea (Korean Ministry of Health & Welfare, 2010) indicate that currently 27.8% of infants below age 1 with working mothers are cared for at child care centers and the enrollment rate rises to 51.6% at age 1. Therefore, this study was implemented to address the period from birth to early toddlerhood instead of a single age group to examine the history of enrollment in center-based care using event history analysis which assumes that entering a child care center is a life event. To achieve this purpose, nationally representative longitudinal data from the PSKC of KICCE were analyzed. This allowed us to determine whether children had ever been placed in center-based nonparental care and, if so, when they were first placed. In addition, we examined the determinants related to entry in center-based care.

Method

Data and Sample

This study uses the first and second wave data of PSKC, which is a birth cohort panel of 2,078 infants born in 2008. The PSKC is the first panel of newborn babies in Korea. It used a stratified multistage sampling, where the primary sampling unit was hospitals with more than 500 births per year, and the secondary sampling unit was families who gave birth in those hospitals from April to July of 2008. Of 2,561 families recruited in these hospitals, 2,078 families participated in the PSKC. The first wave data were collected when babies were mostly 4 to 8 months old, and the second wave data were collected when the babies were 11 to 18 months old (of which, 84.1% were collected when the babies were between 13 and 15 months old).

The PSKC provides information about child-rearing support policies in Korea such as the use of child care services, the receipt of child care subsidies, and other support and programs related to child-rearing. The data also provides detailed information about children and families including demographic characteristics, developmental properties, family structure, psychological properties, neighborhood characteristics, work history, and earnings.

This analysis focuses on dual-working families who have definite needs for child care services, whether it is a child care center or another form of nonparental care. Thus, families with both parents working and who used any kind of nonparental care arrangement at the time of the second survey were selected as the final sample. The sample was selected based on the results of the second survey so we could examine the association between child care center use and maternal employment characteristics in addition to other factors. Among the 2,078 families in the PSKC, 466 families were included in the analysis.

Measures

Dependent variables. The focus of this study is whether and when infants of dual-working families enter child care centers and what factors influence the family's selection process (i. e., why these families choose child care centers instead of other forms of nonparental care). Therefore, two dependent variables were used in this analysis. The first is a dichotomous variable ("event" variable) indicating

whether each infant in the PSKC had ever been placed in a child care center (those who had never used child care centers at the time of the second survey were censored cases) and the second is a continuous variable ("duration" variable) reflecting the child's age in months at the time of placement (or censoring).

Since the PSKC provides information on the history of child care arrangements for each infant (when and which type of arrangement the family used after birth), this information was used to create two variables. For censored cases, each child's age at the time of the second survey was used for the duration variable. A total of 151 families (32.4%) reported that they had placed their infant in a child care center prior to the second interview.

Independent variables. The research model contains four sets of independent variables that may be related to parents' use of child care centers for their infants: mother characteristics, maternal employment pattern, family structure and income, and child care infrastructure. These four sets of variables were arranged hierarchically in the model. The maternal demographic variables were put into the model first (model 1), followed by the variables for maternal employment patterns: the mother's working hours, employment status, and whether the mother was working at the time of the birth of her infant (model 2). Family structure (whether there were other children to be taken care of, and nonparental adults in the household who could take care of the child), and income variables (which were associated with the family's child care subsidy) were included in the model next. Lastly, the child care infrastructure of the local communities was included in the model (model 4).

Maternal demographic characteristics. Two demographic characteristics of the mother (mother's age and education) known to be associated with the child care selection process were included in the analyses. Since the mothers' ages and child care center use were not in a linear relationship, the mothers' ages were categorized into three groups: under 30 years, 30 to 34 years, and 35 years and over. The mothers' education levels were also categorized into high school education or less, 2- to 3-year college education, 4-year college education, and more than a bachelor's degree.

Maternal employment pattern. The mothers' employment patterns were important predictors of the child care choices of the families. Variables included the mothers' working hours, employment status, and whether the mothers were working at the time of the infant's birth. Maternal working hours were measured in the number of hours spent weekly in the workplace. Employment status was categorized into three groups: regular (or permanent) worker, temporary worker, and self-employed (or family employee). A mother's employment at the time of the birth was measured as a dummy variable.

Family characteristics. For family structure and income, variables included the number of children, the number of nonparental adults in the household, and the monthly household income. The number of children was identical to the child's birth order when we compared both variables. The household income, which is an aggregated amount of earnings, was measured in ten thousand Korean won (KW). Since the household income showed a non-normal distribution when the skewness and kurtosis of the individual variable was examined, a log transformation was completed before putting it into the model.

Child care infrastructure. Since there are variations in the supply and demand of child care centers across regions, two variables indicating the child care infrastructure in local communities were selected: a regional scale, and the perceived availability of child care centers. The regional scale was measured as a categorical variable (big cities, small- and medium-sized cities, and small towns), and the perceived availability of child care centers was measured on a 5-point Likert-type scale ranging from 1 (strongly agree) to 5 (strongly disagree) about the availability of child care centers in the area.

Analytical Procedures

Since this study focused on whether and when the infants of dual-working families first entered child care centers, an event history analysis (also called a survival analysis) was used to analyze the data. An event history analysis has advantages over traditional methods such as a logistic regression or linear regression, in that it can address the censored observations. Censoring exists when incomplete information is available about the duration of the risk period because of a limited observation period (Yamaguchi, 1991). In our sample, for example, 315 infants (67.5%) had not yet

entered child care centers by the time of the second interview, so for these infants we did not know when they would enter a child care center, or whether they would ever enter a child care center. Yet, they provided meaningful information about the reasons that parents do not place their children in child care centers (or delay placing them in child care centers). Thus, to analyze the data with censored observations without missing information, we used an event history analysis.

We also used the Cox proportional hazards model which treats age at entry (measured in months) as a continuous variable, since there was no evidence that event times were highly skewed or concentrated in a few specific points when we examined the distribution of the data. The proportional hazards model assumes that hazard rates are a log-linear function of parameters for the effects of covariates. Its value for person i at time t, denoted by hi(t) is given as

$$h_i(t)=h_0(t)\ \exp(\beta_1 x_{i1}+\ ...+\ \beta_k x_{ik}) \quad (1)$$

where $h_0(t)$ is the baseline hazard function which is common for all subjects, and the value of $X_{ik}(t)$ is the value of the kth covariate for person i at time t.

The dependent variable in an event history analysis model is the hazard rate of the event, a transformation of age that remains meaningful in the presence of censoring (Singer et al., 1998). The hazard rate represents the probability that the event will occur shortly after t, given that it has not occurred up to time t.

In this study, the hazard rate is the instantaneous probability of an infant being placed in a child care center at any particular instant, given that he or she had not been placed in a child care center until that time point.

Results

Characteristics of the Sample

Table 4 shows the demographic characteristics of families in the sample and whether there are differences in the percentage of children entering child care centers among various demographic groups. More than half of the mothers (56%) were between 30 and 34 years old and their mean age was 32.29. Most mothers had some college education and had regular (or permanent) jobs. In addition, most mothers worked more than 36 hours per week and 45.3% of the mothers reported that they worked over 40 hours per week, reflecting a traditional pattern of long working hours in Korea. Most of them (79.6%) were also working at the time of the child's birth. About half of the children (52%) had more than one sibling and only 21.9% of the families had a nonparental adult in the household. The household income was distributed rather evenly with the median income of 4 million KW. Nearly half (46.8%) of the families lived in big cities, while only 16.1% lived in small towns (16.1%); 44.9% of the parents "strongly agree" or "agree" that there are enough child care services in the local community where they live, and only 16% reported that they "strongly disagree" or "disagree."

Looking at the group differences in child care center use, most of the demographic variables except maternal age, the regional scale where they live, and the perception of the availability of child care services are significantly associated with child care center use for the infants. The mother's education level and working hours are negatively related to child care center use for the infants, which means mothers with higher education levels and longer working hours tend not to use child care centers for their infants, but the number of children is positively related to it. The more children there are in a household, the more the parents choose to use child care centers for their infants. Mothers who were not working at the time of the child's birth, and those who worked as temporary workers tended to use child care centers more. Families with higher income levels were also found to use child care centers less.

Table 4
Sample Characteristics and Percentage of Children Entering the Child Care Centers

Variable	Total sample		Percentage in child care centers	
	N	%	%	χ^2
Mother's age				
<30	91	19.5	37.4	4.448
30-34	291	56.0	28.4	
>35	114	24.5	37.7	
M (*SD*)	32.29 (3.32)			
Education of mothers				
High school graduate or less	87	18.7	59.8	
2 or 3-year college graduate	116	25.1	33.6	40.320***
4-year college graduate	215	46.5	24.2	
Post graduate education	44	9.5	18.2	
Mother's working hours				
<36 hours a week	61	13.3	44.3	
36-40 hours a week	190	41.4	28.4	5.338*
>40 hours a week	208	45.3	31.7	
Employment status				
Regular/permanent worker	379	81.5	29.3	
Temporary worker	53	11.4	49.1	9.144**
Self-employed/family employee	33	7.	39.4	
Other working at child birth				
Working	371	79.6	29.1	9.009**
Not working	95	20.4	45.3	
Number of children (birth order)				
One	224	48.1	24.6	
Two	203	43.6	37.4	14.997***
Three or more	39	8.4	51.3	
Nonparental adult in the house old				
None	364	78.1	37.1	
One	58	12.4	8.6	20.744***
Two	35	7.5	28.6	
Three or more	9	1.9	11.1	
Household income (ten thousand)				
200 or less	38	8.2	68.4	
201-300	100	21.5	51.0	
301-400	116	2.9	28.4	55.720***
401-500	114	2.5	20.2	
501 or more	98	21.0	18.4	
M (*SD*)	400.0 (507.3)			
Regional Scale				
Big cities	218	46.8	28.0	
Small and medium-sized cities	173	37.1	35.8	3.710
Small town	75	16.1	37.3	
Availability of childcare services				
Strongly agree	43	9.3	30.2	
Agree	165	35.6	35.2	
Neither agree nor disagree	181	39.1	28.2	3.634
Disagree	61	13.2	36.1	
Strongly disagree	13	2.8	46.2	

* $p < .10$. ** $p < .01$. *** $p < .001$.

Whether and When Infants Enter Child Care Centers

Table 5 shows the proportion of infants entering child care centers by the child's monthly age and cumulative proportions as the age increases. Although these families had a definite need for child care services for their infants, only 32.5% of the infants had ever entered a child care center until the second survey. The second panel presents the number of infants who first entered a child care center by the

child's monthly age. The patterns of child care center use are relatively equally distributed, although there is a tendency that child care center use increases as the child ages.

Table 5
Proportion of Infants Entering Childcare Centers by Child's Monthly Age

Child age (in months)	No. of cases	Cumulative No. of cases	Cumulative percent
1	1	1	0.2
2	4	5	1.1
3	14	19	4.1
4	11	30	6.4
5	5	35	7.5
6	9	44	9.4
7	7	51	10.9
8	9	60	12.9
9	11	71	15.2
10	14	85	18.2
11	20	105	22.5
12	15	120	25.8
13	18	138	29.6
14	10	148	31.8
15	3	151	32.4
16	0	151	32.4
17	0	151	32.4

Figure 3 presents the cumulative hazard probability that infants experience "the event," as they grow up. By definition, the cumulative hazard function begins at 0 and increases over time - sometimes rapidly, sometimes slowly (Singer & Willet, 2003). To deduce the shape of the underlying hazard function, we examined how the rate of increase in the cumulative hazard function changes over time. For example, if the hazard function is constant, the cumulative hazard function increases linearly, as the same fixed amount of risk is added to the prior cumulative level in each successive instant (Singer & Willet, 2003). Likewise, if the hazard function increases linearly, at each successive instant, the cumulative hazard function increases more rapidly.

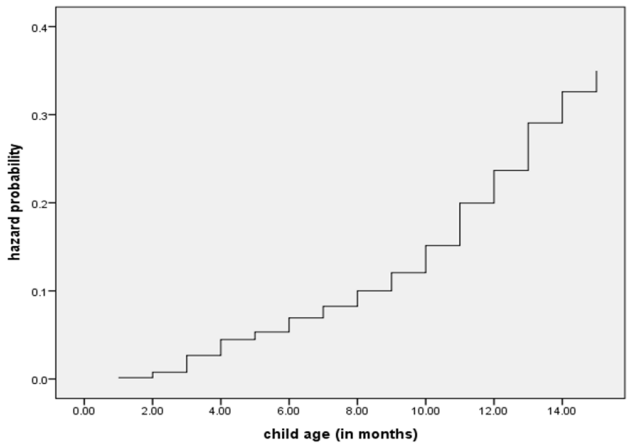


Figure 3. Cumulative hazard probability by child's monthly age

The cumulative hazard probability of infants' entering child care centers shows that the rate of change seems to be linear until children are months of 10 and then it accelerates thereafter. Therefore, we can deduce that the chance of an infant being placed in a child care center is constant over time until the child reaches 10 months and increases thereafter. If the observation period is extended, the rate of change is expected to accelerate more rapidly.

Factors Associated with the Use of Child Care Centers for Infants

Table 6 presents the results of fitting a series of Cox proportional hazard models predicting infants' first placement in child care centers. Since each set of independent variables was added into the model hierarchically, a total of four models are displayed in sequential order.

In model 1, which contains only the mother's demographic characteristics as independent variables, the mother's education level was found to have a significant association with the hazard rate. When compared with the reference group (the mothers with high school diplomas or less), the other three groups were less likely to place their infants in child care centers. Model 2 shows a significant increase in chi-square ($\Delta\chi^2$ = 11.756, *df* = 5), when the variables related to the maternal employment pattern were added. Among these variables, only the mother's working hours per week has a significant relation with the hazard rate of the infant. The results show that the probability of an infant being placed in a child care center declines as the mother works full-time (36 to 40 hours per week) or overtime (over 40 hours per week). This means that mothers who work longer are less likely to choose child care centers as a nonparental form of child care.

Family structure and income variables are all significantly related to an infant's first being placed in a child care center as model 3 shows; families with more children and lower income levels are less likely to place their infants in child care centers and less likely to place them when there are more nonparental adults in the household. Model 4, however, indicates that the proxies for the child care infrastructure are not significantly related to the probability of child care use for infants. The regional scale where the families in the sample live and their perception of the availability of the child care services does not affect the hazard rate of the infants. In addition, the results revealed no significant increase in chi-square between model 3 and model 4 ($\Delta\chi^2$ = 3.831, *df* = 3).

Table 6
Results of Fitting a Series of Cox Proportional Hazard Models Predicting Infants' First Entry into Childcare Centers

Variables	Model 1 *B (SE)*	Model 2 *B (SE)*	Model 3 *B (SE)*	Model 4 *B (SE)*
Mother's age (vs. < 30)				
30-34	-.164(.213)	-.184(.215)	-.425(.226)*	-.449(.230)*
>35	.179(.235)	.234(.239)	-.082(.263)	-.050(.265)
Education of mothers (vs. high school or less)				
2 or 3-year college graduate	-.743(.214)**	-.727(.224)**	-.647(.230)**	-.670(.232)**
4-year college graduate	-1.185(.203)***	-1.294(.226)***	-1.117(.237)***	-1.162(.239)***
post graduate education	-1.406(.382)***	-1.537(.397)***	-1.353(.408)**	-1.380(.413)**
Mother's working hours (vs. <36 hours a week)				
36-40 hours a week		-.759(.279)**	-.671(.278)*	-.721(.280)*
> 40 hours a week		-.721(.268)**	-.588(.271)*	-.652(.275)*
Employment status (vs. regular worker)				
Temporary worker		.184(.253)	.061(.254)	-.017(.257)
Self-employed/family employee		-.060(.306)	.048(.305)	-.050(.314)
Mother working at child birth (vs. not working)				
Working		-.019(.209)	.188(.220)	.202(.222)
Number of children			.413(.134)**	.416(.137)**
Number of non-parental adult in the household			-.569(.177)**	-.564(.178)**
Log of household income			-.553(.206)**	-.564(.207)**
Regional Scale (vs. big cities)				
Small and medium-sized cities				.288(.192)
Small town				-.055(.240)
Availability of child care services				-.111(.095)
Chi-square (*df*)	49.415(5)	60.960(10)	87.309(13)	90.500(16)
△Chi-square (*df*)		11.756(5)*	32.091(3)***	3.831(3)

*p <. 05. **p<.01. ***p<.001.

In summary, family structure and income variables have the greatest effects on the probability of child care use for infants. The mother's education level and weekly working hours also have significant effects, but the other variables included in the models are not significantly related to the probability of child care use for infants. Thus, individual- and family-level factors are found to be more important than regional-level factors in the early child care selection process of these families for their infants.

Discussion

This study using national data in Korea shows whether and when infants of dual-working families are placed in child care centers and what factors influence the family's selection process. Among various levels of characteristics related to the individual families with up to 18-month-old infants, an event history analysis was used to consider predictors at various levels of age of entry into center-based care. As a result of this study that controlled for the child's age, maternal employment, and ethnicity, five predictors were found to be significant factors among the entire profile of determinants related to the probability of child care center use; mother's education level, maternal working hours, number of children in the family, number of nonparental adults in the household, and household income are significantly related to the probability of child care use for infants.

Among the significant predictors, the findings on the effects of maternal working hours, number of children in the family, and number of nonparental adults in the household are consistent with previous research in Western countries. Infants from families with more children, fewer nonparental adults, and mothers with less working time are more likely to be placed in child care centers. It seems that parents with limited resources in terms of their energy, time, or social support may not be able to use center-based programs that are less accessible and less flexible. Therefore, this implies that more customized care service should be considered to accommodate the needs of families whose parents work longer hours and who have multiple children in a nuclear family. Considering that the number of weekly working hours and commute time to workplaces are considerably long and the number of nuclear families with only child has steadily increased in Korea, it seems important to prioritize child care policies for families who do not have a full range of choices for child care arrangements.

Findings on the influences of household income and maternal education level on center choice for infants seem complex. Families with lower income levels and mothers with lower education levels were more likely to place their infants in childcare centers. This result raises a question about whether the use of a child care center is a real choice because program fees for child care centers are the most inexpensive in Korea even for families sending infants, whereas center-based care is generally more expensive than other forms of care in the US (Houston et al., 2002). That is, families of lower SES might not be able to afford personal care at home from paid care providers because they are usually more expensive than center-based programs. Accordingly, these families in Korea might have no choice but to use child care centers that are fully supported for low-income families with infants. To guarantee the full range of options for the types of child care arrangements parents make for their infants, the Korean government's efforts to enhance availability and affordability of various nonparental arrangements should be tailored to individual families' circumstances and values regarding child care.

In further research, a combination of multiple care arrangements that were not considered in this study should be included. According to Seo (2003), an analysis of the use of multiple types of child care is imperative to understand the needs of working mothers. As shown in Table 2, it is prevalent in Korea as well as in the US for parents to use multiple care arrangements, possibly because parents need choices to cover work hours, or it may be driven by a lack of high-quality, full-time child care options, or may originate from financial issues related to child care costs. No matter what the factors leading to the selection of two or more types of concurrent child care, Morrissey (2008) worries about the possibility of a disorganized or haphazard "patchwork" of care with unstable, inconsistent, and stressful experiences from a child's point of view if the combination is not purposefully planned.

Another implication for future study is to consider the quality of child care centers as predictors of what choices parents make. As many scholars have noted, most recent research on child care focuses

on “quality” of child care because it is consistently revealed that high-quality care predicts successful outcomes for children under care (Belsky et al, 2007; Clarke-Stewart, 1991; Clarke-Stewart & Miner, 2008; Houston, 2008). Child care in Korea seems like a somewhat market-based industry rather than a public service even though the number of child care centers operated as not-for-profit has expanded. Accordingly, quality control of care services at center-based programs is a significant policy issue, so national curriculum for child care centers was developed and teacher certificates, which are different from kindergarten teacher certificates, were issued by the government in the past several years. Most importantly, a child care program accreditation system was set up at the national level in 2005, so valuable information about the quality of child care programs is provided to parents. Therefore, future research should address the effects of parents’ needs or perceptions regarding child care quality in the process of their child care choices.

Houston et al. (2002) proposed that “child care decisions are made as a result of an interaction of families’ needs and preferences for child care within the structural/policy child care context in which those families live” (p. 444). In Korea, economic circumstances affecting maternal employment and policy environments surrounding the low birth rate have led to child care policies and become a main public policy. Accordingly, the child care policy is characterized as a dramatic increase in the child care support budget, but it is also criticized as a monolithic approach focusing on subsidy programs (Choi, 2011). The results of this study show that the efforts of the Korean government to facilitate center-based care seem successful but the effects of the policy on individual families may be similar to the past. It appears that the current policies have addressed only some of the needs and preferences of some families. Therefore, a comprehensive set of child care policies considering widely varying needs, resources, preferences, and beliefs should be developed and the quality of care should be seriously improved by providing funds and setting regulations or standards at a higher level.

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