

## ABSTRACT

Title of Document: MATERNAL WELL-BEING, CHILD CARE, AND CHILDREN'S DEVELOPMENT IN FAMILIES ELIGIBLE FOR SUBSIDIES

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Child-care subsidies (CCDF) were expanded after welfare reform in 1996 to help low-income families pay for child-care. Descriptive studies have been conducted on the relationship of subsidies to maternal work characteristics, but there is limited research on the extent to which CCDF is related to factors of maternal well-being. Although many studies have examined the relation between subsidy-use and child care type and quality, few studies have included child developmental outcomes as they relate to subsidy-use. A subsample of subsidy eligible mothers and their children from the Three-Year In-Home and Three-Year Child Care Study of the Fragile Families and Child Well-Being Study were used to examine these relationships. Propensity score matching was used to limit the sample and group code analysis and structural equation modeling were used to test the relationships between maternal well-being, child care and children's development. Finally, multiple group comparisons and latent class analyses with known groups were conducted to assess the invariance of the relationships in the models across families in states with divergent policy considerations. The results indicate that although subsidy use is not independently related to children's developmental outcomes, maternal well-being and child care quality are. Interactions between well-being, quality and subsidy-

use were also found to be related to behavior problems and vocabulary. These relationships varied depending on choices states make about CCDF implementation. Implications of these findings and directions for future research are discussed.

MATERNAL WELL-BEING, CHILD CARE AND CHILDREN'S DEVELOPMENT IN  
FAMILIES ELIGIBLE FOR SUBSIDIES

By

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## Dedication

To Matt, my b'shert, best friend and biggest supporter.

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I would first like to thank my family. Without your love and support throughout my entire graduate career and my whole life I would not have gotten here. Thank you for believing in me, supporting me, and teaching me that I could achieve anything if I put my mind to it. Matt, thank you for being my biggest supporter and always encouraging me, especially when I wanted to give up. No one is prouder of this accomplishment than you are. To my grandmothers, thank you for instilling in me the value of education and teaching me how fortunate I am to be able to get my PhD.

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## Table of Contents

Dedication	ii
Acknowledgements	iii
Table of Contents	iv
List of Tables	vii
List of Figures	x
Chapter 1: Introduction	1
Goals of the Current Study	4
Overview of Literature	4
Statement of Problem and Research Questions	9
Definition of Terms	10
Contributions	13
Limitations	14
Conclusion	17
Chapter 2: Literature Review	18
Introduction	18
Theoretical Framework	19
Family Stress Model	19
Ecological Systems Theory	22
Integration of Frameworks	24
Child-Care Subsidies Overview	26
Welfare Reform	27
Child Care and Development Fund	28
Poverty	32
Poverty and Race/Ethnicity	35
Maternal Stress	36
Other Well-Being Factors Related to Stress	36
Social Support	39
Other Well-Being Factors Related to Social Support	40
Maternal Efficacy	41
Other Well-Being Factors Related to Maternal Efficacy	41
Maternal Mastery	42
Other Well-Being Factors Related to Maternal Mastery	43
Empirical Research on Child-Care Subsidies	43
Child-Care Subsidy-Use	43
Child-Care Subsidies and Child-Care Quality	51
Child-Care Quality	51
Child-Care Quality and Child Development	54
Child-Care Quality Related to Subsidy-Use	57
Child-Care Subsidies and Child Development	61

Child-Care Subsidies and Family Life	62
Child-Care Subsidy Policy	65
Conclusion	67
Chapter 3: Methods	69
Overview	69
Participants	69
Three-Year Core Survey	70
Procedures	71
Three-Year In-Home Survey	72
Procedures	73
Three-Year Child Care Provider Survey and Observation	74
Procedures	75
Analytic Sample for Study	76
Measures	77
Sampling Variables	77
Grouping Variables	78
Independent Variables	79
Dependent Variables	84
Control Variables	86
Analytic Strategy	89
Propensity Score Matching	90
Factor Analysis	91
Analysis of Research Questions	91
Group Code	92
Path Analysis	92
Multi-Group Comparisons	93
Chapter 4: Results	95
Preliminary Analyses	95
Data Cleaning	95
Limiting the Sample	96
Missing Data	100
Propensity Score Matching	101
Sample Comparisons	107
Scale Score Calculation	108
Correlations	110
Exploratory Factor Analysis	116
Modeling Results	118
Research Question 1	119
Research Question 2	121
Research Question 3	127
Research Question 4	129
Research Question 5	131
State Groupings	132
Multiple Group and Latent Class Analysis	134

Research Question 1	135
Research Question 2	137
Research Question 3	139
Research Question 4	141
Summary	142
Chapter 5: Discussion	143
Overview of Results	143
Key Findings	144
Child Care Subsidy-Use is Unrelated to Developmental Outcomes	144
Child care Subsidy-Use is Unrelated to Maternal Well-Being	147
Child Care Subsidy-Use is Unrelated to Child Care Quality	148
Mother Well-Being is Related to Developmental Outcomes	150
Interaction Between Well-Being and Subsidy-Use	152
Child Care Related to Developmental Outcomes	155
Interaction Between Child Care Quality and Subsidy-Use	157
State Subsidy Laws Related to Relationships	159
Implications and Contributions	162
Research	162
Theoretical Framework	165
Family Stress Model	165
Ecological Systems Theory	165
Policy	166
Future Directions	169
Limitations	170
Conclusion	173
Appendix A: Additional Information on Fragile Families Core Baseline Study	174
Appendix B: CCDF Eligibility of Families in Sample and CCDF Policies	179
Appendix C: Federal Poverty Levels	184
Appendix D: Propensity Score Matching	185
Appendix E: Additional Descriptive Statistics for Items	191
Appendix F: Sample Comparisons	200
Appendix G: Overview of Power Analysis	202
Appendix H: State Groupings	203
References	211

## List of Tables

Table 1: Federal Legislation CCDF Policy	30
Table 2: Variables Used in Study	89
Table 3: Research Question, Analytic Plan and Variables	94
Table 4: Rate of Missing Data for both Analytic Samples	101
Table 5: Summary of Propensity Score Matching in Both Analytic Samples	104
Table 6: FES PSM In-Home Analytic Sample Demographics	105
Table 7: FES PSM Child Care Analytic Sample Demographics	106
Table 8: Descriptive Statistics for Scale Scores	109
Table 9: Intercorrelations of Variables FES PSM In-Home Sample	111
Table 10: Intercorrelations of Variables FES PSM Child Care Sample	113
Table 11: Standardized Loadings of EFAs of Mother Well-Being	117
Table 12: Research Question 1: Standardized Estimates of Mean Differences by Subsidy-Use	120
Table 13: Research Question 5: Unstandardized Estimates of MGA of RQ 1	136
Table 14: Research Question 5: Model Fit Indices of LCA of RQ 2 FES PSM In-Home Sample	137
Table 15: Research Question 5: Unstandardized Path Coefficients of LCA of RQ 2 FES PSM In-Home Sample	138
Table 16: Research Question 5: Model Fit Indices of MGA of RQ 2 FES PSM Child Care Sample	138
Table 17: Research Question 5: Unstandardized Path Coefficients of MGA of RQ 2 FES PSM Child Care Sample	139
Table 18: Research Question 5: Model Fit Indices of MGA RQ 3	140
Table 19: Research Question 5: Unstandardized Path Coefficients of MGA RQ 3	140
Table 20: Research Question 5: Model Fit Indices of MGA RQ 4	141

Table 21: Research Question 5: Unstandardized Path Coefficients of MGA RQ 4	141
Table 22: Overview of Results	142
Table A1: Ranking of Cities included in Fragile Families on Welfare Generosity Labor Market and Child Support Enforcement	178
Table B1: CCDF Monthly Income Eligibility Rules for 2001, 2002 and 2003	179
Table B2: CCDF Eligibility Rules for 2001, 2002 and 2003	183
Table C1: 2001 Federal Poverty Guidelines	184
Table C2: 2002 Federal Poverty Guidelines	184
Table C3: 2003 Federal Poverty Guidelines	184
Table D1: Means of Covariates Before Matching for In-Home Sample	186
Table D2: Means of Covariates After Matching for In-Home Sample	187
Table D3: Means of Covariates Before Matching for Child Care Sample	188
Table D4: Means of Covariates After Matching for Child Care Sample	188
Table D5: Descriptive Statistics of Participants Not Matched in PSM	190
Table E1: Descriptive Statistics for Items Included in Scale Scores of Mother Well-Being	191
Table E2: Descriptive Statistics for Items Included in Scale Scores of Child Care Quality	197
Table F1: In-Home Sample Comparisons	200
Table F2: Child Care Sample Comparisons	201
Table G1: Power Analysis for Final Models	202
Table H1: Percent SMI of Family Eligibility of Subsidies	203
Table H2: Existence of Waitlist for Subsidies	204
Table H3: Grouping of States by Policy Variation	205
Table H4: Sensitivity Analyses: Grouping of States by Policy Variation	206

Table H5: Sensitivity Analyses RQ 5: Unstandardized Estimates of MGA of RQ 1	207
Table H6: Sensitivity Analyses RQ 5: Model Fit Indices of LCA of RQ 2 FES PSM In-Home Sample	207
Table H7: Sensitivity Analyses: RQ 5: Unstandardized Path Coefficients of LCA of RQ 2 FES PSM In-Home Sample	208
Table H8: Sensitivity Analysis RQ 5: Model Fit Indices of MGA RQ 2 FES PSM Child Care Sample	208
Table H9: Sensitivity Analysis RQ 5: Unstandardized Path Coefficients of MGA RQ 2 FES PSM Child Care Sample	208
Table H10: Sensitivity Analysis RQ 5: Model Fit Indices of MGA RQ3	209
Table H11: Sensitivity Analysis: RQ 5: Unstandardized Path Coefficients of MGA RQ3	209
Table H12: Sensitivity Analysis: RQ 5: Model Fit Indices of MGA RQ 4	209
Table H13: Sensitivity Analysis: RQ 5: Unstandardized Path Coefficients of MGA RQ 4	210

## List of Figures

<i>Figure 1.</i> Family Stress Model	21
<i>Figure 2.</i> Ecological Systems Theory	24
<i>Figure 3.</i> Conceptual Model for Dissertation	26
<i>Figure 4.:</i> Child Care Decision Making Model	50
<i>Figure 5.</i> Process for Participant Inclusion for Core and Three-Year In-Home Surveys	71
<i>Figure 6.</i> Process for Participant Inclusion for Three-Year Child Care Provider Survey and Observation	71
<i>Figure 7.</i> Procedures for Conducting the Three-Year In-Home Survey	74
<i>Figure 8.</i> Sample Reduction for Analytic Samples	107
<i>Figure 9.</i> Research Question 2: Unstandardized Estimates for Model in FES PSM In-Home Sample with Interactions	124
<i>Figure 10:</i> Interaction between Mental Health Functioning and Subsidy-Use on Behavior Problems.	125
<i>Figure 11.</i> Research Question 2: Standardized Estimates for Model FES PSM Child Care Sample without Interactions	126
<i>Figure 12.</i> Research Question 3: Standardized Estimates for Model with Interaction	128
<i>Figure 13.</i> Interaction between Child Care Quality and Subsidy-Use on Vocabulary	129
<i>Figure 14.</i> Research Question 4: Standardized Estimates for Model	131
<i>Figure D1:</i> Dotplot of Standardized Mean Differences for All Covariates Before and After Matching in In-Home (left) and Child Care (right) Samples	188
<i>Figure D2.</i> Dotplot of Individual Subsidy-Users in either Matched or Un-Matched Groups: In-Home Sample	188
<i>Figure E3.</i> Dotplot of Individual Subsidy-Users in either Matched or Un-Matched Groups: Child Care Sample	189

## Chapter 1: Introduction

Growing up in poverty<sup>1</sup> has been linked to poor developmental outcomes in young children (Farah, et al., 2006; Noble, Norman, & Farah, 2005; Shonkoff, Boyce & McEwen, 2003). A variety of factors, including less stimulating home environments, familial instability, and high rates of maternal stress and mental illness in low-income and poor families<sup>2</sup> contribute to these differences in cognitive, social and emotional domains and in overall brain development (Brooks-Gunn, Klebanov & Duncan, 1996; Hart & Risley, 1995; Kneipp, Welch, Wood, Yucha & Yarandi, 2007; Linver, Brooks-Gunn & Kohen, 2002; Santiago, Wadsworth & Stump, 2011). Not surprisingly, when young children growing up in poverty (or in low-income households) enter school, they arrive at kindergarten behind their more advantaged peers and are often unable to catch up (Duncan & Magnuson, 2005; Janus & Duku, 2007). It is therefore imperative to understand how early experiences contribute to young children's development.

Early care and education programs, specifically high-quality child-care settings, can be beneficial for children's academic and social development when they enter formal schooling (Magnuson, Meyers, Ruhm, & Waldfogel, 2004). Children who attend high-quality child-care settings in the years before kindergarten enter school with higher academic skills and fewer behavior problems than similar children in low-quality settings (Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Vandell, et al., 2010; Votruba-Drzal,

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<sup>1</sup> Poverty refers to an income below the federal poverty line for family size (U.S. DHHS, 2011)

<sup>2</sup> Although the terms "poor" and "low-income" are often used interchangeably, the term "poor" refers to individuals and/or families whose income falls below the federal poverty line. In 2011, this equaled an income of \$22,350 or less for a family of four. The term "low-income" refers to individuals and/or families whose income falls below two times the federal poverty line. In 2011, this equaled an income of \$44,700 or less for a family of four (U.S. DHHS, 2011). In this study, poor and low income will be used interchangeably.

Coley & Chase-Lansdale, 2004). For children growing up in and close to the poverty line, the effects appear to be greater (Magnuson, Ruhm, & Waldfogel, 2007; Votruba-Drzal, et al., 2004). There is also evidence that low-income and poor children who attend high-quality early childhood programs carry some benefits into adulthood (Campbell, Pungello, Miller-Johnson, Burchinal & Ramey, 2001; Vandell, et al., 2010).

Young children spend an increasing amount of time in out-of-home care arrangements as more mothers are in the work force than ever before (U.S. Department of Labor, 2009). For low-income parents, this is especially true since the passage of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA, Pub .L. 104-193, 110 Stat, commonly known as welfare reform), in 1996 which stipulated that families could only receive cash assistance for a limited time, and parents had to engage in work, training or educational activities to qualify for aid. Child-care subsidies were expanded at this time to help low-income families pay for child care (Office of Child Care, 2011; CCDF, 45 CFR Parts 98 and 99). Although subsidies were developed as a work support for parents, families who use child-care subsidies generally purchase higher quality and more formal care and thus, an un-intended positive consequence of subsidies maybe that the program is related to children's academic and social development (Ryan, Johnson, Rigby & Brooks-Gunn, 2011). However, there is limited research evaluating how subsidies are related to children's academic skills and social development and further research is essential to understand this relationship (Brooks, 2002; Herbst & Tekin, 2010a; Ryan, et al., 2011).

Even though child care may have an important influence on young children's development, maternal factors are still the strongest in predicting child developmental

outcomes (Chazan-Cohen, et al., 2009; McLoyd, 1998; Peisner-Feinberg, et al., 2001). For example, mothers who report high levels of stress and more depressive symptoms have children who exhibit more behavioral problems and lower vocabulary skills (Chazan-Cohen, et al., 2009). However, mothers' perception of social support and feelings of mastery as a parent can moderate the influence of stress and depression in relation to children's behavior outcomes and mother-child interactions (Farmer & Lee, 2011; Lee, Lee & August, 2011). Mothers' feeling of control over their lives may also mediate the relationship between stress and reports of maternal abuse and neglect (Guterman, Lee, Taylor & Rathouz, 2009). Therefore, although child care can be an important influence of children's academic and social development, mothers' well-being (such as stress and social support) are essential to consider in any examination of young children, but especially in a low income sample in which mother well-being may be low (Keating-Lefler, Hudson, Campbell-Grossman, Fleck, & Westfall, 2004).

There also is reason to believe that child-care subsidies may be related to mother well-being, and through an interaction, these feelings may influence children's development. Child-care subsidies may reduce maternal stress in that the program provides increased financial resources for families. However, research on this relationship is unclear. Herbst and Tekin (2012) found that mothers using subsidies report lower overall health, and higher rates of anxiety, depression and stress compared to a similar low-income sample. Although not examined in this study, the authors suggest that the negative child outcomes observed in children in families using subsidies in other studies may be a result of compromised mother well-being and not subsidy-use. However, social support, another aspect of well-being, may increase as families use

subsidies if they receive social support from their child-care provider (Bromer, & Henly, 2009; Kossek, Pichler, Meece & Barratt, 2008). Clearly the relationships between subsidy-use, maternal well-being and children's academic and social development are complicated. More research is needed to fully understand how these factors are related.

### **Goals of the Current Study**

With over five billion dollars appropriated for CCDF each year, understanding how subsidies are related to children and families is essential (Office of Child Care, 2011). Little research has examined how child-care subsidies are related to mothers' well-being and if subsidies are related to children's academic and social development through mothers' well-being (Baker, Gruber & Mulligan, 2008). The goal of my dissertation was to examine how families' use of subsidies and mother well-being was related to children's pre-academic skills and social development when they were about three years old. I also examined how the use of subsidies and type and quality of child care that families purchase was related to children's developmental outcomes. The extent to which state policy differences in CCDF implementation was related to these relationships was also explored.

### **Overview of Literature**

In 1996, Welfare Reform was signed into law in the United States. This legislation not only drastically modified the cash assistance program in terms of length of service, it also required that families receiving aid were required to engage in work, training or educational activities in order to continue to qualify for assistance. Therefore, not only did families who were previously on welfare lose benefits and begin working, mothers currently receiving assistance who had not been in the workforce also began

working or participating in other approved activities; all of these families now required child care (PRWORA, Pub. L. 104-193, 110 Stat). The Child Care and Development Fund (CCDF, 45 CFR Parts 98 and 99), which supports child-care subsidies, was expanded to help families afford care during this time. Consequently, the focus of the CCDF program is on assisting parents' ability to work, not on the quality of child care or children's developmental outcomes (Fundamentals of CCDF Administration, 2010).

Federal CCDF legislation requires that at least four percent of overall program funds should be used to promote initiatives to increase child-care quality (U.S. DHHS, ACF, 2010). States have discretion in how these funds are used; some examples of how states spend this money include quality improvement efforts and parent education about the importance of child-care quality (Fundamentals of CCDF Administration, 2010). Extant research supports the connection between subsidy-use and choice of higher-quality child-care programs as compared to those who are eligible but do not use subsidies, which suggests that subsidies may promote quality in the care parents purchase (Crosby, Gennetian & Huston, 2005; Bacharach & Baumeister, 2003; Ryan, et al., 2011). It is unclear whether the quality initiatives are behind this association, but the relationship is important.

Despite the potential for child-care subsidies to help low-income families, nationally few eligible families use them (Giannarelli, et al., 2003; Kinukawa, Guzman, & Lippman, 2004). In order to understand the potential relationship between child-care subsidies and children and families, it is important to know that: (1) not all eligible families want to use subsidies, and (2) there do appear to be some barriers in using this social service (Washington & Reed, 2008; Yoches & Klein, 2011). Therefore, all

conclusions about the relationship between subsidies and mother and child outcomes have to be made with caution. The differences in maternal well-being, child care type and quality and children's academic and social development between children and families that exist may reflect characteristics of the parents who decide to use subsidies, as well as those who are able to navigate the system successfully.

A further factor that affects subsidy-use relates to child care availability. Not all child care programs accept subsidies, and those that do may limit the number of subsidy slots (Washington & Reed, 2008). If a parent wants to use a particular child-care program that either does not accept subsidies or lacks subsidy spots, this parent may decide to enroll their child in the program, but do so without the assistance of the subsidies. Similarly, families may qualify for and obtain subsidies, but be unable to find any program that accepts them. These factors are also important to note, since eligible receivers and non-receivers differ on key conditions and those who do not utilize subsidies may not use them because of the child care market in their neighborhood.

Families who use subsidies may also differ on certain psychological factors, such as stress and mental health, and these differences may contribute to the type and quality of the care that families use as well as their child's academic and social development (Lowe & Weisner, 2004). A study investigating subsidized child-care in Canada found a negative relationship between the implementation of a subsidy program and maternal mental health, specifically depression and stress, which increased with subsidy-use. The authors speculated that increased demands for maternal employment may be behind these trends, but other possibilities also exist (Baker, et al., 2008). However, it may also be possible that the use of subsidies has a positive impact on maternal stress, given the

increase in financial stability. Subsequently subsidies may influence children through their relation to parent well-being. Levels of family stress may also affect how mothers interact with and rear their children (Conger & Donnellan, 2007). Therefore, investigating the differences between mothers on these factors is essential.

Moreover, other variables related to mother well-being such as social support may influence use of child-care subsidies. Low-income families who have more social support tend to experience less stress (Greenfield, 2011). Interestingly, the net result may be that those families do not use subsidies because they have assistance (child care or financial) from others (Hirshberg, Huang & Fuller, 2005; Shlay, Weinraub & Harmon., 2010). Conversely, families using subsidies may gain an increased sense of social support from the subsidies and their child-care providers (Shlay, et al., 2010). These feelings may lessen mothers' levels of stress as well. However, it is unclear what these factors of well-being mean for children's development. Specifically, since families who use subsidies also purchase more formal and higher quality care (Crosby, et al., 2005; Bacharach & Baumeister, 2003; Ryan, et al., 2011), it is unclear whether the quality of the care or maternal well-being is behind increased academic and social outcomes in children. These connections have not been examined and may represent an opportunity for interventions to educate mothers about high-quality child-care.

Finally, state-level regulations of the federal subsidy program vary across states. While certain criteria are federalized, states retain administrative control over the program, including certain eligibility components and other key conditions (see Chapter 2 for a more in-depth discussion of the CCDF program). There have been analyses of state level policy differences (Grobe, Weber, & Davis, 2008), but no direct comparison of

child developmental outcomes or mother well-being measures across state policies has been conducted. Studies examining subsidy-use and children's academic and social developmental outcomes usually control for state policy differences without state-level policy comparisons (e.g., Herbst & Tekin, 2010a). For example, states set reimbursement rates for child-care providers and the copayment rates for families. The reimbursement rate stipulates how much the child-care subsidy will be based on type of care and age of the child covered by the subsidy. State agencies conduct market surveys to determine the rate of care arrangements based on current market costs in the locality where care is provided. Copayment rates are based on income, age of children and family size and recommended to be no more than ten percent of a family's income (Fundamentals of CCDF Administration, 2010).

Differences in policies may dictate whether families will use subsidies (Herbst, 2008a; Joo, 2008; Pearlmutter & Bartle, 2003). For example, parents may not apply for or use subsidies if the reimbursement rate is low and the co-payment that parents must pay is high. Further, states differ on income eligibility requirements. Although federal guidelines recommend that to qualify for subsidies a family's income must not exceed 85% of the state's median household income (SMI); states vary widely on who qualifies for subsidies. Some states are only able to fund families on or transitioning off of temporary assistance for needy families (TANF), while other states are able to fund other low-income families up to 85% SMI (Minton, et al., 2011). These differences in policies are complex and comparing all subsidy eligible families without considering these differences would lead to an incomplete picture of the subsidy program and its relationship to children and families.

## **Statement of Problem and Research Questions**

In my dissertation, I explored the differences between eligible families who use subsidies and those who do not based on measures of mothers' well-being, child-care type and quality, and children's pre-academic skills and social development. This was accomplished in several ways. First, a sample of child-care subsidy eligible families was created by using geographic residence information about families and state rules related to income and work hour eligibility for child-care subsidies. Second, families eligible for subsidies were compared on factors of mother well-being, child-care type and quality, and child pre-academic skills and social development whether or not they used subsidies. Third, families eligible for subsidies were compared on the extent to which using subsidies differs in the relationship between mother well-being and child-care type and quality on children's academic and social development. Fourth, these relationships were compared across states to evaluate the extent to which differential policy contexts relate to the relationships between subsidy-use, maternal well-being, child care and children's academic and social development.

Data were analyzed from the Three-Year In-Home wave of the Fragile Families and Child Well-Being Study, a large-scale longitudinal study targeting at-risk families in large U.S. cities with children born in 1998 and 1999. About 42% of the families in the original sample were classified under the poverty line at the Core Three-Year wave, with another 25% of the families in the sample under 200% of the poverty line. Data were used from the Three-Year In-Home and the Three-Year Child-Care Provider waves, which occurred in 2001, 2002 and 2003. The two final analytic samples in this study were more disadvantaged than the larger sample just described. A more specific sample

description is presented in Chapter 4. The specific research questions that were examined are:

**Research Question 1:** In families eligible for child-care subsidies (FES), do mothers who use subsidies differ on measures of well-being, do children in families using subsidies differ on vocabulary scores and reported behavior problems and do families who use subsidies differ on the type and quality of care they purchase compared to mothers, children and families not using subsidies?

**Research Question 2:** Does well-being of mothers in FES predict children's academic and social development differently whether or not their families use subsidies?

**Research Question 3:** Does the type and quality of child care attended by children in FES predict children's academic and social development differently whether or not their families use subsidies?

**Research Question 4:** Does the joint influence of mother well-being, type and quality of child care attended by children in FES predict children's academic and social development differently whether or not their families use subsidies?

**Research Question 5:** Do differences in state policies about subsidies predict mother well-being, child development, and type and quality of care differently in FES?

### **Definition of Terms**

*Child-Care Subsidies* represents the vouchers/subsidies that families receive through the Child Care and Development Fund (CCDF) program. Subsidies are used to pay for all or part of child care for children from birth through age 13. States set income requirements for eligibility, but federal legislation recommends that families who receive subsidies should not have incomes above 85% the state's median income (SMI) for

household size. States also set reimbursement rates for providers and copayment rates for families. States also decide how to spend at least 4% of overall CCDF funds on quality improvement initiatives. States may vary on other policy considerations, including who constitutes a member of the family, what is counted as income, and how many hours parents must work to be eligible for subsidies among other factors.

*Families Eligible for Subsidies* describes families who are eligible for subsidies based on their yearly income, family size, work status and TANF receipt set by the state they live in. For families to be eligible for subsidies, parents must be working, participating in training or educational programs. For the purposes of this study, the only variables that were used to determine eligibility were income, family size, mother's work participation hours (if she is married/cohabiting where applicable), and TANF receipt (where applicable; see Appendix B for lists of states in the sample and eligibility requirements).

*Mother Well-Being* is defined in this study by several variables, including self-efficacy, social support, stress, social cohesion, social control, mastery and clinical measures of depression and anxiety. Mother well-being has consistently been linked to young children's development. Mothers with higher levels of well-being (e.g., those who experience less stress, less depression) have children with more positive developmental outcomes compared to mothers with lower overall well-being (Chazan-Cohen, et al., 2009; Kneipp, et al., 2007; Lee, et al, 2011). High-well-being in this study was defined as those mothers reporting high self-efficacy, social support, social cohesion, social control and mastery, and low levels of stress, depression and anxiety.

*Child-Care Quality* has been defined by researchers in terms of process and structural characteristics. Process indicators refer to global measures of the child-care setting that include health and safety conditions, child-caregiver interaction and materials for children within the setting. It also includes caregiver sensitivity. Structural indicators of quality include the activities and experiences children have during the day. This includes group size and caregiver education and training, in addition to the activities provided to children. For the purposes of this study, high-quality child-care involves settings with appropriate space, display, and toys and materials for children. High-quality settings also have teachers who engage in sensitive caregiving and provide learning opportunities for children, as well as provisions for parents and professional development for staff. Low-quality care does not have the aspects just described.

*Informal Care* was defined in this study as care not taking place in a formal child-care center or preschool. This includes home-based care which represents a child-care program run out of someone's place of residence and serving children who are not related to the caregiver. Home-based care may have a formal program, with a schedule and is sometimes licensed (but not always). Kin and kith care, another informal care arrangement, was defined as care provided by friends or family in an informal setting, and one that is less formal than a home-based program. This care may take place in the child's home or in the home of the caregiver.

*Child Development* is defined in my dissertation in terms of pre-academic skills and social development. Specifically children's pre-academic skills was evaluated through children's vocabulary and their social development was evaluated through parent report of behavior problems.

*State Subsidy Policies* is defined as the laws that regulate the eligibility of families and policies for providers of the child-care subsidy program in each state. For example, each state sets income requirements to determine family eligibility. These requirements are different across states. Strict subsidy policies are defined as those that serve few families and those that are most in need. For example, states with “strict” policies are those with long waiting lists, those that set income requirements very low (below the 85% SMI suggested by the federal government) and those that require parents to work many hours to obtain assistance. “Less Strict” policies are those that serve more families, including states with small or no waiting lists, those with high income cut-offs (close to the 85% SMI) and those that do not require parents to work many hours to become eligible for assistance.

*Poverty* refers to individuals and/or families whose income falls below the federal poverty line (FPL). In 2011, this equaled an income of \$22,350 or less for a family of four. The term “low-income” refers to individuals and/or families whose income falls below two times the federal poverty line. In 2011, this equaled an income of \$44,700 or less for a family of four (US DHHS, 2011). When evaluating poverty in this study, I used the FPL guidelines from the years in which data was collected, 2001, 2002 and 2003.

### **Contributions**

Although there has been much research about child-care subsidies, few of these studies have connected family’s use of subsidies to children's social and academic outcomes (Herbst & Tekin, 2010a). Further, few studies have examined how subsidies are related to mother's well-being (Baker, et al., 2008), and no study has examined how

mother well-being is related to children's academic and social development in subsidy eligible families. Additionally, although some studies have compared state-policy variations in CCDF as it is related to quality (Joo, 2008; Herbst, 2008; Pearlmutter & Bartle, 2003), no study has examined how these variations are related to children's academic and social development and mother well-being. Therefore, my dissertation provides an important contribution to the field of child development, child care and public policy. Findings from this study provide avenues for interventions in improving subsidy policy, improving child-care quality and helping FES function optimally.

### **Limitations**

Although the Fragile Families and Child Well-Being dataset was limited to a sample that best represents subsidy receivers, the sample may not completely account for all possible eligible families. To determine eligibility, income reported by mothers was used to determine eligibility for initial program requirements. States have different income policy guidelines, including what is considered eligible income. For example some states count TANF aid as income, while others do not. Some states count income earned by minors when calculating eligibility, while others do not. With respect to work and training guidelines, states also differ (i.e. full-time versus part-time; Minton, et al., 2011). In addition, states also differ on continuing and initial income eligibility income requirements. Some states have the same income limits for both initial applications and redetermination (re-certification), but others do not (TRIM3, 2011). The only variables that were used to determine eligibility in my dissertation were household income, TANF receipt and hours of employment by mothers, which is consistent with previous research

using these data (Ryan, et al., 2010), and therefore some eligible families may be missed because these variables may not include all eligibility criteria for all states.

The final sample is also not representative of all subsidy eligible families because of the study design. Specifically, since much of the information for this dissertation was taken from the In-Home survey and child-care provider observation and survey, this sample may represent a unique subset of low-income families. Sampling design weights were not created for either of these portions of the study, so inferences about their generalizability to the larger sample and to the population of all low-income or subsidy eligible families in the U.S. cannot be made.

Further, for the In-Home portion of the survey, families allowed researchers to come into their homes and conduct in-depth interviews and assessments (in most cases). For the child-care observation portion of the study, mothers and providers had to give consent for researchers to observe and conduct interviews with providers. It is possible that the families who agreed to these portions of the survey represented a different subset of families than those who would not grant access, or who would participate in the core survey, which was conducted via telephone. These families may differ on key aspects of mother well-being. To understand these differences, comparisons across the entire sample and these subsamples were performed to identify differences between the families in this portion of the survey and what these differences suggest.

Another limitation of this study is that the data capture only one moment in time. Often families use subsidies and then stop, either because their eligibility changes, their child-care provider changes, or they have difficulties with the redetermination process (Basta, 2007; Chaudry, 2004; Lowe & Weisner, 2004; Pearlmutter & Bartle, 2003;

Washington & Reed, 2008). Parents may begin using subsidies again or find a way to pay for care without the assistance of subsidies. Therefore, in this study, the entire story of subsidy-use is not told. Although information about subsidy-use from the 1-Year Core wave was used as a control variable, this does not explain parents' experiences with subsidies in the time between these data collection periods (families usually have to re-certify every six months to a year to keep their eligibility current). This may provide an incomplete picture of the subsidy program and its influence on children and families.

A recent set of research briefs also highlights the potential difficulties using the Fragile Families and Child Well-Being Study to examine research questions surrounding subsidy-use. In addition to the possible inaccuracy of mother report of subsidy-use, mothers were only asked about subsidies for their child's primary child care arrangement. Families could have received subsidies for other arrangements, which is not captured in this questions (Ha & Johnson, 2012; Johnson & Herbst, 2012).

An added limitation to any analyses using secondary data is the measures that were chosen to be used by the study designers. Although all of the measures that I chose to use are commonly used in early childhood research, there have been some criticisms of some of the measures recently, specifically the ECERS-R (Gordon, Fujimoto, Kaestner, Korenman & Abner, 2012; limitations described further in Chapter 3). However, when using secondary data analysis, one does not have control over the choice of measures used in the study. Care has been taken for my dissertation to validate all of the measures that I chose to use and where applicable I chose measure with limited missing data, if another option existed. Another limitation to this study is that although structural equation modeling was used and subsumes a causal inference in the model, adequate

model fit suggests that this model is one possible relationship that may exist between the variables of interest. Causal inference is not supported in this study.

Finally, I only examined child-care subsidy-use. There are other early childhood assistance programs (such as Early Head Start and Head Start, Public Prekindergarten) that are available for families, and that might represent influences on both children's developmental outcomes and mother well-being but are not accounted for in this study. For example, in a program such as Head Start, where the focus is codified with a set of standards related to development and well-being, there may be more of an influence on child outcomes, such as school readiness than when only examining the subsidy program. Further, programs such as Head Start and Public Prekindergarten are free, where subsidies may incur costs to parents depending on if the amount the subsidy covers all of the costs of child care; different parents may choose different kinds of assistance that are less costly if available to them.

### **Conclusions**

This study is an important contribution to the intersections of developmental science and public policy. Researchers have yet to make the connection between mother well-being and child developmental outcomes and no research has examined whether different state-level policies are related to these factors (Herbst & Tekin, 2010a). Over five billion dollars were spent on CCDF activities in 2011, representing a large portion of the overall funds for early childhood assistance programs (Office of Child Care, 2011). For this reason alone, it is important to understand the influence that this support has on children and their families for understanding possible developmental outcomes. My dissertation is a first step in answering some of these questions.

## **Chapter 2: Literature Review**

### **Introduction**

Young children spend a significant amount of time in out-of-home care arrangements as more mothers are in the workforce than ever before (U.S. Department of Labor, 2009; NIH, NICHD, 2006). Recent research supports both the educational and social benefits of high-quality child-care on children's development. Children from low-income households show the greatest improvement in educational and social outcomes when they attend these programs (Vandell, et al., 2010). Child-care subsidies were developed to help low-income working parents afford child care. While federal subsidy guidelines do not mandate or regulate quality of subsidy eligible care, a portion of the overall funds are set aside for quality improvement initiatives (Office of Child Care, 2011). Subsidy-use may therefore increase the likelihood of participation in high-quality care, potentially improving low-income children's readiness for formal school entry.

Although it would be easy to assume that all eligible families would apply for and receive child-care subsidies, the national take-up rate for this program is quite low. In this review I examined the reasons behind families' decisions about using child-care subsidies as well as the implication of the program for mother well-being and children's academic and social development. First, I review the literature on poverty and child-development. However, since this topic is quite large, I briefly cover the main issues and focus the review as it relates to child-care subsidies, including mother psychological factors (well-being) that may influence subsidy take-up. I then discuss the child-care subsidy program, including its history and current regulations. Next, I examine how child-care subsidy-use is related to child-care type and quality and what child-care type and quality mean for

children's academic and social development. Finally, I evaluate how different child-care subsidy policy contexts may influence parents' use of child-care subsidies and what policy variations enhance children's academic and social development. As the research about child-care subsidy-use is so complex, two theoretical models were used as a guide through the literature.

### **Theoretical Framework**

An examination of several developmental theories provides multiple perspectives on the complex processes involved in decision making about child-care subsidies and the impact of subsidy-use on mothers' well-being and children's academic and social development. The literature demonstrates that using child-care subsidies is not a simple decision; rather, it is one based on the interrelationships between contextual, social and individual considerations for each family. Therefore, two developmental theories that take into account the broad cultural and societal influences that might impact families' decision about subsidies were examined as an entry point into the literature. These theories provide an exploratory framework within which to consider how individual family functioning, societal issues and contemporary factors might influence the availability of social services and ultimately families' use of subsidies. Taken together, these theories help explain the complex relationship between families' subsidy-use and the impacts this decision has on children's academic and social development.

#### **Family Stress Model**

The Family Stress Model was first developed by Glen Elder in his examination of children growing up in the Great Depression and facilitates an understanding of family level factors that contribute to subsidy-use. The theory explains how economic hardship

influences child outcomes through parents' feelings of financial burden. Elder explained that economic anxiety often magnifies problems that already exist in families and may increase the level of conflict that families experience. This increase in conflict and exacerbation of problems manifests itself in negative parenting practices which contribute to poor developmental outcomes in children (Elder, 1974). Therefore, economic pressure does not cause poor academic achievement and increase behavior problems in children, but the process through which economic pressure influences the family, including parents' sense of well-being, has a major impact on children's later functioning.

Ge and colleagues (1992) extended this work by emphasizing the importance of relationship quality and social support in moderating the impact of economic pressure. Economic pressure is "perceived" economic pressure by the family and not defined by a poverty standard (Mistry, Lowe, Benner & Chien, 2008). Families that cope well during times of economic strain may not demonstrate deficient parenting practices described by Elder. However, parents who do not have social support or strong relationships within the family will most likely become distressed, psychologically unavailable and be less effective parents (Ge, et al., 1992).

The Family Stress Model takes a micro-level view of the influences of poverty on child development (see Figure 1). As described previously, the theory postulates that financial difficulties adversely impact parents' functioning by increasing stress within the family which subsequently has an impact on parenting (Conger & Donnellan, 2007; Conger, et al., 2002; Ge, et al., 1992). Economic pressure, including the inability to afford necessities or having to cut back on basic needs (i.e. food insecurity) creates an environment wherein parents become emotionally distressed. Mistry and colleagues

(2008) clarifies that this pressure not only reduces the ability to afford “extras” such as dining out or purchasing toys, but it directly affects the affordability of essential “basic” needs such as the ability to afford adequate child care. Not surprisingly, the stress of economic survival contributes to overall, pervasive distress. This distress affects many aspects of parenting and results in poor academic achievement and behavioral problems in children (Conger & Donnellan, 2007; Conger, et al., 2002).

The Family Stress Model also explains how economic pressure may increase the impact of parents’ existing substance abuse problems or symptoms of psychological illness, such as depression, which is one facet of well-being (Magnuson & Duncan, 2002). For example, parents who are depressed will not only be less effective parents within the home, they may also be unable to obtain appropriate resources for their children when needed, such as child-care subsidies.

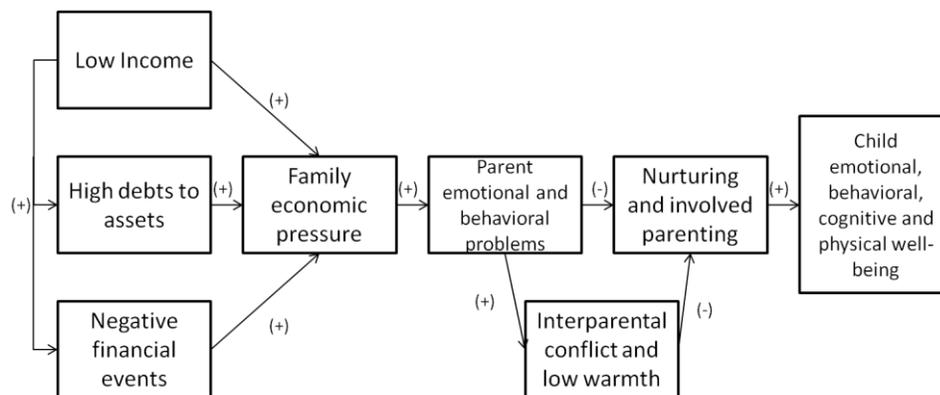


Figure 1. Family Stress Model (Conger & Donnellan 2007).

In specifically looking at child-care subsidies, the Family Stress Model may be used to explain why families may not even apply for subsidies when they qualify. In a study of low-income families’ use of social services, Lowe and Weisner (2004) found that a portion of families who are eligible for subsidies did not even attempt to apply for aid because their family lives were too chaotic. These families were often battling

substance abuse, depression or violence within the home, and did not have the ability to find appropriate and adequate child care for their children, let alone the ability to consider child-care subsidies (Conger & Conger, 2008; Lowe & Weisner, 2004).

### **Ecological Systems Theory**

The Ecological Systems Theory is also useful in understanding the relationship between parents' use of child-care subsidies, their well-being and subsequent child development. Urie Bronfenbrenner developed this theory based on years of research in countries around the world. In his work, he came to understand that human development is influenced by many systems, both proximal and distal. He described the image of a nesting Russian doll to illustrate the way that different ecological systems surround the developing person and influence his/her development in multiple ways (Bronfenbrenner, 1979).

According to Bronfenbrenner (1979), ecological levels that influence development are interrelated, ranging from the immediate environment (such as the family) to the culture and generation within which the child is nested (Bronfenbrenner, 1979, see Figure 2). The innermost level in the model is the microsystem. This system encompasses the immediate environment that a developing person experiences at a given time. Individuals have contact with several microsystems throughout their development, such as their family, child care, and neighborhood. The next level is the mesosystem, which consists of the interaction between two or more microsystems. The mesosystem might be the relationship parents have with the child-care setting or the availability of child care options in their neighborhood. For example, parents may live in a rural

community, with only one unsatisfactory child-care option. Therefore the mesosystem may dictate the choice a parent must make about care (Bronfenbrenner, 1979).

Surrounding the mesosystem is what Bronfenbrenner calls the exosystem. This level includes those environments that do not directly include the individual, but influence his or her development nonetheless (Bronfenbrenner, 1979). The exosystem would include child-care subsidy policies and maternal employment factors such as hours or salary. Although these factors may have an impact on children's development, they are not direct influences. For example, if a parent works non-standard hours (i.e. night shift), there may be limited child care options. Additionally, the rules and requirements of a particular state's child-care subsidy laws may influence the extent to which families even consider using subsidies. For example, if a state does not fund subsidies for informal care (i.e. a non-family member in one's own home), families might not apply for subsidies if they prefer this type of care.

The next level in the Ecological Systems Theory is the macrosystem, which accounts for the culture, values and customs within a society. It also accounts for federal laws and regulations that represent values of the society (Bronfenbrenner, 1979). This level takes into consideration the funding priorities for child-care subsidies in the U.S., since the decision to fund subsidies represents the values of the country to support low-income families. However, the macrosystem also represents the underlying premise of the program as a work support for parents transitioning off welfare and therefore funding supports this goal and less so child development (i.e. academic preparedness and social functioning) or the quality of child-care settings.

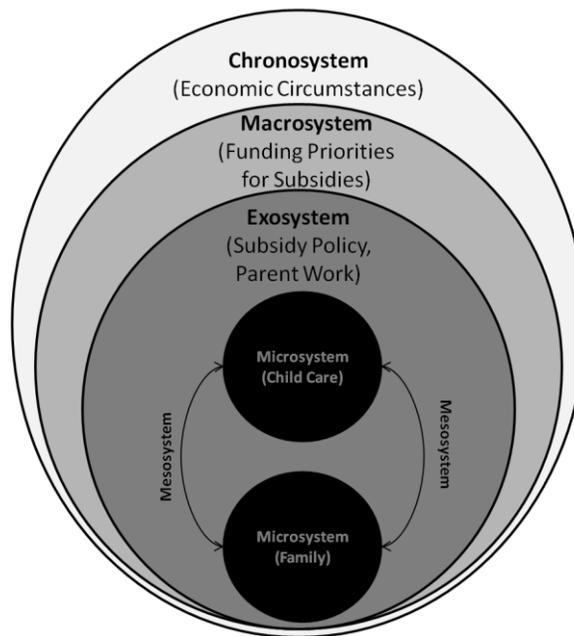


Figure 2. Ecological Systems Theory (Bronfenbrenner, 1979<sup>3</sup>)

Finally, the chronosystem accounts for the historical context that exists during a person’s development (Bronfenbrenner, 1979). For example, current economic challenges directly impact funding levels for social services. In addition to lower funding levels for programs in recent years, more families may need help during tough economic times. Conversely, many families have had to remove their children from child care due to job loss. Current events, such as these examples, are important to consider when understanding how social services may impact the lives of children and families. The Ecological Systems Theory provides a useful perspective to consider when examining this research, since it accounts for both micro- and macro-level influences in the lives of children and their families.

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<sup>3</sup> Bolded aspects of the model represent the model that Bronfenbrenner (1979) designed. Author added examples relevant to current review.

## **Integration of Frameworks**

Taken together, these theories account for the broad societal and cultural influences that families face, as well as family-level processes that are related to use of subsidies. As will be discussed throughout this chapter, there are many reasons that families choose to use child-care subsidies, and no one theory can explain all of them. These two theories guided this review and dissertation research. They were used as a framework to explain the many influences of subsidy-use and the implications for parent well-being, school readiness, and social development.

The Family Stress Model accounts for family-level variables (particularly parent well-being) that influence subsidy-use and what the implications of well-being are for school-readiness and social development in young children. Ecological Systems Theory provides an explanation for the interaction between environments that influence this decision and contemporary factors that may determine funding or policies related to subsidies.

In assessing the relationship between use of subsidies, parent well-being, academic achievement and social development, preferences based on culture, race/ethnicity, and family functioning may be related to subsidy-use. The decision about subsidies may not appear to have a bearing on child development; however use of child-care subsidies has the potential to affect the lives of children in that using subsidies generally influences the type and quality of care that parents purchase (Huston, et al., 2001; Michalopoulos, Lundquist & Castells, 2010). Further, use of subsidies may influence children through how the program influences their parents' feelings of well-being (Herbst & Tekin, 2012). Young children spend a large portion of their time in

child care and this environment has an effect on child development (Brooks-Gunn & Duncan, 1997; McCartney, et al., 2007, NIH, NICHD, 2006). High-quality child-care is beneficial for children’s academic and socioemotional functioning and is especially beneficial for low-income children (Campbell, et al., 2001; Peisner-Feinberg, et. al, 2001). Therefore, the decision about subsidy-use has the potential to impact children for a long time.

A preliminary conceptual model (Figure 3) has been created to illustrate how I attempted to understand subsidy-use through the integration of important theoretical connections between both theories. The theories were combined to explain the immediate, cultural and generational influences on child-care subsidies and how this is related to children’s behavioral and cognitive development.

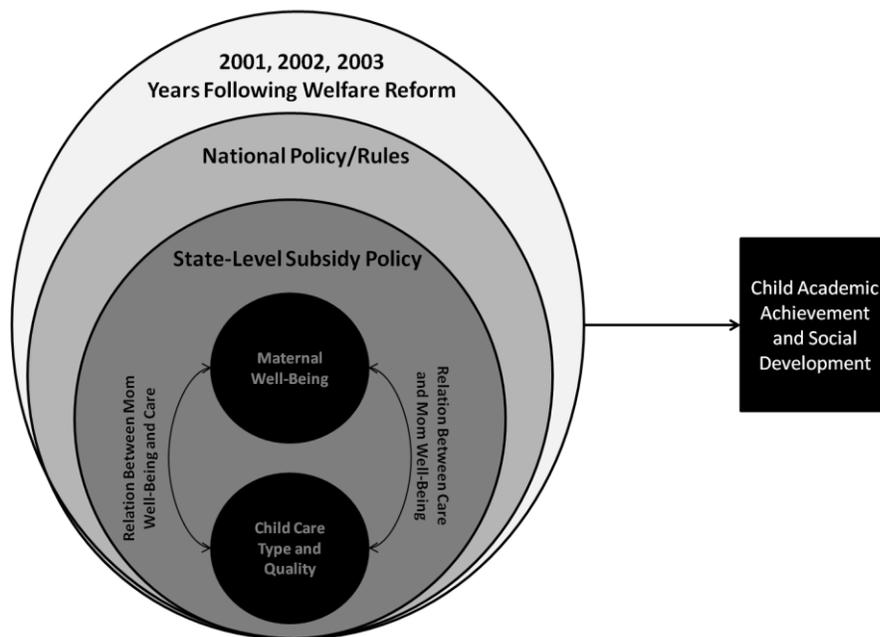


Figure 3. Conceptual Model for Dissertation

## **Child-Care Subsidies Overview**

The Child Care and Development Block Grant (CCDBG) is a federal program established to assist low-income families pay for child care. The CCDBG Act (42 USC 9858) was passed in 1990, but amended in 1998 based on welfare reform (CFR Parts 98 and 99). The legislation empowers states with administrative oversight for family eligibility and management of child-care subsidies. States are required to set basic standards for health, safety and licensing regulations and actively promote parent choice in child-care arrangements. Although specific quality standards are not required, basic standards are set to help raise the overall quality of available care (ACF, 2011).

### **Welfare Reform**

The Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) was passed into law in 1996 (Public Law 104-193) and became effective on July 1, 1997. Stemming from this law, Temporary Assistance for Needy Families (TANF) subsumed the previous federal cash assistance program, Aid to Families with Dependent Children (AFDC), the Job Opportunities and Basic Skills Training (JOBS) program and the Emergency Assistance Program (EA). As opposed to AFDC, JOBS and EA, TANF is not an entitlement program. The goals of TANF are to help families care for their children in their homes, reduce parents' dependence on cash assistance, prevent out of marriage births and encourage marriage in families with children. TANF is funded by states and tribes through a federal block grant (ACF, n.d).

Between 1997 (when TANF went into effect) and 2003, about \$16.38 billion were allocated for TANF. States have discretion about how to spend their TANF funds, and are allowed flexibility as long as the money is spent to promote the goals of TANF

(described in the previous paragraph). Although states retain control over how the money is spent, there are certain federal guidelines: (1) states cannot provide assistance in most cases to families who have received funds for more than 60 months total (although individual state limits can be shorter); (2) unmarried teen parents who are funded through TANF must remain in school and live at home with their parents; (3) funds cannot be provided to any individual who has been convicted of a drug-related felony; and (4) mothers seeking TANF must abide by child support enforcement efforts. Finally, several federal work requirements for parents exist. Parents receiving assistance must work, participate in job training/education or community service to receive benefits, unless the state exempts parents with infants under one or parents with children under six when no child-care is available (ACF, n.d.b).

### **Child Care and Development Fund**

The Child Care and Development Fund (CCDF, 45 CFR Parts 98 and 99) was established in 1996 as an expansion to CCDBG in conjunction with welfare reform. The fund was created to help families transitioning off welfare obtain affordable child care, since PRWORA required parents to participate in work or training activities in order to receive aid. Although the fund was created to support the large number of women entering the workforce who had previously been on welfare, CCDF also supports low-income working families that have never been on welfare (ACF, 2011).

CCDF provides money to states to help low-income families pay for child care in the form of vouchers or subsidies paid directly to child-care providers. Families who use child-care subsidies choose their own care arrangements, with few state-mandated requirements. States are allowed to coordinate their child-care subsidy program with

local Head Start, public pre-kindergarten and other early childhood programs. Money set aside for TANF may also be used to fund CCDF activities (Office of Child Care, 2011).

Although administered by states, the federal government sets basic requirements including the age of children in care (See Table 1 for complete list of federal requirements). Families are only eligible for subsidies if their children are under 13 (19 if they have disabilities). Families whose income is less than 85 percent of the state's median income (SMI) for household size and whose parents are either working or in job training are in general eligible for subsidies. Further guidelines dictate who the states must prioritize in serving as well as what types of providers are eligible to provide care for children receiving subsidies (see Table 1 for a complete list of federal guidelines). Children may also be eligible for aid if they are in the care of child protective services.

Beyond these federal guidelines, states set provider payment rates, more specific eligibility requirements, co-payment rates, how subsidies are administered, quality improvement initiatives and more specific health and safety standards for child-care settings (ACF, 2011). States also decide whether or not they will serve all eligible families, or if they will implement a waiting list since there is often greater need than funds available for this program. Finally, states also determine the length subsidies are approved for (typically 3 to 6 months) and what is required for redetermination/recertification (ACF, 2011).

Table 1.

*Federal Legislation CCDF Policy*

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CCDF State Plan	Each state must submit a CCDF state plan to the Administration of Children and Families every 2 years
Eligible Families	Parents must be working, participating in education or training and children in child protective service. States cannot serve families with incomes above 85% State Median Income for size
Eligible Children	States may serve children under 13 who are citizens and under 19 who are disabled
Eligible Providers	Center-Based providers; Home-Based providers; Family provider; In-Home provider or other providers that are licensed or regulated under state law. Providers must be over 18 and may be related to the child but not be their parent (i.e. grandparent)
Priority	Priority must be given to children with special needs and those from “very low-income” families; States define what this means
Parental Choice	Parents may choose any child-care provider (that is eligible)
Consumer Education	States must provide consumer education that will promote “informed” care choices
Payment	“Certificates” (subsidies, vouchers) are used as payment
Provider Rates	States must prove that provider rates (amount the subsidy pays) are similar to other care options in the state for families not eligible for service
Family Cost Sharing	Families may be asked to pay a portion of the cost of care on a sliding fee basis depending on their income and family size
Limit on Other Costs	States cannot spend more than 5% of funds on administration costs
Quality	States must spend at least 4% of CCDF funds on quality initiatives. Appropriate activities include: consumer education for parents and public, activities that increase parental choice, activities designed to improve quality and availability of child care, funds for child care resource and referral and school-aged child care activities, and activities that improve the quality of infant and toddler care.
Licensing	States must have state child care licensing programs
Health and Safety	States must have health and safety requirements for settings receiving CCDF funds

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*Information for this table retrieved from: Fundamentals of CCDF Administration (2011)*

Despite these federal guidelines, states vary widely on the requirements for family eligibility. For example, in 2001, of the states included in the Fragile Families and Child Well-Being original sampling frame, only one state provided subsidies to families whose income was 85% SMI. Illinois funded families at the lowest level, with an income limit of 39% SMI in 2001 (U.S. Department of Health and Human Services, 2001). Therefore, even though these federal guidelines exist, the families and children who are served may differ on essential characteristics across states. See Table B1 for a list of different state subsidy income eligibility policies in the states included in the Fragile Families and Well-Being Dataset.

Additionally, states are required to conduct market rate surveys every other year to determine the current market rate for child-care in their locality. This survey helps them to determine how much they will reimburse different child-care arrangement types (Fundamentals of CCDF Administration, 2011). Therefore, reimbursement rates for providers vary widely at the state level. For example, the reimbursement rate for infants in full-time care in Maryland was \$771 a month in 2006, while the same care in Oregon was \$525 a month. While these rates do account for cost of living differences and what the market rate for child care is in each area, it may also represent state-level regulations that dictate staff education, facility or training requirements that would affect the cost of care. Further, these rates are determined by locality and there are different criteria used in each state to determine the locality rate. For example, in California rates are determined by zip codes, while in South Dakota, rates are determined by county (US DHHS, 2006).

Finally, as mentioned previously, a minimum of four percent of the CCDF budget must be used for quality initiatives. States have discretion for how they spend this money, and what strategies may be employed to improve quality, with some guidance from the federal government. Many states use the quality funds to improve care for infant and toddlers. This includes resources for caregivers' education, helping infant and toddler programs improve structural quality or raising reimbursement rates for infant and toddler programs. States also may use this money for resource and referral activities, including consumer education programs for parents. Most states also use some money to provide grants or loans to child-care settings in order to help them improve their quality and compliance with state regulations and standards. Finally, many states use this funding to help improve the working conditions of early care and education staff, including professional development or increasing compensation for child-care workers (Fundamentals of CCDF Administration, 2011).

### **Poverty**

Given that child-care subsidies are one of a number of social service programs for low-income families, it is important to discuss poverty and its impact on parents (mostly mothers) and children. Additionally, since research supports the benefits of high-quality child care on children's academic and social development for children in poverty, it is important to review the detrimental effects of growing up under these circumstances (Burchinal, et al., 2000; Dearing, McCartney & Taylor, 2009; Linver, et al., 2002). Extant research has supported the negative relationship between poverty, aspects of mother well-being (Chazan-Cohen, et al., 2009) and children's development in a variety of domains, including brain development (Noble, et al., 2005; Noble, McCandliss, &

Farah, 2007), cognitive functioning (Evans & Schamberg, 2009), and health (Shonkoff, et al., 2009). A complete examination of this research is beyond the scope of this chapter and therefore I will consider only those factors related to child care and child-care subsidy-use.

In general, children growing up in poverty live in homes with fewer educational experiences compared to children not living in poverty. Fewer words are spoken within the household each day and there are fewer educational toys and books available for children (Abner, Bennett, Conley, & Li, 1997; Duncan & Brooks-Gunn, 2000; Duncan, Brooks-Gunn, & Klebanov, 1994; Hart & Risley, 1992; Hart & Risley, 1995; Linver, et al., 2002). However, even after controlling for the richness of one's home environment, living in poverty is still negatively associated with children's academic achievement (Brooks-Gunn, et al., 1996; Linver, et al., 2002). This may stem from other factors associated with poverty that are not explained by the home environment, such as maternal stress or inadequate nutrition (Chazan-Cohen, et al., 2009; Zaslow, et al, 2009). Additionally, parents may be unable to afford to send their young children to enriching high-quality child-care settings (Abner, et al., 1997). Therefore, while growing up in poverty may not directly cause poor academic and social development, it does impact certain factors (such as mother well-being and child care type and quality) which can directly affect children's development.

Living in poverty also seems to influence the type of parenting provided. Mothers are often less responsive, engage in fewer teaching opportunities with their children during the day and are more likely to engage in physical punishment as opposed to inductive reasoning (Bradley, Corwyn, McAdoo & Coll, 2001). Further, children living

in poverty are more likely to live with single-parents. Living in a single parent home is associated with lower academic achievement and more behavior problems. This association may stem from the fact that single parents may have less support at home, or it may be related to an increase in stress that single parents face (Kalil & Ryan, 2010).

Neighborhood composition also influences children's developmental outcomes. Children who live in neighborhoods with a high concentration of poverty have lower IQ scores and more behavior problems than poor children who live with affluent neighbors (Duncan, et al., 1994). This finding might be related to the quality of the schools or other neighborhood factors that influence children's development, specifically stress that may accompany living in an unsafe area.

Despite these environmental factors, parenting practices and family functioning are the strongest predictor of children's development. Waldfogel, Craigie and Brooks-Gunn (2010) suggest that poor parenting practices exhibited in low-income families are explained by few resources, poor maternal mental health, and poor relationship quality. Inadequate resources include both material resources and time. Low-income mothers may often work several jobs or non-traditional hours and may not be able to spend quality time with their children. Additionally, children in single-mother homes may likely have less quality time with their parents simply because there is one less person in the household (Kalil & Ryan, 2010). Further, maternal depression and anxiety are detrimental to children's academic and social development and depression and anxiety are more common in low-income communities (Parke, et al., 2004). Depression may be related to more instability in the home and will negatively impact child development as described in the Family Stress Model previously (Conger & Donnellan, 2007).

Moreover, a recent study also suggests that the increase in general anxiety disorder in mothers, may not be a result of the psychological illness but instead a reaction to living in poverty (Baer, Kim & Wikenfeld, 2012).

Relationship quality describes how parents interact with one another. An increase in relationship discord is related to poor child outcomes (Cummings & Davies, 2002). Finally, Waldfogel and colleagues (2010) suggest that parenting quality, such as sensitivity and responsiveness, are lower in low-income mothers because of the myriad interplay between the factors just described. Since low-income mothers have fewer resources, and more relationship conflict, they may be unable to provide the sensitivity and responsiveness that are necessary for their children's healthy development (Waldfogel, et al., 2010).

### **Poverty and Race/Ethnicity**

Children who are Black or Hispanic are more likely to live in persistent poverty compared to White children (Drake & Rank, 2009; Duncan, et al., 1994). Further, poor Black and Hispanic children are more likely to grow up in neighborhoods with a higher concentration of poverty; Black children are more likely to live in single-female-headed households and have mothers with less education than poor White children. Poor Black mothers also report less social support when compared to poor White mothers (Drake & Rank, 2009; Duncan, et al, 1994). Thus although all children growing up in poverty have difficulties, Black and Hispanic children may be at an added risk since they are more likely to live in persistent poverty and face additional stressors.

## **Maternal Stress**

Although there is little research connecting child-care subsidy-use and maternal stress, research supports the relationship between living in poverty and an increase in maternal stress (Keating-Lefler, et al., 2004; Kneipp, et al., 2007). As previously discussed, low-income families often live in dangerous neighborhoods, experience many stressful life events, and have to develop successful strategies to provide for their families on very little income (Mulia, Schmidt, Bond, Jacobs & Korcha, 2008). Mothers who report more stress have children who exhibit more behavior problems, and perform more poorly on pre-academic assessments of achievement (Church, Jagers, & Taylor, 2012; Teo, Carlson, Mathieu, Egeland & Sroufe, 1999).

Maternal stress may be related to mothers' use of subsidies. Families who experience high levels of stress are less likely to use child-care subsidies (Gibson & Weisner, 2002; Lowe & Weisner, 2004). Conversely, mothers with less stress may be able to choose higher quality child-care for their children (Peyton, Jacobs, O'Brien & Roy, 2001). Maternal stress may therefore be twofold, influencing subsidy-use and the quality of care they choose; a relevant example of the types of relationships illustrated in the Family Stress Model.

**Other well-being factors related to stress.** Maternal stress and depression are particularly related to children's developmental outcomes in low-income families (Kneipp, et al., 2007). As discussed in relation to the Family Stress Model, depressed mothers may be less able to obtain social services that may help their families. While no direct correlation has been established, it is possible that failure to access eligible subsidy

support due to mother mental health problems may be a further contributor to poor academic and socioemotional functioning in children (Kneipp, et al., 2007).

Stress and depression may also manifest itself in the parenting practices. Parke and colleagues (2004) found that not only is economic pressure positively related to maternal depression, but mothers who reported more symptoms of depression engaged in more hostile parenting. These negative practices were also found to be related to children's internalizing and externalizing behavior problems. This study exemplifies how economic stress is related to both psychological illness in mothers and children's behavioral outcomes (Parke, et al., 2004). Additionally, in the Fragile Families and Child Well-Being Study, Cardoso and colleagues (2011) found that maternal depression was a significant predictor of parenting stress.

Raikes and Thompson (2005) examined the extent to which other aspects of well-being predict stress in low-income mothers of children enrolled in Head Start. The results indicate that the impact of poverty on maternal stress could be explained by both maternal self-efficacy and social support. Further, this study demonstrated that mother feelings of self-efficacy appeared to be important factors in reducing stress (Raikes & Thompson, 2005). These feelings might be an important way that low-income mothers are able to cope with the challenges of raising a child while in poverty. Further, these feelings of efficacy might enable mothers to seek out and obtain social services, such as child-care subsidies.

In terms of social service receipt, Heflin and Acevedo (2011) used the Fragile Families and Child Well-Being Study to demonstrate that the mothers' participation in cash assistance (TANF) was negatively related to children's' vocabulary at three and five

years of age. However, maternal stress mediated this relationship. For mothers who received TANF and reported high levels of stress, children had lower vocabulary scores compared to mothers who received TANF and reported low levels of stress (Heflin & Acevedo, 2011). This study raises the question as to why the receipt of social services is related to poor child outcomes, but could also be highlighting the impact of poverty on children's developmental outcomes and not TANF. Further, although this is not a causal relationship, this trend exemplifies the relationship of stress on low-income children's developmental outcomes.

In another sample of low-income women receiving TANF assistance, Mulia and colleagues (2008) demonstrated that stress also increased the likelihood that mothers developed substance abuse problems. Economic stress increased the likelihood of mothers developing alcohol problems with drinking (Mulia, et al., 2008). However, mothers who were better able to manage the stressful life events that accompany living in poverty had children who did better academically and had better behavioral outcomes (Skowron, 2005).

Brown and Lynn (2010) use the term "affective reactivity" to describe the interaction of maternal stress and negative affect. They posit that mothers with high affective reactivity responded to the stressors related to poverty more negatively than those with low affective reactivity. This suggests that personality characteristics may also be associated with response to stress. Further Brown and Lynn (2010) found that social support diminishes the relationship between affective reactivity and stress, suggesting the importance of social support, especially for low-income mothers.

Similarly, Cardoso and colleagues (2011) demonstrated that families with less social support reported higher level of stress.

### **Social Support**

Social support helps to alleviate the stress of parenting with limited resources (Keating-Lefler, et al., 2004). Mothers who have support from others tend to function better and have children with fewer behavioral and academic problems (Skowron, 2005). Mothers who report receiving more social support also report less stressful life events. However, mothers who report giving more social support to others, report more stressful life events (Mulia, et al., 2008). Perhaps these mothers are spreading themselves too thin and therefore experience more stress.

Social support appears to be related to subsidy-use. Shlay et al. (2010) found that families who had economic support from others were less likely to use child-care subsidies. Also, with increasing numbers of adults in the household, which can be a proxy for social support, subsidy-use is lower (Kinukawa et al., 2004). Researchers suggest that the reason families with many adults in the household tend to use less formal child-care arrangements may be because of an increase in social support (Hirshberg, et al., 2005) and this may be related to cultural backgrounds as well. This is one reason that Hispanic families may not use subsidies at the same rate as White and Black families. Greenfield (2011) found that intergenerational co-residence, a proxy for social support, was positively related to mothers' stress in Black mothers, but negatively related to stress in Hispanic mothers. Perhaps a grandparent living with Hispanic families means something different than it does in Black families, and this leads to the interpretation of stress that families feel.

**Other well-being factors related to social support.** Kossek, Pichler, Meece and Barratt (2008) examined mothers' relationships with their children's child care provider as a proxy for support. The authors found that mothers who had better relationships with their child-care providers reported fewer problems at work and fewer depressive symptoms. The authors suggest that this relationship is demonstrative of formal and informal social support. They argue that the social support that caregivers give to the mothers is important and contributes to low-income women's feelings of well-being. In examining the relationship between social support and mothers' feelings about their abilities as a mother, one study found that mothers who felt they were "effective" as parents, also reported high-social support (Woody & Woody, 2007). This suggests that perhaps mothers who feel as though they are effective in their abilities as mothers do not need to seek support from the government in obtaining child-care subsidies or other aid. Other researchers argue that the type of social support may be a more important predictor of these relationships. Manual and colleagues (2012) showed that emotional support provided by family members, neighbors and partners decreased mothers' incidence of depression in the Fragile Families and Child Well-Being Study, but instrumental support (providing money, emergency child care, etc) was not protective against incidence of depression overall. However, the authors also found that instrumental support was protective for mothers against depression in very low-income families who lived in areas of concentrated poverty. Emotional support was less protective in these instances (Manual, Martinson, Bledsoe-Mansori & Bellamy, 2012).

Social support may also be related to subsequent child development outcomes. Lee, Lee and August (2011) investigated relationships between financial strain, social

support, maternal depression and child externalizing behavior problems. They found that social support mediated the relationship between financial strain and depression in predicting children's externalizing behaviors. Further, this relationship varied by severity of aggression and level of academic achievement. For example, for families with children exhibiting the most severe aggression, income more strongly predicted social support than for families with children who exhibited less severe aggression. For families with children with lower academic achievement, the relationship between income strain and social support was significant but this same relationship was not true for families who demonstrated higher academic achievement. This study not only supports the complex relationship between social support and other mother well-being factors, it also suggests that these factors may interact differentially depending on characteristics of children and families (Lee, et al., 2011).

### **Maternal Efficacy**

Self-efficacy is also an important factor of well-being to consider. Maternal efficacy can be loosely defined as mothers feeling that they have the ability to perform their maternal duties effectively (Bandura, 1977). Mothers who believe that they can be successful in their pursuits fight harder to obtain aid than a mother who does not have these beliefs. Additionally, since obtaining child-care subsidies is often difficult (Basta, 2007; Lowe & Weisner, 2004; Washington & Reed, 2008; Yoches & Klein, 2011), the beliefs about efficacy and control may help mothers to navigate the complicated and long application process for subsidies and other social services.

**Other well-being factors related to maternal efficacy.** Maternal efficacy is related to other social and psychological characteristics that have been reviewed thus far.

Maternal stress is negatively correlated with self-efficacy. Mothers with high stress report low-levels of efficacy. Family-level factors are also related to self-efficacy. Mothers with fewer children report more maternal self-efficacy, suggesting that their feelings about their effectiveness is related to their family structure and circumstances (Farkas & Valdes, 2010).

Finally, recent research suggests that there are many factors that influence the longitudinal trajectory of maternal self-efficacy, particularly in low-income families. In one study increases in self-efficacy and decreases in depression were related to a decrease in maternal stress over time. Mothers with high self-efficacy were less likely to experience high levels of stress and were also more likely to report less stress. The authors speculate that mothers with high self-efficacy, and thus feelings of control over their environments, were less likely to experience chronic stress because they felt as if they are able to master the challenges that were presented to them (Chang & Fine, 2007). More research in the area of maternal stress and self-efficacy are needed to understand how they are related to child-care subsidy-use and what psychological and personal characteristics predict mothers' use of social services.

### **Maternal Mastery**

Maternal mastery is another important well-being factor. Maternal mastery may be defined as mothers' feeling that they have control over their lives (Farmer & Lee, 2012). Feelings of mastery also allow mothers to feel as though they can handle situations appropriately and without problems. Although maternal efficacy and mastery are sometimes defined in similar ways, they are two distinct concepts that potentially are impacted by subsidy-use (Hassall, Rose & McDonald, 2005). Further, for low-income

mothers, mastery may be of particular importance since these mothers may have more obstacles and fewer resources than affluent mothers (Raikes & Thompson, 2005).

**Other well-being factors related to maternal mastery.** It appears that stress and mastery are also related. In some research, stress is seen as predicting mastery (i.e. the more stress a mother feels, the fewer feelings of mastery they will have; Hill & Rose, 2009), while other research suggests that mastery may be a predictor of stress (i.e. mothers with less feelings of mastery leads to more stress; Scheel & Reickmann, 1998). Other research suggests that mastery is related to mothers' symptoms of depression. For example, mothers exhibiting symptoms of depression generally have low feelings of mastery (Choi, Stafford, Meininger, Roberts & Smith, 2002).

In one study utilizing the Fragile Families and Child Well-Being Study, the authors found that maternal stress negatively influenced mothers' feelings of mastery, which was negatively related to mothers' symptoms of depression (Farmer & Lee, 2011). In another recent study also using data from the Fragile Families and Child Well-Being Study, the authors found that mastery is not independently related to children's behavior problems; it is related to other aspects of parent well-being, including stress, aggressive parenting and family income (Church, et al., 2012).

### **Empirical Research on Child-Care Subsidies**

#### **Child-Care Subsidy-Use**

Despite the large number of families who are eligible for aid, nationally only about 15% of families who qualify for child-care subsidies use them (Giannarelli, et al., 2003; Kinukawa, et al., 2004). Differences in subsidy-use seem to vary by family-level factors. For example, families living in poverty are much more likely to use child-care

subsidies than families not living in poverty. This makes sense since the program has income requirements for participation. However, other differences not related to income are also evident in examining family participation. African-American families are more likely to use child-care subsidies than either White or Hispanic families, even after controlling for income (Kinukawa, et al., 2004). Although these findings do not explain subsidy-use, they illustrate the important differences that exist between families who choose subsidies and those who do not.

Other demographic differences exist. Non-English speaking immigrant families are less likely to use child-care subsidies compared to non-immigrant, English-speaking families (Grobe, et al., 2008; Hirshberg, et al., 2005; Shlay, et al., 2010). The subsidy process can be very confusing, and parents who do not speak English may find the complexity of the application process daunting. Subsidy offices may not have bilingual staff or translated forms, which creates another barrier for non-English speaking families. Immigrant families may also be afraid to supply information to the government, especially when they may not have entered the country legally (Washington & Reed, 2008; Yoches & Klein, 2011).

Researchers have found that families who use child-care subsidies differ from eligible non-recipients in terms of family structure as well. Single mothers are more likely to use subsidies than either married or cohabitating mothers (Kinukawa et al., 2004). Subsidy recipients also report having fewer adults living in their household, regardless of marital status, discussed with respect to social support in the previous section (Ahn, 2012).

Subsidy recipients are also more likely to live in communities with higher unemployment rates compared to eligible non-receivers (Forry & Hofferth, 2011; Kinukawa, et al., 2004). Mother age has been found to be related to use of subsidies. Older mothers are less likely to use subsidies than younger mothers (Ahn, 2012; Blau & Tekin, 2007; Ha, 2009). Interestingly, more educated mothers with more stable jobs and lives are more likely to use child-care subsidies for a longer period of time (Ha & Meyer, 2010). Although these findings may appear surprising, this relationship may be circular. Mothers who are able to keep their employment over time may be able to keep their subsidies, since one requirement of the program is maternal work. Additionally, mothers who have stable child care may be more able to keep their current employment. Each family must decide whether to use subsidies based on their own culture, family and daily routines, but other factors within the family may explain why certain families are able to keep subsidies while others are not. Eligible families with slightly higher income-to-needs ratios and more education (high school diploma versus none) are more likely to receive subsidies than eligible non-receivers (Blau & Tekin, 2007; Johnson, Martin & Brooks-Gunn, 2011; Johnson, 2010).

Other predictors of families' use of child-care subsidies include the age of the child. Although families may be eligible for subsidies until children are 13 (and 19 if the child has a disability), mothers are less likely to use child-care subsidies as their children age (Meyers, Heinze, & Wolf, 2002). Other assistance programs, such as Head Start or public pre-kindergarten, are available when children are of preschool age and are usually provided at no cost to mothers. It should be noted, however, that only a small percent of these programs are full day and therefore wrap around care may be necessary to

accommodate mother work schedules (U.S. DHHS, ACF, 2010). Entry into formal schooling also reduces mothers' need for assistance since some of the time children would be in care is covered by elementary school (Grobe, et al., 2008).

Using qualitative data from the New Hope anti-poverty study in Milwaukee Wisconsin, Gibson and Weisner (2002) identified four reasons how low-income families choose whether to use child-care subsidies. These reasons include information, stability of home life, cost benefit analyses and fit with family routines. The first reason of why families did not use subsidies involved a lack of information about the program. About one fourth of the mothers in the study reported having a lack of information or misinformation about the subsidy program. Parents did not know that they were eligible for assistance and did not know what was required to obtain the subsidies. They also may have thought (incorrectly) they needed to be receiving TANF benefits to be eligible for child-care subsidies. The second reason family instability, represented fourteen percent of the parents in the sample. These families were eligible for subsidies but had lives that were too unstable to actually apply for the program. This included families in which parents had drug or alcohol problems, those who were involved in the legal system or those who were in physically abusive homes. This also included families in which parents suffered from depression or other mental illnesses (Gibson & Weisner, 2002). These reasons are examples for support of the Family Stress Model described above in explaining subsidy-use (Conger & Donnellan, 2007).

Cost benefit analyses was the third reason revealed in this study for subsidy-use. One third of the parents in the sample actually used the child-care subsidies offered by the New Hope program, but in deciding whether to use them, they weighed the benefits

of the program versus costs to themselves. These families ultimately decided that the benefits to the program were worth the costs associated with applying and re-certifying their families for subsidies. The final reason for subsidy-use in this sample represented one fourth of the parents. These families only used the child-care subsidies if it fit into the daily routines of their family life. Additionally, they used the subsidies if it allowed them to use their preferred type of child care (Gibson & Weisner, 2002). This study was able to demonstrate the complex nature of families' use of child-care subsidies and possible reasons for use. Low-income families are very diverse, and there are many reasons that families decide to use subsidies besides economics (Gibson & Weisner, 2002).

There are many other reasons that families do not use child-care subsidies, but were not highlighted in the study by Gibson and Weisner (2002). These reasons include: difficulties with the application process, lags in subsidy payment to providers; and resistance from providers to accept subsidies (Basta, 2007; Chaudry, 2004; Lowe & Weisner, 2004; Pearlmutter & Bartle, 2003; Washington & Reed, 2008; Yoches & Klein, 2011). Providers may limit the number of families using subsidies in their programs: many families report difficulties finding programs that will accept their subsidy even if the program itself actually accepts child-care subsidies (Washington & Reed, 2008). Other parents report not using child-care subsidies because they do not trust the care of their children to anyone but close family and friends. These parents generally believe that child-care subsidies may not be used in such informal care arrangements (Lowe & Weisner, 2004). Other parents report that the redetermination process, or recertification, is difficult (Scott, London, & Hurts, 2005; Yoches & Klein, 2011). Finally, some parents

describe difficulties with the subsidies in regard to their flexibility when families move, or when parents work status changes (Basta, 2007).

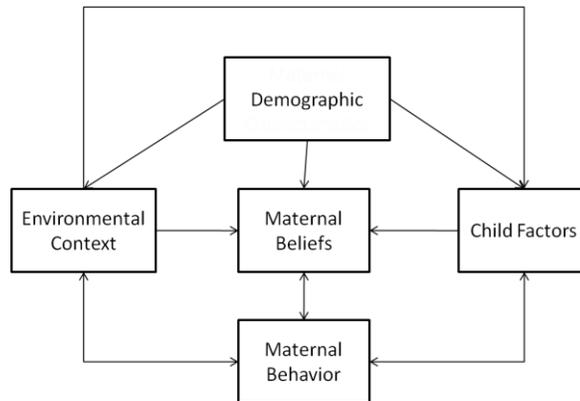
There are also differences between eligible families' use of subsidy based on receipt of other social services. Since child-care subsidies were expanded in the wake of welfare reform and funds are usually targeted for families transitioning from Temporary Assistance for Needy Families (TANF), it is not a surprise that most families receiving funds are current or recent TANF recipients (Meyers, et al., 2002). However, Herbst (2008b) found that families who were forced off of TANF when they reached the time limit for aid report feeling stigmatized by the system and do not pursue other assistance programs (such as child-care subsidies), even though they are eligible. Other parents report confusion in understanding that the subsidy program is separate from TANF; many parents also think (incorrectly) that child-care subsidies are a part of welfare (Basta, 2007).

Shlay et al. (2010) found similar results. The authors established that former TANF families stopped using child-care subsidies once they no longer received aid from TANF. However, by looking more closely at former TANF recipients the authors noticed a trend. Families who no longer received TANF, but received SNAP (Food Stamps) were more likely to use child-care subsidies than those who did not use TANF or SNAP (Shlay, et al., 2010). This suggests that families who participate in other aid programs may be more likely to continue using child-care subsidies after they stop receiving TANF benefits (Herbst, 2008b).

A simple physical factor such as the actual location of the local subsidy office has been found to be related to whether or not families use child-care subsidies. Using a

national sample of children, Herbst and Tekin (2010b) found that as the distance to the local social service office (where child-care subsidies are administered) increases, families subsidy-use decreases. This pattern is more common in rural areas, where public transportation may be less available. However, these results were similar whether or not families actually had to visit the social service agency to obtain subsidies (Herbst & Tekin, 2010b). Other research corroborates this finding (Grobe, et al., 2008).

The amount the subsidy covers has also been found to be related to use. Each state sets reimbursement rates for program participation which might cover all or only a portion of the cost of child care depending on which type of care and which setting a family decides to use. Grobe et al. (2008) found that the larger amount the subsidy provided (i.e. less a family has to pay out of pocket), the more likely mothers were to continue using the child-care subsidy program. The benefits (the amount of child care paid) must be large enough for families to want to use the subsidies. A higher subsidy amount may convince mothers that the program is worth it even if they may not have previously thought about applying. Additionally, there are other costs related to child-care that may not be covered by subsidies and may contribute to use, such as transportation and additional fees. These additional costs may not be present in settings that do not accept child-care subsidies, such as informal family or friend care and may convince mothers not to apply for the program (Lowe & Weisner, 2004).



*Figure 4.* Child Care Decision Making Model (Pungello & Kurtz-Costes, 1999).

Emlen (2010) discussed how mothers’ choice about child care must fit into the lives of each family, noting “parental choices reflect a blend of values, circumstances and opportunities” (Emlen, 2010, p. 30). Pungello and Kurtz-Costes (1999) developed a model to reflect the complex relationship between mothers’ environmental context, their beliefs, and their own and their children’s demographic characteristics in predicting the type of care they will use for their children (see Figure 4). Choice about child-care and use of subsidies must not only fit into the lives of children and their families, it must also be a viable option in their community. Are there available and convenient child-care settings that accept subsidies in families’ communities? These contextual factors about families’ communities and beliefs have a major impact on both their decisions about child care as well as subsidy-use and may explain some of the cultural and racial/ethnic differences observed in mothers’ choice of child-care (Radey & Brewster, 2007)..

Similarly, subsidy-use may be related to mothers’ child-care preferences. Using a nationally representative sample, Johnson, Martin and Brooks-Gunn (2011) found that mothers who ranked cost as very important when choosing child care were less likely to use child-care subsidies than other mothers. Similarly, mothers who ranked cost as very important were more likely to use Head Start a free program, instead of subsidies,

whereas there may be co-pays or other fees associated with subsidies. Conversely, mothers who ranked proximity to their home when choosing child care as important were more likely to use subsidies (Johnson, et al., 2011). These differences in preference may represent accommodation to family life. As stated before, families' use of subsidies must fit into their daily routines. Therefore since families using subsidies may have to pay some out of pocket costs, those families that are unable to afford these costs (and rank cost as important) may choose not to use child-care subsidies at all. Further, facets of mother well-being may be able to explain the difference in subsidy-use among low-income mothers.

### **Child-Care Subsidies and Child-Care Quality**

Although the CCDF was created and expanded in order to support low-income parents' ability to afford child care as they entered the work force, recent interest has focused on the potential impact that subsidies may have on the setting itself, specifically on quality. Researchers have looked at the relationship between child-care subsidy utilization and quality of child-care setting with less focus on child developmental outcomes. Since there is an established link between the quality of a child care setting and academic and socio-emotional development, particularly for children from disadvantaged backgrounds, understanding the relationship between quality and subsidies is of central importance (Brooks-Gunn & Duncan, 1997; Campbell, et. al, 2001; McCartney, et al., 2007; Peisner-Feinberg, et. al, 2001).

**Child-care quality.** First, it is essential to define and explain quality child-care. Child-care quality has often been described with both process and structural characteristics. Process variables usually refer to global measures of the child-care

setting that include health and safety conditions, child-caregiver interaction and materials for children within the setting. It also includes caregiver sensitivity. Structural indicators of quality include the activities and experiences children have during the day. This includes group size and caregiver education and training. Both of these aspects of quality are related to positive child developmental outcomes (Vandell & Wolfe, 2000).

Recently, there has also been a specific focus on caregiver sensitivity, which is defined as a caregiver's ability to respond appropriately and sensitively to individual children's needs and developmental stage (Gerber, Whitebook & Weinstein, 2007). Children who have sensitive caregivers tend to do well in both academic and social domains. This relationship may buffer children who come from disadvantaged backgrounds from developmental problems later on, especially for children who might not have a strong and stable relationship at home (Howes, 1999). Further, teacher sensitivity, as assessed by emotional support, may have a differential impact in classrooms of varying quality. Burchinal and colleagues (2010) found that emotional support was more strongly predictive of an increase in children's language, math, and social skills and more predictive of a decrease in behavior problems in high-quality child-care settings than in moderate to low-quality settings (Burchinal, et al., 2010).

Caregiver sensitivity may be related to child adult ratios or other aspects of quality such as accreditation and overall structural quality (Gerber, et al, 2007). Specifically, accreditation, or state-level regulation of quality, uniquely predicts less harsh teaching style by caregivers. However, once accreditation is controlled for, more experienced teachers and smaller classrooms predict higher caregiver sensitivity (Gerber, et al., 2007). Additionally, instructional quality is related to children's pre-academic

skills more in high-quality child-care settings (Burchinal, 2010), suggesting that what matters first is the quality of the child-care settings, since caregiver sensitivity and teaching quality seems to be related to child outcomes more strongly in those settings of higher-quality.

Unfortunately, the care that children from low-income families receive is generally of low-quality. One study (Phillips, Voran, Kisker, Howes and Whitebrook, 1994) found that over half of toddler classrooms did not meet basic standards for child-caregiver ratios and caregivers did not have education beyond high-school or any specialized training in early childhood care and education. Most centers serving low-income children did not even meet “good” levels of quality, and this is more common in classrooms serving infants and young toddlers compared to preschoolers. Teacher sensitivity was lower in settings serving low-income children and teacher detachment was higher (Phillips, et al., 1994). There are also high staff turn-over rates for child-care workers in general, and this is even more common in settings serving low-income families (Helburn & Howes, 1996).

Extant research suggests there is a U-shaped distribution of quality in child-care settings. Since low-income families are eligible to receive help from the government in paying for care, the care these families purchase may be slightly higher in quality than families who are not eligible for subsidies, or families whose income is just above the eligibility requirement (Fuller, Holloway, & Liang, 1996). Since the distribution of quality care is not equal across income levels, the associations between child-care quality and subsidy-use is important to investigate.

In addition to these trends, there are also demographic differences in what types of children attend high-quality care arrangements. African-American children are more likely to experience low-quality care, even when controlling for income and other family level factors. This may be attributed to structural quality and teacher sensitivity (Burchinal, et al., 2010). Additionally, mothers who work more hours tend to select care with higher teacher sensitivity (Fuller, Kagan, Loeb & Chang, 2004). Therefore, although high-quality care is important, in practice it is not available for all children.

**Child-care quality and child development.** The potential impact of high-quality child care for low-income children's academic and social development is great. Many studies have demonstrated the positive impacts of high-quality child care on low-income children's developmental outcomes and several studies have demonstrated benefits seen in children throughout formal schooling as well as into adulthood (Campbell, et al., 2001; Duncan, et al., 2007). High-quality child-care environments appear to buffer children from some of the negative effects of growing up in poverty, since the environments children in poverty experience may be deficient in stimulating materials and educational interactions with adults (McCartney, et al, 2007). Since children's cognitive and socio-emotional development when entering kindergarten are predictive of later achievement through elementary school, the experiences they have before entering formal schooling are of vital importance to their success throughout school (Duncan, et al., 2007).

In a study using sensitivity and positive caregiving of caregivers as a measure of quality, researchers found that children from low-income backgrounds who were in settings with more positive and sensitive caregivers were more prepared for formal school entry than children in settings with less positive caregiving and sensitivity

(McCartney, et al., 2007). These children had higher receptive and expressive language skills than similar children not attending these types of programs. This study also found that children who had similarly low income-to-needs ratios but higher quality home environments were more likely in higher-quality care (McCartney, et al., 2007). This reiterates the importance of the home environment in predicting children's academic achievement and suggests that families who provide a richer home environment are also able to find high-quality child-care settings.

Since quality child-care appears to be important for children's development, the Cost, Quality and Child Outcomes in Child Care Centers Study (Peisner-Feinberg, et al., 2001) was conducted to examine the quality of child care settings that children experience every day. The study tracked the child-care quality of center-based programs in four states. In addition to quality measures, the study collected assessments of children's pre-academic achievement. Peisner-Feinberg and colleagues (2001) found associations between child-care quality and language and math achievement in children and these associations persisted through second grade. They noted that children in higher quality programs were more ready academically upon school entry compared to children in lower quality programs. Nevertheless, despite the positive effects with respect to program quality, family background was again the most salient factor in predicting children's achievement. Therefore, although child care has the opportunity to impact the lives of children, children's family background and home life is still the most important factor in predicting children's development. This helps explain why children from disadvantaged backgrounds who attend high-quality programs may still enter school

behind their more advantaged peers, since child care alone cannot erase the impact of poverty in children (Peisner-Feinberg, et. al, 2001).

Dearing, McCartney and Taylor (2009) used data from the National Institute of Health and Human Development, Study of Early Child Care and Youth Development, a longitudinal study of early care arrangements, to examine the effects of child-care on children through early elementary school. Both in the short term, and through early elementary school, children who attended higher-quality child-care settings had higher academic achievement and fewer behavior problems than children attending lower quality settings. In fact, the relationship between income to needs and achievement (which is usually negative) was insignificant when children attended high-quality child-care arrangements. This study supports the long-lasting nature of early care experiences, especially for low-income children. Although this study had few very low-income children, it sheds light on how important the quality of child-care settings is to children's developmental outcomes and their achievement throughout school.

While very low-income children may not always attend high-quality child-care settings, intervention studies shed important light on what the possible impact of very high-quality child care is on children's academic and social development if it was available for all children. The Abecedarian project (Campbell, et al., 2001) was an intensive early childhood intervention program that enrolled children in a comprehensive and very high-quality early childhood education from birth through school entry in the early 1970s. Children attended the program five days a week, year round, until school entry. In addition to a high-quality early care and education setting, families received nutritional and social services as well as transportation to and from the child-care

program. Children were followed into adulthood. Even at age 21 there were many significant differences between children in the intervention and those in the control group. Children who attended the early childhood program had higher IQ scores, higher reading and higher math scores as adults. These individuals were also more likely to graduate high-school, and less likely to have a criminal record. They were also less likely to become teen-parents. Although this intervention program does not represent what most children experience, this study demonstrates the potential power that high-quality early childhood education has on children's academic and social development and how this early experience may influence children throughout their entire lives (Campbell, et al., 2001).

The High/Scope Perry Preschool Project is another early childhood intervention study that demonstrated the long-lasting impact of high quality preschool into adulthood. Low-income children were randomly assigned to attend either one or two years of a high-quality preschool program or a control group. At age 40, those participants who attended the Perry Preschool Program were more likely to have achieved more schooling, have higher incomes and a more stable family life compared to those participants who were in the control group. Participants were also more likely to have health insurance and have better overall health than the control group (Muening, Schweinhart, Montie & Neidell, 2009)

**Child-care quality related to subsidy-use.** Despite the connection between quality child-care and child development, the link between child-care subsidies and quality is not straightforward. Antle and colleagues (2008) assessed the classroom quality of child-care centers that accepted subsidies compared to those that did not. The

authors found that classrooms with a high-density of subsidized children were on average lower quality compared to classrooms with either few subsidized children or in settings that did not accept child-care subsidies. Additionally, teachers in classrooms with a high proportion of subsidized children had on average less education and were paid less than teachers in classrooms with either few subsidized children or in centers that did not accept child-care subsidies (Antle, et al., 2008).

Jones-Branch, Torquati, Raikes and Edwards (2004) found similar results related to quality in observations of centers with and without subsidized care. Classrooms that did not serve children supported by subsidies were rated significantly higher on measures of classroom quality than any classroom serving subsidized children. The authors also found, using teacher salary as a proxy for quality, that teachers in classrooms with many children using subsidies were paid on average less than teachers in classrooms with few subsidies (Jones-Branch, et al., 2004).

Other researchers, however, have demonstrated that differences in classroom quality may depend in part on the comparison group. For example, in one study, children whose families used child-care subsidies attended, on average, higher quality child care than those whose families were eligible for subsidies, but did not use them (Ryan, et al., 2011). Further, parents purchased higher-quality care compared to eligible non-users only if the non-users are not participating in other public programs, such as Head Start or public pre-kindergarten. These programs tend to be of higher quality than subsidized child-care programs (Johnson, 2010). Comparing children in subsidized classrooms versus settings that do not accept subsidies may be comparing classrooms in lower-income areas against those in higher income areas, which is not a fair comparison.

However, in looking specifically at quality of care settings serving low-income children in the years following welfare reform (and the expansion of CCDF), the amount of low-quality settings serving infants and toddlers almost doubled in one state (Witte, Queralt, Witt & Griesinger, 2001).

Using state level of regulation as a measure of quality, Raikes, Raikes and Wilcox (2005) found that although state regulations were highly correlated with teacher education and training, it was negatively correlated with subsidy density. Higher levels of state regulation are associated with lower subsidy-dense settings. Additionally, states with more regulations have more high-quality settings, but lower subsidy density in those settings. In terms of caregiver sensitivity, no direct relationship was found between state regulation and subsidy density. However, there is an interaction between levels of regulation and education, suggesting that in states with less regulation, caregivers' education was more strongly related to their sensitivity than it was in more regulated settings (Raikes, et al., 2005).

Further research suggests that families who use child-care subsidies are more likely to use them to purchase center-based care. Families who choose formal care may be more likely to apply for child-care subsidies. Therefore use of subsidies may be related to child-care type preference. Additionally, center-based care tends to be higher-quality than informal care (Huston, et al., 2001; Michalopoulos, et al., 2010), and the differences in quality may be a function of care type and not subsidy-use. Additionally, researchers speculate that those who wish to use informal care may not be aware that subsidies may be used in these settings in most states (Hirshberg, et al., 2005). However, families who use subsidies to purchase informal care are more likely to use them to

purchase home-based child care settings, which are higher in quality than relative care and other informal care types (Ryan, et al., 2011). When using subsidies for informal care, families do not have to use licensed care, but it appears that they are more likely to do so.

Child-care subsidies may actually encourage parents to purchase a particular type of care. Weinraub, Shlay, Harmon and Tran (2005) found that families who used child-care subsidies were more likely to select center-based care as well as use care that was licensed or registered. Eligible families that did not use child-care subsidies were more likely to arrange care with relatives. Subsidy recipients were also less likely to use multiple child-care arrangements and are more likely to be receiving other help (non-government) in paying for child care (Forry & Hofferth, 2011). Since families using child-care subsidies are more likely to purchase center-based care, the differences in quality between eligible families may be due in part to this difference in care type as center-based care is generally higher quality (Forry, 2009; Herbst & Tekin, 2010a; Huston, Chang & Gennetian, 2002; Huston, et al., 2001; Kinukawa, et al., 2004; Lowe & Weisner, 2004; Shlay, et al., 2010; Weinraub, et al., 2005; Wolfe & Scrivner, 2007).

Ryan and colleagues (2011) demonstrate this difference in quality. The authors used the Fragile Families and Child Wellbeing study and were able to assess both the quality of care (based on observations) as well as families' use of subsidies. They found that subsidized home-based care was two-thirds of a standard deviation higher in quality than non-subsidized home-based care. Conversely for center care, families who used subsidies actually chose lower quality care than eligible families not using subsidies. Although on average child-care centers are higher in quality than home-based care

settings, subsidy receipt may not allow families to purchase the highest quality center-based programs. Considering that center-based care is generally more expensive than home-based care, subsidies may not cover the highest quality center-care, but allows parents to purchase higher quality home care (Ryan, et al., 2011).

Other aspects of care unrelated to either structural or process quality include the stability in care arrangements. Bacharach and Baumeister (2003) suggest that children who change child-care settings frequently exhibit more behavior problems than those who do not switch care. As the number of settings increase, so do the incidence of behavior problems (Bacharach & Baumeister, 2003). It appears that the use of subsidies may facilitate more stable care (Brooks, 2002; Michalopoulos, et al., 2010). Further, children in more stable care demonstrate fewer internalizing problems and higher school readiness scores than children who change care arrangements often (Tran & Winsler, 2011; Votruba-Drazl, Coley, Maldonado-Carreno, Li-Grining & Chase-Lansdale, 2010). However, the issue of stability in child-care subsidies is unclear. Washington and Reed (2008) suggest that subsidized care may not be as stable since families have to re-authorize their eligibility every few months, and because of this, families may have to change their care arrangements if they no longer receive aid or if there is a gap between recertification and obtaining the subsidies (Herbst & Tekin, 2010a).

### **Child-Care Subsidies and Child Development**

There is limited research connecting subsidy receipt to child academic and social development. There is a line of research examining the connection between subsidies and other child developmental outcomes (i.e. obesity and health), but this connection will not be examined here. One study with a nationally representative data set demonstrated

that subsidy receipt the year before kindergarten was associated with an increase in behavior problems and a decrease in reading and math scores once in kindergarten (Herbst & Tekin, 2010a). The researchers note that children receiving subsidized care were often in care for longer hours and perhaps less stable care than other children in the sample, which might account for these differences. This study did not compare subsidized children versus eligible non-receivers; instead, the comparison group was limited to poor single mothers. The authors note that this is not a proxy for subsidy eligibility. Therefore the comparison group of children not using subsidies may not represent eligible non-receivers (Herbst & Tekin, 2010a). Hawkinson and colleagues (2013) found a similar negative relationship between families use of subsidies and children's cognitive development at kindergarten. Children whose families used subsidies during the year before kindergarten had lower reading and math scores once they entered kindergarten. However, again, the authors use a low-income comparison group as subsidy non-users and do not consider a comparison of eligible non-users by state laws (Hawkinson, Griffen, Dong & Maynard, 2013)

In another study that actually compared subsidy eligible families in a nationally representative study of preschoolers, Johnson (2010) did not find any relation between subsidy-use in preschool and school readiness measures at kindergarten (Johnson, 2010). Brooks (2002) found similar null results in academic achievement.

### **Child-Care Subsidies and Family Life**

Since child-care subsidies were expanded as part of welfare reform and are seen as a support for maternal employment, it is important to assess whether child-care subsidies actually achieve this goal. Several studies have shown that child-care subsidies

increase maternal employment and participation in education/training activities (Ahn, 2012, Berger & Black, 1992; Blau & Tekin, 2007; Brooks, 2002; Cochi Ficano, Gennetian & Morris, 2006; Herbst & Tekin, 2011b; Meyers, et al., 2002). Subsidies also increase stability of maternal employment (Grobe, et al., 2008; Shlay, et al., 2010).

An important caveat to these findings was highlighted by Ha (2009), who similarly found a positive relationship between child-care subsidy utilization and maternal employment. The authors also found that mothers who have a high-school diploma are more likely than those without a high-school diploma to use child-care subsidies. These mothers are more likely to use subsidies for longer periods of time. The authors suggested this may be because mothers with a high-school diploma are able to find more stable, skilled jobs than those with less education. Mothers with little education may not be able to keep a job for long periods of time, and since child-care subsidies require mothers to work in order to obtain aid, these mothers may eventually stop trying to utilize the program. Therefore mothers with stable jobs may choose to use child-care subsidies, and therefore the program is not increasing maternal employment, it simply assists mothers who have stable employment. However, Coci Fianco and colleagues (2006) found that mothers who had child-care subsidies spent less time unemployed and were able to find work faster than similar mothers without subsidies, suggesting that this support also assists mothers find employment.

Mothers who choose to use subsidies may also share certain work characteristics. For example, mothers using subsidies were more likely to work during standard hours (Weinraub, et al., 2005). In terms of work disruption, the use of child-care subsidies seems to decrease the incidence of mothers reporting having to leave work to take care of

their children (Michalopoulos, et al., 2010; Press, Fagan & Laughlin, 2006). Forry and Hofferth (2011) found that the odds that mothers report a child care related work disruption are significantly lower for families using subsidies compared to those on a wait-list for subsidies in a small sample. These results were replicated using the Fragile Families and Child Well-Being Study (Forry & Hofferth, 2011). These differences may represent similarities between mothers who are able to obtain subsidies and not a result of using subsidies.

Forry (2009) also found that families who use child-care subsidies report using extra money they would have used to pay for child-care on food and clothing for their children, on bills and even having some savings because of subsidies. This finding was replicated by Ha (2009). Not only do families who use subsidies have more disposable income, but also tend to earn more than families that have subsidies for shorter periods of time, again perhaps representing mothers with more stable work.

However, in a recent study by Herbst and Tekin (2012), mothers who use subsidies in the U.S. have lower overall well-being as compared to eligible non-receivers. Mothers using subsidies displayed poorer overall health, higher rates of depression, higher rates of stress and more aggression (Herbst & Tekin, 2012). These findings are somewhat troubling, given the positive impact of subsidies on mothers work and finances. However, the authors only used a four-item measure of stress and no other well-being constructs besides stress, and clinical measures of depression and anxiety, to represent well-being. There could be other aspects of well-being that demonstrate different findings.

## **Child-Care Subsidy Policy**

As described earlier, child-care subsidies are a federal program with state-level variation in rules, eligibility and administration. Some researchers have compared the different policy contexts of states to see whether the differential state laws are related to any differences in subsidy utilization. Joo (2008) demonstrated that the more generous a subsidy policy is, the more maternal work hours increase. Specifically, in states with high income cut-offs that allow mothers to work longer hours without losing benefits if they make too much money; families are more likely to work more and earn more money without the fear of losing benefits. These findings were replicated by Vesely and Anderson (2009). Determination of maternal work is likely influenced by state or local policies. If mothers will lose benefits for working more hours (or for making more money), they may work fewer hours in order to keep this benefit. Mothers report frustration with this, and often feel like they are punished for succeeding at their jobs since additional salary will reduce their benefits (Pearlmutter & Bartle, 2003; Yoches & Klein, 2010).

Similarly, Herbst (2008a) demonstrated that an increase in CCDF funding not only increased maternal work, but also decreased the likelihood that mothers would be on TANF. Increases in CCDF funding were negatively correlated with unemployment rates, suggesting that as child-care subsidies are more generous, families are more inclined to work, as they will receive help in paying for child-care. However, increases in CCDF funding also decreases full-time, year round work, which may represent mothers working fewer hours in order to keep their eligibility status for subsidies, suggesting an interesting relationship between subsidy policy and mothers' work (Herbst, 2008a).

Vesely and Anderson (2009) also found an interesting relationship between maternal work and subsidy policy. Specifically, they demonstrated that in states with waiting list, mothers worked fewer hours than in states without waiting lists. Further, mothers who lived in states with tiered income eligibility worked more hours than mothers in states without tiered eligibility. Tiered eligibility refers to different levels of income eligibility for different reimbursement rates. For example, a family may qualify for a certain amount of subsidies if they make a certain income, but if they make more than the income cut off, they may still be eligible for aid, although the subsidy amount may be lower. In terms of child-care quality, Rigby, Ryan and Brooks-Gunn (2007) found that states with higher income eligibility levels were associated with an increase in quality of care in non-profit centers and increased use of center-based care. They also found that stricter regulation policies (state level laws for caregiver training, child-adult ratios) was positively related to quality in both family and center-based care settings (Rigby, et al., 2007).

Another way to examine the relationship between different subsidy policy contexts is to consider what these policies mean for child-care providers. Witte, et al. (2001) found that if states have high standards for regulation (i.e. requirements for higher caregiver education, lower caregiver child ratios), reimbursement rates often did not cover the cost of care. Instead, many settings accepting subsidies did not satisfy the regulation standards set by the state because this would increase the amount they would need to charge families. This results in lower-quality care since child-care providers do not want to lose money by accepting child-care subsidies. Conversely, many mothers using subsidies choose to use less-regulated care in this instance because they did not

want to pay the extra costs that the subsidies do not cover (Witte, et al., 2001). The differential policy contexts demonstrate what was discussed in the Ecological Systems Theory. Depending on when and where a family lives, the relationship between the child-care subsidy program will be different. The eligibility standards that states use, as well as the generosity of the subsidy itself are important in determinants of potential influence of subsidies on the daily lives of families it serves.

### **Conclusion**

Parental decisions about subsidies are complex, related to a wide array of factors, and difficult to disentangle, as noted by Weisner (1984), who suggests that families' every day decisions are a product of their culture, beliefs and the contextual factors of everyday life. Therefore, there is no "one" type of family who uses subsidies; instead families differ in their use of this program for a wide range of reasons.

Growing up in poverty is detrimental to children's development. Children are less prepared for school and have a difficult time catching up once they are in formal school (Brooks-Gunn, et al, 1996; Dearing, et al., 2009). High-quality early care and educational settings have the ability to improve low-income children's school readiness, but in practice, many low-income children do not attend high-quality child-care (Burchinal, et al., 2010; Campbell, et al., 2001). Child-care subsidies have the potential to improve the quality of care that low-income families can purchase, but few families who are eligible actually use subsidies (Giannarelli, et al., 2003).

While it is clear that there are many differences in use of subsidies, less clear is whether use of subsidies is related to mothers' well-being and children's development. It appears that families who use child-care subsidies more often choose center-based care

and are able to purchase higher quality child-care (Huston, et al., 2001). However, the research connecting child-care subsidy-use to mothers' well-being and children's academic and social development is scarce. Therefore, future research in this area needs to examine child-care subsidy-use in relation to children's academic preparedness and socioemotional development. Even though child-care subsidies were established as a work-support program for mothers, the program has the potential to improve the quality of care that children experience and consequently their readiness for school. Research needs to also investigate the extent to which differential policy contexts influence children's developmental outcomes.

The use of child-care subsidies has been studied extensively since its inception in 1990. However, large gaps remain in the research as to the ways in which subsidy-use might have varied impacts on the children and families it serves. With billions of dollars spent each year on this program, it is worthwhile investigating relationships between subsidy-use and maternal well-being, child care and children's developmental outcomes.

## **Chapter 3: Methods**

### **Overview**

In this study, I examined the associations between child-care subsidy-use, mothers' well-being, child-care quality, and children's vocabulary and social development in families eligible for child-care subsidies. The extent to which state-level variation in child-care subsidy policy is related to these variables in families using subsidies was also explored. In order to investigate the research questions, the Fragile Families and Child Well-Being Study was utilized. In this chapter, I describe the Fragile Families and Child Well-Being sample, data collection procedures and measures as well as the analytic plan used for this study.

### **Participants**

Participants were drawn from the Three-Year In-Home Longitudinal Study of Pre-school Aged Children and the Three-Year Child Care Provider Survey and Observation in the Fragile Families and Child Well-Being Study. The Fragile Families and Child Wellbeing Study was initiated to better understand the well-being of low-income families living in large U.S. cities in the years immediately following welfare reform. The initial sampling frame sought to include an over representation of unwed parents and their children (with a ratio of unwed to wed parents 3:1 for the baseline sample). This sampling frame has implications for families included in this study; specifically, there is a higher representation of African-American families in this sample than in the U.S. in the years of data collection, since there is a higher rate of unwed births in this group of families (Child Trends, 2012). Further, there is a lower rate of White and Hispanic families in the sample for the same reasons. The baseline sample is

representative of non-marital births in large U.S. cities in the years of data collection (Reichman, Teitler, Garfinkle & McLanahan, 2001). These sampling decisions are important in the discussions of policy implications, since the sample does not represent all low-income families.

The baseline sample, which was recruited between February 1998 and September 2000, consisted of about 4,900 infants in 75 hospitals in 20 cities throughout the United States. Mothers were initially interviewed at the hospitals and about 75% of fathers were interviewed at this time as well, regardless of marital status (Reichman, et al., 2001). About 86% of mothers ( $n = 4,140$ ) from the baseline sample, and about 85% of fathers ( $n = 2,297$ ) from the baseline sample participated in the Three-Year Core data collection period, during April 2001 and December 2003. About 62% of mothers ( $n = 3,288$ ) from the baseline sample participated in the Three-Year In-Home Survey, which took place from 2001 through 2003, and about 16% of mothers from the baseline sample participated in and completed the Three-Year Child Care Provider Survey ( $n = 781$ ), which took place in 2002 and 2003. See Figure 5 for a map of participant inclusion rules in the Core and Three-Year In-Home Survey and Figure 6 for a map for inclusion rules in the Three-Year Child Care Provider Survey and Observation.

**Three-Year Core Survey.** The Three-Year Core Survey re-interviewed mothers from the Baseline Core sample when their children were about three years old and was completed between April 2001 and December 2003. All mothers who were interviewed during the Baseline Core Survey were eligible for the Three-Year Core Survey, whether or not they participated in the One-Year Core Survey (not discussed). The Three-Year Core Survey covered such topics as parents' relationship status, attitudes on parenting,

health and economic well-being, neighborhood composition, and social program participation (Bendheim-Thoman Center for Research on Child Wellbeing, 2008).

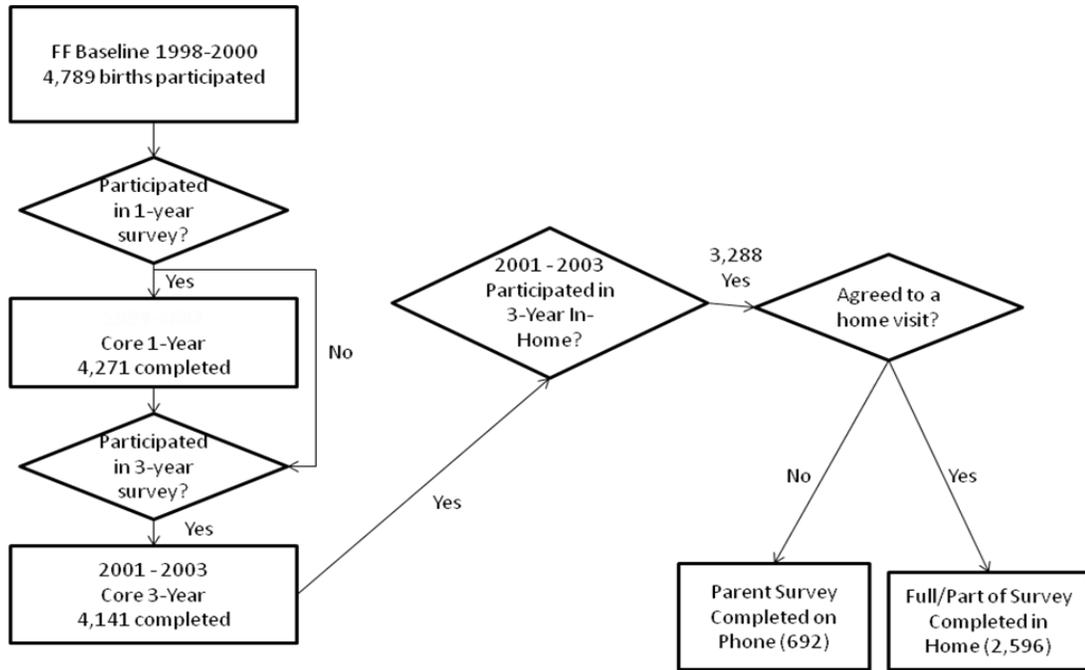


Figure 5. Process for Participant Inclusion for Core and Three-Year In-Home Surveys (User's Manual, 2008)

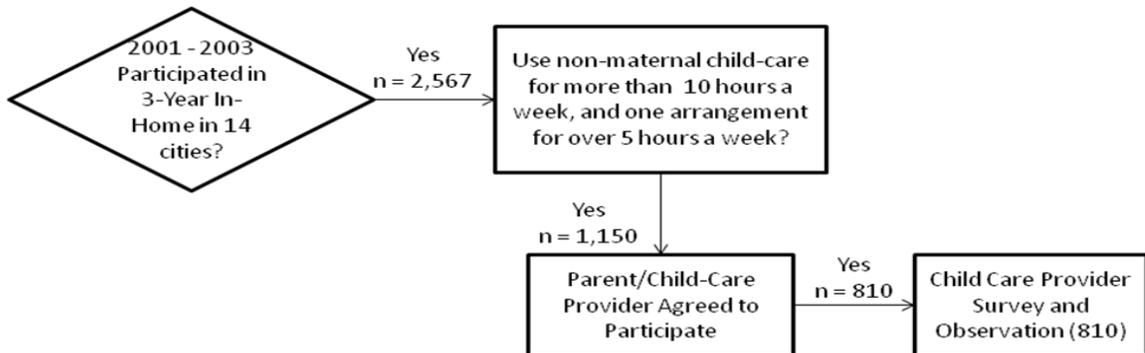


Figure 6. Process for Participant Inclusion for Three-Year Child Care Provider Survey and Observation (Brooks-Gunn, Garfinkel, McLanahan & Paxson, n.d.).

Note: Total sample size of child-care settings contacted was 810, but sample size for complete interviews was 798 and for observations was 781.

**Procedures.** All of the parent interviews were attempted by phone, and interviewers used a Computer Assisted Telephone Interview (CATI) to complete the survey. Most of the respondents were mothers. A separate father interview was also

completed if possible. If the mother could not be reached by phone, a field researcher visited her home to conduct the interview. Mothers were paid \$30 for their participation by phone and were paid \$50 if an interviewer made a home visit. Eighty-six percent of mothers from the baseline survey participated in at least one portion of the Three-Year Core Survey, which includes interviews that were started but not completed (Bendheim-Thoman Center for Research on Child Wellbeing, 2008).

**Three-Year In-Home Survey.** The Three-Year In-Home Survey is a subsample of the Three-Year Core Survey. The In-Home Survey consisted of a more in-depth mother interview and direct child assessments. The survey included a detailed questionnaire about the child's health, family routines, home environment and activities, parental stress, parental mastery, discipline, social support, social control, and children's behavior problems. Direct assessments were administered to assess both the child and respondent's vocabulary in English (and Spanish when necessary). Most of the respondents were the child's biological mother (User's Manual, 2008).

During the Three-Year Core Survey, respondents were asked to participate in the Three-Year In-Home Survey. Of the 4,248 mothers who were contacted to participate in the Three-Year In-Home Survey, 3,288 mothers agreed to participate, 2,581 agreed to a home visit and completed some or part of the In-Home Survey at their residence. About 79% of individuals who participated in the Three-Year Core Survey participated in all or part of the In-Home Longitudinal Study, and 62% of individuals who participated in the Three-Year Core Survey participated in a home visit as part of the In-Home Survey. The data collection was completed in waves; the first wave occurred in 2001, but only in two pilot cities. After these data were collected, changes were made to the survey based on

this wave and the second data collection wave occurred from 2002 through 2003 in the remaining cities (User's Guide, 2008). Participants in the In-Home wave who participated in all or part of the survey represent about 22% who were White, Non-Hispanic, 49% who were Black, Non-Hispanic and 26% who were Hispanic (User's Manual, 2008).

**Procedures.** Trained field interviewers visited the homes of respondents (if they agreed). The interviewers first asked if it was a good time for the child to complete the direct child assessment. If it was, the field interviewer recorded the child's height and weight, and administered the vocabulary measure to both the child and parent respondent (in Spanish if necessary). Once this was completed, the interviewer assessed the mother with the In-Home Questionnaire. This schedule could be modified if the child was not ready for the direct child assessment when the interviewer arrived. If the respondent did not agree to a home visit, the In-Home Questionnaire was administered by phone. In these cases, mothers were asked if an interviewer could visit them to assess the child in person, but if the mother did not agree, this portion was skipped (User's Manual, 2008). See Figure 7 for procedure map of the Three-Year In-Home Survey.

After data collection was completed, the data were cleaned by the data collection research firm Mathematica Policy Research (MPR) before release to the public. Several variables were constructed by MPR prior to release (ex. Body Mass Index (BMI) of mother and child, Vocabulary (PPVT/TVIP) scores). Scoring information and psychometrics on some of the measures was included for researchers, but other scales and items are not given scoring guidelines (User's Guide, 2008).

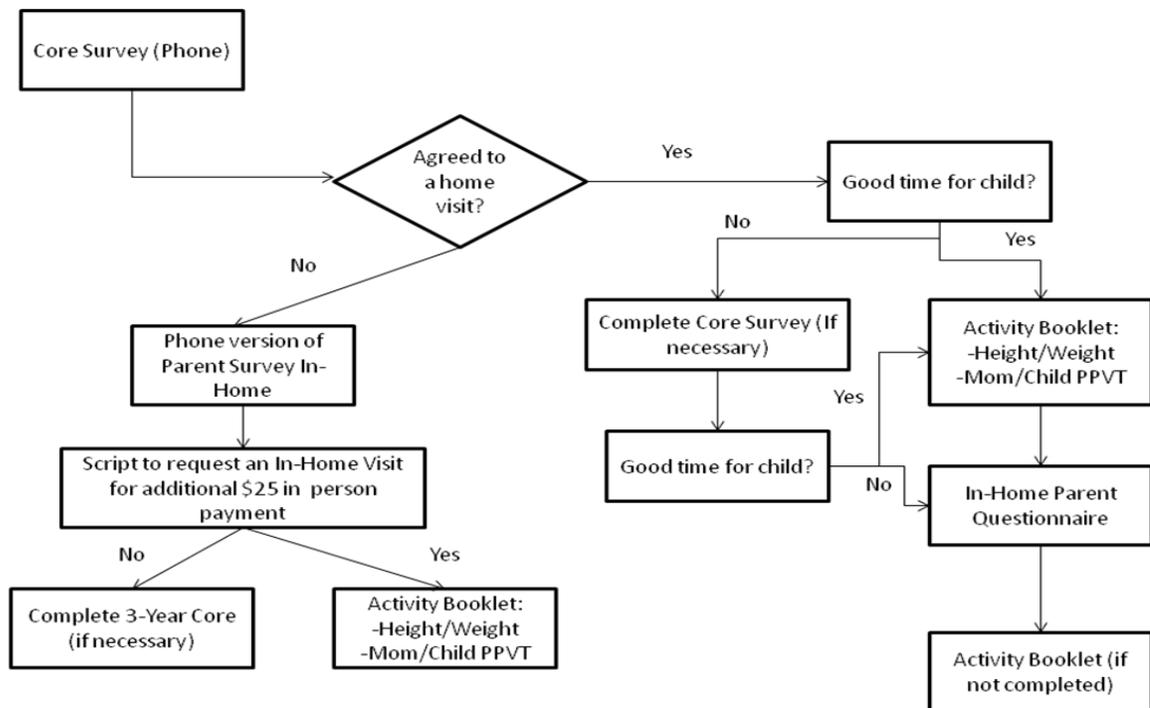


Figure 7. Procedures for conducting the Three Year In-Home Survey (User's Manual, 2008).

**Three-Year Child Care Provider Survey and Observation.** The Three-Year Child Care Provider Survey and Observation was administered after the Three-Year In-Home Survey, during 2002 and 2003. This portion of the Fragile Families and Child Well-Being study is a sub-sample of the Three-Year In-Home Survey. Data were collected in 14 of the 20 sample cities and only from families who participated in the In-Home Parent Survey and who used child care for over seven hours a week and one child care arrangement for at least five hours a week. If families fit these criteria, they were asked for permission to allow the researchers to contact their children's primary child-care provider. Originally 810 respondents agreed to participate, but once contacted, some providers refused to participate, which led to a sample size of 798 child-care provider interviews and 781 child-care observations. Three-hundred seventy-one (371) center-based care providers were interviewed and 367 center-based settings were observed.

Four-hundred twenty-seven family-based care providers were interviewed and 424 family-based care settings were observed (Brooks-Gunn, et al., n.d.).

*Procedures.* Trained researchers contacted child care providers to schedule the observation and interview. The researchers visited the providers and utilized a modified version of the Early Childhood Environment Rating Scale specifically created for the Child Care Provider Survey and Observation (CCS-ECERS-R; Harms et al., 1998) and a modified version of the Family Day Care Rating Scale specifically created for the Child Care Provider Survey and Observation (CCS-FDCRS; Harms & Clifford, 1989). These measures were used to rate the overall quality of each child care setting. The CCS-ECERS-R was utilized in center-based programs, while the CCS-FDCRS was utilized in home-based programs and kith and kin care (family and friend) arrangements. Both of these scales have been used extensively in other research concerning child-care quality, have strong psychometric properties, and are considered to be the benchmark measure of child care quality (in the un-modified form).

After the quality observation, center directors were interviewed with the Center-Based Provider Interview (Center-Based Care Interview, 2002) and Family Day Care Providers and Kith and Kin Providers were interviewed with the Family Child Care/Kith and Kin Interview (Family Child Care/Kith and Kin Interview, 2002). Most of the questions for both the Center-Based Provider Interview and the Family Child Care/Kith and Kin Interview are from the Child Care Provider and Director Interviews for the National Evaluation of Head Start, but some questions are from the Panel Study of Income Dynamics, Child Development Supplement, the ECERS-R/FDCRS interview section and other national large-scale surveys (Center-Based Care Interview, 2002;

Family Child Care/Kith and Kin Interview, 2002). The field interviewers also completed the Post Observation Form for all child-care types once the observations and interviews were complete. This observation included ratings of the neighborhood, building, common areas, and items from the HOME scale. This was administered in all but 40 cases (Brooks-Gunn, et al., n.d.; Post Observation Form)

### **Analytic Samples for Dissertation Study**

To identify an appropriate sample for the analysis, several steps were taken with the dataset just described. First, to answer the research questions for my dissertation, two sets of analytic samples were used and limitations to the sample were employed. The first analytic sample was limited to those families that participated in the Three Year In-Home Survey, since key variables of interest come from this portion of the survey ( $n = 3,288$ ). The second analytic sample was limited to individuals who participated in the Child Care Provider Survey and Observation since variables concerning child care type and quality information is taken from this subsample ( $n = 781$ ).

The sample was also limited in the following ways: (1) only biological mother respondents who were currently working and/or in training and/or participating in education were included in this sample, since this is a requirement of the federal subsidy program (2) to gain an accurate sample of FES, eligibility rules for each state in which sample families lived during the Three Year wave were used to further limit both samples to those who were income and work eligible for subsidies. Information derived from the Urban Institute's clearinghouse, Transfer Income Model, version 3 (TRIM3), which contains a collection of information on child-care subsidy eligibility rules ([trim3.urban.org](http://trim3.urban.org)) was used for this purpose. A detailed description of how the sample

was limited and what state rules were used is provided in Chapter 4. By limiting the sample in this way a more accurate sample of FES is possible. See Table B1 for the sample, years of data collection, and income eligibility rules and family size considerations. See Table B2 for rules about TANF eligibility and maternal work hour requirements for each state in the sample in the data collection years.

Finally, power analyses were performed for each of the two analytic samples. Separate power analyses were tested for each of the final models. See Appendix G.

## **Measures**

### *Sampling Variables.*

*State Subsidy Rules.* Rules about state requirements for family eligibility for subsidies were taken from the TRIM3 database for all of the years of data collection and states of residence in the sample. The variables used to determine eligibility were limited to household income and family size, TANF receipt eligibility and hours of employment required by mothers (See Tables B1 and B2). For states in which all TANF participants are eligible, those families receiving TANF were automatically coded into the subsidy eligible group. Limits were also set for families living in the states that mandate minimum work hour requirements in 2003 based on mothers' report of work hours during the past two weeks. To be coded eligible in these states, families not only had to satisfy income requirements, they also had to report that they worked at least the minimum hours required by their state of residence.

*Family Income.* Mothers were asked to report their yearly income during the Three-Year Core Survey. This variable was constructed with imputed values by MPR to

account for missing data. This variable was divided by 12 to create a monthly income variable that was used to determine income eligibility for subsidies.

*Family Size.* Mothers were asked to complete a household roster to verify the number of individuals living in their home. Two variables were constructed that represent the number of adults and the number of children in the household. These variables were added together to create a total number of household residents variable.

*TANF Receipt.* Mothers were asked if they are currently receiving welfare or TANF. If they answered in the affirmative they were coded as receiving TANF. All other answers were coded as not receiving TANF.

*Mother Work Hours.* If mothers responded that they were engaged in work during the previous two weeks, they were then asked how many hours per week they worked. In 2001 and 2002, there were no minimum work hour requirements for mothers to be eligible for subsidies in any of the states where data collection took place. However in 2003, several states in which families lived instituted a minimum work hour requirement if mothers were married or cohabitating, therefore for mothers in these states who were interviewed during 2003, an identifying variable was created and families were only deemed eligible for subsidies if they met both the income and work hour requirements of their state of residence.

#### ***Grouping Variables.***

*Child Care Subsidy Receipt.* The In-Home Survey contained a question about whether or not families received aid in paying for child care from a government source. This variable was used to group the families into the groups of subsidy-users and eligible non-users.

### ***Independent Variables.***

The following set of constructs represent scale scores that I calculated. As previously mentioned, the study authors did not give specific scoring recommendations for all measures since select items from each measure were used. These items were identified or grouped into specific categories on the interview questionnaire (e.g. Stress, Social Support, and Mastery) by the study authors. For example, one portion of the interview was entitled “Maternal Stress” and drew items from several extant measures of stress; these variables represent the construct of Maternal Stress in my dissertation. Scale scores were calculated for each of the following constructs: Maternal Stress, Maternal Mastery, Informal Social Control, Social Cohesion, Social Support and Maternal Self-Efficacy. The calculation of scale scores has been used previously with these data (Church, et al., 2012) and was used as opposed to factor analyses so each item was equally represented in the final score for the construct.

For all of the constructs except Social Support, all of the items in the interview section were initially included in the calculation of the scale scores. Two items were initially dropped from the Social Support section since they were on a different metric and were inconsistent with the rest of the items in that section. These two items asked mothers how often the family visited the child’s grandparents. The other items in this section assessed whether or not mothers could rely on others for economic support. Cronbach’s alphas were calculated for each of the scale scores and are discussed further in Chapter 4.

*Maternal Stress.* Twelve items were used to assess maternal stress in the In-Home Survey. Individual items for this section were taken and/or modified from the

Early Head Start Study or developed for the Fragile Families and Child Well-Being Study. Mothers were asked to rate each of the statements in this section on a scale of one (Strongly Agree) to five (Strongly Disagree; User's Manual, 2008). For example, one item asked mothers to rate the statement: "You often have the feeling that you cannot handle things very well." Low scores indicate high levels of stress. Therefore, for ease of interpretation, these items were reverse coded so that high scores indicate high stress; High scores on these items indicate high feelings of mastery; total scores of this scale range from 12 to 60.

*Maternal Mastery.* Five items were used to assess maternal mastery in the In-Home Survey. These items were taken from the Parental Mastery Scale (Pearlin & Schooler, 1978). Mothers were asked to rate each of the statements in this section on a scale of one (Strongly Agree) to four (Strongly Disagree; User's Manual, 2008). For example, one item asked mothers to rate the statement: "I have little control over the things that happen to me." High scores on these items indicate high feelings of mastery; total scores of this scale range from 5 to 20.

*Informal Social Control.* Five items were used to assess mothers' feelings of informal social control in the In-Home Survey. These items were modified from the Informal Social Control Scale (Sampson, 1997; Sampson, et al., 1997). Mothers rated each of the statements in this section on a scale of one (Very Likely) to five (Very Unlikely; User's Manual, 2008). For example, one item asked mothers to rate the statement: "How likely would your neighbors be to intervene if children were skipping school and hanging out on a street corner?" High scores on these items indicate low feelings of informal social control. Therefore, for ease of interpretation, these items were

reverse coded so that high ratings indicate high levels of informal social control; total scores of this scale range from 5 to 25.

*Social Cohesion.* Five items were used to assess mothers' feelings of Social Cohesion in the In-Home Survey. These items were taken from the Social Cohesion and Trust Scale (Sampson, 1997; Sampson, et al., 1997). Mothers rated each of the statements in this section on a scale of one (Strongly Agree) to five (Strongly Disagree; User's Manual, 2008). For example, one item asked mothers to rate the statement: "People around here are willing to help their neighbors." Low ratings on three of the items indicate high ratings of social cohesion and high ratings on two of the items indicate high ratings of social cohesion. Therefore, for ease of interpretation, three of the items were reverse coded so that high ratings indicate high levels of social cohesion; total scores of this scale range from 5 to 25.

*Social Support.* Six items were used to assess mothers' feelings of social support in the Three-Year Core Survey. These were created for the Fragile Families Study. Mothers answered yes (1) or no (2) to each of the questions in this section (User's Manual, 2008). For example, one item asked mothers to answer the question: "If you needed help during the year could you count on someone to loan you \$200?" Low ratings of these items indicate high ratings of social support. Therefore, for ease of interpretation, the items were reverse coded, so that affirmative answers represent two, and negative answers represent one, so high ratings indicate high levels of social support; total scores of this scale range from 6 to 12.

*Maternal Self Efficacy.* Four items were used to assess mothers' feelings of self-efficacy in the Three-Year Core Survey. The source for these questions was not

provided, but these items have been used in other large-scale studies (i.e. ECLS-B). Mothers rated each statement in this section on a scale of one (Strongly Agree) to four (Strongly Disagree; Mother's Three Year Follow-Up Survey, 2008). For example, one item asked mothers to rate the statement: "Being a parent is harder than I thought it would be." High ratings on these items indicate high feelings of self-efficacy. The following items represent measured variables in the dataset; total scores of this scale range from 4 to 16.

*Maternal Depression.* Maternal Depression was measured using the Composite International Diagnostic Interview-Short Form (CIDI-SF), Section A (Kessler, et al., 1998) which consisted of 15 items assessing mothers' mood in the past 12 months. Mothers were asked if they experienced feelings of sadness, loss of interest and other symptoms of depression for two weeks in the past 12 months. Based on mothers' responses to these questions, they were classified as to whether or not they were currently experiencing a major depressive episode. A conservative estimation of maternal depressive episode was used to represent maternal depression and scores ranged from 0 to 1 (Scales Documentation and Question Sources for Three-Year Questionnaires, 2006). This measure and scoring has been used widely in research and is considered an appropriate scale to measure maternal depression in a community sample (Aalto-Setälä, et al., 2002) and is considered reliable and valid (Andrews & Peters, 1998). However, some research suggests that compared to other measures of depression used in community samples (i.e. CES-D), the CIDI may under-represent actual cases of depression (Suthers, Gatz, & Fiske, 2004). Since the rate of depression in this sample is

quite low for a sample of low-income urban mothers, this possible limitation of this study needs to be expressed.

*Maternal Anxiety.* Maternal Anxiety was measured using the Composite International Diagnostic Interview-Short Form (CIDI-SF), Section B (Kessler, et al., 1998), which consisted of 20 items asked to mothers. Mothers were first asked if they felt anxious, worried or tense for over the past six months. If they answered this question in the affirmative, additional questions were asked to assess whether the anxiety they felt during this time was for longer periods than normal, if they felt the anxiety on more days than they did not and if they worried about more than one thing. Based on these responses, an index was created by the Fragile Families Research Team that represents mother's meeting anxiety criteria, scores ranged from 0 to 1. This measure is considered valid and reliable and is used widely in a community sample (Andrews & Peters, 1998).

*Child Care Quality.* Child care quality was assessed using a modified version of the Early Childhood Environment Rating Scale-Revised (CCS-ECERS-R; Harms et al., 1998) and a modified version of the Family Day Care Rating Scale (CCS-FDCRS; Harms & Clifford, 1989) in the Child Care Provider Survey and Observation for the care type that children attended for the most hours a week. The CCS-ECERS-R was used for center-based programs, while the CCS-FDCRS was used for home-based programs and kith and kin care arrangements. The CCS-ECERS-R contains 38 items divided into seven subscales including, Space and Furnishing, Personal Care Routines, Language-Reasoning, Activities, Interaction, Program Structure and Parents and Staff. The CCS-FDCRS contains 29 items divided into five subscales including, Space and Furnishing for Care and Learning, Basic Care, Language and Reasoning, Learning Activities and Social

Development. The ECERS-R and the FDCRS are used widely to assess child-care quality (Johnson, et al., 2012).

Recent research suggests that the ECERS-R lacks construct validity for each of its subscales (Gordon, et al., 2012), and for that reason, only the total score of overall child-care quality was used in this study. The FDCRS is considered a valid and reliable measure of quality in informal care arrangements; only the total score of overall quality will be used (Iverson, 2012). To create the variable “Child Care Quality” these scores were merged into one variable regardless of scale used.

*Child Care Type.* Based on the measure used to assess child-care quality, a variable was created to represent child care type. If families’ child care was assessed using the CCS-ECERS-R, they were classified as using formal care (i.e. child care center). If their child care was assessed using the CCS-FDCRS, they were classified as using informal care (i.e. home-based, family-care).

***Dependent Variables.***

*Child’s Behavior Problems.* Assessment of children’s behavior problems was taken from mothers’ answers to sixty-five modified items from the Child Behavior Checklist 2-3 (CBCL/2-3; Achenbach, 1988; 1992), the 2000 CBCL 1.5-5 (known as Achenbach System of Empirically Based Assessment or ASEBA; Achenbach & Rescorla, 2000), and the Adaptive Social Behavior Inventory (ASBI; Hogan, Scott and Bauer, 1992). These items were used to assess children’s mother-reported behavior problems and these measures have been validated in many studies of early childhood and are considered appropriate measures of behavior problems in young children (Flanagan, 2004; Watson, 2004). During the In-Home Survey, mothers were asked to rate their

children on each of the statements to the extent to which the statement was not true (0), sometimes/ somewhat true (1) or very true/ often true (2). For example, one question asks mothers “[He/She] is disobedient.” Several sub-scales can be created from the items in this section, but for my dissertation, only the total CBCL score was used, which includes 39 items. Higher scores indicate more mother reported behavior problems.

*Child’s Vocabulary.* The Peabody Picture Vocabulary Test (PPVT-R) (or the Test de Vocabulario en Imagenes Peabody (TVIP) if the child’s native language was Spanish) was used to assess children’s vocabulary during the In-Home Survey, and the test was administered in the child’s native language. In both of the assessments, children are asked to identify the picture of a word that is spoken and are given four options to choose from. Children’s scores were calculated based on the number of correct pictures they were able to identify (Dunn & Dunn, 1997; Dunn, Padilla, Lugo & Dunn, 1986). Both of these measures have been validated in many studies of early childhood and are considered appropriate measures of vocabulary in young children (McCallum, 1981)

I used the standardized PPVT and TVIP scores, which were calculated by the Fragile Families Research team and these scores were used in my dissertation. These scores account for the child’s age in months at the time of the assessment. To create one measure of child vocabulary, the English and Spanish scores were combined into one variable, “Child Vocabulary.” If children only took one assessment, that score was used. If both the PPVT and the TVIP were administered, the higher of the two scores was used for the “Child Vocabulary” variable. A second variable was created noting whether the vocabulary test was administered in Spanish or English. This variable was used as an additional control variable in the modeling.

***Control Variables.***

*Propensity Score Matching.* The following variables were used as control variables in the propensity score matching analyses (discussed later). The variables were chosen since they have been shown to be related to families' use of subsidies (as reviewed in Chapter 2).

*Household Income to Needs Ratio.* A variable for household income to needs ratio was calculated by dividing household yearly income by the total number of individuals in the household. This number was then divided by the federal poverty line ratio (income for family at 100% federal poverty line divided by number of individuals in household) for the data collection year of the In-Home Survey. This calculation has been used widely as another measure of poverty status (Dorabawilla, DuMont & Herzfeld, 2012). See Appendix C for Tables C1, C2 and C3 which list the federal poverty levels and family size considerations for 2001, 2002 and 2003.

*Maternal Age.* The variable for maternal age was transformed by multiplying mothers' reported age by 12, to have a variable of age in months (to match the metric of child age).

*Maternal Race.* A series of three dummy variables representing maternal race was created based on mothers' identification of their own race. These variables represent African-American/Black (non-Hispanic), Hispanic and Other. Mothers who identified as White, non-Hispanic served as the reference group.

*Maternal Education.* The variable for maternal education is a continuous measure of maternal education, ranging from "no formal education" to "graduate school".

*Total Household Size.* Mothers were asked to complete a household roster to verify the number of individuals living in their home. Two variables were constructed to account for the number of adults in the household and number of children in the household. These two variables were added together to create a new variable of total household residents.

*Mother Works Full Time.* Mothers were asked if they are currently working. A follow-up question asks how many hours they are working. These variables were transformed to a dichotomous variable indicating working full time (35 hours a week or more) and not.

*Mother's Intelligence.* Although mothers were assessed on the Peabody Picture Vocabulary Test (PPVT) or the Test de Vocabulario en Imagenes Peabody (TVIP), which is the same measure of vocabulary that was used to assess their children, the rate of missing data on this variable for mothers was around 25% in the final analytic samples. Therefore, although it would have been appropriate to use the same measure of vocabulary for mothers and children, I decided to use the Weschler Adult Intelligence Scale—Revised (WAIS-R) since the rate of missingness was less than 1% for this variable in the final analytic samples and this measure is correlated with the PPVT and TVIP ( $r = 0.29$  in final In-Home Analytic Sample).

Eight items from the Similarities subtest of the WAIS were used in the Fragile Families and Child Well-Being Study for the Maternal Intelligence variable. The Similarities subtest measures verbal concept formation and reasoning and also assesses long-term memory. In the entire sample of mothers in the Fragile Families, the alpha is 0.60; scores range from zero to sixteen (Fragile Families, 2006; Wechsler, 1981). This

measure is considered reliable and valid in previous studies and has been used extensively in research (Kaufman, 1981; Matarazzo, 1981).

*Nativity Status.* Mothers were asked whether they were born in the U.S. during the baseline interview. This variable was transformed to a dichotomous variable indicating born in a country other than the U.S. and not.

The following variables were used as additional control variables in the models described below.

*Other Government Assistance.* A series of questions assessing whether the respondents received any government assistance was asked to all participants. This includes Food Stamps, Supplemental Security Income (SSI), Medicaid, and “other assistance”. TANF receipt was not used as a control since it will be used to assess subsidy eligibility. TANF receipt was used as an additional control variable. These variables are dichotomized indicating use of the services (1) / not (0), and these individual items were added together to create one variable of “Government Assistance”. Scores range from zero to four.

*Hours in Child Care.* Mothers were asked how many hours per week their children were in care, including all arrangements.

*Child's Age.* Children's age at assessment in months at the time of the Three-Year In-Home Survey.

*Prior Subsidy Receipt.* During the One-Year Core Survey, mothers were asked whether or not they received aid in paying for child care from a government source. This variable signified whether families used subsidies at the one-year data collection period

(1) and not (0). See Table 2 for a full list of control, independent, dependent and sampling variables.

*Maternal Marital Status.* Mothers were asked whether they were married to the child’s father, married to a different partner, living with the child’s father, or living with another partner during the Three Year Core Survey. These variables were combined and dummy coded. One variable represented mothers who were married and another represented mothers who were cohabitating with a partner. Single mothers were the reference group.

*Table 2.*

**Variables Used in Study**

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Sampling Variables	State Subsidy Rules; Monthly Income; Household Size; TANF Receipt; Mother Work Hours
Grouping Variables	Child Care Subsidy Receipt
Independent Variables	Maternal Stress; Maternal Mastery; Informal Social Control; Social Cohesion; Social Support; Maternal Self-Efficacy; Maternal Depression; Maternal Anxiety; Child-Care Type; Child-Care Quality
Dependent Variables	Children’s Vocabulary; Children’s Behavior Problems
Control Variables	
Propensity Score Matching	Household Income to Needs Ratio; Maternal Age; Maternal Race; Maternal Education; Household Size; Mother Works Full Time; Mother’s Intelligence; Nativity Status
Additional Controls	Government Assistance; Hours in Child Care; Child’s Age; Prior Subsidy Receipt; English Vocabulary Assessment; Mother Marital Status

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**Analytic Strategy**

This section covers the analytic strategy of my dissertation research, including propensity score matching, factor analysis, structural equation modeling and multiple

group comparison. Further, the analyses plan for each of the research questions are outlined (Mueller & Hancock, 2010). All of these analyses were analyzed using SPSS 20 (SPSS Statistics for Windows, Version 20) and MPlus 7.0 (Muthen & Muthen, 2010).

**Propensity score matching.** In order to control for the potentially biased nature of the groups, propensity score matching (PSM) techniques were employed. As was discussed in Chapter 2, there are many demographic and family background variables that contribute to whether or not families use child-care subsidies. For example, non-English speaking immigrant families are less likely to use subsidies than non-immigrant, English speaking families (Grobe, et al., 2008; Hirshberg, et al., 2005; Shlay, et al., 2010). Further, more educated mothers who are working full-time are more likely to use child-care subsidies and tend to use them for a longer period of time (Ha & Meyer, 2010). In order to control for these group differences, PSM techniques were used. I decided to use this technique so that the true association between subsidy-use, maternal well-being and child social and academic outcomes can be explored and the biased nature of the groups is not explaining this relationship. PSM techniques have been used extensively in developmental research, and in current studies of parental use of subsidies (Gormley, Phillips, Newmark, Welti & Adelstein, 2011; Heckman, Ichimura, Smith & Todd, 1996; Johnson, et al., 2012).

PSM techniques were developed by Rosenbaum and Rubin (1983) in order to account for systematic differences in groups in non-randomized studies. This technique matches cases using the propensity score that is generated based on the variables included in the model. In this way, differences that are observed between the groups can be examined without extraneous factors accounting for the differences (Rosenbaum & Rubin,

1983; Rubin, 1997). While PSM is a strong statistical procedure, it is important to remember that this technique does not control for any variables that are not included in the model. Therefore, there could be differences between the groups that were either not measured in this study or not identified by me to be included in the PSM and this could reflect group differences. However, despite these limitations, PSM was appropriate for these analyses. A more detailed explanation of this technique and how it was conducted is in Chapter 4.

**Factor analysis.** In order to represent the latent construct of “Maternal Well-Being” exploratory factor analysis (EFA) were employed to identify how many latent factors exist in these data. Factor analysis in general assumes that latent constructs, or those that cannot be directly measured exist in the data. EFA is a statistical technique in which no specific number of factors are identified *a priori* (Bandalos & Finney, 2010). There are many constructs of maternal well-being that are important in families’ use of child-care subsidies, the variables that were used in the study to create this factor included: Maternal Stress, Maternal Mastery, Informal Social Control, Social Support, Social Cohesion, Self-Efficacy, Maternal Depression and Maternal Anxiety. Factor loadings of 0.50 or greater were used as the cutoff for item inclusion in the factors. Descriptive statistics, model fit indices, and factor loadings are reported for the final factor model.

### **Analysis of Research Questions**

Three data analytic methods were primarily used to assess the research questions outlined in Chapter 1: Group Code Analysis, Path Analysis, and Multigroup Comparison. The methods are outlined below, and a discussion of how they were used to assess the

research questions follow. Please see Table 3 for an outline of all of the research questions, analytic methods and variables used.

**Group Code.** Means modeling is an extension of t-tests and ANOVAs in a latent framework. The procedure assesses the difference in mean values of both latent and measured variables. However, it is considered a stronger technique than either t-tests or ANOVA because it does not have to satisfy as many assumptions as the former techniques (Hancock, 2003).

**In families eligible for child care subsidies (FES) , do mothers using subsidies differ on measures of well-being, do children in families using subsidies differ on vocabulary scores and reported behavior problems and do families using subsidies differ on the type and quality of care they purchase compared to mothers, children and families not using subsidies?(Research Question (RQ) 1).** Group code analysis were employed to assess whether the differences in overall means in each of the factors/measured variables listed previously vary across mothers and children in families using and not using subsidies. All of the control variables were included in the models.

**Path Analysis.** Path analysis is a form of structural equation modeling which can posit a causal relationship between variables. It is an extension of regression analysis, but in contrast to regression, there are fewer assumptions and causal statements can be tested (Muller & Hancock, 2010). I used both measured variable path analysis and latent variable path analysis.

**Does well-being of mothers in FES predict children's academic and social development differently whether or not their families use subsidies? (RQ 2)** The second research question was answered using latent variable path analyses in both

samples. The interaction between Well-Being and Subsidy-Use on children's developmental outcomes was also explored.

**Does the type and quality of child care attended by children in FES predict children's academic and social development differently whether or not their families use subsidies? (RQ3)** The third research question was answered using measured variable path analyses in the Child Care Sample. The interaction between Child Care Type, Quality and Subsidy-Use on children's developmental outcomes was also explored.

**Does the joint relationship of mother well-being and type and quality of child care attended by children in FES predict children's academic and social development differently whether or not their families use subsidies? (RQ4)?** The fourth research question was answered using latent variable path analyses using the final models from the second and third research questions in combination. This relationship was explored in the Child Care Sample.

**Multi-Group Comparisons.** Multi-group comparison is a data analytic technique that allows comparison of the equivalence of an analytic model across one or more groups (Byrne, 1995).

**Do differences in state policies about subsidies predict mother well-being, child development, and type and quality of care differently in FES? (RQ5)** The fifth research question examined the extent to which state-level policy differences are differentially related to the final models in research questions one through four.

Table 3.

*Research Question, Analytic Plan and Variables*

Research Question	Analytic Technique	Constructs/Variables
RQ1	Group Code Analysis	Stress, Self-Efficacy, Social Support, Social Cohesion, Mastery, Social Control, Depression, Anxiety, Vocabulary, Behavior Problems, Child Care Type, Child Care Quality
RQ2	Path Analyses	Stress, Self-Efficacy, Social Support, Social Cohesion, Mastery, Social Control, Depression, Anxiety, Vocabulary, Behavior Problems
RQ3	Path Analyses	Child Care Type, Child Care Quality, Vocabulary, Behavior Problems
RQ4	Path Analyses	Stress, Self-Efficacy, Social Support, Social Cohesion, Mastery, Social Control, Depression, Anxiety, Vocabulary, Behavior Problems, Child Care Type, Child Care Quality
RQ5	Multigroup Comparisons	Stress, Self-Efficacy, Social Support, Social Cohesion, Mastery, Social Control, Depression, Anxiety, Vocabulary, Behavior Problems, Child Care Type, Child Care Quality, State Subsidy Classifications

## Chapter 4: Results

The relationships between child-care subsidies, mother well-being, child-care type and quality, and children's academic and social development when children were about 3-years old in a sample of families eligible for child-care subsidies were examined. Five research questions were explored and two analytic samples were used to answer these questions. In this chapter, I report the data analytic results. Prior to examining the research questions, preliminary analyses were carried out. All of these analyses, including data cleaning, limiting the sample and conducting the propensity score matching were performed with SPSS 20.0. The exploratory factor analyses, structural equation modeling and multiple group analyses were performed with MPlus 7.0.

### **Preliminary Analyses**

**Data Cleaning.** Although the majority of variables came from the Three-Year In-Home Survey (In-Home Survey) and the Child Care Provider Survey and Observation (Child Care Observation) waves of the Fragile Families and Child Well-Being Study, other variables of interest were taken from the Baseline, Core One-Year and Core Three-Year waves of the study. The Fragile Families data set is organized by the wave of data collection: each wave is provided in a separate file. Therefore, I merged these files to create one data file with my variables of interest.

In SPSS I cleaned the data. I first recoded all missing data, regardless of reason (i.e. skipped, don't know) to system missing. I next re-coded the Subsidy-Use variable so that if mothers reported that they received assistance from the government to help pay for child care they were coded as receiving a subsidy and all other responses were coded as not receiving a subsidy.

I next re-coded and calculated the variables as described in Chapter 3, including the maternal well-being constructs and the Income to Needs ratio variable. I did not calculate the scales for maternal well-being at this point. Finally, I calculated the variable of Other Government Assistance, and recoded the Prior Subsidy-Use variable.

**Limiting the Sample.** Prior to any of the analyses or even examining the distribution of variables, I limited my sample to families eligible for subsidies based on state rules about income, TANF participation and work-hour requirements for mothers. Prior to limiting the data file based on these rules, I first limited the In-Home Survey data file to biological mother respondents who were participating in work, school or training activities, since these were requirements of the federal subsidy program. This reduced the In-Home Survey sample from 3,288 to 2,478. It reduced the Child Care Observation sample from 810 to 684.

Next, I obtained the restricted geographic data from the Fragile Families Research Team at Princeton University. I matched cases in my data file with the Mother State of Residence at 30 Months variable from the restricted data CD. The rate of missing responses on this variable was minimal; however, some families in my sample did not have information for mother's state of residence during the three year wave. This occurred in 138 cases. Based on communication with the Fragile Families Research Team, I made the following decisions. If families were missing mother's state of residence at the three-year data wave, but mothers reported living in the same state during the one- and five-year interviews, I determined that these families most likely did not move during the three-year wave and coded their state of residence as it occurred in the one-year and five-year waves. This occurred in 84 cases. For another six cases, mothers

were missing information about their state of residence for the three-year and either the one- or five-year waves. For these families, I used information about the father's state of residence at the three-year wave to code the child's state of residence.

For 32 families both mother and father's state of residence was missing for the three year wave, but for 15 of these families the state of residence was the same for father's state of residence during the one- and five- year waves. I therefore used fathers' state of residence for these families. In 8 of these cases, there were missing data for both the mother and father on the one year wave, but mothers provided information about their state of residence for the five year wave. For these families I used the state of residence for the mother at the five year wave. Twenty-five cases were dropped from the analyses because they were missing data on both the mother and father three-year wave, and state of residence changed from one to five years for both parents; therefore I was unable to determine where the family lived during the three-year wave.

I next limited the sample based on state rules for subsidy eligibility. Although the original sampling frame identified 20 cities in 15 states at the time of the child's birth, due to family mobility, 37 families did not live in one of the original states in the sampling frame when their child was 3-years old. Therefore, to insure that all eligible families were captured in this sample, I wrote codes to limit the data file for the 15 states in the original sample where every combination of family size, income limits, TANF participation, and mother work hour requirements for subsidies in each of the three years of data collection was used. For the remaining 37 families who did not live in a core state, individual codes were written for the specific state, year of data collection, family size and income, TANF participation and mother work hour requirements, since in most

cases only one family lived in a particular state, and writing code for all possible combinations of family size, income limit and mother work hour requirements would have been inefficient. All of the state rules that were used to create these limits are included in Appendix B.

Three variables were generated from these codes. The first variable represented families who were eligible for subsidies based on their household income and family size, which I called Income Eligible. The second variable represented families who were eligible for subsidies based on TANF participation, which I called TANF Eligible. All families who reported currently receiving TANF at three-years were deemed subsidy eligible since in all states in the sample TANF receipt automatically made a family eligible for CCDF in the years of data collection (US DHHS, 2002, 2003). The third variable represented families who were eligible based on the number of hours they reported working each week, which I called Work Hour Eligible. This was only applicable for mothers who were married or cohabitating and only occurred in 13 states during 2003. In these states, married or cohabitating mothers were required to work a minimum number of hours in order to be eligible for subsidies above and beyond the income limits. I next created a Combined Eligible variable in which I manually examined the three variables for each family and determined if the family was eligible for subsidies. For example, in many cases families were eligible on the Income Eligible variable, but ineligible on the Work Hour Eligible variable. These families were ultimately coded ineligible for subsidies. All of the families who were considered eligible for subsidies based on TANF rules in their state were coded eligible for subsidies.

Finally, I cross-classified families who reported using subsidies with the Combined Eligible variable. Seventy recipients were misclassified as ineligible for subsidies when they reported receiving subsidies; I re-coded these families as subsidy eligible. This cross-classification is standard and a small amount of mis-classification is expected given that I did not use administrative data to confirm subsidy eligibility (Herbst, 2008). This process was similar to other researchers' determination of subsidy eligible families (Ryan, et al., 2010). The families who were deemed eligible (1,617) were kept in the final sample and all other families were dropped from the sample (1,671).

The final Families Eligible for Subsidies (FES) In-Home sample included 1,617 families. Three hundred ninety six (396) of these families were eligible because of state rules requiring all TANF-recipients to be eligible for CCDF subsidies. One-thousand one-hundred eighty-nine (1,189) families were deemed income eligible by state rules and family size, and 23 of these families did not meet work-hour requirements of their state of residence, and were classified as ineligible for subsidies (and thus dropped) in this sample. Several families were eligible for subsidies on more than one category and 70 participants were mis-classified (as described earlier). Of the final FES In-Home sample, 465 (28.8%) reported receiving subsidies during the three-year interview, which is slightly more than other estimates of the rate of subsidy-use by eligible families nationally (Giannarelli, et al., 2003; Kinukawa, et al., 2004), but consistent with other estimates using these data (Ryan, et al., 2010).

To obtain the second analytic sample, which represents families eligible for subsidies who participated in the child-care observation portion of the study, the In-Home

Sample was reduced to families who participated in the Child Care Observation wave. The final FES Child Care analytic sample consisted of 437 families, and 184 (42.1%) reported receiving subsidies. This sample is consistent with other estimates of subsidy-use using these data (Ryan, et al., 2010)<sup>4</sup>.

**Missing Data.** The missing data for the variables was minimal. Missing data codes revealed that data were missing for a variety of reasons, including items being skipped, missed or refused. However, besides Children’s Vocabulary Scores, which revealed a missing rate of 19.8% in the final analytic FES In-Home sample, all other variables of interest displayed missing rates less than 4% in both analytic samples. Since Full Information Maximum Likelihood estimation (FIML) was used in the analyses of the research questions in MPlus, a small amount of missing data is acceptable. FIML appropriately handles the existence of missing data by fitting the estimates to non-missing variables for each case instead of deleting or replacing missing values which can misestimate the results (McCartney, et al., 2006). See Table 4 for the rate of variables with missing data in the In-Home and Child Care Samples.

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<sup>4</sup> Communication with authors from other papers using these data confirmed this. However my sample has 9 fewer families than a similar study using the Child Care Observation data. After discussion with study authors, it was determined that this difference was related to my restriction of the sample to biological mother respondents in the In-Home Study, a limit to the sample that was not used in other research. Further only 3% of respondents in the In-Home Study were not biological mother respondents.

Table 4.

*Rate of Missing Data for both Analytic Samples*

Covariates/ Limiting	FES In-Home Sample Percent Missing	FES Child-Care Sample Percent Missing
Monthly Income	0.0	0.0
Total Household Size	0.2	0.2
Maternal Marital Status	0.0	0.0
TANF Receipt	0.0	0.0
Mother Work Hours	2.8	1.6
Income to Needs	0.1	0.2
Maternal Age	0.1	0.0
Maternal Race	0.0	0.0
Maternal Education	0.2	0.5
Mother Full Time Work	0.0	0.0
Mother WAIS	0.4	0.5
Nativity Status	0.0	0.0
Other Assistance	0.0	0.0
Hours in Child Care	0.0	0.0
Prior Subsidy	0.0	0.0
Maternal Stress (Average)	0.4	0.2
Efficacy (Average)	0.6	0.9
Mastery (Average)	0.1	0.0
Social Control (Average)	0.2	2.3
Social Cohesion (Average)	0.3	2.7
Social Support (Average)	0.2	0.5
Maternal Anxiety	0.4	0.0
Maternal Depression	0.1	0.0
Subsidy Receipt	0.1	0.0
Child Care Quality	--	3.7
Child Care Type	--	3.7
Child Vocabulary	19.8	1.8
Behavior Problems (Average)	0.3	0.1

**Propensity Score Matching.** Once the sample was limited to families eligible for subsidies (FES), I conducted the propensity score matching (PSM) analysis. PSM was used to account for the biased nature of the two groups in this study (subsidy-users and eligible non-users). In PSM, a score is generated for each case (family) to represent their likelihood of receiving the treatment (using subsidies) based on the covariates

included as predictors in the model. After propensity scores are generated, they are “matched” across groups to similar cases with similar scores. The researcher sets criteria for how close these matches need to be. After cases are matched, there should be no difference between the matched cases on the covariates; the only difference should be whether or not they were in the treatment or control group. In this way, PSM subsumes the same assumptions as random assignment in an experimental study (Thoemmes, 2012). A detailed explanation of the PSM technique, including the formulas used to calculate the propensity scores is included in Appendix D.

The PSM program in SPSS requires that there are no missing data in the covariates. Therefore, prior to employing the matching, missing data analyses were conducted on the covariates. Inspection of the rates of missing data in the covariates revealed that one to seven cases were missing on five covariates (average missing variable rate of 2.5 variables for the covariates in the FES In-Home Sample), and these cases occurred randomly across the groups of subsidy-users and eligible non-users. Instead of dropping all of the individuals with any missing data, I replaced the missing variables on the covariates with the variable mean on four of the variables since the rate of variables with missing information was less than 1% on these variables. One to four responses were missing from the following variables: Income to Needs, Maternal Age, Maternal Education, and Total Household Size and mean replacement was used for these variables. This is an appropriate solution when there is a small amount of missing data (McCartney, et al., 2006).

For Maternal Intelligence, which had seven missing cases I used regression based imputation to replace missing values. Since Maternal Vocabulary and Maternal

Intelligence are significantly correlated ( $r = 0.29, p < 0.01$ ), I used maternal vocabulary scores to determine maternal intelligence scores. To do this, Maternal Vocabulary scores were inspected and replacement values were determined based on other mothers' scores on these values. For example, one mother with a missing intelligence score had a score of 51 on the vocabulary measure. All other mothers with a 51 on the vocabulary measure received a 0 on the WAIS intelligence test, so for this mother I input a 0 for this variable (possible scores for the WAIS ranged from 0 to 16). Similar conclusions were made for the other four cases with missing data on the Maternal Intelligence variable.

I then proceeded with the PSM analysis. Nearest neighbor matching without replacement was used, and K:1 matching was selected, with a ratio of 5:1 since the sample sizes of the groups were uneven and this is the largest ratio suggested without compromising the precision of the matches in PSM (Ming & Rosenbaum 2000). That is, up to five subsidy-user families could be matched to one subsidy eligible non-user family. A caliper of 0.20 was set to ensure that matches were reasonably close to one another<sup>5</sup>. Two separate PSM analyses were conducted for the two analytic samples (In-Home Sample and Child Care Sample). The covariates included in the PSM analyses were: Household Income to Needs Ratio, Maternal Age, Maternal Race, Maternal Education, Total Household Size, Mother Works Full Time; Mother's Intelligence, and Nativity Status.

The PSM analysis revealed adequate fit and balance for both samples. A detailed description of fit and balance statistics are discussed in Appendix D. Some individuals were dropped from the sample because they could not be appropriately matched. The

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<sup>5</sup> A caliper of 0.20 suggests that no two matches will be farther than 0.20 of the standard deviation of the logit apart from one another in their propensity score. Using a caliper ensures better balance and probability that the matches will be more accurate and closer.

majority of the cases in both samples were matched. A table with descriptives of those individuals who were dropped from the sample is also included in Appendix D. See Table 5 for case summary of the matching for these data.

Table 5.

*Summary of Propensity Score Matching in Both Analytic Samples*

	Control	Treatment	Total
<b>In-Home Sample</b>			
All Variables (Prior to PSM)	1210	407	1617
Matched	1102	389	1491
Un-Matched	108	18	126
<b>Child Care Sample</b>			
All Variables (Prior to PSM)	271	166	437
Matched	260	154	414
Un-Matched	11	12	23

The final analytic FES PSM In-Home sample included 1,491 families who were eligible for subsidies. About 26.1% of these families reported using subsidies during the 3-year In-Home Study. The final analytic FES PSM Child Care Observation sample included 414 families who were eligible for subsidies. About 37.2% of these families reported using subsidies during the 3-Year Child Care Observation. See Table 6 and Table 7 for the final sample demographics for the FES PSM In-Home and the FES PSM Child Care Observation analytic samples as well as the mean differences across groups. Even after matching, some of the variables that were used as covariates in the PSM were still significantly different across groups. In order to account for this, these variables were included in the final models as additional control variables. See Figure 8 for visual of sample limitation.

All of the differences in the samples were in the expected direction. That is, subsidy eligible mothers who were Black, born in the U.S., had more education and

worked more hours are more likely to use subsidies (Anh, 2012; Kinukawa, et al., 2004; Grobe, et al., 2008).

Table 6.

*FES PSM In-Home Analytic Sample Demographics*

	M(SD) %	Subsidy Recipients	Eligible Non-Recipients	Range
<b>Maternal Race</b>				
Black**	64.5%	71.2%	62.2%	0-1
Hispanic*	22.1%	17.5%	23.7*	0-1
Other	3.0%	2.8%	3.0%	0-1
<b>Mother Education**</b>				
Less than HS	41.9%	35.0%	43.0%	0-1
HS Diploma/GED	35.4%	38.8%	34.2%	0-1
Some College/Tech. School	22.7%	25.5%	21.7%	0-1
BA or Higher	1.0%	0.7%	1.1%	0-1
Mother US Born*	93.0%	96.0%	92.0%	0-1
Mother Age (Years)	26.32 (5.14)	25.82 (4.71)	26.50 (5.27)	17-50
Mother Works**	60%	74%	55%	0-1
Mother Works Full Time *	68.3%	72.8%	66.8%	0-1
Mother in School/Training*	25.0%	34.0%	23.0%	0-1
Total Household Size	4.51 (1.67)	4.30 (1.56)	4.59 (1.71)	2-12
<b>Marital Status</b>				
Married*	15.0%	12.0%	16.0%	0-1
Cohabiting <sup>+</sup>	33.0%	30.0%	34.0%	0-1
Income to Needs**	0.88 (0.65)	1.00 (0.76)	0.84 (0.60)	0.5-47
Yearly Income**	\$17,062.37 (\$13,270.65)	\$18,623.57 (\$14,902.14)	\$16,511.27 (\$12,605.83)	0 - \$132,000
Mother's Vocabulary	87.19 (11.63)	87.19 (11.02)	87.02 (11.85)	40-137
Mother's WAIS	6.46 (2.5)	6.64 (2.38)	6.40 (2.54)	0-14
TANF Receipt	26.0%	27.0%	25.0%	0-1
Other Government Assistance**	1.54 (0.84)	1.69 (0.73)	1.48 (0.87)	0-4
Hours in Child Care**	19.98 (18.75)	35.03 (11.69)	14.67 (17.89)	0-84
Prior Subsidy**	16.0%	34.0%	9.0%	0-1

\*  $p < 0.05$ , \*\*  $p < 0.01$

Table 7

*FES PSM Child Care Observation Analytic Sample Demographics*

	M(SD) %	Subsidy Recipients	Eligible Non-Recipients	Range
<b>Maternal Race</b>				
Black	72.0%	76.0%	69.6%	0-1
Hispanic	17.9%	13.6%	20.4%	0-1
Other	1.0%	1.9%	0.5%	0-1
<b>Mother Education</b>				
Less than HS	35.8%	31.2%	38.5%	0-1
HS Diploma/GED	38.9%	43.5%	36.2%	0-1
Some College/Tech. School	24.4%	24.0%	24.6%	0-1
BA or Higher	1.0%	1.3%	0.7%	0-1
Mother US Born	95.0%	97.0%	93.0%	0-1
Mother Age (Years)	26.76 (5.47)	26.44 (5.31)	26.95 (5.57)	18-46
Mother Works*	73.0%	80.0%	69.0%	0-1
Mother Works Full Time	68.1%	69.5%	67.3%	0-1
Mother in School/Training	26.0%	28.0%	25.0%	0-1
Total Household Size	4.60 (1.73)	4.39 (1.63)	4.73 (1.78)	2-11
<b>Marital Status</b>				
Married*	12.0%	9.0%	14.0%	0-1
Cohabiting	33.0%	32.0%	35.0%	0-1
Income to Needs*	0.90 (0.64)	0.98 (0.70)	0.85 (0.59)	0-2.49
Yearly Income	\$17,517.20 (\$12,612.53)	\$18,486.43 (\$13,307.79)	\$16,943.11 (\$12,171.89)	\$0 - \$100,000
Mother's Vocabulary	87.53 (11.16)	87.68 (11.74)	87.44 (10.84)	40-131
Mother's WAIS	6.55 (2.41)	6.82 (2.11)	6.39 (2.57)	0-13
TANF Receipt	22.0%	21.0%	22.0%	0-1
Other Government Assistance*	1.57 (0.83)	1.70 (0.76)	1.50 (0.86)	0-3.00
Hours in Child Care **	26.30 (18.35)	37.06 (10.45)	19.92 (19.05)	0-84
Prior Subsidy**	22.0%	40.0%	12.0%	0-1

\*  $p < 0.05$ , \*\*  $p < 0.01$

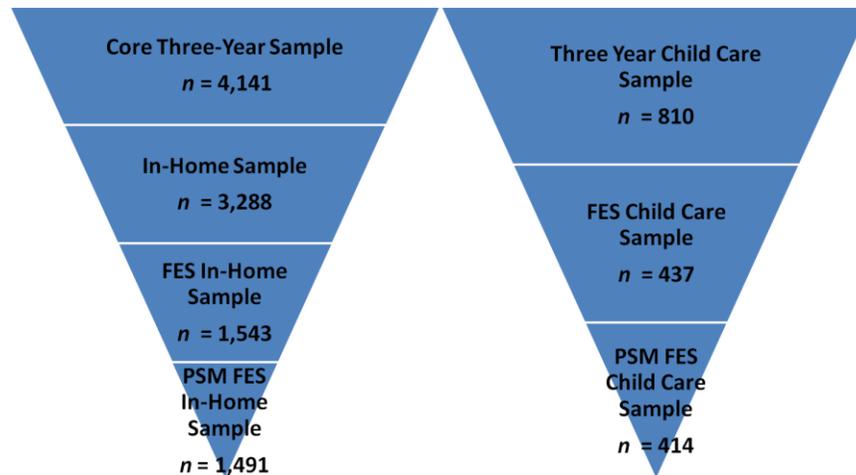


Figure 8. Sample reduction for analytic samples.

**Sample Comparisons.** Sample comparisons were made between the final FES PSM In-Home, FES In-Home and In-Home samples to explore differences between the three samples. Overall, results indicated that the PSM FES In-Home Sample was more disadvantaged than the larger In-Home Sample, which was expected. Comparison results indicate that the FES PSM In-Home sample had a higher percentage of Black mothers and a lower percentage of Hispanic mothers than the In-Home or FES In-Home samples. There was also a higher percentage of mothers born in the United States in the FES PSM In-Home sample and mothers in the FES PSM In-Home were more likely to work or be in school than mothers in the other samples. Finally, families in the FES PSM In-Home were more economically disadvantaged, that is, they reported less income, more government assistance and use child care subsidies at a greater rate than families in the In-Home and FES In-Home samples.

Comparisons were also made between the FES PSM Child Care Sample, FES Child Care Sample and Child Care Sample. Results were similar to those in the In-Home Sample. However, some differences did emerge. First of all, there were few differences

between the FES PSM Child Care Sample and FES Child Care Sample mainly because only 23 families were dropped to create the final FES PSM sample. The PSM FES Child Care Sample had a higher percentage of Black mothers than both the Child Care and FES Child Care Samples. There was also a higher percentage of US born mothers in the FES PSM Child Care Sample and mothers in the FES PSM Child Care Sample were significantly more likely to work or be in school than mothers in the Child Care Sample. Finally, families in the FES PSM Child Care Sample were significantly more disadvantaged, that is, they reported less income, more government assistance and used child care subsidies at a greater rate than families in the Child Care Sample. See Appendix F for the complete results of the sample comparisons.

**Scale Score Calculation.** I next ran descriptive statistics on the individual variables for all of the scales for both analytic samples to examine the means, variances and normality of items prior to calculation of scale scores for the constructs of mother well-being, child behavior problems and child care quality. Some of the individual items were non-normal, but since the items were used to calculate scales, slight non-normality is acceptable at the item level as long as it is not persistent at the scale level. See Tables E1 and E2 in Appendix E for the list of item level descriptive information, including skew and kurtosis of all items in both samples.

I next calculated the scale scores. Sums of the items were computed and reliability estimates (alphas) were calculated. The alphas for Maternal Stress, Mastery, Social Support, Social Cohesion, and Behavior Problems were appropriate (larger than 0.70), but the alpha for Self-Efficacy was a little low in both samples ( $\alpha = 0.64$  and  $0.63$ ). Although alphas above 0.70 are desired, I kept this construct in the final analyses since it

was just below the recommended cut off and the construct is of importance to my definition of maternal well-being. However, it is important to note that a low alpha signifies that the construct may not be measuring what it purports to measure.

Table 8

*Descriptive Statistics for Scale Scores*

FES In-Home Sample						
	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)	Alpha	Number Items
Maternal Stress	25.99 (8.58)	10-60	0.40 (0.06)	-0.14 (0.13)	0.87	12
Mastery	16.74 (3.23)	4-20	-0.91 (0.06)	0.26 (0.13)	0.80	5
Social Control	12.60 (6.17)	1-25	0.58 (0.06)	-0.75 (0.13)	0.86	5
Social Cohesion	13.82 (4.95)	3-25	0.26 (0.06)	-0.45 (0.13)	0.78	5
Social Support	7.00 (3.74)	0-12	-0.30 (0.06)	-0.86 (0.13)	0.80	6
Self-Efficacy	10.85 (2.74)	4-16	-0.17 (0.06)	-0.47 (0.13)	0.63	4
Beh. Problems	17.24 (9.53)	0-54	0.53 (0.06)	0.00 (0.13)	0.88	32
Vocabulary	83.72 (14.88)	40-125	-0.36 (0.07)	0.46 (0.14)	N/A	N/A
FES Child Care Sample						
	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)	Alpha	Number Items
Maternal Stress	25.90 (8.61)	12-54	0.45 (0.12)	-0.06 (0.24)	0.87	12
Mastery	16.81 (3.38)	7-20	-0.87 (0.12)	-0.27 (0.24)	0.82	5
Social Control	12.53 (6.04)	3-25	0.59 (0.12)	-0.67 (0.24)	0.85	5
Social Cohesion	13.69 (4.81)	5-25	0.37 (0.12)	-0.35 (0.24)	0.76	5
Social Support	7.06 (3.41)	0-12	-0.31 (0.12)	0.70 (0.24)	0.77	6
Self-Efficacy	10.77 (2.78)	4-16	-0.16 (0.12)	-0.45 (0.24)	0.64	4
Beh. Problems	16.69 (9.53)	0-54	0.52 (0.12)	-0.17 (0.24)	0.89	32
CCS-ECERS	4.68 (1.42)	1-7	-0.24 (0.18)	-0.75 (0.36)	0.97	38
CCS-FDCRS	3.17 (1.25)	1-7	0.59 (0.17)	-0.23 (0.33)	0.97	32
Vocabulary	84.63 (14.79)	40-118	-0.38 (0.12)	0.43 (0.24)	N/A	N/A

The Vocabulary Score variable was calculated by the Fragile Families Research Team; however I examined the descriptive statistics for this measure in each of the samples as well. No assumptions were violated for any of the scales. The Child Care Quality (FFS-ECERS, FFS-FDCRS) scores also revealed adequate reliability. The FFS-ECERS and FFS-FDCRS were calculated based on recommendations from the Fragile

Families Research Team in which each sub-scale was averaged and the overall average of the seven subscales were calculated. See Table 8.

**Correlations.** I next ran inter-correlations of the 35 variables in the FES PSM In-Home Sample and 37 variables in the FES PSM Child Care Observation sample in SPSS. See Table 9 for FES PSM Three-Year In-Home Sample, Table 10 for FES PSM Child Care Observation Sample. Many of the variables were significantly correlated at the  $p < 0.05$  level, and several were correlated at the  $p < 0.01$  level in both samples. However, the variable of primary interest, Subsidy-Use, was not significantly correlated with any construct of maternal well-being or child developmental outcomes. Subsidy-Use was significantly correlated with Child Care Type in the FES PSM Child Care Sample. Many of the individual constructs of well-being, however, were significantly correlated with Vocabulary and Behavior Problems, and in the expected direction in both samples. That is, mothers who reported more Stress, higher feelings of Efficacy, Mastery, Social Support and Social Control, had children with significantly lower Vocabulary scores in the FES PSM In-Home Sample and significantly more Behavior Problems in both analytic samples. Additionally, in the FES PSM Child Care Sample, higher Child Care Quality was significantly correlated with fewer behavior problems.

Table 9.

*Intercorrelations of Variables FES PSM In-Home Sample*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Child Age	1.00										
2. Mom Age	-0.05	1.00									
3. Mom Black	0.02	0.02	1.00								
4. Mom Hispanic	0.01	-0.01	-0.72**	1.00							
5. Mom Other	0.00	0.01	-0.24**	-0.09**	1.00						
6. Mom U.S. Born	-0.1	0.09**	2.72**	-0.30**	-0.15**	1.00					
7. Mom Education	-0.03	0.26**	0.00	-0.07**	0.08**	-0.02	1.00				
8. Income	-0.00	0.07**	-0.13**	0.08**	0.06*	-0.09**	0.23**	1.00			
9. Household Size	-0.04	0.15**	0.01	0.03	0.02	0.01	-0.10**	0.21**	1.00		
10. Mom Married	-0.00	0.07**	-0.20**	0.16**	0.11**	-0.16**	0.11**	0.18**	0.11**	1.00	
11. Mom Cohabiting	0.01	-0.04	0.01	-0.01	-0.04	0.01	-0.07*	0.05	0.08**	-0.29	1.00
12. Income to Needs	0.02	0.03	-0.14**	0.08**	0.05*	-0.10**	0.28**	0.91**	-0.13**	0.15**	0.02
13. Mom Work	0.01	0.12**	-0.04	0.00	0.01	-0.05	0.22**	0.22**	-0.05*	0.03	-0.04
14. Mom Work Hours	0.04	0.04	0.05	-0.02	-0.00	0.03	0.08**	0.10**	-0.01	0.04	-0.06*
15. Mom Full Time	0.04	0.07**	0.08**	-0.06*	-0.01	0.05*	0.11**	0.12**	-0.00	0.00	-0.01
16. Mom School	0.01	-0.12**	-0.02	0.04	0.04	0.04	0.05	0.03	-0.04	0.03	-0.04
17. Subsidy-Use	0.08**	-0.06*	0.08**	-0.07*	-0.00	0.07*	0.07*	0.07**	-0.08**	-0.05*	-0.04
18. TANF Receipt	0.02	-0.08**	0.10**	-0.06*	-0.03	0.11**	-0.20**	-0.20**	0.01	-0.12**	0.00
19. Other Assistance	0.03	-0.05*	0.14**	-0.11**	-0.04	0.11**	-0.11**	-0.25**	0.03	-0.18**	0.04
20. Prior Subsidy	0.03	-0.00	0.06*	-0.06*	0.00	0.08**	0.10**	0.04	-0.03	-0.05	-0.03
21. Hours Child Care	0.05*	-0.02	0.05*	-0.03	-0.02	0.00	0.18**	0.18**	-0.07**	-0.06*	-0.10**
22. Mom PPVT	-0.03	-0.02	-0.19**	0.08**	0.03	-0.09**	0.34**	0.20**	-0.08*	-0.04	-0.00
23. Mom English	-0.01	-0.09**	0.26**	-0.35**	0.03	0.63**	0.07*	-0.05	-0.05	-0.04	-0.00
24. Mom Intelligence	-0.02	-0.00	-0.03	-0.06*	0.02	0.11**	0.21**	0.15*	-0.03	0.04	0.03
25. Mom Anxiety	0.00	0.01	-0.05*	-0.00	0.06*	0.02	-0.02	0.00	0.02	0.01	-0.04
26. Mom Depression	-0.01	-0.02	0.00	-0.04	0.05*	0.02	0.04	-0.03	-0.03	0.01	-0.04
27. Maternal Stress	0.01	-0.02	-0.03	-0.02	0.03	-0.00	-0.13**	-0.13**	-0.00	0.03	0.02
28. Maternal Efficacy	-0.01	0.01	-0.04	0.04	-0.02	-0.02	0.10**	0.04	0.00	0.03	-0.06
29. Maternal Mastery	-0.02	-0.05	0.07*	-0.04	-0.08**	0.05	0.12**	0.14**	0.01	0.00	-0.01
30. Social Control	0.01	-0.03	0.01	-0.01	0.04	-0.07**	-0.06*	-0.07*	0.13	0.01	-0.00
31. Social Cohesion	0.05	-0.08**	0.09**	-0.05	-0.01	0.00	-0.13**	0.00	-0.13**	0.03	0.01

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
32. Social Support	-0.03	-0.05	-0.07**	0.04	-0.01	-0.02	0.09**	-0.02	0.09**	0.01	0.02
33. Behavior Problems	0.05*	-0.04	-0.05	0.04	0.04	-0.02	-0.18**	-0.02	-0.18**	-0.02	0.04
34. Child Vocabulary	-0.06*	0.01	-0.13**	0.06*	-0.02	-0.06*	0.12**	-0.06*	0.12**	-0.03	0.01
35. Child English	-0.02	-0.09**	0.25**	-0.34**	0.03	0.057**	0.08**	0.57**	0.08**	-0.03	0.01
	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
12. Income to Needs	1.00										
13. Mom Work	0.25**	1.00									
14. Mom Work Hours	0.12**	0.04	1.00								
15. Mom Full Time	0.75**	1.00	0.75**	1.00							
16. Mom School	-0.11**	-0.11**	-0.11**	-0.11**	1.00						
17. Subsidy-Use	0.02	0.06*	0.02	0.06*	0.11**	1.00					
18. TANF Receipt	-0.11**	-0.07**	-0.11**	-0.07**	0.14**	0.02	1.00				
19. Other Assistance	-0.11**	-0.11**	-0.11**	-0.11**	0.10**	0.11**	0.37**	1.00			
20. Prior Subsidy	0.03	0.07**	0.03	0.07**	0.00	0.31**	-0.03	0.07*	1.00		
21. Hours Child Care	0.15**	0.19**	0.15**	0.19**	0.04	0.48**	-0.15**	-0.12**	0.23**	1.00	
22. Mom PPVT	0.05	0.06	0.05	0.06	0.10**	0.03	-0.18**	-0.15**	0.03	0.14**	1.00
23. Mom English	0.04	0.07*	0.04	0.07*	0.00	0.09**	0.10**	0.11**	0.08**	0.05	-0.17**
24. Mom Intelligence	-0.00	0.03	-0.00	0.03	0.04	0.04	-0.04	-0.02	0.07**	0.04	0.31**
25. Mom Anxiety	0.05*	-0.07**	0.05*	-0.07**	0.02	-0.02	0.09**	0.06*	0.01	-0.03	0.01
26. Mom Depression	0.00	-0.02	0.00	-0.02	0.04	0.04	0.05	0.09**	0.00	0.04	0.04
27. Maternal Stress	-0.05	-0.04	-0.05	-0.04	-0.02	-0.01	0.12**	0.11**	-0.01	-0.05	-0.13**
28. Maternal Efficacy	0.03	-0.01	0.03	-0.01	-0.03	-0.03	-0.07**	-0.09**	0.02	-0.01	0.09**
29. Maternal Mastery	0.08**	0.08**	0.08**	0.08**	0.04	0.04	-0.09**	-0.08**	0.03	0.07*	0.14**
30. Social Control	-0.06*	-0.06*	-0.06*	-0.06*	0.05	-0.02	0.01	0.06*	-0.06*	-0.03	-0.07
31. Social Cohesion	-0.05	-0.08**	-0.05	-0.08**	-0.01	-0.02	0.09**	0.13**	-0.01	-0.09**	-0.07
32. Social Support	0.03	0.03	0.03	0.03	0.04	0.04	-0.14**	-0.13**	0.01	0.07*	0.12**
33. Child Behavior	-0.01	-0.04	-0.01	-0.04	-0.04	-0.01	0.11**	0.10**	-0.01	-0.05	-0.14**
34. Child Vocabulary	0.06	0.05	0.06	0.05	0.05	0.02	-0.08**	-0.09**	0.02	0.11**	0.31**
35. Child English	0.01	0.05	0.01	0.05	0.00	0.08**	0.08**	0.10**	0.08**	0.05	-0.15**
	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.
23. Mom English	1.00										
24. Mom Intelligence	0.10**	1.00									
25. Mom Anxiety	0.05	0.03	1.00								
26. Mom Depression	0.03	0.02	0.35**	1.00							
27. Maternal Stress	0.02	-0.09**	0.20**	0.28**	1.00						
28. Maternal Efficacy	0.01	0.05	-0.16**	-0.23**	-0.49**	1.00					

	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.
29. Maternal Mastery	0.01	0.09**	-0.18**	-0.24**	-0.55**	0.29**	1.00				
30. Social Control	-0.07	-0.04	-0.01	0.06	0.11*&	-0.10**	-0.09**	1.00			
31. Social Cohesion	-0.07	0.00	-0.05	0.11**	0.18**	-0.09**	-0.15**	0.40**	1.00		
32. Social Support	0.12**	-0.01	0.11**	0.15**	0.07*	0.06	0.11*&	-0.10**	-0.09**	1.00	
33. Behavior Problems	-0.14**	-0.05	-0.09**	0.17**	0.07*	0.11**	0.18**	-0.09**	-0.15**	-0.12**	1.00
34. Child Vocabulary	0.31**	-0.14**	0.12**	0.01	-0.09**	0.07*	0.12**	-0.09**	-0.07*	0.09**	-0.13**
35. Child English	-0.15**	0.90**	0.09**	0.01	0.04	-0.02	-0.03	-0.04	0.00	-0.02	-0.04
	34.	35.									
34. Child Vocabulary	1.00										
35. Child English	-0.16**	1.00									

Table 10.

*Intercorrelations of Variables FES PSM Child Care Sample*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Child Age	1.00										
2. Mom Age	-0.02	1.00									
3. Mom Black	-0.00	0.00	1.00								
4. Mom Hispanic	-0.04	0.02	-0.75**	1.00							
5. Mom Other	0.07	0.00	-0.24**	-0.07	1.00						
6. Mom U.S. Born	-0.02	-0.15**	0.24**	-0.23**	-0.19**	1.00					
7. Mom Education	-0.05	0.24**	0.03	-0.07	-0.04	-0.02	1.00				
8. Income	0.03	0.09	-0.14**	0.13**	-0.01	-0.13**	0.24**	1.00			
9. Household Size	-0.13*	0.13**	0.05	0.04	0.02	0.00	-0.16**	0.17**	1.00		
10. Mom Married	0.04	-0.00	-0.18**	0.13**	0.11*	-0.15**	0.10	0.18**	0.13**	1.00	
11. Mom Cohabiting	0.01	-0.08	0.03	-0.00	-0.06	0.02	-0.10	0.10*	0.10	-0.26**	1.00
12. Income to Needs	0.07	0.03	-0.16**	0.10*	-0.02	-0.15**	0.30**	0.91**	-0.18**	0.12*	0.07
13. Mom Work	-0.03	0.15**	-0.02	0.03	-0.066	-0.02	0.21**	0.20**	-0.01	0.05	-0.06
14. Mom Work Hours	0.06	0.09	0.10*	-0.12*	-0.08	0.07	0.09	0.08	-0.02	0.02	-0.02
15. Mom Full Time	0.04	0.12*	0.12*	-0.11*	-0.11	0.09	0.14**	0.14**	0.02	0.03	0.00
16. Mom School	0.05	-0.14**	-0.03	0.06	0.03	-0.01	0.03	-0.04	-0.05	0.01	0.02
17. Subsidy-Use	0.08	-0.05	0.07	-0.09	0.02	0.07	0.05	0.06	-0.09	-0.08	-0.03
18. TANF Receipt	0.04	-0.10*	0.04	-0.02	0.04	0.05	-0.20**	-0.18**	-0.01	-0.10*	0.06
19. Other Assistance	0.06	-0.05	0.07	-0.06	-0.02	0.11*	-0.13**	-0.26**	-0.01	-0.19**	0.05

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
20. Prior Subsidy	0.02	0.01	0.05	-0.01	-0.08	0.13**	0.10*	0.01	-0.02	-0.05	0.02
21. Hours Child Care	0.00	-0.02	0.02	-0.04	0.04	-0.02	0.19**	0.13*	-0.07	-0.04	-0.13**
22. Mom PPVT	-0.01	-0.01	-0.14**	0.10*	-0.06	-0.08	0.32**	0.14**	-0.06	0.01	0.02
23. Mom English	0.10	-0.26**	0.20**	-0.27**	0.02	0.54**	0.02	-0.07	-0.09	0.03	-0.06
24. Mom Intelligence	-0.04	-0.09	-0.08	0.01	0.03	0.10*	0.22**	0.12*	0.03	0.05	-0.04
25. Mom Anxiety	0.02	0.06	-0.05	-0.01	0.11*	0.02	0.02	-0.06	-0.02	0.00	0.00
26. Mom Depression	0.05	-0.04	-0.08	-0.01	0.06	0.02	0.05	-0.06	-0.04	0.01	-0.06
27. Maternal Stress	0.01	-0.03	-0.12*	0.05	0.05	0.07	-0.09	-0.08	0.02	-0.11*	-0.03
28. Maternal Efficacy	-0.01	0.05	-0.04	0.02	-0.01	-0.11	0.06	0.11*	0.04	0.09	-0.08
29. Maternal Mastery	-0.03	-0.06	0.13**	-0.05	-0.12*	0.03	0.09	0.13*	0.03	0.06	0.09
30. Social Control	0.06	0.02	0.02	-0.04	0.08	0.07	-0.08	-0.06	0.03	-0.14**	0.12*
31. Social Cohesion	0.08	-0.05	0.05	-0.05	0.06	0.02	-0.04	-0.08	0.04	-0.02	0.03
32. Social Support	-0.05	-0.10	0.04	0.00	-0.08	-0.01	0.06	0.12*	0.00	0.04	-0.01
33. Behavior Problems	0.07	-0.06	-0.06	0.02	0.10*	0.06	-0.21**	-0.07	0.04	0.04	-0.01
34. Child Vocabulary	-0.02	0.04	-0.05	-0.00	-0.06	-0.06	0.11*	0.05	-0.02	0.04	0.01
35. Child English	0.05	-0.18**	0.20**	-0.26**	0.02	0.43**	0.11*	0.01	-0.11*	0.01	-0.07
36. Child Care Quality	0.01	-0.05	-0.01	0.03	-0.07	-0.05	-0.07	0.01	-0.13*	0.10*	-0.06
37. Child Care Type	0.06	-0.03	0.11*	-0.06	-0.04	-0.01	0.07	0.03	-0.20**	0.11*	-0.08
	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
12. Income to Needs	1.00										
13. Mom Work	0.20**	1.00									
14. Mom Work Hours	0.10*	0.12*	1.00								
15. Mom Full Time	0.15**	0.10*	0.78**	1.00							
16. Mom School	-0.04	-0.27**	-0.20**	-0.15**	1.00						
17. Subsidy-Use	0.10*	0.12*	0.00	0.02	0.04	1.00					
18. TANF Receipt	-0.20**	-0.44**	-0.17**	-0.14**	0.16**	-0.02	1.00				
19. Other Assistance	-0.27**	-0.26**	-0.14**	-0.15**	0.20**	0.12*	0.33**	1.00			
20. Prior Subsidy	0.03	0.13**	0.06	0.08	-0.05	0.32**	-0.04	0.08	1.00		
21. Hours Child Care	0.16**	0.25**	0.22**	0.23**	-0.01	0.45**	-0.19**	-0.09	0.22**	1.00	
22. Mom PPVT	0.16**	0.11*	-0.00	0.03	0.13*	0.01	-0.17**	-0.13*	0.03	0.10	1.00
23. Mom English	-0.04	-0.03	-0.04	-0.08	-0.07	0.10	0.06	0.06	0.07	0.05	-0.16**
24. Mom Intelligence	0.11*	0.00	0.03	0.05	0.05	0.09	0.02	0.03	0.08	0.06	0.25**
25. Mom Anxiety	-0.04	-0.18**	-0.03	-0.01	-0.01	0.02	0.02	0.09	0.04	0.02	0.03
26. Mom Depression	-0.04	-0.14**	0.01	0.06	-0.01	0.08	0.01	0.10*	0.01	0.07	0.03
27. Maternal Stress	-0.07	-0.09	0.02	-0.02	-0.03	0.01	0.01	0.13**	0.03	0.02	-0.07
28. Maternal Efficacy	0.09	0.16**	0.04	0.02	-0.08	-0.02	-0.03	-0.13**	-0.01	-0.04	0.08

	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
29. Maternal Mastery	0.10*	0.10*	0.10	0.08	0.01	-0.01	-0.01	-0.08	0.03	0.06	0.09
31. Social Support	-0.08	-0.08	0.04	0.02	0.03	0.13**	0.04	-0.04	-0.03	0.03	-0.08
32. Social Cohesion	-0.02	-0.06	0.01	0.06	-0.12*	-0.05	-0.02	0.06	0.06	0.01	0.06
33. Behavior Problems	0.02	-0.07	-0.06	0.01	0.01	0.17*	-0.01	-0.03	-0.17**	0.01	-0.09
34. Child Vocabulary	0.15**	0.13**	0.00	-0.02	0.03	-0.07	-0.03	0.13**	0.24**	-0.09	0.17**
35. Child English	-0.04	-0.04	-0.02	0.05	-0.04	0.01	0.07	0.10	-0.05	0.80**	0.16**
36. Child Care Quality	0.02	-0.01	-0.03	0.06	-0.06	-0.09	-0.02	0.09	0.10	0.04	0.03
37. Child Care Type	0.03	0.03	0.04	0.23**	-0.02	0.04	0.10	0.16**	0.03	0.07	0.03
	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.
25. Mom Anxiety	0.03	0.03	1.00								
26. Mom Depression	0.03	-0.02	0.40**	1.00							
27. Maternal Stress	-0.07	-0.01	0.19**	0.24**	1.00						
28. Maternal Efficacy	0.08	-0.08	-0.14**	-0.18**	-0.48*	1.00					
29. Maternal Mastery	0.09	0.05	-0.23**	-0.29**	-0.51**	0.27**	1.00				
30. Social Control	-0.03	0.03	0.09	-0.08	-0.09	1.00	-0.09	1.00			
31. Social Cohesion	0.06	0.01	0.12*	-0.02	-0.16**	0.37**	-0.16**	0.37**	1.00		
32. Social Support	-0.17**	0.01	-0.27**	0.13**	0.16**	-0.07	0.16**	-0.07	-0.03	1.00	
33. Behavior Problems	0.24**	-0.09	0.35**	-0.17**	-0.28**	0.07	-0.28**	0.07	0.14	-0.10*	1.00
34. Child Vocabulary	-0.05	0.80**	-0.09	0.06	0.15**	-0.07	0.15**	-0.07	-0.05	0.08	-0.17**
35. Child English	0.10	0.04	0.01	-0.12*	0.02	-0.03	0.02	-0.03	0.02	0.05	0.09
36. Child Care Quality	0.03	0.07	-0.01	-0.07	0.11*	0.01	0.11*	0.01	-0.03	0.13**	-0.02
37. Child Care Type	-0.06	-0.02	-0.09	-0.02	0.07	-0.09	0.07	-0.09	-0.01	0.03	-0.02
	34.	35.	36.	37.							
34. Child Vocabulary	1.00										
35. Child English	-0.17**	1.00									
36. Child Care Quality	0.15**	0.12*	1.00								
37. Child Care Type	0.01	0.11*	0.49**	1.00							

**Exploratory Factor Analysis.** In order to obtain a latent measure of Maternal Well-Being, I conducted an exploratory factor analysis (EFA) in MPlus with the eight constructs of well-being discussed previously. An EFA with varimax rotation was used and up to three possible factor solutions were allowed. A three factor solution fit the data best for both samples. EFAs in both analytic samples demonstrated good fit (FES PSM In Home Sample:  $X^2 = 7.76$ ,  $df = 7$ ,  $p > 0.05$ ; RMSEA = 0.00, SRMR = 0.01; FES PSM Child Care Sample:  $X^2 = 3.39$ ,  $df = 7$ ,  $p > 0.05$ , RMSEA = 0.00, SRMR = 0.02). Although it was anticipated that there would be one factor of Maternal Well-Being in both samples, results suggested that a three factor solution would be more appropriate for both samples (eigenvalues  $> 1.00$ ), representing one factor accounting for Impaired Psychological Processes, one factor accounting for Neighborhood Supports and a third factor accounting for Mental Health Functioning.

Slight differences emerged between the analytic samples. In the FES PSM Child Care Sample, the variable of Social Control demonstrated a standardized loading less than 0.10 on each of the factors. Therefore, this variable was dropped from further analyses in the FES Child Care Sample. An EFA without Social Control allowed a three factor solution and fit the data well, with Social Cohesion loading on its own factor (Neighborhood Supports). However, Social Cohesion displayed a negative error variance, which is an indicator that too many factors are attempting to be extracted. This variable was therefore dropped from subsequent EFA analyses. Social Cohesion was still included as a measured variable predictor in the models described later. A final EFA was run and a two factor solution fit the data appropriately ( $X^2 = 0.63$ ,  $df = 4$ ,  $p > 0.05$ ; RMSEA = 0.00; SRMR = 0.01). The three factors accounted for about 60% of the

variance in responses in the FES PSM In-Home Sample and the two factors accounted for about 56% of the variance in the FES PSM Child Care Sample.

Table 11.

*Standardized Loadings of EFAs of Mother Well-Being*

FES PSM In-Home Sample			
	Mental Health Functioning	Impaired Psychological Processes	Neighborhood Supports
Anxiety	0.50	0.15	0.04
Depression	0.64	0.22	0.07
Efficacy	-0.18	-0.48	-0.04
Maternal Stress	0.11	0.98	0.08
Mastery	-0.19	-0.53	-0.09
Social Support	-0.13	-0.26	-0.13
Social Control	0.05	0.07	0.46
Social Cohesion	0.04	0.11	0.85
FES PSM Child Care Sample			
	Mental Health Functioning	Impaired Psychological Processes	
Anxiety	0.53	0.15	
Depression	0.71	0.18	
Efficacy	-0.13	-0.48	
Maternal Stress	0.10	0.99	
Mastery	-0.29	-0.48	
Social Support	-0.11	-0.26	

The Impaired Psychological Processes factor consists of four scale score constructs and describes mothers' well-being in terms of psychological factors, including social support and feelings of competence as a parent. Loadings of the factors were in the expected direction. Specifically, the loading for Maternal Stress is positive, suggesting that parents who have high scores on the Impaired Psychological Processes factor, demonstrate high levels of Maternal Stress, but low levels of Mastery, Efficacy, and Social Support. In the modeling results below, this factor was built such that Maternal Stress was loaded on the factor negatively and the factor name was changed to

Psychological Processes instead of Impaired Psychological Processes. Therefore high ratings on this factor represented low levels of Maternal Stress, high feelings of Mastery, Efficacy and Social Support. The term Psychological Processes has been used to represent these constructs in previous research (Raikes & Thompson, 2005).

The Mental Health Functioning factor consists of two measures of mental health, Maternal Anxiety and Maternal Depression. Both of these variables have positive loadings, suggesting that mothers with high scores on the Mental Health Functioning factor have met criteria for anxiety disorder and/or major depressive episodes more often in the past six months. . Finally, the Neighborhood Supports factor consists of two scale score constructs that describe mothers' feelings about their environment and neighborhood. High scores on this factor indicate high feelings of social control and social cohesion.

Since the Mental Health Functioning and Neighborhood Supports Factors have only two indicators each and if freely estimated would be locally under-identified, in the modeling results the paths from each Maternal Anxiety and Maternal Depression, and Social Control and Social Cohesion were fixed to be equal. That is, the variables were fixed to contribute equally to each of the factors they represented. In the FES PSM Child Care Sample, Social Cohesion was included as an independent predictor.

### **Modeling Results**

To answer the proposed research questions, I utilized group code analysis, measured and latent variable path analysis and multigroup comparisons using MPlus 7.0 software (See Table 2 in Chapter 3 for a detailed description of the types of analyses used for each research question). For all of the latent variable path analyses, the exogenous

(independent) variables were correlated with each other and the endogenous outcome variables were also correlated with each other. For the analyses using the FES PSM In-Home Sample, additional control variables were added (Maternal Hispanic race, Maternal African American race, Maternal Nativity Status, Maternal Education, and Income to Needs Ratio) due to differences that still existed between the two groups of subsidy-users and eligible non-users after employing the PSM analyses. Only Income to Needs ratio was added as an additional control variable in the FES PSM Child Care Sample.

Finally, the recommendations for model fit indices outlined by Hu and Bentler (1999) were followed for all of the measured variable path analyses. That is, ideal fit indices included a root mean square error of approximation (RMSEA) less than 0.06; a comparative fit index (CFI) greater than 0.95 and a standardized root mean square residual (SRMR) less than 0.08. However, for the models with the latent mother well-being factors included, the SRMR was not calculated since there are categorical variables used as predictors (Maternal Anxiety and Maternal Depression). Therefore the weighted root mean square residual (WRMR) measure was used in these instances. I followed recommendations by Yu and Muthen (2002) to evaluate fit of this measure, which suggests that WRMR values less than 1.0 indicate adequate fit. For the models that included latent variable interaction terms, the only model fit indices that are provided are the akaike information criteria (AIC) and the Bayesian information criteria (BIC). To evaluate model fit using these indices, AIC values are compared across two models. The lower AIC value indicates the best fitting model.

**Research Question 1.** To assess the extent to which mean levels of Maternal Well-Being, Children's Vocabulary and Behavior Problems and Child-Care Type and

Quality differ whether or not families used subsidies, I ran a series of group code analyses using matched samples on the measured variables of well-being, the latent factors of well-being, the measured variables of Vocabulary, Behavior Problems, Child-Care Type and Child Care Quality. I ran these models with both samples. Results indicated that mothers' mean levels of Anxiety, Depression, Stress, Efficacy, Mastery, Social Support, Social Cohesion and Social Control were not significantly different whether or not families use subsidies in the FES PSM In-Home Sample and FES PSM Child Care Sample.

Table 12.

*Research Question 1: Standardized Estimates of Mean Differences by Subsidy-Use*

	FES PSM In-Home Sample			FES PSM Child Care Sample		
	Mean Difference	S.E.	<i>p</i>	Mean Difference	S.E.	<i>p</i>
Anxiety	-0.11	0.12	0.35	0.05	0.20	0.64
Depression	0.05	0.08	0.18	0.10	0.14	0.13
Stress	-0.02	0.53	0.53	0.01	0.89	0.92
Efficacy	-0.03	0.17	0.20	-0.02	-0.29	0.69
Mastery	0.04	0.20	0.14	-0.01	0.34	0.89
Social Support	0.04	0.22	0.12	0.06	0.35	0.24
Social Control	-0.02	0.37	0.50	--	--	--
Social Cohesion	-0.03	0.30	0.40	0.02	0.49	0.66
Mental Health Functioning	0.02	0.08	0.58	0.09	0.13	0.19
Psychological Processes	0.02	0.03	0.57	-0.01	0.25	0.99
Neighborhood Supports	-0.03	0.03	0.35	--	--	--
Children's Vocabulary	0.01	0.03	0.62	-0.02	1.52	0.64
Behavior Problems	-0.01	0.03	0.77	0.01	0.97	0.92
Child Care Type	--	--	--	0.23**	0.05	0.00
Child Care Quality	--	--	--	0.06	0.16	0.26

Note: Control Variables Included in the models

The mean levels of Psychological Processes and Mental Health Functioning did not differ based on subsidy-use in either sample as well. Further, Children's Vocabulary

and Behavior Problems did not differ whether or not families used subsidies in either sample. Child Care Quality also did not differ based on subsidy-use in the FES PSM Child Care Sample, but Child-Care Type differed depending on whether or not families used a subsidy ( $\beta = 0.23, p < 0.01$ ). That is, families who used a child-care subsidy choose center-based care significantly more often than home-based care. See Tables 12 for the results of these analyses in both samples.

**Research Question 2.** In order to assess the extent to which Maternal Well-Being and Subsidy-Use predicted Vocabulary and Behavior Problems when children were about three years old, I employed a series of latent variable path analyses (structural equation models). Before testing the structural model to answer the research question, I ran a measurement model with both analytic samples. A measurement model assesses the relationship between the latent variables and all other variables in a model without imposing any structural relationships between the variables. To do this I correlated the three factors of maternal well-being in the FES PSM In-Home Sample and the two factors in the FES PSM Child Care Sample with each of the outcome variables, the Subsidy-Use variable and all of the control variables. In the FES PSM Child Care Sample I also correlated Social Cohesion with all other variables. If the measurement model fits the data appropriately, one can move on to the structural model. When running this model, I asked for modification indices to see if any additional paths would improve model fit and made theoretical sense.

*In-Home Sample.* After running the measurement model and assessing modification indices, I correlated the errors of Efficacy and Maternal Stress (both indicators of the Psychological Processes factor) to improve model fit. I re-ran the model

and assessed further modification indices, which suggested that I correlate Mastery and Maternal Stress (both indicators of the Psychological factor). Both of these modifications make empirical sense since research suggests that stress is significantly related to feelings of both mastery and efficacy (Raikes & Thompson, 2005). I next re-ran the measurement model and did not make any further modifications since the suggestions were not empirically appropriate. Results indicated good fit ( $X^2 = 341.25$ ,  $df = 113$   $p < 0.05$ , CFI = 0.95, RMSEA = 0.04, WRMR = 0.86). It was therefore appropriate to move on to the structural model.

I next analyzed the structural model to answer the second research question. As a first step I analyzed the model without the interaction terms. Inclusion of the interaction terms requires the use of a “random” estimation in MPlus, and the traditional fit indices that are calculated and used to determine model fit are not provided in this estimation. Therefore, I first tested the structural model without the interaction terms, then ran a model with the interactions and compared the models based on their AIC values.

The structural model without interaction terms revealed good fit ( $X^2 = 153.31$ ,  $df = 107$   $p < 0.05$ , CFI = 0.97, RMSEA = 0.02, WRMR = 0.67) and several of the paths were significant. Specifically, the paths from Psychological Processes to Children’s Vocabulary ( $\beta = 0.18$ ,  $p < 0.01$ ) and Behavior Problems ( $\beta = -0.54$ ,  $p < 0.01$ ) were significant. Mental Health Functioning trended toward significance in its relation to Behavior Problems ( $\beta = -0.13$ ,  $p < 0.10$ ). Finally Neighborhood Supports also trended toward significance in relation to Vocabulary ( $\beta = -0.06$ ,  $p < 0.10$ ). The independent variables accounted for about 10% of the variance in Vocabulary and about 25% of the variance in Behavior Problems in this model.

I next added the interaction terms to the model. To do this I created three latent interaction variables 1) Psychological Processes X Subsidy-Use; 2) Mental Health Functioning X Subsidy-Use, and 3) Neighborhood Supports X Subsidy-Use. When creating interaction terms where at least one of the original variables is latent, the corresponding interaction variable will be latent in MPlus. Therefore in the interaction model there was one measured variable (Subsidy-Use) and six latent variables (Psychological Processes, Mental Health Functioning, Neighborhood Supports and the three interaction terms). Further, in this model I correlated all of the independent variables (as in the previous model) except the three interaction terms since correlating these terms with the variables they were created from would lead to multicollinearity issues.

Before comparing the interaction model with the non-interaction model, I first examined the interaction model as a whole. The interaction model revealed an AIC value of 61,642.21 and BIC value of 62,247.64. Several of the paths were significant as well, but results indicated that none of the interaction variables were significantly related to Vocabulary. However, the interaction between Mental Health Functioning X Subsidy-Use was significantly related to Behavior Problems ( $B = 0.84, p < 0.05$ ). The interaction between Psychological Processes X Subsidy-Use was also significantly related to Behavior Problems ( $B=1.10, p < 0.05$ ).

Since several of the paths were not significant, I trimmed the non-significant interaction terms from the model to make it more parsimonious and re-ran the model. See Figure 9 for full model. Similar results were found in the trimmed model; the relationship between Mental Health Functioning X Subsidy-Use was significantly related

to Behavior Problems ( $B=0.80, p < 0.05$ ) and the relationship between Psychological Processes X Subsidy-Use trended toward significance in relation to Behavior Problems ( $B = 1.05, p < 0.10$ ). Further, Psychological Processes was significantly related to Behavior Problems ( $B = -2.99, p < 0.01$ ) and Vocabulary ( $B = 1.58, p < 0.05$ ); Mental Health Functioning was also significantly related to Behavior Problems ( $B = -0.59, p < 0.05$ ). See Figure 9.

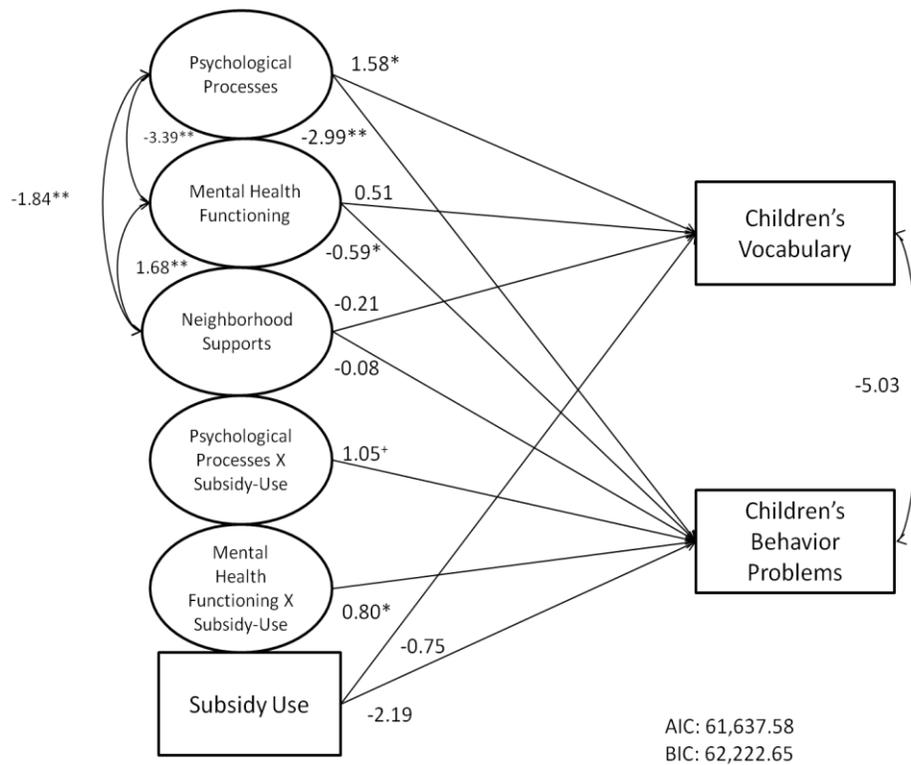


Figure 9. Research Question 2: Unstandardized estimates for model in FES PSM In-Home Sample with interactions

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , +  $p < 0.10$ ; All non-significant correlations were removed from diagram to conserve space. Control variables and error terms not shown. Unstandardized estimates presented since standardized values are not provided in Random estimator.

The results of the interaction terms are displayed in Figure 10. The results of analysis revealed that increases in mothers' Mental Health Functioning were positively

related to Behavior Problems in families using subsidies. However, in families eligible for subsidies who are not using them, this relationship is negative.

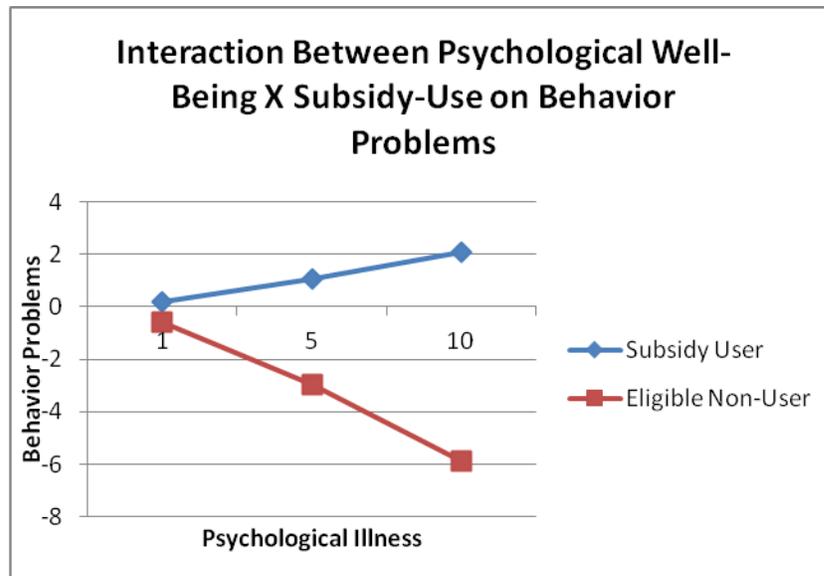


Figure 10. Interaction between Mental Health Functioning and Subsidy-Use on Behavior Problems.

I next compared this trimmed interaction model with the model without interactions. To determine which model fit the data better, I compared the models on their AIC values. The AIC value of the non-interaction model (61,576.32) was larger than the AIC trimmed interaction model (61,577.75); therefore the trimmed interaction model fits the data better.

*Child Care Sample.* I next replicated these analyses with the Child Care Sample. The measurement model demonstrated similar results, except the modification indices suggested correlating the errors between Mastery and Efficacy. The final measurement model revealed good fit ( $X^2 = 65.12$ ,  $df = 56$ ,  $p > 0.05$ ,  $CFI = 0.99$ ,  $RMSEA = 0.02$ ;  $WRMR = 0.48$ ) and therefore it was appropriate to move on to the structural model. The structural model without the interaction terms also demonstrated good fit ( $X^2 = 73.75$ ,  $df = 56$ ,  $p > 0.05$ ,  $CFI = 0.96$ ,  $RMSEA = 0.03$ ,  $WRMR = 0.60$ ) and several of the paths were

significant. Specifically, the paths from Psychological Processes to Vocabulary trended toward significance ( $\beta = 0.12, p < 0.10$ ) and was significantly related to Behavior Problems ( $\beta = -0.42, p < 0.01$ ). This model accounted for about 5% of the variance in Vocabulary and about 20% of the variance in Behavior Problems. See Figure 11.

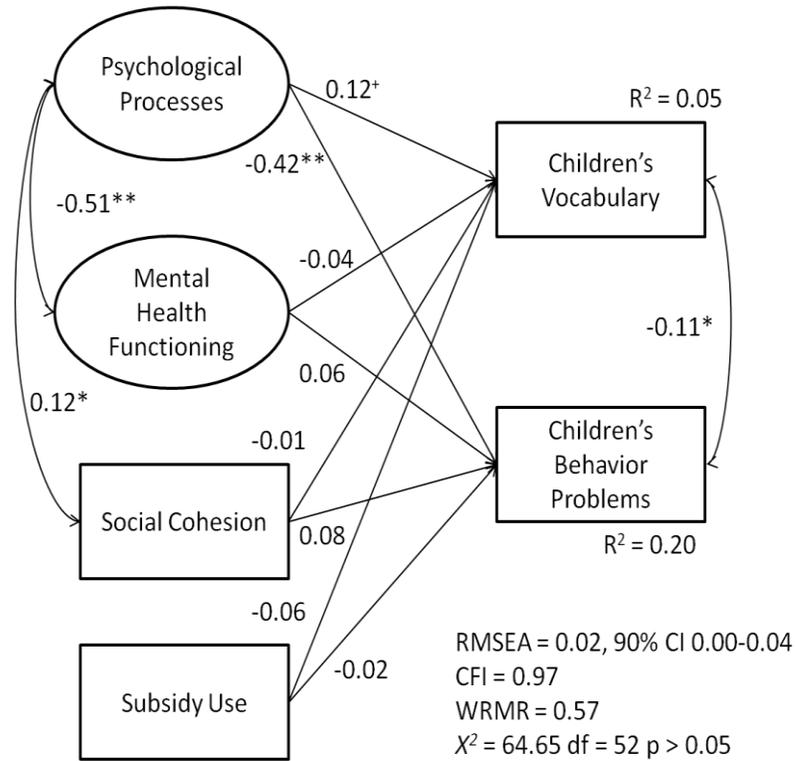


Figure 11. Research Question 2: Standardized Estimates for model FES PSM Child Care Observation Sample without interactions

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , +  $p < 0.10$ ; All non-significant correlations were removed from diagram to conserve space. Control variables and error terms not shown.

I next added the interaction terms into the model. To do this I created two latent interaction variables 1) Psychological Processes X Subsidy-Use and 2) Mental Health Functioning X Subsidy-Use and a measured variable interaction of Social Cohesion X Subsidy-Use. As opposed to the interaction model with the In-Home Sample, all the paths from the interaction terms to the child outcome variables were non-significant, suggesting that the inclusion of the interaction is not necessary to understand these

relationships and does not add anything to the final model. Further, the AIC of the interaction model was larger (AIC=18,587.97) than the AIC of the non-interaction model (AIC=18,395.22) suggesting that the model without the interaction terms fits the data better.

**Research Question 3.** To examine the third research question regarding to what extent Child Care Type, Quality and Subsidy-Use were related to children's developmental outcomes, a measured variable path analysis was conducted. The measurement model demonstrated perfect fit ( $X^2 = 0.00$ ,  $df = 0$ ,  $p < 0.05$ , CFI = 1.00, RMSEA = 0.00, SRMR = 0.00), so I moved on to the structural model. Since this proposed model has an interaction term similar to the previous research question, I first tested the model without the interaction and then tested the model with the interaction. The structural model demonstrated perfect fit ( $X^2 = 0.00$ ,  $df = 0$ ,  $p < 0.05$ , CFI = 1.00, RMSEA = 0.00, SRMR = 0.00), which was expected since the model is fully identified. Only the path from Child Care Quality to Vocabulary was significant ( $\beta = 0.20$ ,  $p < 0.01$ ). The model accounted for 7% of the variance in Vocabulary and 4% of the variance in Behavior Problems.

I next tested the model with the two interaction terms, 1) Child Care Quality X Subsidy-Use and 2) Child Care Type X Subsidy-Use. When I ran this model it demonstrated perfect fit ( $X^2 = 0.00$ ,  $df = 0$ , CFI = 1.00, RMSEA = 0.00, SRMR = 0.00). Further, several of the paths were significant. Specifically, the path from Child Care Quality to Vocabulary was significant ( $\beta = 0.32$ ,  $p < 0.01$ ). The path from the interaction between Child Care Quality X Subsidy-Use was also significant ( $\beta = -0.40$ ,  $p < 0.05$ ). The path from Child Care Type to Children's Vocabulary trended toward significance ( $\beta$

= -0.13,  $p < 0.10$ ) as did the path from Subsidy-Use to Children's Vocabulary ( $\beta = -0.32$ ,  $p < 0.10$ ). See Figure 12.

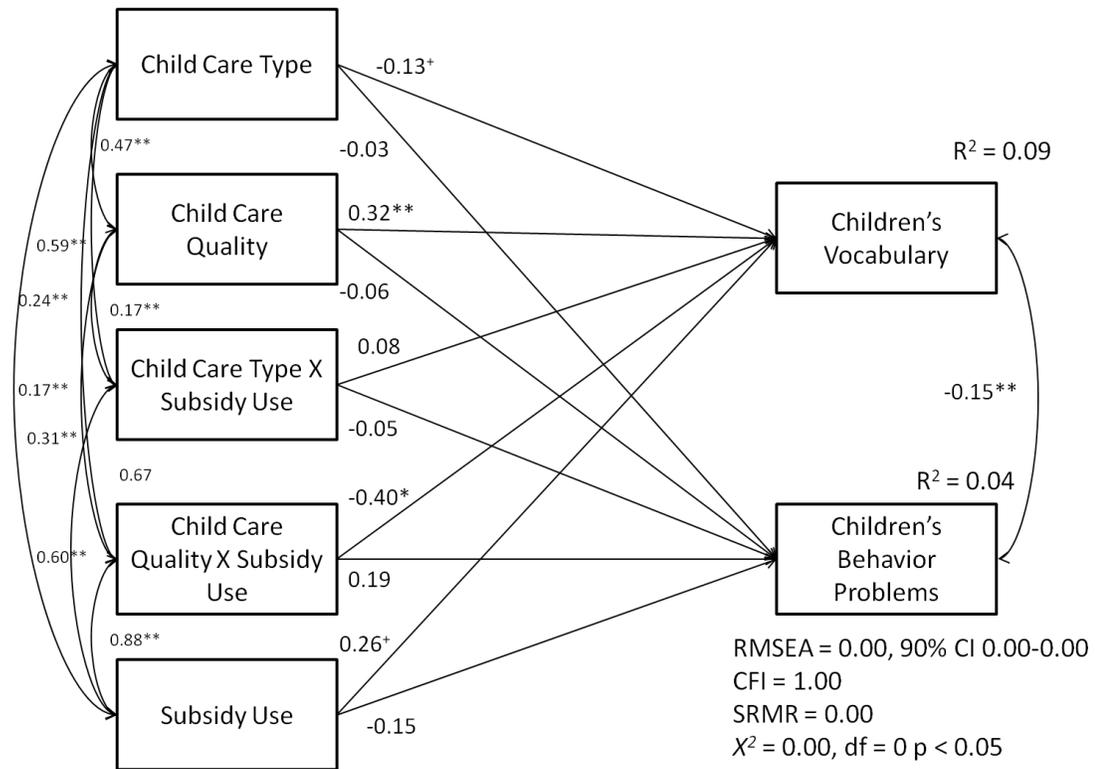


Figure 12. Research Question 3: Standardized estimates for model with interaction. Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ ; Control variables and error terms not shown.

The results of the interaction terms are represented in Figure 13. The results of the analysis revealed that increases in Child Care Quality were positively related to Vocabulary in families eligible for subsidies but not using them. However, in families eligible for subsidies but not using them, this relationship is slightly negative.

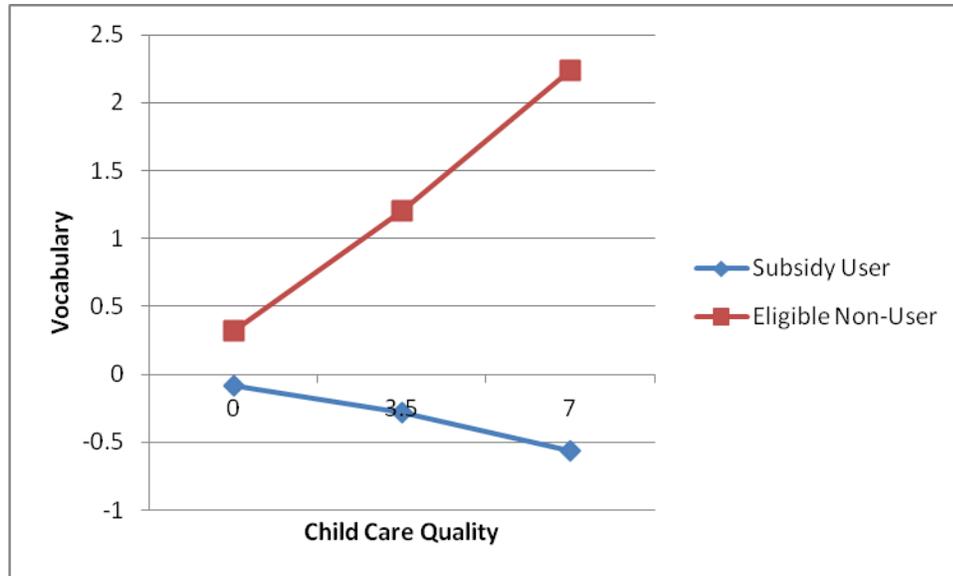


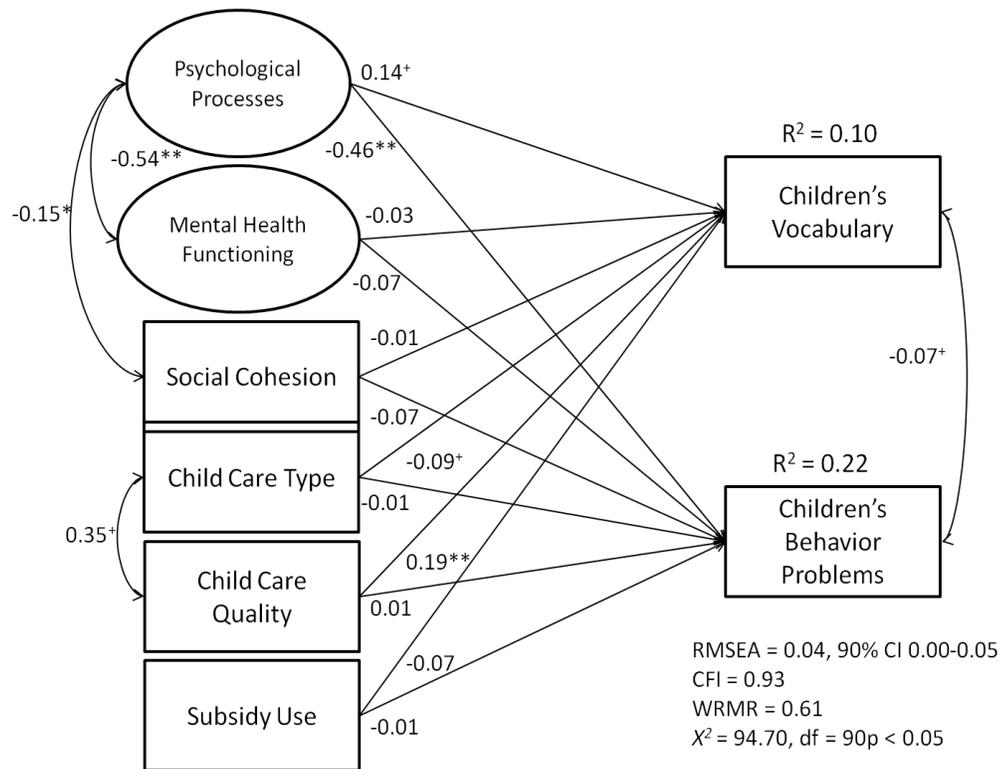
Figure 13. Interaction between Child Care Quality and Subsidy-Use on Vocabulary.

**Research Question 4.** The fourth research question assessed the joint influence of Mother Well-Being, Child Care Type and Quality, and Subsidy-Use in its relation to Children’s Vocabulary and Behavior Problems. To answer this question, only the FES PSM Child Care analytic sample was used. Since the interaction variables relating to Mother Well-Being did not fit the data for the Child Care Sample, those variables were not explored in this research question. The only interaction terms I included were Child Care Quality X Subsidy-Use and Child Care Type X Subsidy-Use. Similar to the other research questions, a two step process was taken. I first evaluated a measurement model. I also included the correlation between the errors of Maternal Stress and Efficacy that was included in the previous model with these data. The measurement model demonstrated good fit ( $X^2 = 91.54$ ,  $df = 73$ ,  $p > 0.05$ , CFI = 0.99, RMSEA = 0.03, WRMR = 0.49) and no additional modifications were suggested.

The full structural model demonstrated good fit ( $X^2 = 104.72$ ,  $df = 73$ ,  $p > 0.05$ , CFI = 0.97, RMSEA = 0.02 WRMR = 0.64), and a few of the paths were significant.

Psychological Processes was significantly related to Vocabulary ( $\beta = 0.14, p < 0.01$ ). Child Care Quality was significantly related to Vocabulary ( $\beta = 0.24, p < 0.01$ ). Neither of the interaction terms were significantly related to either of children's developmental outcomes. I therefore decided to test this model without the interaction model to create a more parsimonious model.

The full structural model without the interaction demonstrated good fit ( $X^2 = 94.70, df = 64, p < 0.05, CFI = 0.93, RMSEA = 0.04, WRMR = 0.61$ ), and several of the same paths were significant. Psychological Processes trended toward significance in relation to Vocabulary ( $\beta = 0.14, p < 0.10$ ) and was significantly related to Behavior Problems ( $\beta = -0.45, p < 0.01$ ). Further, Child Care Quality was significantly related to Vocabulary ( $\beta = 0.19, p < 0.01$ ). Child Care Type trended toward significance in relation to Vocabulary ( $\beta = -0.09, p < 0.10$ ). The independent variables accounted for about 10% of the variance in Children's Vocabulary scores and 22% of the variance in Behavior Problems in this model. See Figure 14.



*Figure 14.* Research Question 4: Standardized estimates for model  
*Note:* \*  $p < 0.05$ , \*\*  $p < 0.01$ ; +  $p < 0.10$ ; Non significant correlations were deleted from the figure for ease of interpretation; Control variables and error terms not shown.

**Research Question 5.** To answer the fifth research question, which asked how the previous research questions varied based on state subsidy laws, I first grouped states based on variations in these laws in their states of residence. Careful examination of CCDF policies and state level variations led to the determination that there was no way to perfectly group the states on several policies at once to represent “strict” and “less strict” implementation of CCDF laws. Consequently, I chose two policy decisions at the state level with which to group the states. Before grouping states, I first examined the state of residence by year of data collection of the participants in the final FES PSM In-Home and FES PSM Child Care samples. Since the child care observations occurred only in states within the original sampling frame, there were only 14 states of residence in the

FES PSM Child Care sample. The final FES PSM In-Home sample, however, contained participants living in 32 states.

The first state-level grouping I decided to test involved the cut-off level of state median income (SMI) that determined family eligibility in the year of data collection. To account for the fact that some states had very few residents in the sample (ex. Washington) and others had many residents (ex. New Jersey), I multiplied the number of residents in a particular state by the SMI in that state in the year of data collection. I then took the average of this number and created a mean split of states into “high” and “low” SMI cut offs for eligibility in each sample. I then created two groups: (1) those states that allowed families to be eligible for subsidies whose income is a higher SMI level (income eligibility cut off from 57% up to 85% SMI) and (2) those states that allowed families to be eligible for subsidies whose income is a lower SMI level (income eligibility cut off up to 57% SMI). I next grouped states as to whether there was a waitlist for subsidies in that state in the year of data collection. Existence of a waitlist represents two groups of states, (1) those with a waitlist and (2) those without a waitlist i.e. those serving all eligible families. These groups are significantly correlated; See tables H1 and H2 in Appendix H for a list of states and their groupings.

Since differences in the subsidy eligibility cut off may not be evident for families who live in states close to the mean split for SMI eligibility level (i.e. Ohio funds families whose incomes are at or below 57% SMI and Pennsylvania funds families whose incomes are at or below 58% SMI), I conducted a series of sensitivity analyses for each of the models tested for this research question. To do this, I compared two groups of families: (1) those who lived in states that allowed families to be eligible for subsidies at

the lowest third of the SMI levels in this whole sample (income cut off up to 51% SMI) and (2) those states that allowed families to be eligible for subsidies in the highest third of the SMI levels in this sample (income eligibility cut off from 61% to 87% SMI). Results indicated no differences in the sensitivity analyses compared to the final analyses presented below. See Tables H5 to H12 in Appendix H for the results of all of the tests.

***State Groupings.*** In the FES PSM In-Home sample, about 47% of participants ( $n = 702$ ) lived in states that set the income cut off for subsidy eligibility for families with incomes up to 57% SMI (Low SMI Group), about 53% of participants ( $n = 789$ ) lived in states that set the income cut off for subsidy eligibility for families with incomes up to 85% SMI (High SMI Group). About 35.5% of participants ( $n = 530$ ) lived in states with a waitlist for subsidies (Waitlist Group), and about 64.5% of participants ( $n = 961$ ) lived in states without a waitlist for subsidies (No Waitlist Group). These two groupings are significantly correlated ( $\phi = -0.48, p < 0.01$ ). That is, states who set lower income eligibility cut-offs tend not to have waitlists.

In the FES PSM Child Care sample, about 35% ( $n = 144$ ) of participants lived in states who set the income cut off for subsidy eligibility to families with incomes up to 57% SMI (Low SMI Group), about 65% of participants ( $n = 270$ ) of participants lived in states who set the income cut off for subsidy eligibility to families with incomes up to 85% SMI (High SMI Group). About 44% of participants ( $n = 183$ ) lived in states with a waitlist for subsidies (Waitlist Group) and about 56% of participants ( $n = 231$ ) lived in states without a waitlist for subsidies (No Waitlist Group). These two groupings are significantly correlated ( $\phi = -0.50, p < 0.01$ ). That is, states who set lower income eligibility cut-offs tend not to have waitlists.

*Multiple Group and Latent Class Analysis.* To examine whether the relationships from research questions one through four are different depending on states' SMI eligibility cut-off or use of a waitlist, multiple group analyses (MGA) and latent class analyses (LCA) with known classes were employed for each of the final models in those research questions for each grouping (i.e. two sets of analyses were employed for each model). Best practices of MGA suggest first testing the model without specifying any groups, next testing the model separately for each group, then testing a configural model in which no constraints are held between groups and finally testing for model invariance starting with a fully constrained model (Kenny, 2011). I followed these recommendations for each of the models that required MGA. To assess group differences in the models which had latent variable interactions (Research Question 2 for the In-Home Sample), I employed latent class analysis (LCA) with known groups since MGA would not handle this type of model. Muthen (the creator of MPlus) recommends using LCA to run a MGA in this framework (Muthen, 2011). To run the LCA models, I first tested the model as a whole, then tested the model independently for each group, tested a configural model and then ran a fully constrained model and tested parameter constraints using a Wald Test for significance across the constraints.

Further, as I was only interested in the differing relationships between the paths of these models, I only tested invariance in the paths in both MGA and LCA. In MPlus, when using MGA or LCA, the factor loadings, intercepts and thresholds are constrained across groups automatically. In the models I tested, I constrained the path loadings to be equal across groups as well and depending on model fit and modification indices, freed

paths accordingly. I did not examine the factor loadings, intercepts and thresholds for invariance in any of the models, since this was not of interest in my research question.

However, before employing the MGAs and LCAs of the research question, I tested for invariance of the factor loadings in each of the groups both samples, since factor loading invariance is essential when testing structural invariance in MGAs and LCAs even if I was not interested in testing invariance across groups (Kenny, 2011). To accomplish this, I ran two sets of MGAs for each of the factor models in each sample. Both samples the MGAs demonstrated good fit with the factor structure and constrained loadings across groups (RMSEA < 0.01, CFI > 0.99 and WRMR < 0.82 in both samples). Based on these results, I felt confident moving forward in testing path invariance.

To compare the nested models when releasing the path constraints, I used a standard chi-square difference test for the two models that were estimated using the maximum likelihood (ML) estimator (Research Question 3). For the models that were estimated using the Weighted Least Squares Measurement (WLSM) estimator I calculated the chi-square difference test using the Satorra-Bentler scaled chi-squared difference test recommended on the MPlus website which adjusts the estimated chi-square value.

***Research Question 1.*** To assess whether mean levels of Maternal Well-Being, Vocabulary, Behavior Problems, Child Care Type and Quality differed whether or not eligible families used subsidies in states with different policy variations, I conducted two sets of MGAs for both policy variations in the group code models used to assess the first research question. Results indicated that state-level policy variations were generally not

related to differences in the mean levels of any of the variables of interest whether or not families used subsidies in either sample.

Table 13.

*Research Question 5: Unstandardized Estimates of MGA of RQ 1*

	FES PSM In-Home Sample		FES PSM Child Care Sample	
	SMI Groups	Waitlist Groups	SMI Groups	Waitlist Groups
	Estimate	Estimate.	Estimate	Estimate
Anxiety	-0.12	-0.12	0.06	0.07
Depression	0.09	0.05	0.20	0.19
Stress	-0.28	-0.41	0.23	-0.08
Efficacy	-0.18	-0.19	-0.13	-0.10
Mastery	0.29	0.30	0.01	0.03
Social Support	0.41 <sup>+</sup>	0.36 <sup>+</sup>	0.43	0.39
Social Control	-0.36	-0.30	--	--
Social Cohesion	-0.32	--	0.25	0.23
Waitlist	--	0.23	--	--
No Waitlist	--	-1.07*	--	--
Mental Health Functioning	0.02	0.00	--	0.18
Psychological Processes	0.18	0.19	-0.05	0.03
Neighborhood Processes	-0.33	--	--	--
Waitlist	--	0.19	--	--
No Waitlist	--	-1.00*	--	--
Children's Vocabulary	0.69	0.46	-0.63	-0.53
Behavior Problems	-0.06	-0.19	0.24	0.13
Child Care Type	--	--	0.25**	0.25**
Child Care Quality	--	--	0.27 <sup>+</sup>	0.20

Note: Control Variables Included in the models

Several differences emerged in the FES PSM In-Home Sample. Mean levels of Social Cohesion in families using subsidies varied whether or not families lived in states with a waitlist. That is, in states without a waitlist, mothers reported significantly less Social Cohesion if they used subsidies, compared to eligible non-users. In states with a waitlist, this relationship was not significant. Mothers' mean levels of Neighborhood Processes also varied based on residence in a state with a waitlist. That is, in states

without a waitlist for subsidies, mothers who used subsidies reported lower overall Neighborhood Processes than eligible non-users. In states with a waitlist, this relationship was not significant. See Table 13 for full results.

***Research Question 2.***

*In-Home Sample.* To assess group differences in the final models of the second research question of the FES PSM In-Home Sample, I ran a series of latent class analyses (LGA) with known groups, since there were two latent variable interactions terms in the final model and an MGA would not handle this type of model appropriately. I first ran a fully constrained model and tested parameter constraints using a Wald Test to assess significance across groups. Both LCAs indicated that a fully constrained model fit the data. The Wald Test in each LCA was not significant, suggesting the null-hypothesis, that the paths are equal across groups. See Tables 14 and 15 for LCA results.

Table 14.

*Research Question 5: Model Fit Indices of LCA of RQ 2 FES PSM In-Home Sample*

Model	Likelihood	AIC	BIC	Wald Test ( <i>df</i> )	<i>p-value</i>
<b>In-Home Sample: SMI Grouping</b>					
Fully Constrained	-31,469.74	63,223.49	63,945.92	6.11 (10)	0.81
Unconstrained	-31,466.51	63,237.02	64,010.33		
<b>In-Home Sample: Waitlist Grouping</b>					
Fully Constrained	-31,434.45	63,152.91	63,875.34	8.88 (10)	0.40
Unconstrained	-31,429.96	63,163.91	63,937.91		

Table 15.  
*Research Question 5: Unstandardized Path Coefficients of LCA of RQ 2 FES PSM In-Home Sample*

	SMI Grouping		Waitlist Grouping	
	Vocabulary	Behavior	Vocabulary	Behavior
Psychological Processes	2.49*	-4.63**	2.46*	4.68**
Mental Health Functioning	0.51	-0.55*	0.50	-0.59*
Neighborhood Processes	-0.21	-0.08	-0.21	-0.03
Subsidy-Use	-0.71	-1.48	-0.74	-1.20
Psychological Processes X Subsidy-Use	--	1.60 <sup>+</sup>	--	1.65*
Mental Health Functioning X Subsidy-Use	--	0.76*	--	0.80*

*Child Care Sample.* In the FES PSM Child Care Sample similar results were observed. That is, a fully constrained model fit the data best for both sets of MGAs (See Tables 16 and 17). No modification indices of paths were suggested to improve model fit in either the SMI or the Waitlist MGAs. These results signified that the relationship between Mother Well-Being and Children’s Vocabulary and Behavior Problems did not vary whether families lived in states with different levels of SMI eligibility cut-offs or the existence of a waitlist for subsidies.

Table 16.  
*Research Question 5: Model Fit Indices of MGA RQ 2 FES PSM Child Care Sample*

Model	$X^2$	$df$	$\Delta X^2$	WRMR	CFI	RMSEA
FES PSM Child Care Sample: SMI Grouping						
Fully Constrained	131.56	119		0.85	0.98	0.02
Unconstrained	122.74	111	> 0.05	0.834	0.973	0.03
FES PSM Child Care Sample Waitlist Grouping						
Fully Constrained	120.21	119		0.80	1.00	0.01
Unconstrained	117.79	111	> 0.05	0.79	0.98	0.02

Table 17.

*Research Question 5: Unstandardized Path Coefficients of MGA RQ 2 FES PSM Child Care Sample*

		SMI Grouping		Waitlist Grouping		
		Vocabulary	Behavior	Vocabulary	Behavior	
Psychological Processes		1.48 <sup>+</sup>	-3.09**	1.65*	-3.11**	
Mental Health Functioning		-0.11	-0.15	0.07	-0.91	
Social Cohesion		0.01	0.12	-0.02	0.11	
Subsidy-Use		-2.05	0.42	-2.26	-0.07	
$R^2$	Low SMI	6%	19%	Waitlist	6%	20%
	High SMI	6%	23%	No Waitlist	7%	25%

**Research Question 3.** A similar MGA was employed to assess the third research question. In regards to the SMI grouping, one modification index suggested freeing the path between Subsidy-Use and Vocabulary, but this did not significantly improve model fit. These results indicated a fully constrained model fit the data best for the path analysis (See Tables 19 and 20). That is, the relationship between Child Care Type, Quality, Subsidy-Use and Children’s Vocabulary and Behavior Problems did not vary whether families lived in states with variations in state SMI eligibility levels.

However, slightly different results emerged when comparing the MGA of the Waitlist Groups. Although the fully constrained model fit the data, modification indices suggested freeing the path from Child Care Quality to Vocabulary to improve model fit. I freed this path and re-ran this model. New modification indices suggested freeing the path from Subsidy-Use to Behavior Problems. I freed this path and re-ran this model. No further modifications were suggested. This final model demonstrated good fit, and  $X^2$  difference tests revealed that the final model was a significantly better fit to the data than

the fully constrained model (see Table 18). An examination of the paths reveals an interesting pattern. In states without a waitlist, Child Care Quality was more strongly related to Children’s Vocabulary compared to states with a waitlist. Further, in states with a waitlist, Subsidy-Use was significantly related to a decrease in Behavior Problems, but in states without waitlist this relationship is not significant.

Table 18.

*Research Question 5: Model Fit Indices of MGA RQ 3*

Model	$X^2$	Df	$\Delta X^2$	SRMR	CFI	RMSEA
FES PSM Child Care Sample: SMI Grouping						
Fully Constrained	15.29	10	---	0.01	1.00	0.05
Free Path Subsidy/Vocabulary	14.19	9	> 0.05	0.01	1.00	0.05
Unconstrained	0.00	0	> 0.05	0.00	1.00	0.00
FES PSM Child Care Sample Waitlist Grouping						
Fully Constrained	18.13	10	--	0.02	1.00	0.06
Free Path Quality/Vocabulary	10.47	9	< 0.01	0.01	1.00	0.03
Free Path Subsidy/ Behavior	4.28	8	<0.05	0.01	1.00	0.00
Unconstrained	0.00	0	> 0.05	0.00	1.00	0.00

Table 19.

*Research Question 5: Unstandardized Path Coefficients of MGA RQ 3*

	SMI Grouping		Waitlist Grouping	
	Vocabulary	Behavior	Vocabulary	Behavior
Quality	3.07**	-0.52	--	-0.45
Waitlist	--	--	2.12**	--
No Waitlist	--	--	4.85**	--
Type (center)	-3.28	-0.32	-3.03	-1.17
Subsidy-Use	9.04*	-2.87	9.78**	--
Waitlist	--	--	--	-6.58*
No Waitlist	--	--	--	-0.82
Quality X Subsidy	-2.94**	0.96	-3.14**	0.94
Type X Subsidy	1.63	-1.32	1.38	0.05
$R^2$				
Low SMI	7%	3%	Waitlist	7%%
High SMI	11%	7%	No Waitlist	15%

**Research Question 4.** Finally, I investigated state of residence variation for the fourth research question. Both sets of MGAs indicated a fully constrained model fit the data best for the structural equation model for both sets of groupings (see Tables 20 and 21). This signifies that the relationship between the Mother Well-Being, Child Care, Subsidy-Use and Children’s Vocabulary and Behavior Problems did not vary based on whether families lived in states with variations in state SMI eligibility levels.

Table 20.

*Research Question 5: Model Fit Indices of MGA RQ 4*

Model	$X^2$	$df$	$\Delta X^2$	WRMR	CFI	RMSEA
FES PSM Child Care Sample: SMI Grouping						
Fully Constrained	162.14	137	---	0.93	0.97	0.03
Unconstrained	149.44	125	>0.05	0.88	0.96	0.03
FES PSM Child Care Sample Waitlist Grouping						
Fully Constrained	154.15	137	---	0.90	0.96	0.03
Unconstrained	145.44	125	<0.05	0.79	0.95	0.03

Table 21.

*Research Question 5: Unstandardized Path Coefficients of MGA RQ 4*

	SMI Grouping		Waitlist Grouping	
	Vocabulary	Behavior	Vocabulary	Behavior
Psychological Processes	1.80 <sup>+</sup>	-2.79**	-1.80 <sup>+</sup>	-2.79**
Mental Health Functioning	0.20	-0.71	0.20	-0.71
Social Cohesion	-0.03	0.10	-0.03	0.10
Subsidy-Use	1.73	0.41	1.73	0.41
Child Care Type	-22.80	-2.32	-22.80	-2.32
Child Care Quality	5.71	0.24	5.71	0.24
$R^2$				
Low SMI	13%	24%	Waitlist 13%	22%
High SMI	10%	28%	No Waitlist 18%	23%

## Summary

Table 22 provides a summary of the results from the research questions I examined in this chapter.

Table 22.

### *Overview of Results*

Research Question	Results
RQ 1	<ul style="list-style-type: none"> <li>• No differences on Well-Being, Vocabulary, Behavior Problems or Child Care Quality based on Subsidy-Use</li> <li>• Families that use subsidies choose Center-Based care more often</li> <li>• Psychological Processes is positively related to Vocabulary</li> <li>• Psychological Processes is negatively related to Behavior Problems</li> </ul>
RQ 2	<ul style="list-style-type: none"> <li>• Mental Health Functioning is negatively related to Behavior Problems</li> <li>• Psychological Processes X Subsidy-Use is positively related to Behavior Problems</li> <li>• Mental Health Functioning X Subsidy-Use is positively related to Behavior Problems</li> </ul>
RQ 3	<ul style="list-style-type: none"> <li>• Child Care Quality is positively related to Vocabulary</li> <li>• Child Care Type is positively related to Vocabulary</li> <li>• Subsidy-Use is positively related to Vocabulary</li> <li>• Child Care Quality X Subsidy-Use is negatively related to Vocabulary</li> <li>• Psychological Processes is negatively related to Behavior Problems</li> </ul>
RQ 4	<ul style="list-style-type: none"> <li>• Psychological Processes is positively related to Vocabulary</li> <li>• Child Care Quality is positively related to Vocabulary</li> <li>• Child Care Type is positively related to Vocabulary</li> <li>• In states without a waitlist for subsidies, families using subsidies have lower mean Social Cohesion and Neighborhood Supports than subsidy eligible non-users.</li> </ul>
RQ5	<ul style="list-style-type: none"> <li>• In states without a waitlist for subsidies, Child Care Quality is more strongly related to Vocabulary than in states with a waitlist</li> <li>• In states with waitlist, Subsidy-Use is related to fewer Behavior Problems than in states without a waitlist</li> </ul>

## **Chapter 5: Discussion**

In this research, I examined the relationships between child-care subsidies, mother well-being, child care and children's academic and social development in a sample of subsidy-eligible families when children were about three years old. In addition, I explored how state-level policy differences are related to these relationships. This research adds to the literature in the field by providing additional support for prior findings of positive relationships between maternal well-being, child-care quality and developmental outcomes. In addition, in this study, new findings in regards to interactions between well-being, quality, and subsidy-use in relation to children's vocabulary and behavioral outcomes were uncovered. These findings, as well as implications for policy, research and future directions will be discussed in this chapter.

### **Overview of Results**

Using a child-care subsidy-eligible sample from the Three Year In-Home and Child Care Observation waves of the Fragile Families and Child Well-Being Study, I estimated the relationships between constructs of maternal well-being, subsidy-use, child care and children's vocabulary and behavior problems. Overall the results indicate:

- (1) Child subsidy-use is not independently related to children's vocabulary scores or behavior problems, maternal well-being or child care quality;
- (2) Maternal well-being is strongly related to children's vocabulary scores and behavior problems;
- (3) Child care quality is strongly related to children's vocabulary, and child-care type and subsidy-use is modestly related to vocabulary;

- (4) For families who use subsidies, the relationship between maternal well-being and behavior problems is not as strong compared to eligible non-users;
- (5) For families who use subsidies, the relationship between child-care quality and vocabulary scores is not as strong compared to eligible non-users;
- (6) State-level variation in CCDF policies are related to differences in some of these relationships.

## **Key Findings**

### **Child Care Subsidy-Use Is Unrelated to Developmental Outcomes**

Few researchers have found a strong, consistent relationship between the use of child-care subsidies and children's pre-academic and social development; the findings are thus far inconclusive. Current research on the topic suggests either negative associations between subsidy-use and later academic achievement and social development (Hawkinson, et al. 2013; Herbst & Tekin, 2010a) or no associations (Brooks, 2002; Johnson, 2010). However, these studies differ from my dissertation in a variety of ways. First, in most of these studies, researchers investigated the relationship between subsidy-use during the year before kindergarten and children's subsequent performance on measures the following year. I examined these relationships when children were three years-old, two years before kindergarten. Perhaps there is a difference between the experiences children have in child care the year immediately before kindergarten compared to two years before kindergarten. In fact, there is evidence that these programs place more of an emphasis on education and school readiness, and this is evidenced by the fact that more parents place their children in center-based programs with an academic focus as they get older (Meyers, et al., 2002).

There are also more free or reduced priced early care and education options in the year prior to kindergarten than when children are three years old. Johnson, et al., (2010) found that overall, compared to eligible non-users, subsidy-users choose lower quality child-care for their children, but when teased apart, this is due to high quality care found in Head Start and Public Pre-Kindergarten programs compared to settings parents paid for with subsidies. The same children who would be attending child care settings with subsidies at three years of age may transfer to these programs when they are four to prepare for kindergarten.

Second, most of these studies also only limited their samples to low-income families or single mother households and did not look exclusively at subsidy eligible families using state rules for eligibility (Brooks, 2002; Hawkinson, et al., 2013, Herbst & Tekin, 2010a). Associations in these papers may therefore represent a more disadvantaged group versus a general low-income group. In most states, the lowest-income families (e.g., those receiving TANF), or those determined to be most at risk are prioritized for subsidies (Minton, et al., 2010). Therefore the associations between subsidy-use and negative child developmental outcomes found in these studies may highlight differences in risk status instead of an actual effect of subsidy-use.

Given that my dissertation was the first study that I know of to examine these relationships in a sample of three-year old children, the findings make a unique contribution. Perhaps at three-years of age, children's emerging competencies in vocabulary-use and their self-regulatory skills that might be measured by behavioral indicators are not influenced as strongly by child care programs as they might be as they

get older. With pre-kindergarten programs that have educationally based curricula, the relationship between these variables may change.

Differences between my research and other studies may also be due to the way in which I limited my sample. I not only limited the sample to subsidy-eligible families, but I also matched mothers on a variety of demographic characteristics related to subsidy-use, including maternal race, maternal education and maternal nativity status. It is possible that the family level demographics controlled in my research contributed to the differences between my work and other research. This strict set of controls has the advantage of making sure that the significant associations are due only to the variables of interest, i.e. subsidy-use, but also the limitation of controlling for factors that might influence the choice to use subsidies or family circumstances that could explain why families choose to use subsidies. Thus, it is possible that the findings would have been different if I used fewer controls

Despite these differences, my results are consistent with two studies that found null relationships between subsidy-use and children's developmental outcomes. For example, Johnson (2010) did not find any relation between subsidy-use in preschool and school readiness measures at kindergarten using the ECLS-B dataset (Johnson, 2010). Similarly, Brooks (2002) found no association between subsidy use and academic achievement in kindergarten. Another reason for the lack of association (which is also evident in the prior studies) could be that I only assessed subsidy-use at one time point. It is unclear how long families had been using subsidies. There could not be a relationship because most families just started using subsidies, and therefore the impact of the program was not evident yet. Future research should gauge how long families have been

using subsidies so a more accurate assessment of the influence of subsidy-use can be investigated.

The Child Care and Development Fund (CCDF) was created as a program to support parent work options, not to support children's development. Any unplanned influence on children's academic and behavioral outcomes would be a potentially powerful though unintended benefit of subsidy-use. This hypothesis was not supported in my research, but based on Bronfenbrenner's Ecological Systems Theory, the impact of subsidies is most likely indirect; through parent work characteristics, mother well-being or child care (Bronfenbrenner, 1979). Since there are positive associations between subsidy-use and maternal work characteristics, the impact of subsidies on children could be through maternal work. Mothers who use child-care subsidies work more stable jobs, work for longer stretches of time and report fewer work disruptions than eligible non-users (Forry & Hofferth, 2011; Michalopoulos, et al., 2010; Press, et al., 2006). It is therefore more likely that there would be significant differences between maternal factors of well-being and subsidy-use. This finding however was also not substantiated in my dissertation.

### **Child Care Subsidy-Use Is Unrelated to Maternal Well-Being**

The very limited research on the relation between subsidy-use and mother well-being is contradictory at best. Some researchers find that mothers using subsidies have increased depression, stress and more health problems (Baker, et al., 2008; Herbst & Tekin, 2012), while other researchers have found positive associations. Mothers who use subsidies report less financial strain than eligible non-users (Forry, 2009; Ha, 2009).

Considering these findings, it was surprising that there were no differences between the constructs and factors of well-being and child-care subsidy-use in my dissertation.

It is possible that the stringent controls in my models, including the propensity score matching, may have contributed to the lack of significant results. By controlling for so many family-level variables, I may have reduced the variation in the sample on the constructs of well-being. For example, I controlled for nativity status and household size in the matching procedure. Extant research demonstrates that immigrant families tend to live in larger households (sometimes used as a proxy for social support) and use subsidies less compared to non-immigrant families. Perhaps in controlling for these variables, the variation in the social support construct was reduced. Given the above mentioned negative associations between well-being and subsidy-use, this null finding might be viewed from another perspective. It could be considered as a potential positive outcome, in that subsidy-use is unrelated to maternal well-being. Given the demands that the subsidy program places on mothers in some states (i.e. increased work hours), it is positive that these mothers are not overly stressed, depressed or feel overwhelmed in satisfying these requirements.

### **Child Care Subsidy-Use Is Unrelated to Child Care Quality**

I also did not find a significant relationship between subsidy-use and child-care quality. Although type of care was related to subsidy-use (center-based care arrangements were more often chosen by subsidy-users), quality was unrelated to use of subsidies in this study. This is surprising given that Ryan et al. (2011) found an association between quality and subsidy-use with the same dataset. Closer examination of variable selection and sampling procedures reveals important differences between the

two studies. First, the way in which the samples were limited were distinct (for example, my sample was limited to biological mother respondents). Second, I utilized propensity score matching to control for demographic differences of families in my sample. Because of this, my sample yield was slightly smaller. Third, I used maternal report of subsidy-use, while Ryan and colleagues utilized provider report. The rates of subsidy-use differed by 10%: Ryan, et al. (2011) reported a subsidy-use rate of 47%, while mine was 37%. A recent research brief by Johnson and Herbst (2012) reveals that mother and provider agreement on report of subsidy-use is around 80%. Finally, Ryan and colleagues (2011) examined relationships between program type (e.g., center based vs. family based) and child care quality, which was not a variable in my research.

Johnson et al. (2012), using the ECLS-B dataset, found a negative relationship between use of subsidies and child care quality in the year before kindergarten. Similar to my research, the sample in this study was reduced to a subsidy eligible group of families, using state laws for subsidy eligibility. The researchers suggested that differences in quality could be explained by families' use of other free or subsidized programs. When families used either Head Start or Public Pre-Kindergarten compared to just using a subsidy, quality was reduced. But in comparing quality of those who just used a subsidy versus those who did not use a subsidy, Head Start, or Public Pre-Kindergarten, those families using subsidies placed their children in higher quality care (Johnson, et al., 2012). This highlights the complex relationship between subsidy-use and quality, and depending on the comparison group, sources of data and control variables, differences between studies emerge. Given the tremendous variation across these variables, as well as different measures and information sources, it is not surprising

that there is some variation that needs further consideration before any conclusions might be drawn on these particular questions.

Another important difference when comparing my research with that of Johnson et al. is the population that formed the basis for the sample. The ECLS-B is a nationally representative data set, compared to the Fragile Families and Child Well-Being Study, which targeted at-risk mothers and their children from large U.S. cities when children were born. The Fragile Families and Child Well-Being Study targeted low-income mothers and there was an oversampling of non-marital births in the baseline wave of data collection. Even after employing the sample limits I used, there were still a substantial proportion of mothers in my sample who were unmarried (53%), which is more than the national average during the years of data collection (Ventura, & Bacharach, 2000). Although I controlled for marital status in my models, my sample is not representative of either subsidy eligible families or low-income families in the United States.

### **Mother Well-Being is Related to Developmental Outcomes**

A large body of research has supported the positive impact of maternal well-being on children's academic and social development (Chazan-Cohen, et al., 2009; Church, et al., 2012; McLoyd, 1998; Peisner-Feinberg, et al., 2001; Teo, et al., 1999). Individually, constructs of well-being, such as stress, depression, and social support have been linked with children's developmental outcomes. Mothers who report more stress have young children with more behavior problems and lower academic achievement compared to mothers who report less stress (Church, et al., 2012; Teo, et al., 1999). Mothers who report more social support have children with fewer behavior problems and greater academic achievement (Mulia, et al., 2008; Skowron, 2005). Mothers with more

depression have children with more behavior problems (Parke, et al., 2004). These relationships are supported by the Family Stress Model (Conger, et al., 2002).

These constructs of well-being are also highly related. Mothers who report more stress have fewer feelings of efficacy, or competency as a parent, and less social support (Raikes & Thompson, 2005). Lee, Lee and August (2011) demonstrated that social support mediated the relationship between maternal stress and depression in predicting children's behavior problems. That is, in families with children who have more behavior problems, income was more strongly related to social support than for families with children with fewer behavior problems. Similarly, Church and colleagues (2012) found that maternal mastery is not independently related to children's behavior problems, but is related to other aspects of parent well-being, including stress, aggressive parenting and family income which are directly related to children's behavior problems. By using factors to represent these constructs, and correlating the factors, I was able to account for these interrelations. This also highlights the fact that these constructs are not independent predictors of young children's social and academic competencies and by creating factors to represent the constructs I was able to explore these relations together.

Maternal well-being may be even more important in mothers who have low-incomes. Low-income mothers report more stress and mental illness (Cardoso, et al., 2011), and generally report fewer feelings of mastery and efficacy as parents than middle-class mothers (Raikes & Thompson, 2005). Despite overall low well-being, in studies with low-income samples, well-being is still strongly linked with young children's academic and social development and these findings were replicated in my dissertation. The link between psychological processes and both vocabulary scores and

behavior problems (compared to the other well-being factors) is most strongly supported by previous studies. Stress and social support in particular have been two constructs that are not only heavily related, but also strongly indicative of young children's academic and social development and these findings were supported in my study (Cardoso, et al., 2011; Keating-Lefler, et al., 2004; Skowron, 2005).

One puzzling finding surrounds the negative association between mental health functioning and children's behavior problems. Although a large body of research on this topic finds that increases in maternal depression are related to increases in behavior problems in young children (Lee, et al., 2011; Turney, 2012; Parke, et al., 2004; van der Toom, et al., 2010), conflicting evidence suggests that including maternal anxiety in models alongside depression as a predictor may muddy the water. Some researchers have found that maternal anxiety is either unrelated to children's behavior problems (ex. van der Toom, et al., 2010), related to an increase in behavior problems (ex. Sales, Greeno Shear, & Anderson, 2004) or related to a decrease in behavior problems (ex. Zerk, Mertin & Proeve, 2009). For example, Zerk and colleagues (2009) found that when parenting stress was introduced into their model examining the relationship between psychological illness and children's behavior problems, maternal report of anxiety was positively related to children's scores on the Child Behavior Check List (CBCL) in a low-income sample of mothers (the same measure used for behavior problems in my study).

Another possible explanation could be the use of the CBCL total score to represent children's behavior problems. Although many studies use the total score as the measure for children's overall behavior problems, it could be that this relationship is more complicated. By using the total CBCL score, other variables such as internalizing

behavior problems and externalizing behavior problems could be obscured. Perhaps different relationships would emerge with the use of these scores. Future research should examine other sub scores of the CBCL.

### **Interaction Between Well-Being and Subsidy-Use**

A particularly new and interesting finding from this study concerns the interaction between well-being and subsidy-use. For families who use subsidies, the relationship between mental health functioning and behavior problems is reduced compared to eligible non-users. Similarly, for families who use subsidies, the relationship between psychological processes and behavior problems is reduced compared to eligible non-users. However, families who use subsidies do not differ on mean levels of maternal well-being or their children's behavior problems compared to eligible non-users. This raises an interesting question about the potential impact of subsidy-use on social development in these families. Perhaps families using subsidies are somehow more advantaged than eligible non-users. Previous research suggests that families who use child-care subsidies have more stable jobs than eligible non-users (Coci Fianco, et al., 2006). Further, the stability of families who use subsidies might explain why children in these families do not benefit from maternal well-being as much as eligible non-users. When mothers are working more stable jobs, it follows that children's home lives may be more stable as well. For these children, the "pay off" of positive maternal well-being may not be as critical to their developmental trajectory.

Subsidy-use could also be a proxy for another family level characteristic, such as the ability to "work the system" or gain assistance for one's family. It could also be a proxy for persistence. Extant research supports the difficulty in obtaining child-care

subsidies (ex. Yoches & Klein, 2010), so perhaps families who are able to successfully navigate the system and obtain subsidies have other functional competencies that might explain this relationship.

Another possible explanation for this finding could be due to continuity of care. Bacharach and Baumeister (2003) found that families who use child-care subsidies tend to use the same child-care setting over time compared to eligible non users. Children who change child-care settings often tend to have more behavior problems than children who stay at the same setting over time. The Office of Child Care even raised the issue of continuity of care in its recommendations to states about changes in their subsidy programs given the importance of continuity (OCC, 2011). I did not account for how long children had been in their current child-care setting and this unobserved variable could help explain these results.

Finally, these relationships highlight the indirect influence of subsidies on children as illustrated in the Ecological Systems Theory (Bronfenbrenner, 1979). As discussed in the theory, there are distant influences on children that may affect them through their influence on environments closer to them. Therefore, the interaction between subsidy-use and maternal well-being may exemplify how subsidy policy (part of the exosystem, a distal influence) relates to maternal characteristics (part of the microsystem, a proximal influence) to impact the developing child. In this way, subsidies do not directly influence young children, but through these systems they can have an important influence on children's development.

## **Child Care Related to Developmental Outcomes**

Another important and consistent finding with previous research was the positive association between child-care quality and children's academic achievement in my study. A large body of research supports the relationship between high quality child care and children's academic and social development and this association is stronger in young children growing up in poverty (Campbell, et al., 2001; Duncan, et al., 2007; McCartney, et al., 2007). Given that this association was supported in this study with a sample of subsidy eligible families, the robustness of this finding is further sustained. The average income-to-needs ratio in both of my analytic samples were less than 1.00, meaning that the majority of families in these samples fell below 100% of the federal poverty line (less than \$15,260 a year for a family of three in 2003) during data collection. This finding is especially important given that increased child care quality has been associated with increased academic achievement into elementary school (Dearing, et al., 2009; Peisner-Feinberg, et al., 2001). Since children spend so much time in child care, it is encouraging to provide additional evidence on the importance of quality in supporting children's academic development (Peisner-Feinberg, et al., 2001).

Child-care quality was assessed in my research with the Early Childhood Environmental Rating Scale-Revised (ECERS-R). This is a measure of structural quality in child-care settings. Child care settings that are high quality (or have high scores on the ECERS-R) have age appropriate and educationally engaging activities for children. There are health and safety standards that are followed and the staff in these settings have support for training activities and supplemental educational opportunities. The findings support this connection and provide further evidence for the importance of improving

quality in early childhood settings (Burchinal, et al., 2010; Magnuson, et al., 2004; Vandell, et al., 2010; Votruba-Drzal, et al., 2004). It would be interesting to examine relationships between process quality and caregiver sensitivity (other aspects of quality that have been associated with children's academic and social development in other studies) in relation to the child outcomes, although it was not possible to do so in this research. Future researchers should investigate these connections given the importance of quality to children's academic and social development overall.

In the final model for the third research question, child care type trended toward significance in relation to children's vocabulary. That is, families who used center-based child-care programs had children with lower vocabulary compared to families who used family based child care for their children. Although extant research supports the academic benefits of center-based child-care programs (i.e. Huston, et al., 2001; Michalopoulos, et al., 2010), when looking at child-care type in subsidy eligible families, the results are different. Ryan, et al. (2011) found that families using subsidies choose higher-quality family-based child care, but lower quality center-based care. Therefore, the relationship between type of care and children's vocabulary in my study could highlight a difference in quality of care, and not in type of care. I did not examine the interaction between type and quality, but future research should investigate this.

Similarly, subsidy-use also trended toward significance in this model, suggesting that subsidy-use was positively related to children's vocabulary. This relationship could be due to quality as well. Families who use subsidies tend to choose higher quality child-care settings overall (Ryan, et al., 2011). Therefore the positive association between subsidy-use and vocabulary could be due to higher quality setting in families using

subsidies even though mean levels of quality did not differ between families eligible for, but not using subsidies, and subsidy-users in my findings. Given the relationship between vocabulary and the interaction between child-care quality and subsidy-use (described below), differences related to quality most likely explain this finding.

### **Interaction between Child Care Quality and Subsidy-Use**

Another interesting and new finding was related to the interaction between subsidy-use and child-care quality. In families who use subsidies, the influence of child-care quality on vocabulary is not as strong compared to eligible non-users. However, mean quality and vocabulary did not differ whether families used subsidies. This means that although children in subsidy eligible families have the same vocabulary scores, those families who actually use subsidies do not get the same boost on vocabulary scores from high-quality care compared to families who are eligible for but do not use subsidies.

Despite the connection between child care quality and children's academic and social development (Campbell, et al., 2001; Duncan, et al., 2007; McCartney, et al., 2007) the link between child-care subsidies and quality is not straightforward. As discussed previously, the relationship between quality and subsidy-use is complicated. Depending on the type of child care that families using subsidies choose, using subsidies does not appear to have an influence on whether families choose higher quality care (Ryan, et al., 2011). However, other researchers suggest that some unobserved variables related to the child-care setting might explain the relationship between using a subsidy and choosing higher quality care. For example, Antle, et al. (2008) found that child care settings with a high density of subsidized children were lower quality compared to classrooms with either few subsidized children or those that do not accept subsidies at all.

Although mean quality did not differ based on subsidy-use in this study, subsidy density could be a possible explanation for why there were no differences, and could explain the interaction finding between quality and subsidy-use.

Another explanation for this relationship could be due to different decision-making factors that enter into the choice process for subsidy using families compared to eligible non-users. Although child-care settings that accept subsidies also enroll children without subsidies, perhaps there are other things going on in these settings that are not captured in the data that make the relationship between child care quality and children's developmental outcomes less of an influence for subsidy using families. For example, one study found that mothers who identify an increased level of social support from their child-care providers report fewer problems at work and fewer depressive symptoms (Kossek, et al., 2009). In this way, perhaps children in families using subsidies do not need the beneficial effects of quality as much as other children because their mothers have more support, better mental health functioning, and more stable work environments which are all related to better child academic and social outcomes (Chazan-Cohen, et al., 2009).

Similarly, although I controlled for a host of family level demographic and income related variables in my models (including using propensity score matching), there may be other variables less easily identified that I did not capture with this very stringent analytic process. The families who used subsidies in my sample could be somehow more advantaged compared to eligible non-users. For instance, they may have access to child care options that are of higher quality that is not well captured on the ECERS-R. Perhaps there are contextual level family factors that explain this relationship. Families using

subsidies may not be as disadvantaged as those eligible non users; thus children in families not using subsidies benefit most from high-quality child-care because they are most disadvantaged (McLoyd, 1998; Peisner-Feinberg, et al., 2001).

The subsidy process (referral, application, support) might also somehow provide a scaffold of sorts to families using subsidies that are not tapped in the variables included in my dissertation. For example, states are required to use a portion of their overall funds for quality improvement initiatives, and some states use these funds to educate families receiving subsidies about the importance of high-quality child-care. It is possible these initiatives are related to this finding about quality (Fundamental of CCDF Administration, 2011), in that they encourage parents to purchase higher quality care.

### **State Subsidy Laws Related to Relationships**

As reviewed in detail in Chapter 2, child care subsidies are implemented at the state level with few federal guidelines (Minton, et al., 2011). State regulations vary most notably on income level eligibility and number of families states are able serve. These two features underlie the two subsidy variations I chose to examine in my dissertation. Many researchers have demonstrated that implementation of state-level subsidy laws is highly related to child and family characteristics (e.g. Raikes, et al., 2005; Rigby, et al., 2007). These findings are supported in the current investigation, but also raise additional questions that need to be addressed in the future.

State-level regulations of child care in general may also be related to certain provider characteristics that are associated with children's development. Most states do not place specific requirements on the child-care settings that receive children with subsidies. Therefore, the relationship between state regulation, quality and child-

outcomes has been largely ignored. As already noted, states are required to spend a minimum of four percent of their overall funds on quality initiatives; however there is little evidence that these activities would have a direct effect on children's development, specifically since many of these activities include education for consumers and funds for research and referral agencies (Fundamentals of CCDF Administration, 2011).

The state-level variations in subsidy policy may have an indirect influence on children's developmental outcomes but a direct influence on child-care quality. Rigby, Ryan and Brooks-Gunn (2007) found that in states that set higher upper limits for income eligibility, child-care settings overall were higher quality. However, families using subsidies did not purchase this type of care. The authors speculated that the increase in quality may have driven up the price of child care in these settings, making it unaffordable for families receiving subsidies. Similar associations with state-regulation, quality and subsidy-use have been found in other studies (Raikes, et al., 2005).

Vesely and Anderson (2009) found that mothers living in states with a waitlist for subsidies worked fewer hours than those living in states without a waitlist for subsidies. Similarly, mothers worked longer hours in states with tiered eligibility. Tiered eligibility exists in some states to allow families with different income levels different reimbursement rates for subsidies. For example, a family may qualify for a certain subsidy amount if they make one income level, but if they make more than that level, they may still be eligible for aid, although the subsidy amount will be lower. Therefore, mothers are not completely ineligible for subsidies if they make slightly higher incomes, get promotions or are offered the opportunity to work more hours. A recent recommendation by the Office of Child Care suggests that states implement tiered

eligibly for this very reason (OCC, 2011). States without tiered eligibility may unintentionally encourage families to work fewer hours to have less income to be eligible for subsidies.

This could explain the findings in the current study in regards to families living in states with a waitlist. Although income is controlled for in the models, families who live in states without a waitlist are more economically disadvantaged overall. States with waitlists generally set income eligibility levels low. Further, many states prioritize certain families for subsidies. Most often, the most “at-risk” families (i.e. those currently on or transition from TANF, or those with the lowest income) are given priority when there are not enough subsidies for all eligible families (Minton, et al., 2011). Therefore, the fact that high quality child-care has a stronger relationship to vocabulary in families living in states without a waitlist is most likely an effect of differences in the populations of subsidy eligible families in these states. Given that quality child care has more of an influence for the poorest children, this finding may reflect the differential influence (Campbell, et al., 2001; Duncan, et al., 2007; McCartney, et al., 2007).

Differences in the population of families that are served could also be behind the finding regarding social cohesion and neighborhood supports. Results of the first research question demonstrate that families using subsidies that live in states without waitlists (i.e. those serving lower-income families), have lower overall neighborhood support and social-cohesion. Perhaps these families are more at-risk overall, and thus subsidy-use does not cause lower well-being, but families who are prioritized for subsidies have lower well-being to begin with. Similarly, the finding in regards to subsidy-use and behavior problems could be a product of the samples. Results in the

third research question reveal that subsidy-use is negatively related to children's behavior problems in states with a waitlist. This relationship is not significant in states without a waitlist. The children who are receiving subsidies in states with a waitlist may be those who are more at-risk and thus using a subsidy, and receiving the benefits from the child care provider and/or family level supports that were discussed previously, might be related to a reduction in behavior problems. In states without a waitlist, where all eligible children are at similar risk, the benefits of subsidy-use in relation to behavior problems are not evident.

### **Implications and Contributions**

#### **Research**

The body of research on child-care subsidies is limited. Few researchers have examined how subsidies may be related to certain developmental outcomes and/or maternal well-being. My study contributes to this emerging research area in several ways. The findings provide additional evidence that child care quality and maternal well-being are important factors related to children's academic and social development. Further, the finding that the interaction between subsidy-use, maternal well-being and child care quality are related to children's developmental outcomes is a new contribution to the literature. I was able to examine these relationships in a more fine grained analysis for two reasons: I used advanced statistical techniques and I used a subsidy-eligible sample in contrast to a more general low-income sample.

One criticism of the existing literature on child-care subsidies has been the use of a low-income comparison sample as opposed to a subsidy eligible sample. Although some researchers have begun to use state laws to limit samples to subsidy eligible

families (i.e. Johnson, et al, 2011), most have not (i.e. Hawkinson, et al., 2012; Herbst & Tekin, 2010a). By using a child-care eligible, I was able to make connections between the variables of interest based on actual subsidy-use. Had I instead used a general low-income sample, I would have been unable to draw conclusions based on subsidy-use, and thus would not have captured the findings presented here.

The use of propensity score matching (PSM) analyses in my dissertation is a unique strength to this study. PSM analyses subsume the same assumptions that a randomly assigning participants to an experiment does. Therefore, any demographic differences that are related to subsidy use are controlled for. In using this technique, I was able to create an un-biased sample of families eligible for subsidies. While some of my findings differ from previous research, specifically in the relationship between subsidy-use and mental health functioning and psychological processes factors (Baker, et al., 2008; Herbst & Tekin, 2012), this could be a factor of my sample derived through PSM. Using PSM allowed me to create a sample in which families did not differ on demographic variables that have been linked to using subsidies (e.g. Ahn, 2012; Washington & Reed, 2008). Because of this, I examined more closely the relationships between subsidy-use and well-being regardless of demographic differences between families who use subsidies. Perhaps in other studies, these demographic factors explain differences in well-being across subsidy-users. Other findings in my research, such as subsidy-use predicting choice of a center-based program (Ryan, et al., 2011) and quality child-care predicting children's vocabulary (Magnuson, et al., 2004), are consistent with previous research regardless of these controls.

By using PSM, I can more definitively discuss the relationships in my research based on whether families use subsidies, not based on their family background or preferences for care. A large body of research has demonstrated that subsidy-use is related to many demographic factors, including race and ethnicity and nativity status (Grobe, et al., 2008; Hirshberg, et al., 2005; Kinukawa, et al., 2004; Shlay, et al., 2010). Given that single mothers use subsidies at a higher rate than either married or cohabitating parents, and my sample has an over-representation of single mothers, it was important for me to use this variable as an additional control in my dissertation (Ahn, 2012; Kinukawa, et al., 2004).

Finally, by using factor analysis, I was able to test the relationships in my dissertation in a latent framework. For the well-being constructs included in my models, a latent framework is best since constructs such as “stress” and “social control” are unobservable. Using latent variables to represent the scale scores also accounts for the fact that these constructs may be difficult to measure. By using factor analysis, I not only controlled for measurement error in the scales used, but I was also able to identify the underlying relationship between the measured variables. Further, by employing exploratory factor analysis, I was able to discover and identify the specific relationships between the measured variables to more accurately identify different factors of well-being in this sample. As evidenced by my results, there appear to be different relationships between these factors and the dependent variables of vocabulary and behavior problems. If I did not use factors, these relationships may not have been identified or clearly represented.

## **Theoretical Framework**

The findings from my dissertation further support the two theoretical models I used to guide this study. Although neither framework was directly tested, the findings support the associations discussed in each theory.

### **Family Stress Model**

The Family Stress Model postulates that economic hardship does not have a direct influence on children's development, but through a series of pathways, economic hardship influences parents' emotional and behavioral functioning, which influences their parenting practices and in turn influences children's developmental outcomes (Conger & Conger, 2008). Although the family stress model was not tested directly, the model is supported in my dissertation. The findings support that maternal well-being influences children's development. Although maternal well-being specifically is not part of the original family stress model, variables used to represent maternal emotional and behavior functioning include some variables of well-being that I used in this study. For example, Conger and colleagues (2002) explored the connections between parental depression and parenting practices, which influenced children's developmental outcomes. Similarly, Long, Gurka and Blackman (2008) examined how parental stress is related to children's developmental outcomes in the family stress model. Therefore, constructs and portions of the model are supported with my results.

### **Ecological Systems Theory**

The Ecological Systems Theory was also supported in this study. Bronfenbrenner (1979) postulated that children are influenced directly by those environments closest to them, as well as indirectly through environments farther from the child. Specifically, the

theory suggests that distal factors, such as state policies in the chronosystem, do not have a direct influence on children's development. Instead these factors have an influence on children's development through environments closer to the child, including the child care setting children attend and the family environment within the microsystem. Again, although not directly studied, this relationship was supported in my findings, most specifically from the last research question. In particular the finding that the relationship between child care quality and children's development is different depending on state-level subsidy policies supports the indirect influence of factors in the macrosystem (subsidy policy) on children's development. Further, the important influence of settings within the microsystem (family characteristics and child care) on the developing child are supported in this study. Although previous research has not tested the Ecological Systems Theory in the same way that it has examined the Family Stress Model described above, the associations made about this theory are supported by my findings.

### **Policy**

The findings from my dissertation are directly relevant to family policy. There are several implications for child-care subsidy policies specifically that may be taken from the findings, both in regards to subsidy policies themselves as well as policies focused more directly on young children and child outcomes. First, given that child-care quality was especially important for young children's vocabulary in this study, policy emphasis should be on improving child care quality. At the state level decisions must be made to increase the overall quality of child-care for young children and specifically for those children most in need. Unfortunately, often times when states increase the quality of care for children, those not receiving assistance do not attend high-quality programs

(Phillips, et al., 1994; Rigby, et al., 2005). When quality increases, so does the cost of care and this makes high quality care sometimes unaffordable for low-income parents (Fuller, et al., 1996). Subsidy reimbursement rates must be updated to cover the rising cost of care and often times this is not the case (Schulte, 2013).

Ryan and colleagues (2011) found that families receiving child-care subsidies do not purchase the highest quality center-based programs because they cannot afford the cost of care that subsidies do not cover. Families instead choose home-based settings, which are often cheaper, but of lower quality in general than centers. Therefore, states should work to increase the quality of both formal and informal care. If assistance programs, such as child-care subsidies do not cover the cost of high-quality care, then families will not choose the best settings for their children that will improve their school readiness (Ryan, et al., 2011; Schulte, 2013). Therefore it is imperative that states work in tandem to increase quality of care, as well as make sure that subsidies are generous enough to cover high quality child care options in families' local communities.

Second, the samples included here were economically disadvantaged. All of the families were eligible for child-care subsidies, but many were receiving other assistance as well (about a quarter of the families were receiving TANF and most families were also receiving another public assistance). Given the positive results in regards to maternal well-being in this low-income sample, policy considerations need to be given to programs and assistance that raise the overall well-being of low-income mothers. Although child care can have an important influence on children's development, mother well being is especially important for both social and academic outcomes. As these

mothers are also receiving other social services, an entry point for an intervention to increase well-being could target these families when they are receiving other aid.

Additionally, given the results about the interaction between subsidy-use and maternal well-being, there are important differences between families that use subsidies and those who are eligible but do not use them. These differences may manifest themselves in the developmental outcomes of children. These differences could be explained by the assistance some families receive from the subsidy office in choosing the best care for their children. The Office of Child Care even highlighted the importance of improving maternal well-being in a new memorandum to states. The office suggests that to further support children and families, states needed to make the subsidy process easier for families, including increasing the amount of time that subsidies cover and to lessen the work hour requirements of families (OCC, 2011). By creating so many requirements for families, including long work hours, short subsidy spells, frequent renewal requirements and reprimand for changing family circumstances, families may be overburdened and their well-being could suffer.

Similarly, the fact that few eligible families use subsidies begs the question as to whether this is a choice based on need or based on the difficulties with the subsidy system itself. Parents report difficulties with subsidy staff, lost paperwork and inaccuracies in the subsidies their children receive. Often parents who were once interested in subsidies will stop trying to obtain them if the process is too difficult (Washington & Reed, 2008; Yoches & Klein, 2011). Recent recommendations have focused on improving the subsidy process, including increasing communication among

other social service agencies to ensure needy families get the assistance they are eligible for (OCC, 2011). These recommendations need to be instituted in states.

Finally, many child-care providers do not accept subsidies because of similar difficulties with the subsidy process and gaps in payment (Washington & Reed, 2008). Work must be done to increase the ease at which both parents and providers can obtain subsidies. Barriers with the subsidy system should not deter eligible families from obtaining the assistance they need. The Office of Child Care also recommends making communication between providers and the subsidy office easier so that services can be provided in a more seamless way (OCC, 2011).

### **Future Directions**

My dissertation answers many questions on the relationships between child-care subsidy-use, maternal well-being, child care and children's development. However, it also raises many questions that should be examined in future research. As discussed previously, I employed many controls in my samples and models. In addition to propensity score matching to create an unbiased sample, I also added many additional control variables into the model. It is possible that I over controlled for some of the family level demographic variables, and this is why my independent variables were not related to children's developmental outcomes as strongly as in other studies. Future research should compare the models in the FES PSM Samples with models in the FES Sample at large to see what differences emerge when this control is not employed.

There are also many unanswered questions about the interaction between subsidy-use and maternal well-being. A next step in this research would be to conduct an in-depth qualitative study that digs deep into the relationships explored in my dissertation.

As there could be some unobserved variables at play that were not accounted for in my study, a qualitative investigation would be helpful to understand these unobserved variables. Based on the findings of this qualitative study, a larger quantitative study should tap into the constructs of well-being that were expressed by parents and investigate some of the variables not explored here. In this way the patterns that were discovered in the small qualitative study can be explored in greater detail in a larger sample and trends can be explored.

Finally, as I only examined two policy variations, future work should examine how other policy decisions are related to the relationships. Decisions surrounding child-care regulations in particular would be an interesting process to examine. Particularly, investigating what states spend quality improvement money could illuminate whether these decisions are behind some of the relationships found in my dissertation. Similarly, the policies are not made in isolation, and it would be helpful to examine how they are jointly related to the associations I found. Instead of creating groups of states, next steps should use continuous measures of these variations (ex. number of individuals on the waitlist) to examine variations in the models. A multi-level framework could be employed to examine this. In this way, multiple policy variations could be examined in conjunction with each other to understand how they may work together to impact the relationships explored here.

### **Limitations**

Although the sample from the Fragile Families and Child Well-Being Study was limited to one that best represented subsidy receivers based on state rules, the sample does not represent all eligible families because of the study design. This sample is a

unique subset of low-income families. Specifically, the study authors sampled low-income mothers in large U.S. cities who gave birth in hospitals in 1998 and 1999. There is an overrepresentation of unmarried mothers in this sample as well. This does not represent the population of low-income births in those years, and inferences about the generalizability of my findings to the larger sample and to the population of all low-income or subsidy eligible families in the U.S. have to be made with caution. This sample is also not representative of eligible subsidy receivers. Nationally, only about 15-20% of eligible families use subsidies (Giannarelli, et al., 2003; Kinuakawa, et al., 2004); however, the rate of subsidy-use in my samples was over 25%. The demographics of my sample do not match the rates of subsidy-use nationally.

A second limitation of this study is that the data capture only one moment in time. Often use of subsidies is not consistent, and families go on and off of the program (Basta, 2007; Chaudry, 2004; Lowe & Weisner, 2004; Pearlmutter & Bartle, 2003; Washington & Reed, 2008). These particular patterns were not captured in this research. Although I controlled for subsidy-use at the one year data collection wave, parents could have gone on and off subsidies several times during the period between these waves. Further, since information from the In-Home study was asked at a different time than the information from the Child Care Study, parents' responses to questions may have changed in the time between assessments.

There are also questions about some of the measures that were used. As discussed in Chapter 4, the reliabilities of the measures for my sample were for the most part adequate. However, the maternal self-efficacy reliability measure was slightly lower than the standard cut off of 0.70. A low alpha could signify that the scale is not

measuring what it purports to measure, so the findings about efficacy have to be interpreted with some caution. A second concern about measurement surrounds the depression measure. As reviewed in Chapter 3, there are concerns that the depression scale under-reports chronicity in community samples (Suthers, et al., 2004). Given the somewhat confusing finding in regards to the Psychological Illness factor, this could be one explanation for these findings.

A further measurement concern surrounds the use of maternal report of subsidy-use. A recent set of studies highlight the potential for inaccuracy in subsidy-use by mothers. Specifically, in using the Fragile Families and Child Well-Being Study, the authors found about an 80% rate of agreement between child-care providers and mothers in subsidy receipt (Johnson & Herbst, 2012). The authors suggest that parents may misreport subsidy-use more often than child-care providers for two main reasons. The first of which could be due to embarrassment in reporting government assistance to researchers, whereby parents knowingly do not report use of subsidies. Parents could also forget that they in fact get subsidies to help pay for care, especially if they are receiving assistance from multiple sources (i.e. subsidies and Head Start). Despite these reasons, this discrepancy is a concern for researchers who use parental report of subsidy use.

Finally, as mentioned, the two policy variation groupings are highly correlated and the variations do not occur in isolation. Decisions about funding, demographics about the state and practical considerations are taken together when making policy decisions. In future studies researchers need to examine states as a whole and compare different choices about all of their CCDF decisions together to more fully understand the

underlying differences in maternal well-being, child care type and quality and children's vocabulary and behavior problems in families eligible for subsidies.

### **Conclusion**

Although many more questions were raised from this research, several things are clear. Maternal well-being is influential for children's developmental outcomes, and especially in a subsidy eligible sample. Child care quality is also an important predictor of young children's pre-academic skills. Further, although not independently related to children's development, child care subsidies interact with both maternal well-being and child care quality to influence children's development. More research is necessary to unpack these findings further.

Further, choices states make about subsidy implementation matter, not only for the type of care parents choose when using a subsidy, but also in the influence quality of care has on children's development. Although the CCDF was created as a work support for mothers transitioning off of welfare, the program has implications for families beyond employment. While predictions of well-being were not found in this study, there are a variety of reasons, including this sample that may provide explanation. Future work needs to continue to investigate this relationship. This research supports the complex relationship that these policy variations have on children and families eligible for child-care subsidies.

## **Appendix A: Additional Information on Fragile Families Study**

**Baseline Core Survey Sample.** The Fragile Families and Child Well-Being Study used a stratified random sampling framework to select 20<sup>6</sup> cities that represented U.S. cities with over 200,000 residents in 1998. This represented the sampling plan to gain a representative sample of families living in large U.S. cities in 1998. Hospitals were sampled within the selected cities, and births were sampled within hospitals.

**Initial Sampling.** To create a representative sample of cities, all large cities in the U.S. were rated based on the amount offered for welfare assistance, the strength of child-support rules of the state and the labor market in the city. Cities were ranked from highest to lowest on each of these three categories and quartiles were created based on these rankings. Those cities that were ranked in the top quartile were classified as high in that category. Those that were in the bottom quartile were classified as low in that category, and all other cities were classified as average in that category. Sixteen cities were then randomly selected based on these criteria for inclusion in the study. Four additional cities were selected because of special interest to the principal investigators. These four cities were also ranked on the above described categories. The final sample of cities was representative of large U.S. cities (cities with extreme, either high or low, ratings on each of these categories were over represented in the sample). This representation assured that cities with different policy employment contexts would be represented in the sample (see Table A1 for the ranking on each of the categories for each city included in the sample). Ultimately, cities with both very high and very low welfare

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<sup>6</sup> Cities included: Boston, MA; Milwaukee, WI; Norfolk, VA; Indianapolis, IN; Pittsburgh, PA; Philadelphia, PA; Toledo, OH; Detroit, MI; Newark, NJ; Richmond, VA; Jacksonville, FL; Baltimore, MD; Nashville, TN; San Jose, CA; Austin, TX; Oakland, CA; Chicago, IL; San Antonio, TX; New York, NY; Corpus Christi, TX

benefits, very strong and very weak labor markets and very strict and very loose child support enforcement rules were included in the sample (Reichman, et al., 2001).

After selecting the cities, birthing hospitals within the cities were randomly sampled in order to gain a representative sample of the births in each city. In smaller cities with few birthing hospitals, babies were sampled from each of the hospitals in the city, but in other larger cities (for example, New York City), a subsample of birthing hospitals were selected in which to sample births. Seventy-five hospitals were sampled in the 20 cities. Within each hospital, a random sample of marital and non-marital births was taken in order to match the ratio of non-marital births in the city of the hospital in 1996 or 1997. In each of the eight cities with extreme ratings (high or low) for any of the three categories, 325 infants were sampled. In the other eight cities with average rankings in all of the categories, 100 infants were sampled. In the four cities of special interest to the principal investigators (Newark, Oakland, Detroit and San Jose), 325 infants were sampled. Institutional Review Board (IRB) approval was obtained in all of the hospitals where mothers were recruited (Bendheim-Thoman Center for Research on Child Wellbeing, 2008; Reichman, et al., 2001).

Mothers were excluded from the sample if they were planning on putting their child up for adoption, if the father was deceased at the time of birth, if the family did not speak Spanish or English well, if the mother or infant were very ill at the time of birth or if the infant died before the interview took place. Less than 5% of all infants sampled fell into these categories. In some hospitals mothers younger than 18 were not permitted to be interviewed and these mothers were omitted from the sample. This occurred in 2/3 of the hospitals sampled. The final baseline sample of mothers and infants was

representative of non-marital births in cities with over 200,000 residents in the U.S in 1997 and 1998 (Bendheim-Thoman Center for Research on Child Wellbeing, 2008; Reichman, et al., 2001).

About 69% of the mothers in the baseline sample were Black, non-Hispanic, 8% were White non-Hispanic and 19% were Hispanic. About 87% of the mothers in the baseline sample were born in the U.S., and 59% had at least a high school diploma. About 25% of the baseline sample mothers were teenagers at the time of their child's birth, 60% of the mothers were in their twenties at the time of their child's birth and 36% of children were their mother's first child (Reichman, et al., 2001).

*Procedures*<sup>7</sup>. After mothers were selected for inclusion in the study, trained interviewers screened mothers to ensure their eligibility. This screening included questions about marital status, maternal age and if she was giving the child up for adoption. Questions were also asked about the father and if the father was going to visit the mother in the hospital, as the researchers wanted to include. Since the study aimed to over sample non-marital births, mothers had a higher probability of inclusion if they were not married at the time of their child's birth. Further, since the study attempted to include fathers, it was important to make sure that the father could be reached if possible (Bendheim-Thoman Center for Research on Child Wellbeing, 2008).

If the mother was deemed eligible for inclusion in the study, she signed a consent form before beginning the interview. The interviews took place in person, at the hospital, and took on average 42 minutes. If the father was present at the time of the screening, the father interview was completed first, but neither the father nor mother's interview was

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<sup>7</sup> Information for this section modified from Bendheim-Thoman Center for Research on Child Well-Being, 2008.

completed in the presence of the other parent. Mothers and fathers were given a check for \$20 when the interview was complete (This only occurred in hospitals where their IRB permitted this payment). The interviewers then obtained consent from the mother to access her and the child's medical records, which was used to verify answers mothers gave during the interview as well as acquiring the infant's Apgar scores. Apgar Scores range from 0 to 10 and are brief medical assessments given to newborns about their overall health immediately after birth. Topics included in the baseline survey questionnaire were demographic information about the family, parents' relationship status, and attitudes about marriage. Mothers who completed the baseline interview were eligible for inclusion in each wave of the study regardless of whether they participated in every wave (Bendheim-Thoman Center for Research on Child Wellbeing, 2008).

Table A1.

*Ranking of Cities included in Fragile Families on Welfare Generosity, Labor Market and Child Support Enforcement*

		Child Support Enforcement								
		Strict			Moderate			Lenient		
Welfare Generosity	Labor Market:	Strong	Average	Weak	Strong	Average	Weak	Strong	Average	Weak
	High	Boston <sup>1</sup> Milwaukee <sup>2</sup>	Pittsburgh <sup>1</sup>	Toledo <sup>1</sup> Detroit <sup>2</sup>					San Jose <sup>2</sup>	Oakland <sup>2</sup>
Moderate	Norfolk <sup>1</sup>	Philadelphia <sup>2</sup>	Newark <sup>2</sup>	Jacksonville <sup>1</sup>	Baltimore <sup>2</sup>			Chicago <sup>1</sup>		
Low	Indianapolis <sup>2</sup>		Richmond <sup>2</sup>		Nashville <sup>1</sup>			Austin <sup>2</sup>	San Antonio <sup>1</sup>	Corpus Christi <sup>2</sup>

<sup>1</sup>Small Sample (100 Births)

<sup>2</sup>Large Sample (325 Births)

Table adapted from: Reichman, et al., 2001

## Appendix B: CCDF Eligibility and State Policies

Table B1.

*CCDF Monthly Income Eligibility Rules for 2001, 2002 and 2003 for Families in Final FES PSM*

*Samples*

		2001	2002	2003
California	2	\$2,536.59	\$2,536.59	\$2,730.00
	3	\$2,723.49	\$2,723.49	\$2,925.00
	4	\$3,019.25	\$3,019.25	\$3,250.00
	5	\$3,502.87	\$3,502.87	\$3,770.00
	6	\$3,985.52	\$3,985.52	\$4,290.00
	7	\$4,076.08	\$4,076.08	\$4,387.00
	8	\$4,167.29	\$4,167.29	\$4,485.00
	9	\$4,257.41	\$4,257.41	\$4,582.00
	10	\$4,348.62	\$4,348.62	\$4,680.00
	Florida	2	\$1,295.00	\$1,295.00
3		\$1,623.00	\$1,623.00	\$1,908.00
4		\$1,950.00	\$1,950.00	\$2,300.00
5		\$2,278.00	\$2,278.00	\$2,693.00
6		\$2,605.00	\$2,605.00	\$3,085.00
7		\$2,933.00	\$2,933.00	\$3,478.00
8		\$3,260.00	\$3,260.00	\$3,870.00
9		\$3,588.00	\$3,588.00	\$4,263.00
10		\$3,915.00	\$3,915.00	\$4,655.00
Illinois		2	\$1,575.62	\$1,575.62
	3	\$1,946.28	\$1,946.28	\$2,328.00
	4	\$2,317.02	\$2,317.02	\$2,771.00
	5	\$2,687.76	\$2,687.76	\$3,215.00
	6	\$3,058.69	\$3,058.59	\$3,658.00
	7	\$3,128.03	\$3,128.03	\$3,741.00
	8	\$3,465.93	\$3,465.93	\$3,824.00
	9	\$3,803.83	\$3,803.83	\$3,907.00
	10	\$4,141.74	\$4,141.74	\$3,990.00
	Indiana	2	\$1,655.10	\$1,655.10
3		\$2,081.88	\$2,081.88	\$1,502.00
4		\$2,509.62	\$2,509.62	\$1,810.00
5		\$2,936.32	\$2,936.32	\$2,119.00
6		\$3,363.19	\$3,363.18	\$2,428.00
7		\$2,790.92	\$3,790.92	\$2,737.00
8		\$4,217.19	\$4,217.19	\$3,045.00
9		\$4,643.46	\$4,643.46	\$3,354.00
10		\$5,068.74	\$5,068.74	\$3,663.00

Table B1. *CCDF Monthly Income Eligibility Rules for 2001, 2002 and 2003 for Families in Final FES PSM Sample (Continued)*

		2001	2002	2003
Maryland	2	\$1,242.00	\$1,242.00	\$2,023.00
	3	\$1,534.00	\$1,534.00	\$2,499.00
	4	\$1,826.00	\$1,826.00	\$2,975.00
	5	\$2,119.00	\$2,119.00	\$3,451.00
	6	\$2,411.00	\$2,411.00	\$3,927.00
	7	\$2,466.00	\$2,466.00	\$4,016.00
	8	\$2,520.00	\$2,520.00	\$4,105.00
	9	\$2,575.00	\$2,575.00	\$4,195.00
	10	\$2,630.00	\$2,630.00	\$4,284.00
	Massachusetts	2	\$1,793.82	\$1,793.82
3		\$1,860.30	\$1,860.30	\$2,414.00
4		\$2,214.82	\$2,214.82	\$2,874.00
5		\$2,569.35	\$2,569.35	\$3,333.00
6		\$2,923.88	\$2,923.88	\$3,793.00
7		\$2,990.35	\$2,990.35	\$3,879.00
8		\$3,056.82	\$3,056.82	\$3,966.00
9		\$3,123.29	\$3,123.29	\$4,052.00
10		\$3,189.77	\$3,189.77	\$4,139.00
Michigan		2	\$1,693.63	\$1,693.63
	3	\$2,092.47	\$2,092.47	\$1,990.00
	4	\$2,491.31	\$2,491.31	\$2,367.00
	5	\$2,890.16	\$2,890.16	\$2,746.00
	6	\$3,289.00	\$3,289.00	\$3,123.00
	7	\$3,687.84	\$3,687.84	\$3,500.00
	8	\$4,085.72	\$4,085.72	\$3,877.00
	9	\$4,482.63	\$4,482.63	\$4,254.00
	10	\$4,883.40	\$4,883.40	\$4,526.00
	New Jersey	2	\$1,742.12	\$1,742.12
3		\$2,191.70	\$2,191.70	\$2,543.00
4		\$2,641.28	\$2,641.28	\$3,067.00
5		\$3,090.86	\$3,090.86	\$3,590.00
6		\$3,540.44	\$3,540.44	\$4,113.00
7		\$3,990.02	\$3,990.02	\$4,637.00
8		\$4,437.97	\$4,437.97	\$5,160.00
9		\$4,886.91	\$4,886.91	\$5,683.00
10		\$5,334.86	\$5,334.86	\$6,207.00
New York		2	\$1,823.37	\$1,823.37
	3	\$2,252.40	\$2,252.40	\$2,543.00
	4	\$2,681.42	\$2,681.42	\$3,067.00
	5	\$3,110.45	\$3,110.45	\$3,590.00
	6	\$3,539.48	\$3,539.48	\$4,113.00
	7	\$3,968.50	\$3,968.50	\$4,637.00
	8	\$4,397.53	\$4,397.53	\$5,160.00
	9	\$4,826.56	\$4,826.56	\$5,683.00
	10	\$5,255.59	\$5,255.59	\$6,207.00
			\$1,742.12	\$1,742.12

Table B1. *CCDF Monthly Income Eligibility Rules for 2001, 2002 and 2003 for Families in Final FES PSM Sample (Continued)*

		2001	2002	2003
Ohio	2	\$1,642.57	\$1,642.57	\$1,010.00
	3	\$2,061.65	\$2,061.65	\$1,272.00
	4	\$2,480.72	\$2,480.72	\$1,533.00
	5	\$2,898.83	\$2,898.83	\$1,795.00
	6	\$3,317.90	\$3,317.90	\$2,057.00
	7	\$3,736.97	\$3,736.97	\$2,318.00
	8	\$4,156.86	\$4,156.86	\$2,580.00
	9	\$4,576.74	\$4,576.74	\$2,841.00
	10	\$4,996.63	\$4,996.63	\$3,103.00
	Pennsylvania	2	\$2,078.00	\$2,078.00
3		\$2,610.00	\$2,610.00	\$2,543.00
4		\$3,143.00	\$3,143.00	\$3,067.00
5		\$3,675.00	\$3,675.00	\$3,590.00
6		\$4,208.00	\$4,208.00	\$4,113.00
7		\$4,741.00	\$4,741.00	\$4,637.00
8		\$5,274.00	\$5,274.00	\$5,160.00
9		\$5,806.00	\$5,806.00	\$5,683.00
10		\$6,339.00	\$6,339.00	\$6,207.00
Tennessee		2	\$1,475.43	\$1,475.43
	3	\$1,822.56	\$1,822.56	\$2,355.00
	4	\$2,169.70	\$2,169.70	\$2,803.00
	5	\$2,516.84	\$2,516.84	\$3,252.00
	6	\$2,863.98	\$2,863.98	\$3,699.00
	7	\$2,929.09	\$2,929.09	\$3,784.00
	8	\$2,994.26	\$2,994.26	\$3,868.00
	9	\$3,059.43	\$3,059.43	\$3,952.00
	10	\$3,124.59	\$3,124.59	\$4,036.00
	Texas	2	\$1,306.59	\$1,306.59
3		\$1,643.78	\$1,643.78	\$1,908.00
4		\$1,980.96	\$1,980.96	\$2,300.00
5		\$2,318.15	\$2,318.15	\$2,693.00
6		\$2,655.33	\$2,655.33	\$3,085.00
7		\$2,992.52	\$2,992.52	\$3,478.00
8		\$3,315.87	\$3,315.87	\$3,870.00
9		\$3,639.23	\$3,639.23	\$4,263.00
10		\$3,962.58	\$3,962.58	\$4,655.00
Virginia		2	\$1,641.61	\$1,641.61
	3	\$2,062.61	\$2,062.61	\$2,353.00
	4	\$2,480.72	\$2,480.72	\$2,837.00
	5	\$2,899.79	\$2,899.79	\$3,321.00
	6	\$3,318.86	\$3,318.86	\$3,805.00
	7	\$3,737.94	\$3,737.94	\$4,289.00
	8	\$4,156.29	\$4,156.29	\$4,773.00
	9	\$4,575.73	\$4,575.73	\$5,257.00
	10	\$4,996.26	\$4,996.26	\$5,741.00

Table B1. *CCDF Monthly Income Eligibility Rules for 2001, 2002 and 2003 for Families in Final FES PSM Sample (Continued)*

		2001	2002	2003
Wisconsin	2	\$1,459.00	\$1,459.00	\$1,869.00
	3	\$1,833.00	\$1,833.00	\$2,353.00
	4	\$2,208.00	\$2,208.00	\$2,837.00
	5	\$2,581.00	\$2,581.00	\$3,321.00
	6	\$2,955.00	\$2,955.00	\$3,805.00
	7	\$3,329.00	\$3,329.00	\$4,289.00
	8	\$3,703.00	\$3,703.00	\$4,773.00
	9	\$4,077.00	\$4,077.00	\$5,257.00
	10	\$4,451.00	\$4,451.00	\$5,741.00
	Alabama	4	--	\$1,675.33
Arizona	3	--	--	\$2,099.00
	8	--	--	\$3,827.00
Arkansas	6	--	\$2,410.00	--
Connecticut	4	--	--	\$3,438.00
Delaware	3	--	\$1,677.00	--
	4	--	\$2,015.00	--
Georgia	3	\$2,023.00	\$2,023.00	--
	5	\$2,428.00	--	\$2,872.00
Hawaii	4	--	--	\$2,034.00
	5	--	--	\$4,380.00
Iowa	3	--	\$1,722.00	--
	5	--	--	\$2,513.00
Kansas	3	--	--	\$1,908.00
Kentucky	2	--	\$1,675.33	\$1,515.00
	3	--	--	\$1,908.00
Louisiana	3	--	--	\$2,596.00
Minnesota	3	--	--	\$2,225.00
Mississippi	3	--	--	\$2,513.00
New Hampshire	3	--	--	\$2,407.00
New Mexico	4	--	--	\$3,067.00
North Carolina	2	--	--	\$2,385.00
	3	--	--	\$2,946.00
	5	--	\$3,113.00	\$4,068.00
	6	--	--	\$4,630.00
Oklahoma	3	\$2,308.00	--	--
	4	\$2,747.00	--	--
	5	--	\$3,187.00	--
Oregon	3	--	--	\$3,187.00
Rhode Island	4	--	--	\$2,751.00
	6	--	--	\$4,628.00
South Carolina	5	--	--	\$2,693.00
	7	--	\$2,553.00	--
Washington	6	--	--	\$4,727.00

Table B2.

*CCDF Eligibility Rules for 2001, 2002 and 2003 for Families in Final FES PSM Sample*

	2001		2002		2003	
	Minimum Work Hours	TANF Participants	Minimum Work Hours	TANF Participation	Minimum Work Hours	TANF Participation
California	None	All eligible	None	All eligible	None	All eligible
Florida	None	All eligible	None	All eligible	None	All eligible
Illinois	None	All eligible	None	All eligible	None	All eligible
Indiana	None	All eligible	None	All eligible	None	All eligible
Maryland	None	All eligible	None	All eligible	None	All eligible
Massachusetts	None	All eligible	None	All eligible	30 hours	All eligible
Michigan	None	All eligible	None	All eligible	None	All eligible
New Jersey	None	All eligible	None	All eligible	30 hours	All eligible
New York	None	All eligible	None	All eligible	None	All eligible
Ohio	None	All eligible	None	All eligible	None	All eligible
Pennsylvania	None	All eligible	None	All eligible	25 hours	All eligible
Tennessee	None	All eligible	None	All eligible	40 hours	All eligible
Texas	None	All eligible	None	All eligible	25 hours	All eligible
Virginia	None	All eligible	None	All eligible	None	All eligible
Wisconsin	None	All eligible	None	All eligible	None	All eligible
Alabama	--	--	None	All eligible	--	--
Arizona	--	--	--	--	None	All eligible
Arkansas	--	--	32 hours	All eligible	--	--
Connecticut	--	--	--	--	None	All eligible
Delaware	--	--	None	All eligible	--	--
Georgia	None	All eligible	None	All eligible	35 hours	All eligible
Hawaii	--	--	--	--	None	All eligible
Iowa	--	--	None	All eligible	28 hours	All eligible
Kansas	--	--	--	--	None	All eligible
Kentucky	--	--	None	All eligible	20 hours	All eligible
Louisiana	--	--	--	--	None	All eligible
Minnesota	--	--	--	--	20 hours	All eligible
Mississippi	--	--	--	--	25 hours	All eligible
New Hampshire	--	--	--	--	None	All eligible
New Mexico	--	--	--	--	None	All eligible
North Carolina	--	--	None	All eligible	30 hours	All eligible
Oklahoma	None	All eligible	None	All eligible	--	--
Oregon	None	All eligible	--	--	--	--
Rhode Island	--	--	--	--	20 hours	All eligible
South Carolina	--	--	None	All eligible	None	All eligible
Washington	--	--	--	--	None	All eligible

TRIM 3, 2011

## Appendix C: Federal Poverty Levels

Table C1.

*2001 Federal Poverty Guidelines*

Family Size	48 Contiguous States and DC
2	\$11,610
3	\$14,630
4	\$17,650
5	\$20,670
6	\$23,690
7	\$26,710
8	\$29,730
For each additional person, add	\$3,020

U.S. Department of Health and Human Services (2001b)

Table C2.

*2002 Federal Poverty Guidelines*

Family Size	48 Contiguous States and DC
2	\$11,940
3	\$15,020
4	\$18,100
5	\$21,180
6	\$24,260
7	\$27,340
8	\$30,420
For each additional person, add	\$3,080

U.S. Department of Health and Human Services (2002b)

Table C3.

*2003 Federal Poverty Guidelines*

Family Size	48 Contiguous States and DC
2	\$12,120
3	\$15,260
4	\$18,400
5	\$21,540
6	\$24,680
7	\$27,820
8	\$30,960
For each additional person, add	\$3,140

U.S. Department of Health and Human Services (2003b)

## Appendix D: Propensity Score Matching

PSM was estimated using SPSS 20. The PSM macro was recently developed by Thoemmes (2012) and works through an association with the R statistical package. The PSM macro in SPSS uses the following formula to create propensity scores:

$$\text{Ln} \left[ \frac{P(Z = 1|X_1, \dots, X_j)}{1 - P(Z = 1|X_1, \dots, X_j)} \right] = \beta_0 + \sum_{j=1}^p \beta_j X_j$$

Where  $Z$  is the treatment group, in this case, subsidy-users, and  $X_1$  through  $X_j$  are the covariates, in this case Household Income to Needs Ratio, Maternal Age, Maternal Race (Dummy Coded), Maternal Education, Total Household Size, Maternal Full Time Employment, Maternal Intelligence and Maternal Nativity Status. This is a similar formula to logistic regression.

### PSM Fit Indices

To evaluate fit, several indices were examined. The standardized difference test, or  $|d|$  statistic was not larger than 0.25 in either sample, suggesting balance in the matching. The  $|d|$  statistic is calculated using the following formula:

$$|d| = \left| \frac{100 (\bar{X}_{Treatment} - \bar{X}_{Control})}{\sqrt{s_{Treatment}^2 + s_{Control}^2 / 2}} \right|$$

Where the treatment group is subsidy-users and the control group is eligible non-users (Thoemmes, 2012).

The  $L_1$  statistic, another measure of balance, also suggested adequate fit in both samples. The  $L_1$  statistic was larger in the unmatched samples for both the In-Home (0.990) and the Child Care Observation (0.993) than in the matched group for each

sample (0.988; 0.987) suggesting that the matching improved the overall balance. The  $L_1$  measure is similar to a  $X^2$  test and is calculated as:

$$L_1 = \frac{1}{2} \sum_{l1...lj} |t_{l1...lk} - c_{l1...lk}|$$

Where  $l$  represents the frequency of responses in a cell for the treatment (subsidy-users) and control (eligible non-users) groups. This test assesses the distribution of all of these cells simultaneously and the final statistic ranges from 0 to 1. A smaller  $L_1$  represents better balance, but there is no cut off number recommended by researchers (Thoemmes, 2012),

Output figures D1, D2 and D3 further show that covariate balance was improved in the matched samples. Output figures D2 and D3 reveal that the region of common support spanned the distribution of propensity scores and that only in the tail regions were no matches found for both samples. All of this supports the PSM matching in both analytic samples.

Table D1.

*Means of Covariates Before Matching for In-Home Sample*

	Subsidy-Users Mean	Eligible Non-Users Mean	Eligible Non-Users SD	Standard Mean Difference
Propensity	0.31	0.23	0.11	0.58
Income to Needs	1.15	0.83	0.59	0.30
Mother's Age (Years)	25.83	26.86	5.51	-0.22
Mother Race				
Black	0.72	0.57	0.50	0.33
Hispanic	0.17	0.30	0.46	-0.33
Other	0.3	0.3	0.17	-0.02
Mother Education	4.35	4.02	1.37	0.25
Total Household Size	4.25	4.68	1.77	-0.28
Mother Full Time Work	0.74	0.66	0.47	0.17
Mother WAIS Score	6.68	6.22	2.65	0.19
Mom US Born	0.96	0.84	0.37	0.60

Table D2.

*Means of Covariates After Matching for In-Home Sample*

	Subsidy- Users Mean	Eligible Non- Users Mean	Eligible Non- Users SD	Standard Mean Difference
Propensity	0.29	0.29	0.11	0.07
Income to Needs	1.00	0.98	0.68	0.03
Mother's Age (Years)	25.82	26.01	4.98	-0.04
Mother Race				
Black	0.71	0.69	0.46	0.05
Hispanic	0.18	0.19	0.39	-0.04
Other	0.03	0.03	0.17	-0.01
Mother Education	4.30	4.27	1.38	0.02
Total Household Size	4.30	4.37	1.63	-0.05
Mother Full Time Work	0.73	0.71	0.45	0.03
Mother WAIS Score	6.65	6.62	2.5	0.01
Mom US Born	0.96	0.95	0.22	0.03

Table D3.

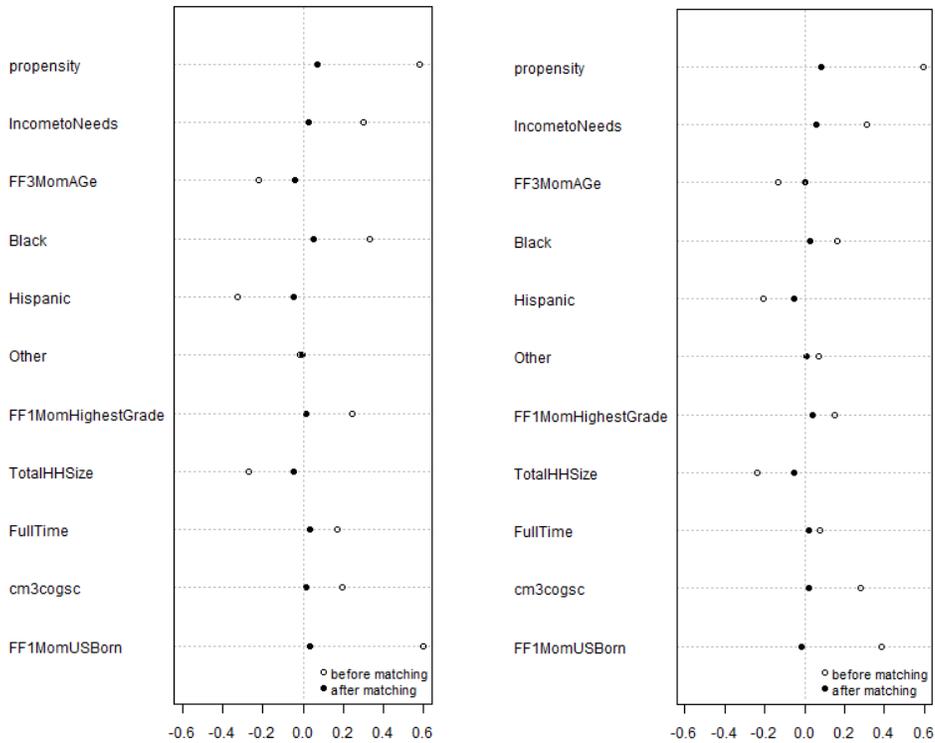
*Means of Covariates Before Matching for Child Care Sample*

	Subsidy- Users Mean	Eligible Non- Users Mean	Eligible Non- Users SD	Standard Mean Difference
Propensity	0.43	0.35	0.13	0.59
Income to Needs	1.15	0.84	0.59	0.31
Mother's Age (Years)	26.40	27.08	5.60	-0.13
Mother Race				
Black	0.75	0.68	0.47	0.16
Hispanic	0.15	0.23	0.42	-0.21
Other	0.03	0.02	0.14	0.07
Mother Education	4.37	4.17	1.39	0.15
Total Household Size	4.33	4.72	1.76	-0.24
Mother Full Time Work	0.70	0.66	0.47	0.08
Mother WAIS Score	6.96	6.35	2.57	0.28
Mom US Born	0.97	0.90	0.30	0.38

Table D4.

*Means of Covariates After Matching for Child Care Sample*

	Subsidy- Users Mean	Eligible Non- Users Mean	Eligible Non- Users SD	Standard Mean Difference
Propensity	0.41	0.40	0.11	0.08
Income to Needs	0.98	0.93	0.61	0.06
Mother's Age (Years)	26.45	26.40	5.16	0.01
Mother Race				
Black	0.76	0.75	0.44	0.03
Hispanic	0.14	0.16	0.36	-0.05
Other	0.03	0.03	0.16	0.01
Mother Education	4.33	4.27	1.36	0.04
Total Household Size	4.40	4.48	1.64	-0.05
Mother Full Time Work	0.70	0.69	0.47	0.02
Mother WAIS Score	6.82	6.77	2.51	0.02
Mom US Born	0.97	0.97	0.17	-0.02



*Figure D1.* Dot plot of standardized mean differences for all covariates before and after matching in In-Home Sample (left) and the Child Care Provider (right) Samples

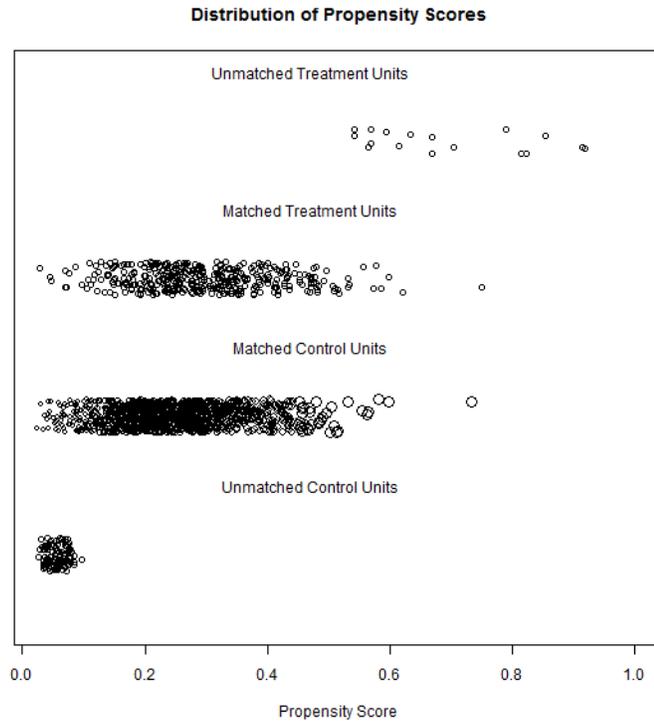


Figure D2. Dot plot of individual subsidy-users in either matched or unmatched groups for In-Home Sample.

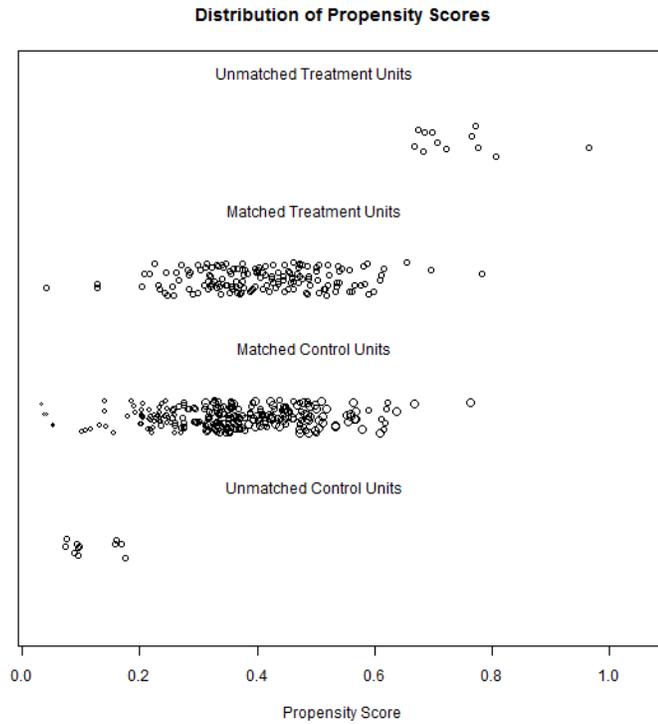


Figure D3. Dot plot of individual subsidy-users in either matched or unmatched groups for Child Care Sample.

Table D5.

*Descriptive Statistics of Participants Not Matched in PSM in PSM FES In-Home Sample*

<i>n</i> = 126	M(SD) %	Range
Maternal Race		
Black	14.3%	0-1
Hispanic	78.6%	0-1
Other	2.4%	0-1
Mother Education		
Less than HS	32.5%	0-1
HS Diploma/GED	20.7%	0-1
Some College/Tech.	15.1%	0-1
School		
BA or Higher	3.2%	0-1
Mother US Born	17%	0-1
Mother Age (Years)	29.9 (6.5)	20-46
Mother Works	63.0%	0-1
Mother Works Full Time	62.7%	0-1
Mother in School/Training	20.0%	0-1
Total Household Size	5.3 (2.2)	2-13
Marital Status		
Married	39%	0-1
Cohabiting	31%	0-1
Income to Needs	1.2 (1.5)	0-9.0
Yearly Income	\$23,899.59 (\$27,162.44)	0-\$220,000
Mother's Vocabulary	89.6 (18.9)	48-125
Mother's WAIS	4.8 (3.1)	0-13
TANF Receipt	8%	0-1
Other Government Assistance	0.95 (0.78)	0-4
Hours in Child Care	17.9 (19.9)	0-80
Prior Subsidy	6%	0-1
Current Subsidy	14%	0-1

## Appendix E: Additional Descriptive Statistics of Items

Table E1.

*Descriptive Statistics for Items Included in Scale Scores of Mother Well-Being and Behavior Problems*

	PSM FES In-Home Sample				PSM FES Child Care Observation Sample			
	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)
<u>Maternal Stress</u>								
You often have the feeling that you cannot handle things very well?	2.31 (1.20)	1-5	0.75 (0.06)	-0.57 (0.13)	2.26 (1.19)	1-5	0.85 (0.12)	-0.33 (0.24)
You find yourself giving up more of your life to meet your child(ren)'s need than you ever expected?	3.09 (1.45)	1-5	-0.10 (0.06)	-1.50 (0.13)	3.10 (1.45)	1-5	-0.11 (0.12)	-1.52 (0.24)
You feel trapped by your responsibilities as a parent?	1.90 (1.02)	1-5	1.39 (0.06)	1.47 (0.13)	1.97 (1.09)	1-5	1.30 (0.12)	0.99 (0.24)
Since having (CHILD) you have been unable to do new and different things?	2.44 (1.24)	1-5	0.61 (0.06)	-0.89 (0.13)	2.40 (1.20)	1-5	0.66 (0.12)	-0.77 (0.24)
Since having (CHILD) you feel that you are almost never able to do things that you like to do?	2.22 (1.14)	1-5	0.97 (0.06)	-0.01 (0.13)	2.20 (1.12)	1-5	0.98 (0.12)	0.03 (0.24)
There are quite a few things that bother you about your life?	2.61 (1.27)	1-5	0.33 (0.06)	-1.23 (0.13)	2.62 (1.23)	1-5	0.30 (0.12)	-1.24 (0.24)
Having (CHILD) has caused more problems than you expected in your relationship with men?	1.60 (0.78)	1-5	1.88 (0.06)	4.80 (0.13)	1.58 (0.77)	1-5	1.98 (0.12)	5.51 (0.24)
You feel alone and without friends?	1.71 (0.89)	1-5	1.76 (0.06)	3.46 (0.13)	1.69 (0.88)	1-5	1.78 (0.12)	3.67 (0.24)
When you go to a party, you usually expect to have a bad time?	1.70 (0.78)	1-5	1.44 (0.06)	2.84 (0.13)	1.65 (0.76)	1-5	1.56 (0.12)	3.50 (0.24)
You are less interested in people that you used to be?	2.27 (1.25)	1-5	0.75 (0.06)	-0.71 (0.13)	2.23 (1.24)	1-5	0.73 (0.12)	-0.76 (0.24)

	PSM FES In-Home Sample				PSM FES Child Care Observation Sample			
	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)
<u>Maternal Stress (Continued)</u>								
You enjoy things less than you used to?	2.18 (1.16)	1-5	0.86 (0.06)	-0.36 (0.13)	2.10 (1.14)	1-5	0.92 (0.12)	-0.24 (0.24)
You are unhappy with the last purchase of clothing you made for yourself?	2.10 (1.14)	1-5	1.10 (0.06)	0.28 (0.13)	2.14 (1.18)	1-5	1.06 (0.12)	0.13 (0.24)
<u>Mastery</u>								
I have little control over the things that happen to me.	3.41 (0.86)	1-4	-1.36 (0.06)	0.92 (0.13)	3.40 (0.89)	1-4	-1.29 (0.12)	0.55 (0.24)
There is really no way I can solve some of the problems I have.	3.25 (0.89)	1-4	-0.92 (0.06)	-0.17 (0.13)	3.25 (0.91)	1-4	-0.89 (0.12)	-0.35 (0.24)
There is little I can do to change many of the important things in my life.	3.33 (0.88)	1-4	-1.14 (0.06)	0.35 (0.13)	3.34 (0.90)	1-4	-1.19 (0.12)	0.38 (0.24)
I often feel helpless in dealing with problems.	3.34 (0.85)	1-4	-1.03 (0.06)	0.42 (0.13)	3.41 (0.80)	1-4	-1.13 (0.12)	0.27 (0.24)
Sometimes I feel that I'm being pushed around.	3.40 (0.87)	1-4	-1.31 (0.06)	0.65 (0.13)	3.43 (0.88)	1-4	-1.45 (0.12)	1.06 (0.24)
<u>Informal Social Control</u>								
How likely would your neighbors be to intervene if Children were skipping school and hanging out on a street corner?	2.33 (1.57)	1-5	0.20 (0.06)	-1.57 (0.13)	2.89 (1.61)	1-5	0.23 (0.12)	-1.57 (0.24)
Children were spray-painting graffiti on a local building?	2.48 (1.52)	1-5	0.77 (0.06)	-1.03 (0.13)	2.35 (1.58)	1-5	0.75 (0.12)	-1.06 (0.24)
Children were showing disrespect to an adult?	2.24 (1.51)	1-5	0.61 (0.06)	-1.14 (0.13)	2.43 (1.52)	1-5	0.69 (0.12)	-1.05 (0.24)
A fight broke out in front of their house?	2.67 (1.50)	1-5	0.89 (0.06)	-0.78 (0.13)	2.26 (1.48)	1-5	0.89 (0.12)	-0.70 (0.24)
The fire station closest to their house was threatened with budget cuts?	2.41 (1.32)	1-5	0.40 (0.06)	-1.26 (0.13)	2.73 (1.48)	1-5	0.35 (0.12)	-1.25 (0.24)

	PSM FES In-Home Sample				PSM FES Child Care Observation Sample			
	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)
<u>Social Cohesion</u>								
People around here are willing to help their neighbors	2.41 (1.32)	1-5	0.80 (0.06)	-0.56 (0.13)	2.35 (1.31)	1-5	0.94 (0.12)	-0.26 (0.24)
This is a close-knit neighborhood	2.67 (1.42)	1-5	0.45 (0.06)	-1.18 (0.13)	2.62 (1.41)	1-5	0.57 (0.12)	-1.04 (0.24)
People in this neighborhood can be trusted	3.05 (1.43)	1-5	0.08 (0.06)	-1.38 (0.13)	3.06 (1.40)	1-5	0.12 (0.12)	-1.34 (0.24)
People in this neighborhood generally don't get along with each other	2.60 (1.30)	1-5	0.38 (0.06)	-1.05 (0.13)	2.59 (1.29)	1-5	0.45 (0.12)	-0.94 (0.24)
People in this neighborhood do not share the same values	3.09 (1.34)	1-5	-0.12 (0.06)	-1.22 (0.13)	3.12 (1.33)	1-5	-0.06 (0.12)	-1.18 (0.24)
<u>Social Support</u>								
If you needed help during the year could you count on someone to loan you \$200	1.59 (0.81)	0-2	-1.47 (0.06)	0.15 (0.13)	1.66 (0.75)	0-2	-1.77 (0.12)	1.13 (0.24)
What about \$1000?	0.74 (0.97)	0-2	0.54 (0.06)	-1.72 (0.13)	0.73 (0.96)	0-2	0.57 (0.12)	-1.69 (0.24)
Is there someone you could count on to provide you with a place to live?	1.61 (0.79)	0-2	-1.54 (0.06)	0.38 (0.13)	1.62 (0.78)	0-2	-1.59 (0.12)	0.54 (0.24)
Is there someone you could count on to help you with emergency child care?	1.69 (0.72)	0-2	-1.93 (0.06)	1.12 (0.13)	1.70 (0.72)	0-2	-1.96 (0.12)	1.86 (0.24)
Is there someone you could count on to co-sign for a bank loan with you for \$1,000?	1.00 (1.00)	0-2	-0.00 (0.06)	-2.00 (0.13)	0.99 (1.00)	0-2	0.03 (0.12)	-2.01 (0.24)
What about co-signing for \$5,000?	0.58 (0.91)	0-2	0.93 (0.06)	-1.14 (0.13)	0.56 (0.90)	0-2	0.99 (0.12)	-1.02 (0.24)
<u>Maternal Self-Efficacy</u>								
Being a parent is harder than I thought it would be	2.01 (0.96)	1-4	0.73 (0.06)	-0.37 (0.13)	2.02 (0.99)	1-4	2.78 (0.12)	7.08 (0.24)
I feel trapped by my responsibilities as a parent	3.38 (0.88)	1-4	-1.23 (0.06)	0.40 (0.13)	3.35 (0.90)	1-4	1.42 (0.12)	1.09 (0.24)

	PSM FES In-Home Sample				PSM FES Child Care Observation Sample			
	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)
<u>Maternal Self-Efficacy (Continued)</u>								
I find that taking care of my child(ren) is much more work than pleasure	3.07 (1.07)	1-4	-0.77 (0.06)	-0.71 (0.13)	3.01 (1.06)	1-4	0.48 (0.12)	-1.19 (0.24)
I often feel tired, worn out, or exhausted from raising a family	2.40 (1.06)	1-4	0.24 (0.06)	-1.17 (0.13)	2.40 (1.06)	1-4	0.34 (0.12)	-1.01 (0.24)
<u>Children's Behavior Problems</u>								
He/she acts too young for age	0.17 (0.42)	0-2	2.55 (0.06)	6.03 (0.06)	0.12 (0.34)	0-2	2.78 (0.12)	7.08 (0.24)
He/she avoids looking others in the eye	0.32 (0.55)	0-2	1.53 (0.06)	1.40 (0.06)	0.33 (0.54)	0-2	1.42 (0.12)	1.09 (0.24)
He/she clings to adults or is too dependent	0.68 (0.75)	0-2	0.60 (0.06)	-1.01 (0.06)	0.75 (0.77)	0-2	0.48 (0.12)	-1.19 (0.24)
He/she is defiant	0.79 (0.70)	0-2	0.30 (0.06)	-0.93 (0.06)	0.79 (0.72)	0-2	0.34 (0.12)	-1.01 (0.24)
His/her demands must be met immediately	0.90 (0.77)	0-2	0.17 (0.06)	-1.29 (0.06)	0.88 (0.76)	0-2	0.21 (0.12)	-1.26 (0.24)
He/she is disobedient	0.62 (0.62)	0-2	0.47 (0.06)	-0.65 (0.06)	0.60 (0.63)	0-2	0.56 (0.12)	-0.62 (0.24)
He/she doesn't answer when people talk to (him/her)	0.58 (0.62)	0-2	0.58 (0.06)	-0.59 (0.06)	0.53 (0.61)	0-2	0.71 (0.12)	-0.46 (0.24)
He/she doesn't get along with other children	0.27 (0.52)	0-2	1.72 (0.06)	2.09 (0.06)	0.24 (0.49)	0-2	1.93 (0.12)	2.96 (0.24)
He/she doesn't know how to have fun, or he/she acts like little adult	0.26 (0.55)	0-2	2.05 (0.06)	3.16 (0.06)	0.26 (0.55)	0-2	1.97 (0.12)	2.91 (0.24)
He/she doesn't seem to feel guilty after misbehaving	0.63 (0.71)	0-2	0.66 (0.06)	-0.79 (0.06)	0.64 (0.70)	0-2	0.62 (0.12)	-0.76 (0.24)
He/she is easily frustrated	0.77 (0.74)	0-2	0.39 (0.06)	-1.09 (0.06)	0.75 (0.71)	0-2	0.41 (0.12)	-0.96 (0.24)
He/she feelings are easily hurt	1.09 (0.76)	0-2	-0.15 (0.06)	-1.27 (0.06)	1.06 (0.75)	0-2	-0.09 (0.12)	-1.21 (0.24)

<u>Children's Behavior Problems (Continued)</u>	PSM FES In-Home Sample				PSM FES Child Care Observation Sample			
	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)
He/she is easily jealous	0.97 (0.80)	0-2	0.06 (0.06)	-1.44 (0.06)	0.92 (0.80)	0-2	0.14 (0.12)	-1.43 (0.24)
He/she gets in many fights	0.23 (0.51)	0-2	2.19 (0.06)	3.92 (0.06)	0.21 (0.49)	0-2	2.31 (0.12)	4.56 (0.24)
He/she gets too upset when separated from parents	0.77 (0.77)	0-2	0.411 (0.06)	-1.20 (0.06)	0.71 (0.75)	0-2	0.54 (0.12)	-1.03 (0.24)
He/she hits others	0.69 (0.64)	0-2	0.44 (0.06)	-0.75 (0.06)	0.70 (0.64)	0-2	0.37 (0.12)	7.56 (0.24)
He/she looks unhappy without good reason	0.15 (0.41)	0-2	2.85 (0.06)	7.78 (0.06)	0.15 (0.42)	0-2	2.82 (0.12)	-0.69 (0.24)
He/she has angry moods	0.70 (0.68)	0-2	0.45 (0.06)	-0.81 (0.06)	0.67 (0.64)	0-2	0.44 (0.12)	4.17 (0.24)
He/she is overly tired	0.23 (0.50)	0-2	2.05 (0.06)	3.40 (0.06)	0.21 (0.47)	0-2	2.20 (0.12)	0.74 (0.24)
Punishment doesn't change his/her behavior	0.61 (0.70)	0-2	0.70 (0.06)	-0.72 (0.06)	0.63 (0.70)	0-2	0.66 (0.12)	3.71 (0.24)
He/she refuses to play games	0.22 (0.48)	0-2	2.12 (0.06)	3.75 (0.06)	0.23 (0.49)	0-2	2.12 (0.12)	-0.65 (0.24)
He/she screams a lot	0.62 (0.74)	0-2	0.75 (0.06)	-0.83 (0.06)	0.57 (0.74)	0-2	0.86 (0.12)	11.30 (0.24)
He/she seems unresponsive to affection	0.12 (0.37)	0-2	3.28 (0.06)	10.75 (0.06)	0.12 (0.37)	0-2	3.355 (0.12)	-0.25 (0.24)
He/she is self-conscious or easily embarrassed	0.54 (0.69)	0-2	0.89 (0.06)	-0.43 (0.06)	0.50 (0.65)	0-2	0.93 (0.12)	-0.66 (0.24)
He/she is selfish or won't share	0.64 (0.65)	0-2	0.53 (0.06)	-0.68 (0.06)	0.63 (0.63)	0-2	0.49 (0.12)	0.75 (0.24)
He/she shows little affection toward people	0.36 (0.61)	0-2	1.50 (0.06)	1.11 (0.06)	0.39 (0.62)	0-2	1.37 (0.12)	0.75 (0.24)

<u>Children's Behavior Problems (Continued)</u>	PSM FES In-Home Sample				PSM FES Child Care Observation Sample			
	Mean (SD)	Range	Mean (SD)	Range	Mean (SD)	Range	Mean (SD)	Range
He/she shows little interest in things around him/her	0.30 (0.56)	0-2	1.69 (0.06)	1.85 (0.06)	0.31 (0.55)	0-2	1.61 (0.12)	1.65 (0.24)
He/she is too shy or timid	0.42 (0.62)	0-2	1.18 (0.06)	0.30 (0.06)	0.40 (0.64)	0-2	1.37 (0.12)	0.60 (0.24)
He/she is stubborn, sullen or irritable	0.72 (0.72)	0-2	0.49 (0.06)	-0.97 (0.06)	0.69 (0.73)	0-2	0.56 (0.12)	-0.94 (0.24)
He/she has sudden changes in mood or feelings	0.62 (0.67)	0-2	0.63 (0.06)	-0.67 (0.06)	0.62 (0.67)	0-2	0.61 (0.12)	-0.67 (0.24)
He/she has temper tantrums or hot temper	0.80 (0.70)	0-2	0.30 (0.06)	-0.95 (0.06)	0.78 (0.69)	0-2	0.33 (0.12)	-0.90 (0.24)
He/she is too fearful or anxious	0.38 (0.60)	0-2	1.31 (0.06)	0.67 (0.06)	0.37 (0.59)	0-2	1.33 (0.12)	0.75 (0.24)
He/she is uncooperative	0.50 (0.58)	0-2	0.69 (0.06)	-0.51 (0.06)	0.45 (0.59)	0-2	0.92 (0.12)	-0.15 (0.24)
He/she is under active, slow moving or lacks energy	0.08 (0.33)	0-2	4.14 (0.06)	17.69 (0.06)	0.10 (0.36)	0-2	3.65 (0.12)	13.52 (0.24)
He/she is unhappy, sad, depressed	0.08 (0.29)	0-2	4.02 (0.06)	16.91 (0.06)	0.08 (0.32)	0-2	4.52 (0.12)	21.19 (0.24)
He/she is usually loud	0.73 (0.76)	0-2	0.49 (0.06)	-1.11 (0.06)	0.72 (0.74)	0-2	0.49 (0.12)	-1.03 (0.24)
He/she wants a lot of attention	1.37 (0.70)	0-2	-0.65 (0.06)	-0.77 (0.06)	1.38 (0.68)	0-2	-0.65 (0.12)	0.68 (0.24)
He/she is whiny	0.79 (0.71)	0-2	0.33 (0.06)	-0.98 (0.06)	0.77 (0.69)	0-2	0.35 (0.12)	-0.89 (0.24)
He/she is withdrawn-does not get involved with others	0.17 (0.43)	0-2	2.61 (0.06)	6.32 (0.06)	0.15 (0.41)	0-2	2.75 (0.12)	7.22 (0.24)

Table E2.

*Descriptive Statistics for Items Included in Scale Scores of Child Care Quality*

	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)
<u>Early Childhood Environmental Rating Scale</u>				
Space and Furnishings (Indoor Space)	5.42 (2.02)	1-7	-0.97 (0.18)	-0.42 (0.36)
Furniture for Routine Care, Play and Learning	6.09 (1.43)	1-7	-2.11 (0.18)	4.28 (0.36)
Furnishings for Relaxation and Comfort	4.79 (2.08)	1-7	-0.36 (0.18)	-1.26 (0.36)
Room Arrangement for Play	5.51 (1.81)	1-7	-0.96 (0.18)	-0.43 (0.36)
Space for Privacy	4.94 (2.21)	1-7	-0.64 (0.18)	-1.06 (0.36)
Children Related Display	4.60 (1.75)	1-7	-0.07 (0.18)	-1.10 (0.36)
Space for Gross Motor Play	4.86 (1.80)	1-7	-0.47 (0.18)	-0.82 (0.36)
Gross Motor Equipment	4.96 (2.24)	1-7	-0.61 (0.18)	-1.15 (0.36)
Greeting/Department	5.32 (1.99)	1-7	-0.72 (0.18)	-0.99 (0.36)
Meals/Snacks	5.02 (2.01)	1-7	-0.73 (0.18)	-0.87 (0.36)
Nap/Rest	5.26 (2.10)	1-7	-0.18 (0.18)	-0.99 (0.36)
Toileting/Diapering	4.85 (1.87)	1-7	-1.12 (0.18)	-0.08 (0.36)
Health Practices	5.08 (1.74)	1-7	-0.62 (0.18)	-1.03 (0.36)
Safety Practices	4.48 (2.02)	1-7	-0.91 (0.18)	-0.51 (0.36)
Language-Reasoning	5.02 (1.88)	1-7	-0.47 (0.18)	-0.70 (0.36)
Encouraging Children to Communicate	5.05 (1.91)	1-7	-0.69 (0.18)	-0.46 (0.36)
Using Language to Develop Reasoning Skills	4.48 (2.02)	1-7	-0.04 (0.18)	-1.30 (0.36)
Informal Use of Language	5.02 (1.88)	1-7	-0.52 (0.18)	-0.82 (0.36)
Fine Motor	5.05 (1.91)	1-7	-0.72 (0.18)	-0.54 (0.36)
Art	4.64 (2.08)	1-7	-0.29 (0.18)	-1.23 (0.36)
Music/Movement	4.46 (1.88)	1-7	0.10 (0.18)	-1.30 (0.36)
Blocks	4.94 (1.86)	1-7	-0.74 (0.18)	-0.43 (0.36)
Sand/Water	4.09 (2.24)	1-7	-0.12 (0.18)	-1.36 (0.36)
Dramatic Play	4.41 (1.78)	1-7	-0.39 (0.18)	-0.69 (0.36)
Nature/Science	3.68 (2.14)	1-7	0.39 (0.18)	-1.13 (0.36)
Math/Number	4.77 (1.89)	1-7	-0.41 (0.18)	-0.84 (0.36)
Use of TV, Video, and/or Computers	4.39 (1.91)	1-7	-0.08 (0.18)	-1.04 (0.36)
Promoting Acceptance of Diversity	4.15 (2.06)	1-7	0.12 (0.18)	-1.22 (0.36)
Supervision of Gross Motor Activities	5.02 (1.57)	1-7	-0.39 (0.18)	-0.31 (0.36)
General Supervision of Children (other than gross motor)	5.18 (1.81)	1-7	-0.64 (0.18)	-0.68 (0.36)
Discipline	5.27 (1.77)	1-7	-0.82 (0.18)	-0.28 (0.36)
Staff-Child Interactions	5.68 (1.97)	1-7	-1.24 (0.18)	0.15 (0.36)

	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)
<u>Early Childhood Environmental Rating Scale (Continued)</u>				
Interactions Among Children	5.27 (1.92)	1-7	-0.84 (0.18)	-0.47 (0.36)
Schedule	4.93 (1.90)	1-7	-0.36 (0.18)	-1.09 (0.36)
Free Play	5.11 (1.69)	1-7	-0.58 (0.18)	-0.38 (0.36)
Group Time	4.84 (2.17)	1-7	-0.54 (0.18)	-1.04 (0.36)
Provisions for Children with Disabilities	5.18 (2.29)	1-7	-0.67 (0.30)	-1.30 (0.60)
Provisions for Parents	4.90 (1.68)	1-7	-0.30 (0.18)	-1.01 (0.36)
<u>Family Environmental Rating Scale</u>				
Furnishings for Routine Care and Learning	3.48 (2.09)	1-7	0.54 (0.17)	-1.03 (0.33)
Furnishings for Relaxation and Comfort	3.80 (1.86)	1-7	0.42 (0.17)	-0.84 (0.33)
Child-Related Display	1.95 (1.48)	1-7	1.89 (0.17)	3.22 (0.33)
Indoor Space Arrangement	3.08 (1.68)	1-7	0.66 (0.17)	-0.08 (0.33)
Active Physical Play	2.82 (1.66)	1-7	0.63 (0.17)	-0.55 (0.33)
Space to be Alone (Infants/Toddlers)	3.65 (2.02)	1-7	0.08 (0.17)	-1.38 (0.42)
Space to be Alone (2 +)	4.00 (2.12)	1-7	0.06 (0.17)	-1.34 (0.34)
Arriving/Leaving	5.12 (1.86)	1-7	-0.71 (0.17)	-0.68 (0.34)
Meals/Snacks	3.15 (2.13)	1-7	0.62 (0.17)	-1.02 (0.33)
Nap/Rest	3.23 (2.19)	1-7	0.66 (0.17)	-1.04 (0.34)
Diapering/Toileting	3.03 (1.99)	1-7	0.88 (0.17)	-0.40 (0.34)
Personal Grooming	2.66 (1.83)	1-7	1.18 (0.17)	0.31 (0.33)
Health	2.59 (1.81)	1-7	1.00 (0.17)	-0.22 (0.33)
Safety	2.84 (1.64)	1-7	1.02 (0.17)	0.47 (0.33)
Informal Use of Language (Infants/Toddlers)	5.10 (1.86)	1-7	-0.73 (0.21)	-0.57 (0.41)
Informal Use of Language (2+)	4.62 (1.84)	1-7	-0.14 (0.17)	-1.06 (0.33)
Helping Children Understand Language (Infants/Toddlers)	3.34 (2.27)	1-7	0.48 (0.21)	-1.25 (0.41)
Helping Children Understand Language (2 +)	2.97 (1.99)	1-7	0.62 (0.17)	-0.88 (0.33)
Helping Children Use Language	3.18 (2.03)	1-7	0.69 (0.17)	-0.72 (0.33)
Helping Children Reason (Using Concepts)	2.94 (1.81)	1-7	0.87 (0.17)	0.02 (0.33)
Eye-Hand Coordination	2.87 (1.74)	1-7	0.85 (0.17)	-0.30 (0.33)
Art	3.03 (1.84)	1-7	0.54 (0.17)	-0.52 (0.33)
Music and Movement	3.25 (1.65)	1-7	0.60 (0.17)	-0.01 (0.33)
Sand and Water Play	1.88 (1.74)	1-7	1.90 (0.17)	2.42 (0.33)
Dramatic Play	2.43 (1.77)	1-7	1.19 (0.17)	0.55 (0.33)
Blocks	2.93 (1.89)	1-7	0.71 (0.17)	-0.43 (0.33)
Use of T.V.	3.12 (1.94)	1-7	0.54 (0.17)	-0.95 (0.33)
Schedule of Daily Activities	2.87 (1.87)	1-7	0.81 (0.17)	-0.26 (0.33)

	Mean (SD)	Range	Skew (SE)	Kurtosis (SE)
<u>Family Environmental Rating Scale</u>				
<u>(Continued)</u>				
Supervision of Play Indoors and Outdoors	3.66 (1.90)	1-7	0.12 (0.17)	-1.15 (0.33)
Tone	5.52 (1.94)	1-7	-0.96 (0.17)	-0.48 (0.33)
Discipline	4.50 (1.96)	1-7	-0.13 (0.17)	-1.19 (0.33)
Cultural Awareness	1.97 (1.50)	1-7	1.73 (0.17)	2.58 (0.33)

## Appendix F: Sample Comparisons

Table F1.

### *In Home Sample Comparisons*

	Core Three- Year Sample ( <i>n</i> = 4,141)	In-Home Sample ( <i>n</i> = 3,288)	FES In-Home Sample ( <i>n</i> = 1,543)	PSM FES In- Home Sample ( <i>n</i> = 1,491)
<b>Maternal Race</b>				
Black	41%	49%	61%	65%
Hispanic	27%	26%	27%	22% <sup>bc</sup>
Other	4.0%	3.5%	2.9%	3.0%
<b>Mother Education</b>				
Less than HS	35%	34%	41%	43%
HS Diploma/GED	30%	30%	34%	35%
Some College/ Tech School	24%	25%	22%	23%
BA or Higher	11%	10%	1.2%	1.0%
Mother US Born	83%	86%	87%	93%
Mother Age (Years)	28.0	28.0	26.6	26.32
Use Subsidy	8%	14%	25%	26%
Mother Works	56%	92%	94%	94%
Work Hours	36.35	36.24	36.1	36.2
Mother in School/ Training	20%	20%	25%	25%
Total Household Size	4.4	4.4	4.57	4.51
<b>Mother Marital Status</b>				
Married	34%	29%	16%	15%
Cohabiting	30%	26%	33%	33%
Income to Needs	1.90	1.88	0.91	0.88
Yearly Income	\$35,623.51	\$34,613.47	\$17,395.14	\$17,062.36
Mother's WAIS	6.48	6.43	6.33	6.46
TANF Receipt	13%	16%	24%	26%
Other Government Assistance	1.40	1.13	1.49	1.54
Hours in Child Care	31.00	17.65	19.82	19.98
Prior Subsidy	11%	12%	15%	16%

Table F2.

*Child Care Sample Comparisons*

	Child Care Sample ( <i>n</i> = 810)	FES Child Care Sample ( <i>n</i> = 437)	PSM FES Child Care Sample ( <i>n</i> = 414)
Maternal Race			
Black	62%	70%	72%
Hispanic	19%	20%	18%
Other	2.2%	2.3%	2.2%
Mother Education			
Less than HS	26%	36%	36%
HS Diploma/GED	33%	38%	39%
Some College/ Tech School	27%	25%	24%
BA or Higher	11%	1.2%	1.0%
Mother US Born	92%	93%	95%
Mother Age (Years)	28.0	26.8	26.8
Use Subsidy	22%	38%	37%
Mother Works	72%	73%	73%
Work Hours	35.72	35.91	36.00
Mother in School/ Training	25%	27%	26%
Total Household Size	4.35	5.58	4.60
Mother Marital Status			
Married	28%	14%	13%
Cohabiting	30%	32%	33%
Income to Needs	1.92	0.96	0.90
Yearly Income	\$34,765.22	\$18,509.08	\$17,517.20
Mother's WAIS	6.53	6.58	6.55
TANF Receipt	14%	21%	22%
Other Government Assistance	1.55	1.14	1.57
Hours in Child Care	25.06	26.37	26.30
Prior Subsidy	15%	22%	22%

## Appendix G: Overview of Power Analyses

I conducted post-hoc power calculations on each of the final models based on the tables provided by Hancock (2006). Using the sample size, degrees of freedom, and RMSEA from each of the final models I determined the power of each final model. For the models with latent variables, power is sufficiently large to reject the model. However, for the measured variable path models, given the low degrees of freedom, there is no power to reject the model. Because of this, a perfect solution must exist (i.e. there is not power to reject this model), however the model is based on a strong conceptual background, and thus it was appropriate to test the model on these grounds. See Table G1 for results.

*Table G1. Power Analyses for Final Models*

Final Model	n	df	RMSEA	Power
RQ2: In-Home Non-Interaction <sup>8</sup>	1,491	107	0.02	>0.99
RQ2: Child Care Non-Interaction	414	52	0.02	>0.99
RQ3: Child Care Interaction	414	0	0.00	~0.26
RQ4: Child Care Non-Interaction	414	91	0.02	>0.99
RQ5: RQ 2 Child Care SMI MGA	414	119	0.02	>0.99
RQ5: RQ 2 Child Care Waitlist MGA	414	119	0.01	0.99
RQ5: RQ 3 Child Care SMI MGA	414	10	0.00	~0.50
RQ5: RQ 3 Child Care Waitlist MGA	414	8	0.00	~0.45
RQ5: RQ 4 Child Care SMI MGA	414	149	0.03	>0.80
RQ5: RQ 4 Child Care Waitlist MGA	414	149	0.01	>0.99

<sup>8</sup> RMSEA was not calculated in the final model for RQ 2 that included the latent variable interactions, therefore I calculated the power based on the non-interaction model.

## Appendix H: State Groupings

Table H1

*Percent SMI of Family Eligibility of Subsidies of Sample in FES PSM In-Home*

	2001 SMI (dollar amount) <sup>9</sup>	2002 SMI (dollar amount)	2003 SMI (dollar amount)
Alabama	--	43% (\$19,020)	
Arizona	--	--	54% (\$24,156)
Arkansas	--	60% (\$23,523)	--
California <sup>c</sup>	75% (\$35,100)	75% (\$35,100)	75% (\$35,100)
Connecticut	--	--	75% (\$47,592)
District of Columbia	--	--	56% (\$29,280)
Florida <sup>c</sup>	--	56% (\$29,268)	56% (\$29,268)
Georgia	--	--	85% (\$42,828)
Hawaii	--	--	80% (\$39,288)
Illinois <sup>c</sup>	39% (\$21,816)	39% (\$21,816)	39% (\$21,816)
Indiana <sup>c</sup>	57% (\$26,484)	57% (\$26,484)	57% (\$26,484)
Iowa	--	--	46% (\$22,680)
Kentucky	--	55% (\$24,144)	55% (\$24,144)
Maryland <sup>c</sup>	--	40% (\$25,140)	40% (\$25,140)
Massachusetts <sup>c</sup>	--	--	50% (\$28,968)
Michigan <sup>c</sup>	--	51% (\$26,064)	51% (\$26,064)
Minnesota	--	--	75% (\$42,012)
Missouri	42% (\$17,784)	--	--
New Jersey <sup>c</sup>	61% (\$36,570)	61% (\$36,575)	61% (\$36,575)
New Mexico	78% (\$29,256)	--	78% (\$29,256)
New York <sup>c</sup>	--	61% (\$29,256)	61% (\$29,256)
North Carolina	--	75% (\$34,224)	75% (\$34,224)
Ohio	57% (\$27,060)	57% (\$27,050)	57% (\$27,050)
Oklahoma	53% (\$23,232)	53% (\$23,232)	--
Pennsylvania <sup>c</sup>	--	58% (\$29,256)	58% (\$29,256)
Rhode Island	--	--	61% (\$32,918)
South Carolina	--	40% (\$21,948)	40% (\$21,948)
Tennessee <sup>c</sup>	--	49% (\$24,324)	49% (\$24,324)
Texas <sup>c</sup>	85% (\$38,052)	87% (\$38,052)	87% (\$38,052)
Virginia <sup>c</sup>	--	43% (\$23,400)	43% (\$23,400)
Washington	--	--	64% (\$32,916)
Wisconsin <sup>c</sup>	--	51% (\$27,060)	51% (\$27,060)

Note: <sup>c</sup> signifies those states also in the FES PSM Child Care Sample

<sup>9</sup> FY 2002-2003 CCDF State Plans; median income based on family of 3

Table H2

*Existence of Waitlist for CCDF Subsidies for FES PSM Samples*

	2001 Waitlist	2002 Waitlist	2003 Waitlist
Alabama	--	15,884	--
Arizona	--	--	4,600
Arkansas	--	500	--
California <sup>c</sup>	250,000	280,000	280,000
Connecticut	--	--	None: Serves all eligible applicants
District of Columbia	--	--	1,300
Florida <sup>c</sup>	--	47,489	47,489
Georgia	--	--	33,859
Hawaii	--	--	None
Illinois <sup>c</sup>	None	None	None
Indiana <sup>c</sup>	14,043	1,375	1,375
Iowa	--	--	None
Kentucky	--	None	None
Maryland <sup>c</sup>	--	8,877	8,877
Massachusetts <sup>c</sup>	--	--	19,800
Michigan <sup>c</sup>	--	None	None
Minnesota	--	--	6,086
Missouri	None	--	--
New Jersey <sup>c</sup>	8,724	14,430	14,430
New Mexico	None	--	None
New York <sup>c</sup>	--	None	None
North Carolina	--	11,654	11,654
Ohio	None	None	None
Oklahoma	None	None	--
Pennsylvania <sup>c</sup>	--	2,604	2,604
Rhode Island	--	--	None
South Carolina	--	3,000	3,000
Tennessee <sup>c</sup>	--	26,000	26,000
Texas <sup>c</sup>	37,000-39,000	34,970	34,970
Virginia <sup>c</sup>	--	4,428	4,428
Washington	--	--	None
Wisconsin <sup>c</sup>	--	None	None

Table H3.

*Grouping of States by Policy Variation*

FES PSM In-Home Sample		FES PSM Child Care Sample	
High SMI (> 57%) <i>n</i> = 702	Low SMI (<57%) <i>n</i> = 789	High SMI (> 57%) <i>n</i> = 144	Low SMI (<57%) <i>n</i> = 270
Arkansas	Alabama	California	Florida
California	Arizona	New Jersey	Illinois
Connecticut	District of Columbia	New York	Indiana
Georgia	Florida	North Carolina	Maryland
Hawaii	Illinois	Pennsylvania	Massachusetts
Minnesota	Indiana	Texas	Michigan
New Jersey	Iowa		Tennessee
New Mexico	Kentucky		Virginia
New York	Maryland		Wisconsin
North Carolina	Massachusetts		
Pennsylvania	Michigan		
Rhode Island	Missouri		
Texas	Ohio		
Washington	Oklahoma		
	South Carolina		
	Tennessee		
	Virginia		
	Wisconsin		
Waitlist <i>n</i> = 961	No Waitlist <i>n</i> = 530	Waitlist <i>n</i> = 231	No Waitlist <i>n</i> = 183
Alabama	Connecticut	California	Illinois
Arizona	Hawaii	Florida	Michigan
Arkansas	Illinois	Indiana	New York
California	Iowa	Maryland	Wisconsin
District of Columbia	Kentucky	Massachusetts	
Florida	Michigan	New Jersey	
Georgia	Missouri	Pennsylvania	
Indiana	New Mexico	Tennessee	
Maryland	New York	Texas	
Massachusetts	Ohio	Virginia	
Minnesota	Oklahoma		
New Jersey	Rhode Island		
North Carolina	Washington		
Pennsylvania	Wisconsin		
South Carolina			
Tennessee			
Texas			
Virginia			

## Sensitivity Analysis

To conduct the sensitivity analyses, I multiplied the number of residents in a particular state by the SMI in that state in the year of data collection. I then took the bottom third of this number to create the cut-off for the “Low SMI” group and the second third number to create the cut-off for the “High SMI” group. The residents who lived in states in the middle-third group were excluded from these analyses. This led to a sample size of 980 for the FES PSM In-Home Sample and 279 for the FES PSM Child Care Sample. See Table H4 for the breakdown of states included in these analyses.

Overall results indicate that in the LCA and all of the MGAs, there were no differences between the reduced samples examining differences between the top and bottom third of states and the larger samples presented in Chapter 4. See Tables H5 through H13. This provides additional support for the findings for Research Question 5. Table H4.

### *Sensitivity Analyses: Grouping of States by Policy Variation*

FES PSM In-Home Sample ( $n = 980$ )		FES PSM Child Care Sample ( $n = 279$ )	
High SMI ( $> 61\%$ ) $n = 671$	Low SMI ( $< 51\%$ ) $n = 309$	High SMI ( $> 61\%$ ) $n = 148$	Low SMI ( $< 51\%$ ) $n = 131$
California	Alabama	California	Illinois
Connecticut	Illinois	New Jersey	Maryland
Georgia	Iowa	New York	Massachusetts
Hawaii	Maryland	North Carolina	Michigan
Minnesota	Massachusetts	Texas	Tennessee
New Jersey	Michigan		Virginia
New Mexico	Missouri		
New York	South Carolina		
North Carolina	Tennessee		
Rhode Island	Virginia		
Texas			
Washington			

## Research Question 1

Table H5.

*Sensitivity Analyses RQ 5: Unstandardized Estimates of MGA of RQ 1*

	FES PSM In-Home	FES PSM Child Care
	Sample	Sample
	SMI Groups	SMI Groups
	Estimate	Estimate
Anxiety	-0.03	0.03
Depression	0.06	0.21
Stress	-0.47	0.21
Efficacy	-0.06	0.38
Mastery	0.18	0.49
Social Support	0.09	0.83
Social Control	-0.33	--
Social Cohesion	-0.02	-0.58
Psychological Well-Being	0.02	--
Low SMI	--	1.44
High SMI	--	-0.07
Social Well-Being	0.08	-0.05
Environmental Well-Being	-0.24	--
Children's Vocabulary	0.97	-1.16
Behavior Problems	-0.35	-0.90
Child Care Type	--	0.28**
Child Care Quality	--	0.39

Note: Control Variables Included in the models; Child English was removed because it had an error variance of zero in the Low SMI Group

## Research Question 2

### In-Home Sample.

Table H6.

*Sensitivity Analyses RQ 5: Model Fit Indices of LCA of RQ 2 FES PSM In-Home Sample*

Model	Likelihood	AIC	BIC	Wald Test (df)	<i>p-value</i>
Fully Constrained	-19,988.51	40,237.02	40,842.83	2.40 (10)	0.99
Unconstrained	-19,987.12	40,254.24	40,906.54		

Table H7.

*Sensitivity Analyses: RQ 5: Unstandardized Path Coefficients of LCA of RQ 2 FES PSM*

*In-Home Sample*

	Vocabulary	Behavior
Social Well-Being	1.63	-5.37**
Psych. Well-Being	0.18	-0.97*
Environ. Well-Being	-0.18	-0.07
Subsidy-Use	-1.15	-5.94
Social Well-Being X Subsidy-Use	--	2.60 <sup>+</sup>
Psych. Well-Being X Subsidy-Use	--	1.39*

**Child Care Sample.**

Table H8.

*Sensitivity Analysis RQ 5: Model Fit Indices of MGA RQ 2 FES PSM Child Care Sample*

Model	$\chi^2$	df	$\Delta\chi^2$	WRMR	CFI	RMSEA
FES PSM Child Care Sample: SMI Grouping						
Fully Constrained	131.67	119	---	0.86	0.96	0.03
Free Path Social Well-Being/ Behavior	126.71	118	< 0.05	0.84	0.98	0.02
Unconstrained	122.95	111	> 0.05	0.82	0.97	0.03

Table H9.

*Sensitivity Analysis RQ 5: Unstandardized Path Coefficients of MGA RQ 2 FES PSM*

*Child Care Sample*

	Vocabulary	Behavior
Social Well-Being	2.17*	--
Low SMI	--	-1.83**
High SMI	--	-5.24**
Psych. Well-Being	1.63	-6.28
Social Cohesion	0.00	0.05
Subsidy-Use	-1.68	-1.63
$R^2$		
Low SMI	14%	16%
High SMI	5%	41%

### Research Question 3

Table H10.

*Sensitivity Analysis RQ 5: Model Fit Indices of MGA RQ3*

Model	$\chi^2$	Df	$\Delta\chi^2$	SRMR	CFI	RMSEA
FES PSM Child Care Sample: SMI Grouping						
Fully Constrained	11.50	10	---	0.01	1.00	0.03
Free Path Type/ Behavior	10.634	9	>0.05	0.01	1.00	0.04
Unconstrained	0.00	0	> 0.05	0.00	1.00	0.00

Table H11.

*Sensitivity Analysis: RQ 5: Unstandardized Path Coefficients of MGA RQ3*

	Vocabulary	Behavior
Quality	2.28**	-1.06 <sup>+</sup>
Type (center)	-3.79	1.84
Subsidy-Use	11.92*	-4.96
Subsidy X Quality	-2.91*	0.92
Subsidy X Type	-0.83	-2.01
$R^2$		
Low SMI	9%	13%
High SMI	7%	10%

### Research Question 4

Table H12.

*Sensitivity Analysis: RQ 5: Model Fit Indices of MGA RQ 4*

Model	$\chi^2$	df	$\Delta\chi^2$	WRMR	CFI	RMSEA
FES PSM Child Care Sample: SMI Grouping						
Fully Constrained	147.32	137	---	0.84	0.95	0.02
Unconstrained	122.43	125	>0.05	0.88	0.96	0.03

Table H13.

*Sensitivity Analysis: RQ 5: Unstandardized Path Coefficients of MGA RQ 4*

		Vocabulary	Behavior
Psychological Processes		2.46*	-4.59**
Mental Health Functioning		0.04	-0.29
Social Cohesion		-0.02	0.08
Subsidy-Use		-2.44	0.27
Child Care Type		3.51	-0.60
Child Care Quality		4.37	0.67
$R^2$	Low	11%	22%
	SMI		
	High	9%	26%
	SMI		

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