

Parent Involvement as a Mechanism of the Effects of Early Childhood Intervention

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Dedication

This dissertation study is dedicated to my only sister, Mai Hayakawa. You are the source of my inspiration and motivation. I cannot fully express with words the appreciation I have for all that you have done for me. Thanks, Mai!

Abstract

There is abundant evidence that parent involvement is associated with children's academic achievement and socio-emotional development throughout childhood and into adolescence. However, the mechanisms through which parent involvement impacts children's later outcomes are unclear. Using data from the Chicago Longitudinal Study of the Child-Parent Centers (n = 1,539), this study investigated whether different mediators explain the process from parent involvement to children's long-term outcomes, including educational attainment, criminal history, and substance abuse. Variations in influences by typologies of parent involvement and adult outcomes were examined. Three main results were found for the 1,421 study participants with available outcome data. First, two dimensions of parent involvement emerged- school parent involvement and home parent involvement. School parent involvement predicted later academic outcomes as well as substance abuse and crime outcomes. Home parent involvement predicted educational attainment. Second, mediation analyses revealed that school parent involvement was a mediator of the effect of early childhood intervention on later educational attainment. Third, childhood task orientation, problem behaviors, and frustration tolerance mediated the effect of school parent involvement process on educational attainment. Based on these results, policy findings and future directions are discussed.

Table of Contents

List of Tables.....	v
List of Figures.....	viii
Chapter 1: Introduction and Literature Review.....	1
Chapter 2: Methodology	47
Chapter 3: Results	62
Chapter 4: Discussion.....	107
Chapter 5: Future Directions and Policy Implications.....	118
Bibliography.....	124
Appendix 1: Teacher and Parent Ratings of Parent Involvement Items 1 st -3 rd grade.....	143
Appendix 2: Teacher and Parent Ratings of Parent Involvement Items 4/6 th grade.....	144
Appendix 3: Sample Size and Statistics of Variables in Analyses.....	145
Appendix 4: Correlation Matrix of Predictors, Mediators, Moderators, and Outcomes.....	146
Appendix 5: Correlation Matrix of Independent Variables, Mediators, Moderators, and Outcomes with Covariates.....	147
Appendix 6: Crosstabulation of Trichotomized Home and School Parent Involvement.....	148

List of Tables

Table 1. Pattern Matrix Factor Loadings for Parent Involvement Factor Analysis	63
Table 2. School and Home Parent Involvement Predicting Adult Outcomes	65
Table 3. Years of CPC preschool participation Predicting Adult Outcomes	67
Table 4. Parent School Involvement as a Mediator of CPC Effects on Adult Outcomes	70
Table 5. Home Parent Involvement as a Mediator of CPC Effects on Educational Attainment	71
Table 6. School and Home Parent Involvement as Independent Predictors of Children’s Self- Control	73
Table 7. Self-Control Measures Predicting Adult Outcomes	74
Table 8. Self-Control as a Mediator of School Parent Involvement Effects on Educational Attainment	75
Table 9. Self-Control as a Mediator of School Parent Involvement Effects on Felony Arrest..	76
Table 10. Sobel Test: Self-Control as Mediators of School Parent Involvement and Long-Term Outcomes	76
Table 11. Parent Involvement as a Predictor of Student Motivation	77
Table 12. Descriptive Statistics and Bivariate Correlations Among CPC preschool participation, Family Structure, School Parent Involvement and Educational Attainment	78
Table 13. Moderated Mediation Among Family Structure, School Parent Involvement, and CPC Participation on Educational Attainment	79
Table 14. Descriptive Statistics and Bivariate Correlations Among CPC preschool participation, Maternal Education, School Parent Involvement and Educational Attainment	81
Table 15. Moderated Mediation Among Maternal Education, School Parent Involvement, and CPC preschool participation on Educational Attainment	81
Table 16. Descriptive Statistics and Bivariate Correlations Among Family Structure, Problem	

Behaviors, School Parent Involvement and Educational Attainment	83
Table 17. Moderated Mediation Among Family Structure, School Parent Involvement, and Problem Behaviors on Educational Attainment	83
Table 18. Descriptive Statistics and Bivariate Correlations Among Maternal Education, School Parent Involvement, Problem Behaviors and Educational Attainment	84
Table 19. Moderated Mediation Among Maternal Education, School Parent Involvement, and Problem Behaviors on Educational Attainment	85
Table 20. Descriptive Statistics and Bivariate Correlations Among Family Structure, School Parent Involvement, Problem Behaviors and Felony Arrest	86
Table 21. Moderated Mediation Among Family Structure, School Parent Involvement, and Problem Behaviors on Felony Arrest	86
Table 22. Descriptive Statistics and Bivariate Correlations Among Maternal Education, School Parent Involvement, Problem Behaviors and Educational Attainment	87
Table 23. Moderated Mediation Among Maternal Education, School Parent Involvement, and Problem Behaviors on Felony Arrest	88
Table 24. Descriptive Statistics and Bivariate Correlations Among Family Structure, School Parent Involvement, Frustration Tolerance and Educational Attainment	89
Table 25. Moderated Mediation Among Family Structure, School Parent Involvement, and Frustration Tolerance on Educational Attainment	90
Table 26. Descriptive Statistics and Bivariate Correlations Among Maternal Education, School Parent Involvement, Frustration Tolerance, and Educational Attainment	91
Table 27. Moderated Mediation Among Maternal Education, School Parent Involvement, and Frustration Tolerance on Educational Attainment	92
Table 28. Descriptive Statistics and Bivariate Correlations Among Family Structure, School Parent Involvement, Frustration Tolerance and Educational Attainment	93

Table 29. Moderated Mediation Among Family Structure, School Parent Involvement, and Frustration Tolerance on Felony Arrest	94
Table 30. Descriptive Statistics and Bivariate Correlations Among Maternal Education, School Parent Involvement, Frustration Tolerance and Educational Attainment	95
Table 31. Moderated Mediation Among Maternal Education, School Parent Involvement, and Frustration Tolerance on Felony Arrest	95
Table 32. Descriptive Statistics and Bivariate Correlations Among Family Structure, School Parent Involvement, Task Orientation and Educational Attainment	96
Table 33. Moderated Mediation Among Family Structure, School Parent Involvement, and Task Orientation on Educational Attainment	97
Table 34. Descriptive Statistics and Bivariate Correlations Among Maternal Education, School Parent Involvement, Task Orientation and Educational Attainment.....	98
Table 35. Moderated Mediation Among Maternal Education, School Parent Involvement, and Task Orientation on Educational Attainment.....	98
Table 36. Factor Analyses of Early vs. Later Parent Involvement	101
Table 37. Factor Loadings of Parent Involvement Variables.....	103
Table 38. Parent Involvement as a Predictor of Self-Control Variables.....	104
Table 39. Factor Analysis Results of Parent-Rated Parent Involvement.....	105
Table 40. Factor Analysis of Teacher-Rated Parent Involvement.....	106

List of Figures

Figure 1. Question 2: Does parent involvement mediate the ECE intervention effect on educational attainment and crime behavior	57
Figure 2. Question 3: What mediates the impact of parent involvement on educational attainment and crime behavior?	57
Figure 3. Parent involvement factor analysis	70
Figure 4. Factor analysis of Parent-Rated parent involvement items	104
Figure 5. Factor analysis of Teacher-Rated parent involvement items	105

Chapter 1

Introduction

Early childhood education (ECE) continues to receive much public and research attention; governments at all levels as well as large corporations (e.g., Best Buy, 3M) recognize the importance of early childhood education and are increasing their attention to fund ECE programs and research (e.g., the Minnesota Early Learning Foundation, U.S. Department of Education Investments in Innovation funding). As ECE interventions are created and implemented, researchers from numerous fields have been interested in identifying which programs are most effective, why they are effective, and how long the potential benefits last (e.g. Currie & Thomas, 2000; Gormley, 2010; Ludwig & Phillips, 2007; Raikes, Chazan-Cohen, Love, & Brooks-Gunn, 2010; Reynolds, Temple, & Ou, 2001; Schweinhart & Weikart, 1997). Although there is evidence of the effectiveness of ECE programs, *evidence documenting the complex process of how and why these programs continue to impact children's achievement into adolescence and adulthood is scarce*. It is also not clear *under what conditions and for whom ECE has the most persistent impact*. Identification of the key elements that produce the most *persistent* impact on children's educational attainment and social development is especially important for the successful implementation of future ECE programs.

A promising pathway from ECE to children's successful development lies within the family context. Parents can provide numerous resources to help support children's their development. There is a plethora of research indicating the positive impact of parent involvement on children's and adolescents' academic and social development (e.g. Barnard, 2004; Fan & Chen, 2001; Fantuzzo, Davis, Ginsburg, 1995; Jeynes, 2005; Lee & Bowen, 2006; Izzo, Weissberg, Kaspro, & Fendrich, 1999; McWayne, Hampton, Fantuzzo, Cohen, & Sekino, 2004; Nokali, Bachman, and Votruba-Drzal, 2010; Reynolds, 1989; Rimm-Kaufman, Pianta, Cox, & Bradley, 2003). However, the developmental processes by which parent involvement has an

effect on children's achievement and social development across childhood and adolescence are largely unexplored. Furthermore, to understand specific mechanisms through which parent involvement (as initiated by ECE programs) impacts children's success, researchers are beginning to consider student self-control and motivation as potential mediating variables explaining the persisting influence of early parent involvement on later outcomes (e.g. Grolnick and Slowiaczek, 1994; Gonzalez-DeHass, Willems, & Doan Holbein, 2005; Perrone et al., 2004). Despite the wealth of research conducted in the parent involvement literature, the field has yet to identify 1) the specific typologies of parent involvement which impact children's long term outcomes, 2) whether this parent involvement process differs by type of parent involvement (e.g. parent involvement in school vs. parent involvement at home) and outcome examined (e.g. educational attainment vs. engagement in criminal activity), and 3) whether this parent involvement process is moderated by context (e.g. family structure). It is now timely to identify underlying mechanisms so that education funding can be efficiently invested in ECE programs that address the most significant factors in producing measurable gains.

Literature Review

In response to the cyclic nature of poverty, in 1964 President Lyndon B. Johnson declared a "War on Poverty" and early childhood education (ECE) was newly conceptualized as a potential mechanism for intervention. After decades of research, it is clear that ECE interventions have long lasting academic and social impacts, especially for economically-disadvantaged families (e.g. Campbell et al., 2002; Reynolds et al., 2011, Schweinhart & Weikart, 1997). This documented impact of ECE on educational attainment extends beyond grade school and into high school. Results from the Abecedarian study, the High/Scope Perry Preschool study, the Chicago Longitudinal Study – all nationally-recognized longitudinal studies of ECE interventions, have found that participants of high quality ECE programs are more likely to graduate from high school on time, have higher standardized test scores, are more likely to attend college, and are

less likely to be held back in school (e.g. Barnett, 1995; Campbell et al., 2002; Reynolds et al., 2011; Schweinhart & Weikart 1997). Furthermore, benefit-cost analyses of ECE programs have illustrated their profound impact on society. The cost savings of avoiding criminal activity, teenage pregnancy, and welfare due to ECE intervention, can be more than \$47,759 per child (Reynolds et al., 2011). Given the strong benefits of ECE identified thus far, there is potential for even greater benefits persisting throughout college and beyond. Many researchers and economists believe that ECE is the best solution to end the cycle of poverty and enhance economic development through improving the educational attainment of economically disadvantaged children (e.g. Reynolds et al., 2011; Bartik, 2011).

However, despite the wealth of evidence supporting the many benefits of ECE programs, *it is less clear through what process, under what conditions, and for whom these programs are most effective.* And, to intervene successfully with children, to craft programs and experiences likely to have the greatest positive impact on them, it is critical to be able to answer these questions with some level of concrete specificity. Examining the intersection between the home (e.g. parent involvement, family structure) and school contexts in which children develop, will provide us with some of that specificity, by illuminating specific pathways through which these contexts work. For example, parents can be involved in children's schooling at home or by physically volunteering in the schools. The use of parent involvement in multiple, intersecting contexts, as an effective strategy to improve children's development is supported by various theories of development, discussed in the next section of the dissertation.

Theoretical Foundations

The objective of many federally-and state-funded early childhood and education programs is to promote parent involvement with the rationale that this will also improve children's cognitive and social development (e.g. Early Head Start, Head Start, Nurse Family Partnership, WIC). Parent involvement is a critical factor that can have impacts on child

development from multiple layers of influence and in numerous contexts (e.g. home, school). Moreover, parent involvement lies at the core of many childhood intervention programs because it is perceived as an effective and malleable mediator of behaviors. These ideas that support parent involvement as a critical mechanism for change are derived from several theories that explain how parents' involvement enhances children's academic and social development: Ecological systems theory (Bronfenbrenner, 1979), Human Capital theory (e.g. Schultz, 1961; Becker, 1962; Heckman, 1999), Family stress theory (e.g. McCubbin, 1979), and Resilience theory (e.g. Masten, 2007) A range of theoretical foundations promoting active parent involvement in children's lives is discussed.

Ecological systems theory. The ecological systems model has offered the field of developmental science a framework in which researchers can comprehensively understand and appreciate multiple layers that bidirectionally affect human development (Bronfenbrenner, 1979). This perspective laid the groundwork for conceptualizing human development as a socially embedded phenomenon (Shonkoff & Phillips, 2000). The persistence of its impact in the developmental field can be attributed to its valuable recognition that development is influenced by constantly changing bidirectional contexts. Parent involvement impacts children in a multitude of contexts (e.g. home, school, neighborhood community). Joyce Epstein (1995) has created six typologies of parent involvement that represent parent involvement in a variety of contexts based on Bronfenbrenner's idea that multiple spheres of influences interact on each other. As such, parent involvement occurs not only at home, but in other connected contexts involving for example, the teacher at school, the neighborhood community, organizations such as the PTA, etc.

The ecological model allows researchers to recognize the multiple layers of influences on the child's development, and the bidirectional influences in which multiple layers affect the child, rather than an additive, competitive process that link various layers of contexts (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000). This perspective enhances

developmentalists' awareness of the interaction among culture, family, and society, and highlights how these mutual influences impact the full range of development, including mental, psychological, emotional, and social aspects of an organism. Therefore this model helps guide researchers to understand how parent involvement influences and is influenced by multiple spheres of contexts which all contribute to developing numerous skills of the child.

Moreover, the multiple layers of contexts are reciprocally interacting with the child and are constantly fluctuating. The various layers affect the child, and affect other layers, but also the constantly reorganizing child affects the layers themselves. This perspective highlights the significance of understanding that development is a result of the interactions between an actively evolving human organism and the persons, objects, and symbols in its immediate external environment (Broderick & Blewitt, 2006). This supports the notion that parent involvement is a critical mechanism for change because as parents are increasingly involved in their children's lives across many domains, children, teachers, and others are affected by the involvement. In turn, children and teachers reciprocate the high level of parent involvement, for example, with students increasing their motivation to perform well in school, or by teachers providing resources for highly involved parents to take home and review what is learned in the classroom with the child.

However, the valuable information this perspective offers also poses theoretical challenges. Because the model proposes multiple layers of influences that continuously interact with one another, it is difficult to predict development. Furthermore, there are several other issues that arise in testing questions while subscribing to the ecological model. First, not only is the influence of each layer bidirectional, but many are multidirectional. Thus any specific layer, such as the family as a unit, influences and is influenced by the child, the neighborhood community, the school the child attends, and the parents' work place. When every layer seems to be related to every other layer, it is difficult to differentiate the impact of a specific layer.

Despite the aforementioned challenges facing developmental researchers, the ecological model has been accepted as a useful framework in which development can be understood. This model has also directed developmental researchers to appreciate the value of examining contexts through the perspective of multiple disciplines (e.g. psychology, sociology, criminology, education, demography). The ecological model, in conjunction with other theories, provides strong support for why parent involvement is a critical factor that influences children's cognitive and social development.

Human capital theory. Parent involvement and engagement in their children's lives serves as a valuable resource which provides the foundation for children's future ability to further acquire skills. James Heckman (1999) highlights the importance of non-cognitive skills and motivation that are passed down from schools and families to children. The focus in this theory is on creating ability (intellectual skills) as a resource; ability in turn contributes to further learning and a cyclical process of building further ability (skills) as children progress through school. Children, supported by involved and engaged parents across the early school years, combined with an encouraging school system, maximize the process of learning and skill building.

Furthermore, the benefits of human capital investments are larger if made in early childhood. Skills acquired earlier make the process of later learning easier. For example, if, with the help of a patient and involved parent and a supportive preschool program, a child learns self-regulation skills, by the time this child enters elementary school, s/he will have already formed the foundational skills to be a task oriented student – ready to learn.

Moreover, research on early childhood programs (e.g. the Perry Preschool Program, the Chicago Longitudinal Study) has shown other significant benefits to the children – particularly through increased social skills and motivation (Heckman, 1999). These socio-emotional skills – for example, inhibitory control, task orientation, delay of gratification, and frustration tolerance – to name a few, provide the foundation for successful developmental gains that build on one

another over time. Although not always measured in existing studies, when examined, these skills have been documented to be enduring (e.g. Moffit et al. 2011) and are critical for children's development and well-being both early and later in development. For example, Heckman et al. (2006) has identified these "non-cognitive" skills as the key to the success of early childhood education intervention programs. Participants of early childhood programs which raise non-cognitive skills have been found to participate less in risk behaviors and have better long-term labor market outcomes. Further, Lindqvist and Vestman (2011) have shown that in fact these non-cognitive skills are more predictive of adult labor market status than cognitive skills. Although the empirical testing of this idea of human capital is recent, these ideas have been present for more than five decades by economists who have understood the importance of human capital in the framework of advancing our nation (e.g. Schultz, 1961; Becker, 1962). This human capital theory provides a useful framework to guide scientists in understanding the process of human development.

Resilience theory. The role of parent involvement is also strongly supported by resilience theory. According to Masten (2007), "Resilience is...the capacity of dynamic systems to withstand and recover from significant disturbances" (p. 923). Resilience science was shaped by those who recognized that many young people adapt and do well in the face of adversity. Growing from the idea of risk, and cumulative risk, investigators considered the idea of risk pile up (Sameroff, 2006). However, the idea of risk and its associations can be inverted to create notions of assets and resources, or protective factors. Therefore, high levels of resources can pile up and produce better outcomes (Sameroff, Seifer, & Bartko, 1997). Furthermore, Masten (2001) proposes the concept of compensatory effects – that enough positive assets can offset the burden of significant risks in a child's life. Many intervention strategies have been generated from this idea of cumulative assets and resources. If intervention programs can provide enough resources

that interact with multiple domains of a child's development, they may neutralize the negative risks and instead enhance the child's development.

The resilience framework provides a strong theoretical foundation for intervention programs – and particularly those that focus on parenting and parent involvement. Masten (2007) lists “hot spots” of adaptive systems implicated in resilience research. Examples of potentially effective areas indicated by previous resilience research include family systems, schools, larger community and cultural systems, and peer systems. Of note, many of these areas overlap with Bronfenbrenner's ecological model, highlighting the importance of intervening in numerous contexts within children's development. Furthermore, evidence from research suggests that it may be possible to “reprogram” various systems to operate more normatively with the provision of a positive caring or training environment (e.g. Cicchetti, Rogosch, & Toth, 2006). Intervention strategies have been focusing on altering the level of an asset/resource or risk in a child's life to ultimately improve the child's outcome.

More specifically, parenting and parent involvement have been raised as key mediating mechanisms in interventions because effective parenting appears to be a protective factor with respect to children's development, such as antisocial behavior (Masten et al., 1999). For example, McLoyd (1998) demonstrated the mediating role of parenting in the case of poverty. Utilizing knowledge from the resilience literature applied to concrete, real world settings, other studies have used experimental intervention designs to show a change in child behavior as a function of changes in parenting behavior. Forgatch and DeGarmo (1999) created an intervention which tested the protective effect of a parenting intervention on divorce. Results indicated improved parenting practices among treatment parents, teachers reported better school adjustment in the children, and children and parents reported decreased levels of maladjustment. Particularly under conditions of adversity, poor parenting seems to increase the risk of maladaptive outcomes, while normative parenting appears to protect the development of competence, even during adverse

conditions. Masten (2007) suggests that a review of the resilience literature indicates that parenting seems to play a critical mediating role between major life stressors and children's development.

Family stress theory. An overlapping theory with Bronfenbrenner's ecological model and resilience theory is family stress theory. Family stress theory integrates the idea of multiple levels of influences affecting development with the notion that not just individuals but families and communities can be resilient. The resilience process involves transactions among multiple systems of influence and both risk and protective factors can emerge within individuals, families, and communities (Luthar, Cicchetti, & Becker, 2000). This family stress perspective emphasizes both family vulnerability and regenerative power and suggests that families have the ability to withstand stressors and to recover from them (McCubbin, 1979). A major concept with family stress theory is family resilience. McCubbin and McCubbin (1989) define this as "characteristics, dimensions, and properties of families which help families to be resistant to disruption in the face of change and adaptive in the face of crisis situations." (p. 247) Family resilience is thus synonymous with family strengths or family protective factors. Parent education and family cohesiveness are examples of abilities or resources families can have, as protective factors (Patterson, 2002). Parent intervention programs which provide parents the resources and skills to support their children through increased parent involvement, parent education, and general parenting knowledge are likely to be successful. As parents become involved and improve their parenting techniques, this forms the foundation for a stronger family. According to family stress theory, the unit of analysis is the family, and within the family, the various individuals are constantly interacting with one another and thus impacting one another's behaviors. Therefore, through parent involvement as a mechanism, every member of the family, and thus the family as a unit, benefits from the intervention.

The Influence of Parent Involvement on Children's Development

As evidenced by the ecological model, human capital theory, resilience theory, and family stress theory, it is clear that a number of theories support parent involvement as a critical mechanism underlying processes of ECE prevention and intervention programs for creating change and improving not only children's behaviors but also the success of the family. Both parent involvement in the home and school can contribute greatly to children's academic success and social development, and mitigate the effects of poverty (e.g. Jeynes, 2005). High levels of parent involvement are associated with children's self-esteem and life satisfaction (Wenk et al., 1994). Furthermore, parent's expectations of the child (a type of parent involvement) can have an effect on the child's motivation and self-efficacy. The expectations contribute to children's optimism about life and promote a sense of self-competence, which may have long-term impacts on individual's educational and occupational attainments. These attributes prepare individuals for adult roles and offer a head start on life opportunities (Clausen, 1993). Self-competence skills such as decision-making can have important consequences for future adult trajectories (Elder, Johnson, Crosnoe, 2003). Parents with high expectations set high standards for their children and express the value of academic success. These children are encouraged by their parents and motivated to achieve success – through school and their social behaviors.

There is much evidence documenting the effectiveness of ECE intervention programs, especially those with a parent involvement focus (Reynolds et al., 2011). However, *the developmental processes underlying the beneficial impact of parent involvement are unclear*. It is important for researchers to *identify critical elements, contexts, and mechanisms* that serve as the foundation of early childhood intervention programs. Doing so will help design and target programs in the future so that they are effective for their intended participants. Although early childhood interventions include parent involvement as a critical alterable mediator, there is a *dearth of mechanistic information explaining why parent involvement has such a strong and persistent influence* on children's development, and more specifically, for whom. To fully

understand the parent involvement process on student achievement and social development, this author believes it is important to follow a broad person-process-context theoretical framework (Bronfenbrenner, 1986). Through this framework, proximal processes (e.g. the association between parent involvement and children's later academic and socio-emotional development) may be examined as it varies as a function of person characteristics (e.g. family structure). Since parent involvement is multifaceted, impacting children's development on numerous levels, it is important to understand the specific components and processes of it that have the greatest benefit for children.

Intervention Programs based on Parent Involvement

As illustrated by ecological systems theory, resilience theory, family stress theory, and human capital theory, the significant role of parent involvement on children's development has been supported by numerous theories explaining human development. Particularly through ecological systems theory and resilience theory, parent involvement has been identified as a protective factor for young children's positive development. This valuable role of parents in children's development is reflected in government policies such as the reauthorization of Title 1 under the No Child Left Behind Act, 2101(4) (U.S. Congress, 2001). These policies mandate the active participation of parents in their children's educational development. Moreover, acknowledging the importance of parent involvement, numerous parenting and parent involvement interventions have been designed and implemented to strengthen parent involvement in children's lives. These programs range from home visiting programs with nurses, to early childhood education programs with a strong parent involvement component, to programs that enhance parenting practices. Some examples of parenting interventions include Guiding Good Choices Program (families are provided a parenting guide and shown videos depicting vignettes of parenting skills; Kosterman and Hawkins, 1997), The Incredible Years Program (parents receive training on positive and non-punitive parenting skills; Webster-Stratton, 2000), Fast

Track (parents attend parent groups, home visiting, and learn about parent-child bonding; Conduct Problems Prevention Research Group, 1992), Positive Action (parents engage in planned activities, get involved in the community, and are encouraged to participate in school activities; Allred, 1977), Project Achieve (parents are trained to work at home with children and are educated on school programs; Knoff & Batsche, 1995), and The Strengthening Families Program (where parents and children engage in activities together – e.g. share a meal or do homework together; Kumpfer, DeMarsh, & Child, 1989). Other parent involvement interventions are funded federally and are part of a multidimensional program with additional components (e.g. education) - well-known examples include Early Head Start (USDHHS, 1995) and Head Start (USDHHS, 1996).

Early Head Start is a federal program for low-income children under the age of 3 and their families. (USDHHS, 1995). The program is a service model that may be home-based (weekly home visits along with parent group meetings), center-based (quality center care with parent support groups), or a mixture of these services. Raikes et al. (2010) evaluated the Early Head Start impacts for 3 year old children and found that the program had positive parenting effects such as program parents reading significantly more to their children, providing more supportiveness in play, and spanking their child less. Children of Early Head Start also exhibited positive outcomes relative to the control group – children were less aggressive, were able to sustain attention with objects during play, and had higher cognitive abilities.

Similarly, Head Start, the original program that preceded Early Head Start, is a family of programs that includes parenting classes and provides parental support in numerous domains. (Office of Head Start, 2011). From its creation in 1965 through the 1980s the goals of the program evolved to focus on family outcomes and to provide multiple services to children and their families. While it is yet unclear what components of Head Start are most effective, numerous Head Start evaluation studies provide evidence for parent involvement as a key factor

that contributes to the positive development of Head Start children (e.g., Marcon, 1999; Parker et al., 1999; Webster-Stratton, 1998).

Other parenting/parent involvement programs are included within early childhood education intervention programs. For example, the Chicago Child Parent Centers is a classic example of integrating an educational program with a parent involvement program (Reynolds, 2000). Embracing Bronfenbrenner's ecological systems theory, the Child Parent Centers highlight the significance of impacting children at school and at home, while also ensuring a connection between the home and the school contexts. Therefore, through parent-teacher communication, parents' interactions with the school are critical to help parents understand what their children are learning in the classrooms and support their children's development at home.

The importance of parent involvement has been documented over the past three decades, and many reviews of this literature have provided confirmation of parent involvement's significant contribution to children's positive development (e.g. Stevenson & Baker, 1987; Fan & Chen, 2001; Jeynes, 2005). Furthermore, the vast literature on parent involvement interventions provides experimental evidence that family/parental involvement does seem to have a significant impact on child outcomes. However, it is yet unclear which *type* of parent involvement is most effective. But, even before type of parent involvement can be examined, a major, logically prior issue in the field is the systematic identification of *how* to define parent involvement.

Defining Parent Involvement

Parent involvement is a commonly-used broad construct with many disparate definitions. Originally stemming from language compensation programs implemented in the 1960s and 1970s (Brooks-Gunn, Berlin, & Fuligni, 2000), the term was used to encourage at-risk parents to actively engage in preparing their children for academic success. Federal and government policies since then have continued to embrace the value of "parent involvement," and this is still reflected in recent policies (e.g. No Child Left Behind, Head Start). For example, stemming from the idea

of parent involvement, parents of children attending school in the United States are expected to attend parent-teacher conferences, and are encouraged to be involved in their children's school by volunteering in the class and attending school events. However, with an array of activities defining parent involvement, it is unclear what specifically is meant by "parent involvement." Even within federal law, there is much ambiguity in what is meant by parent involvement within the education system. The No Child Left Behind Act (NCLB), is an example of this - although parent involvement is required, it reads, "Involve parents in the joint development of the plan ... and the process of school review and improvement," and does not identify specific behaviors or participation in activities that are expected of parents (U.S. Congress, 2001, p.1). Similarly, throughout the document, although parent involvement opportunities are expected to be offered by the school, NCLB does not specifically state in what capacity parents are required to be involved.

Furthermore, Bakker and Denessen (2007) raise theoretical and empirical challenges pertaining to the conceptualization and operationalization of parent involvement. The authors note that more than a decade ago, Georgiou (1997) noted that parent involvement is a complex construct with an absence of a clear definition and urged the identification of a specific definition of this construct before researchers set out to understand its function and effects. Yet, after over a decade of research, the state of the parent involvement literature remains the same. Bakker and Denessen note that several issues exist – first, there is the issue of labeling what is and is not parent involvement.

Second, there exists the idea of typologies of parent involvement (e.g. six types of parent involvement, three categories of parent involvement, one general parenting construct) and specific practices (e.g. parents checking children's homework) occurring in specific contexts (e.g. home vs. school). There exists numerous typologies, but also within these sub-types of parent

involvement, there are numerous definitions of what behavior falls under which specific sub-type of parent involvement and whether or not a specific parent behavior has substantial benefits to children over other parent behaviors. In what follows, the author describes the range of construct definitions and descriptions.

Different typologies of parent involvement. Parent involvement at home and in school has been identified as an integral component to children's academic success, particularly because it represents a connection between two significant spheres of a child's life- the school and family. Many researchers have attempted to categorize types of parent involvement. For example, Gordon (1977) identified six types of parent involvement, describing the parent's role as a 1) teacher of own child, 2) classroom volunteer, 3) paraprofessional, 4) learner, 5) decision maker, and 6) audience. Similarly, Williams and Chavkin (1989) also created six types of parental roles, describing the parent as a(n): 1) audience, 2) home tutor, 3) program supporter, 4) co-learner, 5) advocate, and 6) decision maker. A slightly different classification by Cervone and O'Leary (1982) proposed five types of parent involvement: 1) reporting progress, 2) attendance of special events, 3) parent education, 4) parents as teachers, and 5) educational decision makers. As evidenced by these typologies, categories of parent involvement range from passive to active participation in children's schooling. Many of the aforementioned parent involvement categories overlap across typologies (e.g. parents as teachers in the home), and highlight the salience of specific categories of parent involvement. Although these categorizations are useful in the conceptualization and organization of the parent involvement construct, it remains unclear what categories of parent involvement are critical in influencing children's academic development.

While variations of these typologies have been created over the years, Epstein's typologies of parent involvement have been commonly used as a framework for practitioners (e.g. National Middle School Association, 2006; Michigan Department of Education, 2001). Epstein (1995) describes 6 categories of school related parent involvement: 1) parenting (e.g. establishing

a home environment to support children as students), 2) school-parent communication (e.g. establishing an effective school-to-home and home-to-school communication about school programs and students' progress), 3) involving parents in school volunteer opportunities (e.g. parents volunteering and supporting school activities), 4) involving parents in home-based learning (e.g. helping children at home with homework and other curriculum-related activities, decisions, and planning), 5) involving parents in school decision-making (e.g. developing parent leaders and representatives), and 6) involving parents in school-community collaborations (e.g. integrating resources from the community to strengthen school programs). Epstein's (1992, 1994, 1995) categories of parent involvement require an integration of different spheres of a child's life to comprehensively reinforce processes that influence children's academic achievement and overall success. Parent involvement does not only occur at home or school. Instead, school, community, and family partnerships increase the level and extent of parent involvement, thus supporting children's academic success in multiple interacting contexts.

While Epstein's typologies were derived from within a school context, other typologies of general parent involvement also exist. Mau (1997) examined parent involvement through a lens of functionality. The four categories of involvement examined were 1) helping (e.g. checking homework, giving privilege because of good grades), 2) controlling (e.g. limiting privileges because of poor grades, require work or chores, limiting watching TV), 3) supporting (e.g. supporting plans and preparation for ACT or SAT test, supporting the things students have studied in class) and 4) participating (e.g. attending school meetings, volunteering at the school). In Mau's study of differential parent involvement by culture, the frequency of involvement significantly differed by Mau's typologies of parent involvement among Asian, White, and Asian American families, and thus this classification of parent involvement was meaningful for cross-cultural comparison studies.

Despite the numerous classifications of parent involvement, studies examining parent involvement overwhelmingly refer to Epstein's aforementioned categories or a derivative of those categories. This typology is primarily derived from a lens examining parent involvement within a school context. There is still much debate over whether children benefit most from a specific type of parent involvement (e.g. parents volunteering in school events vs. parents helping children with their homework at home) or if simply, general parent involvement in the child's life is most influential in a child's development.

Parent involvement in the home and school. In the debate over parent involvement classifications, Henderson et al. (1986) stated that there are two broad, yet significant, distinctions among the numerous types of parent involvement considered by researchers: 1) parent activities aimed to strengthen the school program and indirectly helping the child (e.g. volunteering in classrooms, attending school events), and 2) parent activities that involve assisting one's own child (e.g. helping with homework, meeting with teacher to discuss child's progress). Thus often, the main typologies of parent involvement are broadly separated into two categories: parent involvement in the home and parent involvement in the school (Hoover-Dempsey & Sandler, 2005; Sheldon, 2002). These two typologies are based off of Epstein's six types of family, school, and community partnerships.

Parent involvement in the home includes activities parents do with the child in the home. Some examples include: parents reading to their children (Becher, 1984; Christenson & Rounds, 1992) keeping an eye on the child's progress, parents talking about the school day with the child (Hoover-Dempsey and Sandler, 1997), cooking with their child, and taking their child to a museum, zoo, or aquarium (Barnard, 2004). *Parent involvement in the school* entails parents' participation in school related activities. Some examples include helping with homework, attending school programs, watching the student in sports or other extracurricular activities, knowing how well the student is doing in school (Bogenschneider, 1997; Steinberg et al., 1992),

presence in the school, volunteering in the classroom (Christenson & Rounds, 1992), and parents contacting the school (Ho Sui-Chu and Willms, 1996; Izzo et al., 1999). Yet this dichotomy of parent involvement in the home versus at school is not always clear. For example, parents helping their children with homework can be placed in either category Help with homework occurs at home , so some researchers categorize this as parent involvement in the home, while others categorize as parent involvement in the school. Therefore, this distinction between parent involvement in the home vs. at school is not clear- some researchers classify the type of parent involvement based on physical location (i.e. occurring at home vs. occurring in school), while others assess the type of parent involvement based on the functionality of the involvement (i.e. interacting with the child vs. involvement for the purpose of enhancing their academic success).

Moreover, parent involvement is examined also as a general measure of parental engagement – including both time spent with family at home and in school. (Astone & McLanahan, 1991; Fan & Chen, 2001). These general measures of involvement include information such as parents keeping track of school progress, monitoring their children’s activities (Grolnick & Slowiaczek, 1994), checking homework, checking up on their child’s friends and knowing the parents of those friends (Jeynes, 2005). Although some researchers identify a specific type of parent involvement in their analyses, others use a general parent involvement variable that consists of several domains of parent involvement. Whether or not these types of parent involvement have distinctly different influences on children’s development is unclear but both types of parent involvement are critical for children’s academic and socio-emotional development and are encouraged by educators (Sheldon, 2002).

Parent Involvement Within the Scope of this Dissertation

Parent involvement has been a critical subject worth studying in depth from within numerous disciplines because it is strongly associated with children’s development in a variety of domains. As such, parent involvement is a large field with many linkages to other related topics

– for example, parenting styles (Steinberg et al., 1992; Darling & Steinberg, 1993), home environment (Bradley, Caldwell, & Rock, 1988), and child abuse and neglect (e.g. Cicchetti, 2004). The abundance of literature on parent involvement and closely related topics is reflected in the volume of reviews and meta-analyses conducted in an attempt to consolidate findings from the numerous studies published (e.g. Amato & Gibreth, 1999; Becher, 1984; Fan & Chen, 2001; Hill & Tyson, 2009; Jeynes, 2005; Mattingly, Prislun, McKenzie, Rodriguez, & Kayzar, 2002).

The topic of parent involvement has been a noteworthy concept for a few decades. As early as in 1984, Becher reviewed and synthesized the wealth of parent involvement studies that already existed. This review examined the role of parents in relation to children's achievement, the effects of parent education n programs on children's academic achievement parental practices, and the effect of parent involvement in early childhood education programs. Becher's review summarized knowledge on parent involvement with eight key points: 1. Parents already make important contributions, 2. Parents can make additional contributions. 3. Parents can learn new parenting techniques, 4. Parents have important perspectives on their children, 5. Parent-child relationships are different from teacher-child relationships, 6. Parents' perspectives about involvement are important, 7. Most parents really care about their children, and 8. Parents have many reasons for their involvement. These eight key points have been integrated into policy and research and continue to be discussed in the general parent involvement literature.

The ideas raised by Becher in 1984 have continued to be a critical topic pursued by researchers to the present day. More recently, Fan & Chen (2001) reviewed 25 studies examining the impact of parent involvement on students' academic achievement. Their findings suggest a small to moderate and practically meaningful association between parent involvement and student achievement. In this study, analyses revealed that parent expectation of the child's academic success most strongly predicted students' academic achievement, but parental home supervision had the weakest link to academic success. Although results are meaningful, it is still unclear what

specific behaviors within parent involvement in the schools are integral to academic achievement is unclear.

Also, building upon studies by Fan & Chen (2001) and Mattingly et al. (2002), Jeynes (2007) examined whether there were varying effects of parent involvement by race and socioeconomic status. Jeynes also addressed specific components of parent involvement that positively impact urban students. Using high-quality studies (i.e. random assignment, avoiding selection bias, specific operationalization of parent involvement), the meta-analysis findings suggest that parent involvement may be a means to reduce the achievement gap between White students and some racial minority groups. Others have examined parenting behaviors specific to children's achievement. Furthermore, investigations of the associations among parent involvement and achievement remain strong in middle childhood. Hill & Tyson (2009) reviewed 50 studies examining strategies of parent involvement (i.e. home-based involvement, school-based involvement, and academic socialization) that promote middle school achievement. Similar to Fan & Chen's meta-analysis, Hill & Tyson report that parent involvement – specifically school-based involvement and academic socialization (e.g. parents highlighting the value of education) was positively associated with achievement, but not parents helping with their children's homework.

Other meta-analyses have examined aspects closely related to parent involvement, such as parenting styles. For example, Amato and Gilbreth (1999) reviewed 63 studies examining the association between nonresident father's parenting and children's well-being. This study highlighted the importance of father child relationships and authoritative parenting style as related to children's academic achievement. Further looking at parenting behavior, Mcleod, Wood, & Weisz (2006) reviewed 47 studies examining the association among parenting and childhood anxiety. Parenting behaviors included parental control and parental rejection. Other studies have examined parenting within the context of home visiting programs. Kendrick et al. (2000)

systematically reviewed 34 studies evaluating the effect of home visiting programs on parenting behaviors. Within this meta-analysis, parenting was defined as emotional and verbal responsiveness of the mother, avoidance of restriction and punishment, organization of the environment, provision of appropriate play materials, maternal involvement with the child, and opportunities for variety within the daily routine. Another meta-analysis on parenting reviewed 161 studies on the association between parenting and delinquency (Hoeve et al., 2009). The authors identified parental monitoring, psychological control, parental warmth, and parental support as indicators of parenting behaviors. As this and other studies illustrate, there is an overwhelming abundance of research examining the broad construct of parent behaviors – whether it is parent involvement, parenting, or parenting styles.

However, to narrow the focus of consideration for the purposes of the present dissertation study, the author, here, will consider parent involvement insofar as it pertains to parents' investment of resources in their children (Grolnick, Benjet, Kurowski, and Apostoleris, 1997) for the purpose of enhancing their cognitive and social development. Although this definition refers to a variety of parent behaviors ranging from activities such as volunteering in the child's school to ensuring that children eat breakfast (Sheldon, 2002), this definition limits the scope of the present review by excluding other constructs closely related to parent involvement, such as parenting styles, parental neglect, and parental warmth. While parent involvement is conceptually related to these other parenting factors, it is a disparate field of study as parent involvement specifically focuses on behavioral measures of the parents in relation to their involvement *for* their children as opposed to parent-child relationships and interactions.

Within this narrower definition of parent involvement, there is still a plethora of parent involvement typologies. Ballantine (1999) noted that because parent involvement is an all-encompassing construct, it would be helpful if researchers identified which aspects of parent involvement had the greatest benefits to children. Furthermore, Grolnick et al. (1997) assert that

once researchers understand the various components of parent involvement, this knowledge can then be utilized to further understand other influences (e.g. family) on children's educational experiences.

Much of the previous parent involvement research literature supports the positive impact of parent involvement on children's and adolescent's cognitive and socio-emotional development (e.g. Barnard, 2004; Fan & Chen, 2001; Jeynes, 2005; Lee & Bowen, 2006). Over several decades, researchers have repeatedly identified both the short and the long term impact of parent involvement on achievement and educational attainment, as well as socio-emotional and social outcomes.

Parent Involvement Impacts Educational Outcomes

To date, numerous studies have provided reliable evidence of the association between parent involvement and children's academic success (e.g. Barnard, 2004; Fan & Chen, 2001; Jeynes, 2007; Steinberg et al., 1992). It is clear that parent involvement is important for children's success in school. Furthermore, theories in psychology, sociology, education, and economics have aimed to describe specific factors associated with increased academic achievement (e.g. Cunha, Heckman, Lochner, & Masterov, 2005; Clausen, 1993; Duncan, Featherman & Duncan, 1972; Entwisle, Alexander, & Olson, 2003). One theory that describes the process of children's development of long-term well-being is the five hypothesis model developed by Reynolds, Ou, & Topitzes (2004). The model lays out 5 different theories— of which parent involvement is one important path- capturing conceptually distinct mechanisms that impact adult well-being. In no prioritized order, these hypotheses are that the effects of preschool are transmitted into adulthood through “a) developed cognitive and scholastic abilities (cognitive advantage hypothesis), b) social development and adjustment (social adjustment hypothesis), c) parent involvement (family support hypothesis), d) children's motivation (motivational advantage hypothesis), and e) quality of the school environments that children experience post-program

(school support hypothesis).” (p.173) The five hypothesis model provides a broad framework for examining the generative mechanisms underlying the development of academic achievement and criminal activity. The model tested demonstrated that ECE, or preschool participation, significantly impacts achievement and parent involvement. Achievement and involvement then further subsequent children’s achievement, parent involvement, and children’s motivation. These factors all contribute to higher educational attainment and disengagement in criminal activity. Although the five hypothesis model is a useful tool to help organize and understand the direction of various effects impacting educational and social outcomes, as it captures processes within a large time period, it lacks the specific identification of micro-processes that occur across development.

Steinberg et al. (1992) provides a complementary explanation further focusing on the family support hypothesis explaining how specifically, parent involvement positively influenced students’ academic engagement. The types of parent involvement examined in this study involved helping with homework, attending school programs, watching and supporting the student in extracurricular activities, helping the student to select course, and keeping abreast of the student’s progress in school. When parents were involved, students reported more effort, concentration, and attention across four main subject areas. Also, when parents were more involved in their child’s schooling, children had higher grade-point averages and were more engaged in school. Parent involvement may be effective in increasing children’ achievement because 1) parents are demonstrating to their children the importance of education, 2) parents are directly providing valuable information about the school environment, 3) children can observe their parents interacting with teachers, and 4) parents can observe their children interacting with other students. (Muller & Kerbow, 1993). These opportunities allow parents to better support their children’s learning. In order to further understand the role of parent involvement, researchers have sought to investigate specific characteristics of parent involvement that enhance student achievement.

In a comprehensive review of research on family influences on achievement outcomes, Hess and Holloway (1984) discussed characteristics of parent involvement that consistently were associated with increasing student achievement. Results indicate that in general, high levels of verbal interaction between mothers and their children, high expectations of parents for their children's achievement, and positive parental beliefs and attributions about their children's abilities were found to be related positively to achievement. Also, parental involvement in school functions was found to have a positive influence on children's school achievement. This review provided the first step in understanding the influential process of parent involvement on children's academic achievement. However, this review was limited to the examination of elementary school children and only a longitudinal study can identify the developmental process explaining the influence of parent involvement in school on children's achievement.

Similarly, addressing the issue of early parent involvement, Arnold, Zeljo, Doctoroff, & Ortiz (2008) examined the association between teacher ratings of early parent involvement in the school and children's pre-literacy skills. The authors found that preschool parent involvement was associated with strong pre-literacy skills even after controlling for socioeconomic status. Furthermore, Miedel & Reynolds (1999) investigated the association between parent involvement in preschools and children's later school competence. Teachers' reports of parent involvement in the school during first and second grade were found to be significantly associated with higher reading achievement in eighth grade. Moreover, examining long-term outcomes, the authors report that children whose parents were involved in schools early also had lower rates of retention and lower rates of special education placement through the eighth grade.

Long-term effects of parent involvement on education have also been explored. Examining long-term effects of early parent involvement, Englund, Luckner, Whaley, & Egeland, (2004) found that the process linking parent involvement and academic achievement is cyclic, influencing one another throughout childhood. Also examining this persistent association, Jaynes

(2005) and Barnard (2004) both found that parent involvement in the school had long-term impacts into adolescence. This finding held true for black and white children, as well as for both boys and girls, and even after controlling for background characteristics of risk factors. The authors suggest that the influence of parent involvement transcends differences in SES, race, and other individual factors and thus is a very strong predictor of student's achievement.

Based on the abundant literature, it is clear that parent involvement contributes to enhancing academic achievement. Moreover, the impact of parent involvement seems to be long-lasting, as evidenced by studies that report effects into adolescence and high school. Yet what still remains unclear is how parent involvement in the home and parent involvement in the school influence not only student achievement but also other domains of development.

Parent Involvement Impacts Crime Outcomes

There is much evidence that parent involvement not only impacts children's educational attainment and academic achievement, but also social outcomes, such as juvenile delinquency and engagement in criminal activity. As delinquent behavior and engagement in criminal activity incur a large cost to society, it is imperative that mechanisms that mediate these pathways are investigated.

Criminologists Gottfredson and Hirschi (1990) sought to understand why people commit crime and engage in delinquent behavior. They proposed the "General theory of crime" that pinpointed parent involvement as the origin of the process that leads to delinquent behavior. This theory identifies lack of self-control as the critical element in the pathway to criminal behavior, and rejects the notion that biology, social reinforcement, peer associations, or context, such as economic deprivation, influence wayward behavior. Instead, Gottfredson and Hirschi argue that parents who do not monitor their children's behaviors and punish deviance raise children with low self-control. These children are thus more deviant, delinquent, and exhibit more criminal behaviors over the life-course. Parents who are involved in the success of their children and have

high expectations for their achievement may recognize poor behaviors exhibited due to the lack of the child's self-control, and appropriately modify the children's behaviors to reflect self-control. In this way, highly-involved parents with high expectations for their children's success shape and develop their children's self-control skills. This theory asserts that parent involvement sets the trajectory of an individual's life course in determining delinquent behavior.

Simons, Johnson, and Conger (1994) sought to examine early influences of parent behaviors on children's aggressiveness and delinquency. Parents' use of corporal punishment, along with various types of parent involvement, was examined as predictors of children's maladaptive behavior. Using dimensions provided by Maccoby & Martin (1983), parent involvement was categorized into four typologies – warmth and affection, demonstration of consistent behavior, monitoring and supervision of children, and use of inductive reasoning to explain rules and expectations. These indices were aggregated as a composite measure of quality of parent involvement. Results indicated that overall quality of parent involvement predicted negative adolescent outcomes (i.e. aggressiveness, delinquency, and psychological well-being), over and above corporal punishment. However, due to the nature of their parent involvement construct (which was used in aggregated form), it is unclear what specific type of parent involvement is most related to influencing aggressive and delinquent behavior and what is the *process* behind the influence of parent involvement on delinquent behavior.

A widely noted study by Loeber and Stouthamer-Loeber (1986) examined the influence of lack of parent involvement on juvenile delinquency and aggression through a comprehensive meta-analysis of 24 studies. The measure of “lack of parent involvement” included measures such as absence of outings with parents, indifference, ignoring, and less cooperation. The majority of the studies in this meta-analysis included child reports of parental attitudes on general behavior – with a few exceptions of parent behavior reported by research observers. As a measure of parent involvement, the authors also included measures such as amount of intimate

communication, confiding, sharing activities, and seeking help. These items were also associated with less parent involvement according to the meta-analysis. Furthermore, Patterson and Stouthamer-Loeber (1984) found that 21 percent of non-delinquent children were poorly monitored by parents, compared to 50 percent and 73 percent for the one to two time offenders and multiple offenders, respectively – thus supporting the notion that parent involvement is associated with delinquent behavior in some manner. Variety of delinquent activities was also related to parental supervision (Loeber & Schmalting, 1985). Children who stole and fought were significantly less supervised than children who either only stole or only fought. Thus lack of parental supervision seems to be associated with both frequency and variety of delinquency in children (Patterson & Stouthamer-Loeber, 1984; Wadsworth, 1979).

Gottfredson and Hirschi's theory explaining the influence of early parent involvement is specific to crime and delinquency and the application of the theory beyond crime outcomes is yet to be explored. It is unclear whether there is a single process underlying the association between parent involvement and children's later outcomes or if the process differs by the outcome examined (e.g. achievement vs. delinquent behaviors). It is important to identify and understand the generative mechanism behind the positive influence parent involvement has on various long-term outcomes.

From the literature reviewed, it is evident that the influence of parent involvement in the schools starts early during the preschool years and continues to have a significant influence throughout childhood on numerous domains of development. The positive impact of parent involvement has been thoroughly examined in relation to academic achievement (e.g. Fan & Chen, 2001; Hoover-Demsey & Sandler, 1997; Mattingly, Prislun, McKenzie, Rodriguez, & Kayzar, 2002) as well as other social behaviors (Grolnick et al., 1991; Loeber & Stouthamer-Loeber, 1986; Nokali, Bachman, & Votruba-Drzal, 2010). Researchers and practitioners however

need to identify *the process* behind parent involvement and also, whether this process differs by different groups of people.

Mediators

Self-control as a mediator. According to Elder's life course paradigm, one general principle which provides guidance for understanding the life course, is the principle of agency (Elder, Johnson, & Crosnoe, 2003). This term, "agency," entails the capacity to enact particular performances necessary for achievement. In this principle, an individual's choices and actions within the opportunities and constraints available to them, influence the trajectory of the life course. For example, an adolescent's ability to take control of the future and prepare accordingly, or "planful competence," promotes educational and occupational attainment (Clausen, 1993). Although it seems clear that this sense of control, or agency, aids in the process of determining future circumstances, the development of self-control and the process through which it impacts later outcomes are less clear.

Self-control, or self-regulation skills, forms a critical foundation for children's cognitive and socio-emotional development. These skills necessitate a balance between processes of emotional arousal and cognitive regulation. Emotions, attention, and stress physiology are managed to further goal-oriented strategies. Self-control can be defined as delay behavior in the service of future satisfactions (Mischel & Mischel, 1983), and examples of self-control include regulating impulsivity, conscientiousness, self-regulation, delay of gratification, executive function, willpower (e.g. Moffitt et al., 2011).

Self-control skills are particularly important for children to succeed in multiple domains at school. They allow for positive adaptation in the school setting by providing basic skills that enhance social development, academic achievement, and emotional development as the child navigates through the school and social system. Also, the perceived importance of self-control is evident in the results of a national survey conducted on kindergarten teachers (National Center for

Education Statistics, 1993). Teachers were asked what key skills were important for school readiness and for children to succeed in school. Teachers endorsed skills, such as following directions, communicating wants, needs, and thoughts verbally, being sensitive to others' feelings, and showing enthusiasm and curiosity about learning. These are all skills that arise from a high level of self-control. Of note, teachers in general did not mention academic skills, such as phonological awareness, literacy, or numeracy. Self-control is a critical factor in children's successful development in social, cognitive, and emotional domains because of the foundation it provides for successful functioning.

To understand why people commit crimes and delinquent acts, criminology literature has extensively examined the influence of self-control as it relates to deviance and crime in adolescents and adults. Pratt & Cullen (2000) conducted a meta-analysis on self-control in criminology and concluded that low self-control is a significant predictor of criminal behavior. However, when examining longitudinal studies (instead of only cross-sectional studies), the authors found that low self-control has a weaker association with long-term outcomes. Thus, according to the authors, Gottfredson and Hirschi's argument that self-control has a consistent and direct influence on criminal activity and deviance (while rejecting other potential mechanisms), was not supported through their analysis. Yet the number of longitudinal studies included in this meta-analysis was limited, and thus further longitudinal investigation of this process is necessary. Therefore, although self-control seems to play a critical role in predicting delinquent behavior and engagement in criminal activity, there may be other factors involved in this process. Moreover, as the majority of these studies are cross-sectional, questions regarding the developmental *process* between self-control and later adult outcomes remain.

Moreover, since self-control is important in determining a child's trajectory in multiple domains of life, researchers recognized the importance of identifying what determines child's self-control skills and its later influences. In the criminology literature, some studies have

examined the dynamics of parenting, self-control, and deviant behavior (e.g. Gibbs, Giever, & Martin, 1998; Hay, 2001). More specifically, Perrone et al. (2004) using a large representative sample of youths, found that adolescent self-control partially mediated the relationship between parental efficacy and deviance. Since self-control is highly stable during childhood (Mischel, Shoda, & Rodriguez, 1989), adolescent self-control serves as a good proxy for early self-control, and thus research in this area sheds light on the potentially mediating role of self-control on the association between parenting and later outcomes. However, the criminological literature examining this association was limited to long-term outcomes of juvenile delinquency and adult criminal activity. Thus, further research is required in other areas of well-being to understand the breadth of impacts that childhood self-control has on various areas of development.

Parent involvement and self-control. Moreover, there is consistent evidence suggesting a relationship between parent involvement and students' perceived control and competence (e.g. Ames, Kohju, & Watkins, 1993; Grolnick et al., 1991; Marchant et al., 2001; Stiller and Ryan, 1992; Trusty and Lampe, 1997). Not only does self-control impact immediate academic achievement, but it also provides important skills that continue to have an influence on multiple domains in adulthood. Children with high levels of self-control are afforded educational, social, and psychological opportunities that place them on a successful life trajectory (Moffitt et al., 2011). Furthermore, children with high levels of self-control are more likely to view the life course to be directed by their volition. This encourages individuals with high levels of self-control to engage increasingly in shaping their future, instead of letting external forces create limited opportunities. Those with low levels of self-control, however, are more likely to feel little control over the trajectory and course of their lives (Gecas, 2003). Thus, children with high levels of self-control are seen to be more productive and successful with their lives.

This long-term impact of childhood self-control, as reflected in multiple dimensions of adult well-being, was captured in the Dunedin Multidisciplinary Health and Development Study.

Moffitt et al. (2011) studied children from birth through age 32, assessing the development of self-control skills and found that childhood self-control (i.e. age 3 through 11) predicts health, wealth, and crime behaviors at age 32. Even after controlling for social class and IQ, results showed that at age 32, children with poor self-control were at an elevated risk for substance dependence, financial struggle (e.g. reported more money management problems, more debt, less investment funds, less retirement funds), and were more likely to be convicted of a criminal offense. This study highlighted the significant predictive value of childhood self-regulation on adult health, wealth, and public safety.

In a subsequent study, Moffitt et al. (2011) utilized a twin study design to examine whether siblings who had the lower self-control in childhood developed worse outcomes, despite both siblings having the same home environment and family. Similar to the first study, the twin study found that the 5-year old sibling with poorer self-regulation was more likely to smoke as a 12 year old, perform poorly in school, and engage in antisocial behavior. All of these outcomes are precursors to adult ill health, lack of wealth and adult crime. A child's ability to control its own actions seems to be a critical skill that is manifested in multiple developmental domains and has persisting effects into adulthood.

With the exception of Moffitt et al.'s study however, single longitudinal studies examining the impact of children's self-control on numerous disparate domains of adulthood are scarce. We would gain much knowledge from further examining correlates of self-control and other long-term outcomes directly related to self-control. Moreover, Moffitt's study did not address the origin of self-control – what impacts levels of self-control in children early on during childhood - nor the potential impact of parent involvement on children's development of self-control.

Previous literature supports the mediating role of self-control- that parent involvement influences childhood self-control and also, childhood self-control seems to impact later adult

outcomes. Gecas (2003) also argues for the possibility that self-control in one domain (e.g. occupational attainment) may or may not carry over into another domain. Therefore it is necessary to examine the association among parent involvement and self-control in multiple domains of children's development.

Yet there is also evidence that childhood motivation mediates the association between parent involvement and later educational and social outcomes. Stipek (1988) suggests that students' perceptions of their control influence their motivation. Moreover, students are more likely to enjoy and be motivated by activities they believe they are doing voluntarily. Therefore, if students engage in self-control and recognize their self-control skills, they are more likely to voluntarily engage in activities and be motivated to succeed in school. The linkage between parent involvement and scholastic success may be mediated by student motivation.

Children's motivation as a mediator.

Parent involvement and children's motivation. A growing literature has demonstrated the benefits of parent involvement for children's development of social behaviors, such as peer interactions/peer social skills, assertive social skills, and acting out (Izzo et al., 1999; Reynolds, 1989; Rimm-Kaufman, Pianta, Cox, & Bradley, 2003). For example, Nokali, Bachman, & Votruba-Drzal (2010), found that children with highly involved parents in elementary school had significantly higher levels of social functioning and fewer behavior problems in school. Children with highly involved parents were more motivated to perform well in school. However, studies examining the association between parent involvement and children's social behaviors have primarily been cross-sectional and thus a clear developmental understanding of this process is lacking.

Scholars have sought to understand the impact of student motivation and have demonstrated its importance on children's achievement, particularly in relation to parent involvement. Children's motivation may be a key factor mediating the relation between parent

involvement and later educational attainment (Hong & Ho, 2005). High levels of parent involvement are associated with children's self-esteem and life satisfaction (Wenk et al., 1994). This contributes to children's optimism about life and promotes a sense of self-competence, which may have long-term impacts on an individual's educational attainment.

Gonzales-DeHass, Willems, & Holbein (2005) provide explanations for the beneficial association between parent involvement and students' motivation. First, parental involvement boosts students' perceived control and competence. Second, parental involvement offers a sense of security and connectedness. Third, parental involvement helps students to internalize educational values. Lastly, student motivation encourages parent involvement. Thus parent involvement positively impacts students' ability to succeed academically through a variety of influences, but students also positively impact parent involvement. Parent involvement, student motivation, and academic achievement intertwine in a complex series of associations, potentially cyclic in nature. It is unclear what exactly the directions within this cycle are, but perhaps there is a variety of interrelated influences acting upon one another to impact subsequent associations.

Moreover, Gonzalez-DeHass, Willems, & Holbein (2005) suggest that parent involvement in the home may relate to student motivation in a different way than does parent involvement in the school. Students' perceptions of their parents' values about achievement strongly influence student motivation. In the aforementioned study, when students perceived that parents valued the importance of effort and academic success, then the students had higher levels of academic achievement and students themselves also tended to value education. Students internalized parental values into their own learning traits. Yet the association between parent involvement and school performance through student motivation was only supported for some types of student motivation and for some types of parent involvement. Specifically, the authors found that parental monitoring of homework and use of rewards in reaction to grades are linked to extrinsic motivation (e.g. money, grades, trophies), while students whose parents provide

encouragement and praise was linked to intrinsic motivation (e.g. enjoyment in attending school, interest in science). Students whose parents are involved in school are more likely to take personal responsibility for their academic success. However, it is unclear which type of parent involvement most strongly impacts students' motivation to do well in school and in other domains of development.

Furthermore, Grolnick & Slowiaczek (1994) tested a model examining the associations among parent involvement, student motivation, and school performance. In a study of 11 to 14 year olds, the path analysis revealed indirect effects of parent involvement on the student's academic performance, through motivational factors. The authors suggest perceiving the parent involvement – student achievement association not as a direct effect, but as a process involving the student as an active participant.

Students' perceptions of their parents' values about learning and achievement have the strongest relationships with both motivations and achievement. Marchant et al. (2001) examined the mediating role of student motivation and self-competence on the impact of family and school contexts on achievement among fifth and sixth graders. Students' perceptions of the family (e.g. parent involvement) and school (e.g. supportive social environment) context predicted school achievement. Most interestingly, the authors found that student motivation and self-competence mediated the association between context (family and school) and achievement. The authors highlight the significant impact of students' internalization of the value of education in predicting achievement. Although parent involvement is very clearly an important factor contributing to children's cognitive development, children's motivation is also a critical element in the process, because it carries forward the impact of parent involvement and impacts achievement.

Motivation is important not only in how children value a task, but also in how well they actually perform on a task. In a 1990 study, Gottfried examined the effects of children's self-rated motivation on later measures of achievement, IQ, and perception of competence in various

subjects. She found that children who had higher levels of motivation received better grades and received higher ratings of achievement (though not standardized test scores) by other teachers. In addition, children who were highly motivated at ages 7 and 8 were more likely to be highly motivated at age 9, beyond effects based on differences in their IQ, achievement, and other factors considered. Therefore, it is not only possible for achievement motivation to affect actual achievement, but also to affect later motivation.

Wigfield and Eccles (2002) further examined the association between children's motivation and academic achievement and conclude that children's motivation to do well starts very early and develops in complexity as they age. In the early school years, children are optimistic about learning, and are highly motivated, relative to their later years. Therefore, if children are most receptive to motivation early in childhood and the impact of motivation carries forward through children's academic career, there is a need to understand how to foster motivation early in childhood. Furthermore, after examining the influence of parent involvement on students' motivation, Gonzalez-DeHass et al. (2005) suggest that perhaps students' motivation influences parent involvement which fuels subsequent student motivation. Moreover, the parent involvement literature indicates that parent involvement in the home and in the school context is associated with positive outcomes for the student's motivation (Gonzalez-DeHass et al., 2005).

To further understand the process behind early parent involvement and achievement, Reynolds (1989) examined the influence of numerous intervening variables as predictors of first grade reading achievement and found that early parent involvement, student motivation, and kindergarten achievement had significant indirect effects. In a subsequent analysis, Reynolds (1991) examined indirect effects of first and second grade achievement and found that parent involvement was a primary mediator explaining the effects of student motivation on achievement. Although this study shed light on an important initial step in the parent involvement process, the

findings were limited to the early achievement process and thus later achievement and long-term social outcomes have yet to be explored.

Similarly, Gonzalez-Pienda et al. (2002) utilized structural equation models and examined the association among parent involvement, motivational characteristics / student aptitude, and academic achievement in middle school and high school students. The authors were interested in understanding whether or not parent involvement significantly affected the relationship between motivational variables/ student aptitude and students' academic achievement. Their results suggest that the influence of parent involvement is indirect and occurs through children's personal variables, such as their self-concept and self-esteem, their typical causal-attribution patterns, and their aptitude for learning.

Thus, both motivation and self-control seem to be potential mediators that carry forth the early influence of parent involvement to continue influencing positive development in children. However, it is unclear whether these associations and trajectories are similar across different subgroups. Furthermore, contextual and demographic factors have been found to be associated with engagement in different types of parent involvement (Alexander & Entwisle, 1996; Downer & Mendez, 2005). As parent involvement seems to be a critical catalyst in the process of positive short and long-term outcomes, it would be fruitful to examine factors that influence parent involvement itself.

Family Structure as a Moderator

In James Coleman's (1966) classic study examining educational equality in the United States with over 150,000 students, he concluded that family background substantially impacts school achievement more than any school-level factor. Of course, family context and school context interact, but children in any school tend to fare better when they come from strong family backgrounds. Coleman's conclusion, though controversial, has been supported by numerous

studies emphasizing the strong association between family background and children's academic achievement (e.g. Hofferth, Boisjoly, & Duncan, 1988; Jencks, 1972).

Parent involvement differs based on the availability of parents or legal guardians that are able to be involved in children's lives. Therefore, it is important to examine how levels of parent involvement and types of parent involvement differ based on family structure due to the availability of varying resources.

Research has consistently shown that children raised in non-intact families are less likely to complete high school or to attend college than children who grow up with both parents (e.g. Amato, 1996; Amato & Keith, 1991; Eagle, 1989; Hetherington, Stanley-Hagan, & Anderson, 1989). Research suggests that the primary reason children from single parent families are less likely to finish high school is because single parent families are more likely than other families to be poor and lack various resources compared to families with both parents (e.g. time, number of adults able for supervision) (Crane, 1996; Onatsu-Arvibani & Nurmi, 1997; Jeynes, 2002). More specifically, some studies indicate that children from non-intact families are subject to less consistent parenting styles, less home supervision, less frequent school participation by the parent, and less social control than children living with both parents (e.g. Hetherington, Cox, and Cox, 1978; Ho Sui-Chu & Willms, 1996).

Despite strong associations among family structure and parent involvement, family structure is rarely included as a component of parent involvement nor is its impact accounted for in analyses of parent involvement (Jeynes, 2005). Jeynes further suggests that the lack of attention to family structure within the parent involvement literature reveals a major problem in this scientific field which fails to completely capture the parent involvement construct.

To address the association among parent involvement, family structure, and student achievement, Astone and McLanahan (1991) first examined whether children from various family structures (i.e. single parent, stepparent, both biological parents) differed in the exposure to parent

involvement and parenting styles. Then, the authors also examined whether differences in parental behavior accounted for any of the negative association between family structure and children's school achievement after taking socioeconomic status into account. Results indicate that children in single parent families report less parental involvement with school work and less supervision outside the home than children in two parent families. Children in stepparent families report less parent involvement in their school work. However, stepparent families resemble two parent families in frequency of parental supervision. To examine the consequences of changes in family structure on parent involvement, the authors also examined the impact of marital disruption on changes in parents' practices and school attachment. Results indicate that marital disruption leads to reductions in the amount of time parents spend monitoring schoolwork and supervising their children, and reductions in parent-child communication. Marital disruption is also accompanied by increases in truancy and negative attitudes toward school. Marital disruption seems to impact behavioral and affective change rather than areas such as aspirations and academic achievement. This study is a critical step in understanding the potential influence of family structure on parent involvement and academic achievement. The results confirm the significant role of family structure on the impact of parent involvement in a child's life. However, researchers have yet to determine *how* family structure impacts the process between parent involvement and achievement, as well as other outcomes. Perhaps family structure may be a moderator – explaining differences in the process between parent involvement and students' achievement by family structure.

Furthermore, the impact of family structure on parent school involvement was examined by Bogenschneider (1997) in a study examining the influence of parent involvement on achievement by controlling for children's gender, ethnicity and family structure. Results indicate that parental school involvement benefited school grades, irrespective of the parent's education and the child's gender. Furthermore, parents' involvement was significantly associated with

family structure. Parents of children from families with both biological parents were more involved than mothers or noncustodial fathers in either single-mother or mother-stepfather families. Of particular importance, this study's major finding is that the involvement of single mothers is a potent influence on school grades than is the involvement of mothers in families with both biological parents. School involvement appears to exert a larger effect on individuals with fewer resources than in more stable, resource-rich ecological contexts (e.g. families with both biological parents who are well-educated).

More recently, Jeynes (2005) sought to understand the impact of a variety of family structures and numerous types of parent involvement on students' academic achievement. This study uniquely identified seven categories of family structure (i.e. intact family, divorced, remarried, single parent never married, cohabitation, widowed single-parent family, and widowed remarried) to realistically capture the variability in family structures. Results indicate that family structure, parents discussing school with the student, and parent attendance at school events were all predictive of academic achievement. Interestingly, checking students' homework and friends did not yield any significant results. Furthermore, students' achievement varied by family structure. Children from intact families obtained the highest test scores in all subjects, and children from never-married single parent, widowed remarried, and cohabitation families earned the lowest test scores. After controlling for SES, statistically significant effects were found for family structure and parents discussing school with the students. When family structure was removed from the model, parents attending school events did not significantly predict student achievement. The author concludes that the single greatest predictor of student achievement was whether or not a child came from an intact family. Also, aspects of parent involvement particularly predictive of achievement were parents discussing school issues with their children and parents attending school functions. Jeynes suggests that intact families have a strong influence on achievement because it is easier for children to 1. obtain help for their homework, 2.

obtain emotional support, 3. enjoy a sense of family unity which facilitates academic achievement, 4. grow intellectually due to interacting closely with adults. Therefore, perhaps what is most important is that parents are available to interact with their children about school, rather than parents attending as many school functions as they can or supervising homework completion.

Maternal Education as a Moderator

Maternal education has also been identified in the parent involvement literature as a critical factor influencing parent involvement and its impact on children. Specifically, educational level of parents predicts more of the variance in student achievement than other family background characteristics (Considine & Zappala, 2002). Building on this idea, Stevenson and Baker (1987) suggests that maternal education is important because 1) mothers are involved in a majority of the day to day schooling activities and 2) the level of maternal education indicates the knowledge that mothers have regarding progressing through the educational system. This is supported by an earlier finding but Baker & Stevenson (1986) which reports that educated mothers knew more about their children's school performance and were more likely to take action to manage their children's academic success. Dauber & Epstein (1989) found that parents with higher levels of education were more likely to be involved in their children's education at home and at school. Further, examining various dimensions of parent involvement, Kohl, Lengua, and McMahon (2000) found that parental education was positively related to parent-teacher contact, parent involvement in school, and parent involvement in the home. The authors suggest that low parental education is associated with lower levels of involvement across multiple domains and that perhaps parents' education facilitates awareness of the value of supporting their children's education.

Previous analysis on the association of maternal education and parent involvement was extended by Stevenson & Baker (1987) who also examined the process among maternal

education, parent involvement, and student's academic achievement. The authors documented the mediational role of parent involvement on the influence of maternal education on children's school performance. Mothers with higher levels of education impacted their children's academic achievement *through* their increased levels of parent involvement.

Furthermore, in a comprehensive path analysis examining the process among maternal education, school parent involvement and its influences on children, Brody & Flor (2000) report that maternal education has a direct, positive impact on maternal school involvement and also has an indirect effect on maternal school involvement *through* its impact on mother's perceived financial adequacy. This study suggests that maternal education impacts mother's ability to be involved in their children's schooling through two distinct mechanisms.

As evidenced by empirical literature, it is necessary to examine family structure and maternal education as protective factors that serve as a moderator of the relationship between parent involvement and children's academic achievement because both family structure and maternal education shape the opportunities and resources parents have in involvement in their children's lives. Clearly, a major gap in the prevention science field is addressing family and background characteristics and examining differential impacts of parent involvement on children's well-being through experimentation of the effects of parent involvement intervention programs. If parent involvement is a critical alterable mediator in prevention programs, such as ECE, researchers must be able to explain *how* and *for whom* parent involvement has a persisting effect on multiple domains of children's development to maximize the benefits derived from parent involvement.

Methodological Challenges

A review of the impact of parent involvement on student achievement (Desforges & Abouchaar, 2003) illustrated diverse and even contradictory results. Methodological issues are considered one of the major sources of the variety of effects (and non-effects) of parent

involvement observed. Mattingly et al. (2002) found that the literature in parent involvement programs is largely non-empirical and methodologically unsound. Of 41 evaluations of parent involvement programs examined, only four were methodologically sound – using matched controls and student academic data as an outcome measure to assess program effects. After examining relevant literature on parent involvement programs, the authors conclude that much attention must be given to study design, methodology, and analysis in interpreting the effectiveness of parent involvement programs. Although conceptually, parent involvement seems to have an effect on children’s success, for the quantity of parent involvement program studies conducted, there are only a small fraction of empirical studies significantly supporting the importance of parent involvement to academic achievement.

Furthermore, most parent involvement studies are correlational and therefore causal inferences cannot be made. Many studies offer a direct association between parent involvement and children’s educational and social outcomes (e.g. Barnard, 2004); however, this is not enough empirical evidence to promote parent involvement. At best, some studies of parent involvement are predictive and researchers have used path analyses to show the predictive role of parent involvement over a cascade of effects on children’s development (e.g. Gonzalez-Pienda et al., 2002; Reynolds, 1989)

Before analyzing the impact of parent involvement, it is important to take note of the *content* measured when studying parent involvement. As previously discussed, parent involvement can be captured as parent involvement in the school or broadly as parenting behaviors at home, and even parental attitudes and expectations towards their children’s academics. Furthermore, numerous typologies exist within the broad framework of parent involvement, and yet studies report findings as effects of “parent involvement” although the actual behaviors assessed may completely vary from study to study. Furthermore reflecting this diversity in typologies, questionnaires that measure parent involvement vary widely – some

parent involvement questionnaires include as few as five items (Steinberg et al., 1992), while others include more than one hundred items (Hoover-Dempsey and Sandler, 2005). Furthermore, not only does the quantity of items capturing parent involvement vary, but also the coding scheme assessing the degree of parent involvement varies widely. While some items measure the concrete numbers of times a parent engages in an activity (Ho Sui-Chu and Willms, 1996), other items measure frequency as a dichotomy (e.g. never engage in a behavior vs. ever engage in a behavior, as in Brody and Flor, 1998) and others use a range of scales.

Despite the lack of consensus on the measurement of parent involvement, Bakker and Denessen's (2007) review of twelve parent involvement studies suggests that most studies report on the multidimensional nature of parent involvement, and indicate the necessity for distinct subscales of parent involvement. Furthermore, the authors argue that the reported reliability estimates of various parent involvement scales seem to satisfactorily measure parent involvement in a consistent manner. Thus, they conclude that existing questionnaires appropriately allow the examination of parent involvement as a multidimensional construct, and do not raise this as a further issue.

However, Bakker & Denessen (2007) acknowledge the methodological challenges in studying parent involvement and highlight validity problems concerning the source of measurement, as a critical issue. Often, parent involvement is reported by teacher assessment, although parent assessment and even student assessment (particularly in studies examining parent involvement in adolescent achievement) are common in the literature. The issues regarding the validity of teacher assessment are thoroughly investigated in Baker et al. (1999) and merit attention. Baker and colleagues examined 190 kindergarten and first-grade teachers' reported knowledge of parents' involvement in their children's education. The findings highlight the lack of knowledge teachers have about parent involvement with their children at home. More than half of the sampled teachers marked "don't know" for items such as "Does projects with child",

“Discusses school with child”, “takes child to cultural events”, and “reads with child.” However, teachers did have greater knowledge about the frequency with which parents had contact with the school, discussions about the child with the teacher, and parent volunteer behavior within the school. Although teacher reports have methodological challenges, parents’ own self reports of their parent involvement are also problematic. Barnard (2004) found that although teacher ratings of parent involvement were significantly associated with various educational attainment variables, parent ratings of home involvement and school involvement were not related to student achievement. The authors question the reliability among parents and raise concern over the low variability among parents’ ratings of parent involvement. Furthermore, Morshbach and Prinz (2006) note the issue of the quality of self-reports and question the ability of parents’ to appropriately understand items on questionnaires and to accurately identify the frequency and type of parent involvement. According to Morsbach and Prinz (2006), the lack of a gold standard to which self-reports can be compared is a difficulty when evaluating the validity of self-reports.

Therefore, given the above issues regarding self-report and teacher reports, the use of multiple informants has been proposed to ensure a valid assessment of parent involvement. However, researchers must proceed with the use of multiple informants with caution. Bakker, Denessen, & Brus-Laeven (2007) examined inter-correlations among teachers and parents on measures of parent involvement. The authors found higher inter-correlations for teacher ratings of parents’ involvement over parents’ rating of their own involvement, which suggests that teachers may have stereotyped images of parents’ involvement behaviors. Furthermore, the authors argue that more empirical evidence is necessary to enable conclusions on the use of multiple informants, because their study had teacher’s assessing parent involvement in the home – a method which may have low validity according to Baker et al.’s (1999) study of teacher reports of parent involvement.

Moreover, there are other methodological challenges in assessing parent involvement – such as the demography of the population examined and other omitted variables. The benefits derived from parent involvement could differ from population to population, and moreover the most effective type of parent involvement could differ based on the culture of a population. Along the same lines, there may be other factors researchers have failed to consider, in understanding parent involvement (e.g. gender, age, family background, ethnicity).

Due to all of these methodological challenges discussed, results from parent involvement literature are complex and unclear. For the field of prevention science this is unfortunate because the ambiguous results of parent involvement intervention evaluations can misrepresent parent involvement as an insignificant factor. The field requires more stringent parameters to evaluate the effectiveness of programs – first, by appropriately asking questions about specific types of parent involvement behaviors instead of addressing questions about general parent involvement.

Therefore, the next step toward the advancement of the prevention science field would be to ask specific, testable questions about specific types of parent involvement and to analyze the questions using sound methodological and statistical techniques. Bakker & Denessen (2007) suggest that the universal idea of parent involvement, indicating general levels of parent involvement, may be misleading and meaningless. Instead, specific behavioral indicators are likely to provide more meaningful information in understanding the impact of parent involvement on various child outcomes. For example, asking questions about parent involvement in the schools for specific populations (e.g. low-income) and specific child outcomes (e.g. achievement, antisocial behavior) forces researchers to address questions with methodological and statistical rigor.

Another methodological issue is that the parent involvement research literature includes studies that involve direct effects as well as mediated effects. It would be helpful, however, to flag the nature of the research designs more clearly in the existing research literature and in future

work, acknowledging the different methods (e.g. direct effects vs. mechanistic) used, and thus differentiate the types of conclusions warranted from the design.

Appreciating the value of parent involvement, scholars thus far have sought to understand which type of parent involvement best influences children's achievement and social development. To this extent, researchers have created numerous categorizations of parent involvement that are variations of Epstein's categories, dichotomized versions of Epstein's categories (i.e. parent involvement in the home vs. school), or a general aggregated measure of parent involvement. The next critical step scholars must face is to understand the *process* underlying the strong and consistent influence of parent involvement on children's development and most importantly, to do so systematically.

Moreover, within this next goal of understanding mechanisms of parent involvement, a crucial gap in the field which must be addressed is the specification of empirically based parent involvement typologies. Previous research highlights the volume of parent involvement typologies and definitions and illustrates the challenges associated with synthesizing parent involvement effects on children's outcomes. A necessary step in understanding the role of parent involvement and its benefits to children's development is to not only create a concrete set of typologies or definitions of parent involvement, but also to create a systematic method of reporting and measuring parent involvement.

Chapter 2

Methodology

Research Questions and Design

To address the gaps in the field of early childhood education intervention, this dissertation study aims to answer the following questions:

- 1) What are the dimensions of parent involvement and which dimension(s) best predicts educational attainment and crime behavior? Does this differ by the outcome examined?
- 2) Does parent involvement mediate the ECE intervention effect on educational attainment and crime behavior? Does this mediator differ by the type of parent involvement examined?
- 3) Which factors mediate the association between parent involvement and educational attainment and crime behavior? Does this differ by the type of parent involvement examined?
 - a. Is children's self-control a mediator of the association between parent involvement and children's later educational attainment and crime behavior?
 - b. Is children's school motivation a mediator of the association between parent involvement and children's later educational attainment and crime behavior?
- 4) What moderators explain subgroup effects of mediational effects on educational attainment and crime behavior?
 - a. Does family structure moderate the potential mediation of self-control or student motivation on parent involvement and educational attainment and crime behavior?

- b. Do protective factors moderate the mediational impact of self-control on parent involvement and educational attainment and crime behavior?

Figure 1 below illustrates Question 2 and Figure 2 illustrates Question 3 of this dissertation study.

Expected Results

- 1) Two typologies/factors will be identified: parent involvement in the school and parent involvement at home. The dimension of parent involvement in the school will include parent involvement that physically occurs at school (e.g. volunteering in the classroom). Parent involvement in the home will include behaviors that occur in the home (e.g. cooking with the child, reading to the child). These typologies have been identified as consistently critical factors in parent involvement research (e.g. Fan & Chen, 2001; Hoover-Dempsey & Sandler, 2005). I also expect to see that parent involvement in the school will predict student achievement while parent involvement at home will predict criminal behaviors. While a comprehensive study examining the differential impact of various types of parent involvement has not been examined, these hypotheses are based on prior theories and empirical evidence that has indicated association between parent involvement in the school and student education (e.g. Fan & Chen, 2001; Hoover-Dempsey & Sandler, 1997; Mattingly, Prislin, McKenzie, Rodriguez, & Kayzar, 2002), as well as parent involvement in the home and children's socio-emotional and behavioral development (e.g. Gonzalez-DeHass, Willems, & Holbein, 2005; Gottfredson & Hirschi, 1990; Loeber and Stouthamer-Loeber (1986).
- 2) Parent involvement will mediate the association between ECE intervention participation and children's educational attainment and crime behavior (Figure 1). As aforementioned literature has indicated, parent involvement is a critical factor that impacts children's cognitive and socio-emotional development (e.g. Barnard, 2004; Fan & Chen, 2001; Jaynes, 2005; Izzo et al., 1999; McWayne et al., 2004; Nokali, Bachman, and Votruba-

Drzal, 2010; Reynolds, 1989; Rimm-Kaufman, Pianta, Cox, & Bradley, 2003). It is particularly considered as a key factor that sustains the impact of ECE interventions over time and therefore is incorporated in numerous interventions (e.g. Head Start, Home-visiting programs). Furthermore, path analysis has revealed (Hayakawa, England, Warner-Richter, Reynolds, 2013) the direct impact of the Child Parent Center (CPC) (a type of ECE intervention) intervention on parent involvement. However, the impact of CPC intervention on other variables (e.g. student motivation) was mediated through parent involvement.

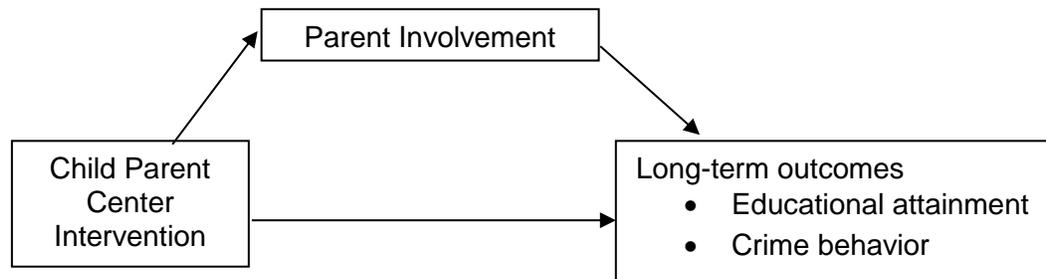


Figure 1. Question 2: Does parent involvement mediate the ECE intervention effect on educational attainment and crime behavior

- 3) Student self-control will mediate the association between parent involvement at home and criminal activity. Also, student motivation will mediate the association between parent involvement in the school and educational attainment. These hypotheses are based on previous studies that have suggested the mediating role of self-control on parent efficacy and crime/deviant activity (Perrone et al., 2004), and research studies examining the differential impact of parent involvement at home vs. parent involvement at school on children’s motivation and academic achievement (Gonzalez-DeHass et al., 2005). Figure 2 illustrates both hypothesized mediation models in Questions 3 and 4.

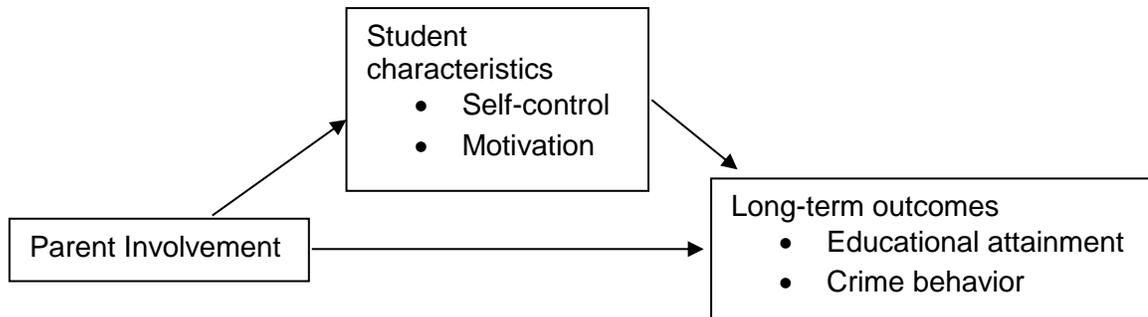


Figure 2. Question 3: What mediates the impact of parent involvement on educational attainment and crime behavior?

- 4) Family structure will moderate the mediational role of parent involvement on ECE intervention effects. Family structure will also moderate the association between parent involvement and crime. These hypotheses are supported by Astone & McLanahan (1991), who found that type and frequency of parent involvement differed by family structure. Therefore, I expect to find family structure as a moderator of the mediations observed in questions 2 and 3.

Sample & Design

The study sample was drawn from the Chicago Longitudinal Study (CLS, Chicago Longitudinal Study, 2005), an ongoing investigation of the school adjustment of a panel of low-income minority children growing up in high-poverty neighborhoods in Chicago. The original sample included 1,539 children and approximately 93% were African American. The majority (76%) of the CLS sample participated in the Child Parent Center (CPC) intervention program, a school-based comprehensive high-quality preschool program that extends from preschool to third grade. The CPC cohort attended preschool in 1984-85 and graduated kindergarten in 1986 from 20 centers, and 550 children (comparison group) participated in alternative government funded programs in the Chicago Public Schools. Data have been collected longitudinally starting from

each child's birth from various sources (e.g. school records, parent surveys, teacher surveys, administrative records) and continues to be collected as the participants reach age 31 – more than 90% of the sample have been tracked into adulthood. Teacher surveys were conducted yearly from kindergarten through 6th grade. Parent surveys were conducted in 2nd grade and 4th or 6th grade depending on when the participant responded. Student surveys were conducted yearly from 3rd grade through 6th grade, twice in high school, and twice as adults at age 20/21 and age 22 through 24.

Variables

Appendix 1 and 2 display all teacher, student, and parent rated items of parent involvement used in the present dissertation study, with the corresponding sample sizes. The percentage of parent involvement variables imputed for the factor analyses are also displayed in appendix 1 and 2. A list of all mediators, moderators, outcome variables, and covariates used in the dissertation study and their corresponding sample sizes, means, standard deviations, and range of responses are indicated in Appendix 3. A correlation matrix among all predictors, mediators, moderators, and outcome variables are presented in Appendix 4.

Predictors.

CPC preschool participation. Participation in the CPC preschool program was indicated by a dichotomous variable: individuals received a code of “1” if they participated in the CPC preschool program at age 3 and/or age 4 (n = 989), and a “0” if they did not participate in the program (n = 550). Data were obtained from administrative records of the Chicago Public Schools and were verified by program staff. There was an additional continuous variable indicating the number of years individuals participated in CPC preschool. The numbers of years ranged from 0-2 years and sample sizes were as follows: 0 years: n = 550, 1 year: n = 455, 2 years: n = 534.

Parent involvement. Teachers were surveyed prospectively about each parent's involvement in school activities in grades 1-3. Teachers rated "parent(s) participate in school activities" on a scale of 1-5 with 1 = "poor/not at all", 2 = "below average/some", 3 = "average/satisfactory", 4 = "above average/good", 5 = "excellent/much".

Parents were also asked to rate their involvement. Examples of the 15 items assessed include, "How often do you help in child's classroom?" "How often do you read to your child?" "How often do you cook with your child?" Items were rated on a scale of 1-5 with 1 = "never", 2 = "once a month", 3 = "once a week", 4 = "2 or 3 times a week", and 5 = "nearly every day." These measures were collected while the children were in 2nd grade and 4th/6th grade. Parents rated expectations of their 2nd grade children on a 5-point scale. While their children were in 2nd grade, parents were asked, "How far in school do you think your child will get?" (1= some high school, 2=graduate from high school, 3=some college, 4=complete 4 year college degree, 5=go to graduate school or complete graduate degree). Reliability and validity for measures have been examined in previous studies (e.g. Miedel & Reynolds, 1998). Reports of parent involvement at varying times were examined through correlation analyses. Results from analyses indicate that parent retrospective responses of their involvement during early periods were significantly correlated with the amount of time parents reported involvement during second grade ($p < .01$) and fourth grade ($p < .01$). Furthermore, ratings of parent involvement have been a frequent correlate and mediator of child outcomes in previous reports in the CLS study (Reynolds, 2000; Reynolds et al., 1996) as well as in other studies (Fan & Chen, 2001). The present study utilizes identical parent involvement data collected during the elementary school years as the earlier Reynolds (2000) study.

Multiple imputation of missing data. Missing data was multiply imputed using maximum likelihood estimations. All available teacher, student, and parent ratings of parent involvement from 1st grade through 6th grade were used to estimate missing parent involvement

values. The ranges of available data for each type of parent involvement variable are as follows: 2nd grade parent report of parent involvement (n = 940 ~ 946), 3rd grade student report of parent involvement (n = 1,091~1,095), 3rd grade teacher report of parent involvement (n = 1,118), 4th or 6th grade parent report of parent involvement (n = 730 ~ 753), 4th grade teacher report of parent involvement (n = 816), 5th grade teacher report of parent involvement (n = 799), and 6th grade teacher report of parent involvement (n = 800). Furthermore, early risk factors of participants (assessed birth to ages 3) were included in the estimations: 60% or more of the child's school neighborhood was below the poverty line, single parent household, mother was less than age 18 at time of child birth, mother did not complete high school, 4 or more children in the household, TANF use, mother was unemployed, and eligible for free lunch. This process imputed all parent involvement items for a final sample size of 1,539, thus reflecting the full original sample.

Mediators.

Student motivation. Students were surveyed in 5th and 6th grade about academic motivation on several items. Students responded on a 4 point scale, with 4 indicating “strongly disagree,” 3 indicating “disagree,” 2 indicating “agree” and 1 indicating “strongly agree” for the following items: “I try hard in school,” “I give up when school gets hard (reverse coded),” “I do my homework,” “I answer questions in class.” The scores for these four items were summed using all available items. The score was then transformed into Z-scores and averaged across 5th and 6th grade. If one time point was missing, the score from the available year was used to indicate motivation for that participant. Principal components analysis conducted in previous studies using these motivation items indicate that the items represent a single underlying dimension, regardless of the age of assessment (Reynolds, Ou, & Topitzes, 2004).

Childhood self-control. The items used for this measure were selected from the Teacher-Child Rating Scale (T-CRS) (Hightower et al., 1986). The T-CRS has an alpha and test-retest

reliability of .87-.94. Evidence from predictive validity studies supports the T-CRS as a measure of socio-emotional adjustment (Perkins & Hightower, 2002). Indicators of childhood self-control consisted of problem behaviors, frustration tolerance, and task orientation assessed in 6th or 7th grade. Each of these three areas of self-control were comprised of the following items from the Teacher-Child Rating Scale: 1. frustration tolerance: “the child accepts things not going his/her way”, “ignores teasing”, “accepts imposed limits”, “copes well with failure”, and “tolerates frustration” ($\alpha = .92$). 2. task orientation: “completes work”, “well organized”, “functions well even with distractions”, “works well without supervision”, and “a self-starter” ($\alpha = .93$). 3. problem behavior: This was a composite score based on the three subdomains of acting out, shyness/anxiety, and frustration tolerance ($\alpha = .89$). Acting out behaviors measure consists of “the child being disruptive in class” “is fidgety”, “has difficulty sitting still”, “disturbs others while they are working”, “constantly seeks attention”, “is overly aggressive to peers”, “is deviant, obstinate, stubborn” ($\alpha = .94$). Shyness/anxiety includes “the child is withdrawn, shy, or timid”, “anxious or worried”, “nervous”, “frightened”, “tense, “does not express feelings” “unhappy or sad” ($\alpha = .84$). Frustration tolerance is identical to the indicator reported above. All self-control measures were converted into Z scores due to extreme differences in range and skew across measures.

Early achievement. Kindergarten achievement is included as a robustness test for analyses examining the long-term impact of parent involvement to account for early cognitive skills. The Iowa Test of Basic Skills (ITBS) was administered in Kindergarten for all CPC participants (Hieronymus, Lindquist, & Hoover, 1980; Hieronymus & Hoover, 1990). In the analyses reported here, the kindergarten assessment was the 35 item word analysis subtest of pre-reading skills (reliability = .87; $M = 59.71$, $SD = 13.68$). Research has confirmed the measure’s predictive validity for later achievement (Reynolds, 2000).

Moderators – protective factors.

Family structure. Family structure was assessed in 1989 when most children were in 4th grade. Prospective and retrospective data from administrative records and parent surveys administered in preschool, 2nd grade, 4th grade and 6th grade were used to identify the family structure of the participant. 1989 Family structure is a dichotomous variable: child living with both biological parents since birth was coded as 1 and child living with a single parent was coded as 0.¹

Maternal education. Maternal education by the child's fourth birthday was identified using two variables collected through administrative data: mother's high school completion status and mother's college attendance status. Mother's high school completion status is a dichotomous variable indicating whether or not the mother completed high school or received a GED credential. Maternal education is a continuous variable (see Appendix 3 for detailed descriptive statistics on maternal education).

Covariates. Measures of preprogram attributes were obtained through birth records, CLS parent survey and self-report participant surveys, and administrative records provided by the Illinois Department of Child and Family Services, the Illinois Department of Health and Family Services, and the Chicago Public Schools. Data sources for the socioeconomic variables include administrative data collected by the Illinois Department of Public Health at child birth, the Chicago Public School Student Information System annually during the school year, and the Illinois Longitudinal Public Assistance Research Database collected annually for families on public assistance. A correlation matrix between all covariates, independent variables, mediators, moderators, and dependent variables are presented in Appendix 5.

- Gender is coded as 1 = male, 0 = female.

¹ Of note, because family structures of the participants changed by year, stable family structures were identified for a single time point. For the 1989 time point used, 60% were single parent families, 27% were two parent families, 5% were grandparent as guardians of the participant, and the remainder was unidentifiable due to conflicting or missing information.

- African American is a dichotomous variable, 1=African American and 0 = Not African American.
- Child welfare status was assessed from birth through the age of 3. This is a dichotomous indicator, 1= any substantiated report of child maltreatment, 0 = no indication. Data sources for child-welfare history include petitions to the juvenile court and referrals to the Child Protection Division of the Illinois Department of Children and Family Services (These data sets are maintained by the Chapin Hall Center for Children).
- Reason for leaving is a dichotomous variable that indicates whether or not the participant left the study because they transferred out of the district. This is administrative data that was collected during elementary school; 1= left because transferred out of district 0= did not transfer out of district.
- Risk factors: Eight discrete early risk indicators from ages 0-3 (pre-intervention) were included in all regression analyses. Risk factors include: single mother, mother age less than 18 at time of child's birth, 4 or more children in household, AFDC (now TANF) participation, mother unemployed, number of years of maternal education, eligible for free lunch, 60% or greater poverty in school attendance area. All risk indicators were dichotomous variables (each factor was indicated as 1 if risk was present from 0-3, 0 if not present, 1 if present anytime during birth -3). Information for these risk factors was collected from administrative records as well as parent surveys.

Outcomes. Sample sizes of outcome variables varied by type of outcome. The largest sample size was 1,421 (on-time graduation) and the smallest sample size was 1,203 (substance abuse). Appendix 3 lists all sample sizes, means, and standard deviations of outcome variables.

Education. The sample used to predict educational attainment includes youth whose educational attainment could be determined by August 2004 (n=1,372). Data were extracted from administrative records in all schools youths attended and were supplemented by interviews with family members. Specific measures of long-term academic achievement include: on-time high school graduation (dichotomous variable), educational attainment (continuous variable), and some college attendance (i.e. 1 or more year, 30+ credits) (dichotomous variable). On-time graduation is a dichotomous variable indicating whether youths completed and earned an official high school diploma by 1998. Highest grade completed is an ordinal variable ranging from 7 to 16. Participants who passed the GED were assigned a value of 12. College attendance is coded according to the number of credits earned. Thirty credits were treated as 1 year of college attendance. Education measures were obtained from administrative records from colleges in Illinois and other states, K-12 schools, and brief surveys of CLS participants.

Adult crime. Data on criminal behavior (n = 1,418) includes all participants who completed the CLS age 22-24 adult survey, whose criminal records were available through administrative records, or whom various administrative sources identified as adult (over 18) residents of Illinois. Most records were from Illinois and other Midwestern states through December 9, 2004. Three measures were used as indicators of criminal behavior between the ages of 18 and 24 years: (1) felony arrest and (2) any guilty conviction. Arrests were measured dichotomously both overall and separately depending on whether charges were felonies. Convictions included both felonies and charges for violence and included individuals found guilty by the courts.

Substance abuse. A dichotomous indicator of substance abuse between ages 16-26 included self-report drug abuse problems and administrative adult drug arrest records by age 24. Adult drug arrest records included drug possession, drug manufacturing/delivery, and drug conspiracy, collected from official court reports of criminal records at the county, state, and

federal level. If participants had any affirmative responses for one or more of the following at the time of the age 22/24 adult survey: a) current use of marijuana or harder drugs; b) substance use problem; and/or c) substance abuse treatment, participants were coded with a 1, otherwise 0.

Data Analysis

Exploratory factor analysis was used to identify categories of parent involvement (PI). Items included in the factor analyses are: 2nd, 4th, and 6th grade parent ratings of parent involvement, 2nd ~6th grade teacher ratings of parent involvement, and retrospective parent ratings of 1st-3rd grade parent involvement assessed when the child was in 11th grade. Based on theory, various types of parent involvement are not expected to be independent of each other and thus the latent factors will be correlated. Therefore, direct oblimin rotations (an oblique rotation) will be included because resulting parent involvement factors will not be orthogonal. The standard 0.4 cut-off was used to determine items that loaded onto a factor.

Factor scores created as a result of the factor analysis will be used in logistic regression to differentially analyze the long-term impacts of PI on educational attainment and crime behavior. As multiple imputation was used to impute missing parent involvement variables, pooled coefficients from regression analyses were used to determine results for all questions.

Mediation analyses according to Baron and Kenny (1986) will be conducted to examine whether parent involvement mediates the association between the Child Parent Center (CPC) intervention and educational attainment and crime behavior (Question 2 of the dissertation study). First, main effects of the CPC intervention on various types of parent involvement (based on the typologies of parent involvement created from addressing Question 1) will be examined. If those are significant, CPC intervention will be correlated with the educational attainment and crime behavior. If these are significant, then, the association between parent involvement and later outcomes will be examined. If all three paths have significant main effects, next, mediation will be examined (per Baron and Kenny, 1986). In this step, the direct effect from CPC intervention to

children's later educational attainment and crime behavior will be re-examined, while including parent involvement.

Similar to addressing Question 2, mediation analyses will be conducted to examine whether children's self-control and motivation mediate the association between parent involvement and educational attainment and crime behavior (Question 3). First, main effects of the various types of parent involvement (based on the typologies of parent involvement created from addressing Question 1) on student self-control and motivation will be examined. If those are significant, the different types of parent involvement will be correlated with the educational attainment and crime behavior. If these are significant, then, the association between self-control and later educational attainment and crime behavior, as well as motivation and educational attainment and crime behavior will be examined. If all three paths have significant main effects, next, mediation will be examined (per Baron and Kenny, 1986). First, the direct effect from parent involvement to children's later educational attainment and crime behavior will be re-examined, while including self-control. Next, the direct effect from parent involvement to children's educational attainment and crime behavior will be re-examined, while including student motivation. For all partial mediations that may results, Sobel tests (according to Sobel, 1982, will be conducted).

Within all regression models, analyses will address the impact of risk factors. Early risk factors will be included as covariates and will consist of early socioeconomic risk factors (e.g. maternal education at child's birth, public assistance use, employment status of mother, whether or not the mother was less than 18 at childbirth). Kindergarten student achievement will also be included in the model to examine the robustness of effects while accounting for early cognitive skills.

To address whether or not family structure and maternal education moderates the mediation suggested in questions 2 and 3, a moderated mediation will be conducted to analyze the

differential mediational influence of a) parent involvement on the association between the CPC intervention and children's educational attainment and crime behavior, by family structure/maternal education and b) student characteristics (i.e. self-control and student motivation) on the association between parent involvement and children's educational attainment and crime behavior, by family structure/maternal education (Question 4). In both of these analyses, family structure will be tested as a moderating variable impacting the direct effect from the independent variable to the mediator. Moderated mediation analyses will be conducted according to the theoretical model laid out in moderated mediation Model 2 methods described in Preacher, Rucker, Hayes (2007) and statistical steps presented for moderated mediations in Muller, Judd, & Yzerbyt (2005). Once the role of family structure and maternal education as a moderator is established (per Baron and Kenny, 1986), a moderated mediation will be examined among mediations and partial mediations identified under Questions 2 and 3.

Robustness of Findings

For all questions, robustness and sensitivity will be explored through the following additional analyses: 1) varying the age of assessed measures and 2) varying the source of report. Furthermore, early achievement will be included in regression models to examine the robustness of parent involvement effects. Although these additional analyses are not central to the dissertation, these analyses will provide further confidence in the results of the dissertation study.

Varying the age of assessed measures. In addition to parent involvement factors being determined from the 2nd-6th grade parent and teacher survey items, factor analyses were also examined by separating early and later school-age parent involvement. Early parent involvement consisted of 1st-3rd grade teacher and parent ratings of parent involvement and later parent involvement consisted of 4th-6th grade teacher and parent ratings of parent involvement. Factor scores were determined using the identical statistical analyses as in the main analyses using the 2nd-6th grade parent involvement items.

Varying multiple imputation among parent involvement variables. Second grade parent ratings of parent involvement, as described in Appendix 1, was only available for 1/3 of the original CLS sample. Thus, multiple imputation was used to estimate 2/3 of the sample – as specific home-based parent involvement activities were only assessed in 2nd or 4th grade and the 2nd grade parent involvement data provided valuable variable information. However, to address robustness of the findings, secondary factor analyses of parent involvement was conducted while excluding any data that was missing. Thus, these sets of analyses excluded all 2nd grade parent involvement items. Factor scores were re-assessed and subsequent mediation questions were also re-analyzed using these alternative factor scores.

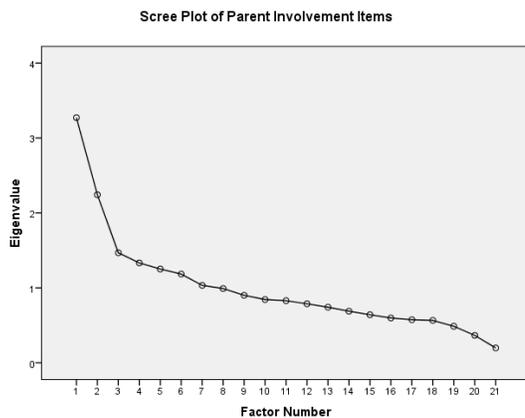
Varying the source of report. To assess the robustness of questions 1~4 results, additional analyses examining teacher ratings of parent involvement (2nd, 3rd, 4th grade) independently and parent ratings of parent involvement in the school (e.g. 2nd grade) independently, will be conducted.

Chapter 3

Results

Question 1: What are the dimensions of parent involvement? Which dimension(s) predict educational attainment and crime behavior? Does this differ by the outcome examined?

First, exploratory factor analyses of 2nd-6th grade student, teacher and parent ratings of parent involvement (21 items) were conducted to examine the latent factors that underlie the construct of parent involvement and to determine the number of distinct latent parent involvement factors. Maximum likelihood was used as the factor extraction method as data was normally distributed. The maximum likelihood approach is the best choice for normally distributed data as it allows for the computation of a wide range of indexes of goodness of fit and permits significance testing of factor loadings and correlations among factors (Fabrigar, Wegener, MacCallum, and Strahan, 1999). Furthermore, direct oblimin rotations were selected as the rotation method attempted because parent involvement factors are expected to be correlated, and not orthogonal.



As parent involvement data was multiply imputed, there are 5 iterations of factor analyses results. First, the Kaiser-Meyer-Olkin measure of sampling adequacy ranged from .71~.73, which is above the recommended value of .6, and Bartlett's test of

Figure 3. Parent Involvement Factor Analysis

sphericity was significant χ^2 ranged from $\chi^2(91) = 3746.88$, $p < .001$ to $\chi^2(91) = 4137.16$, $p < .001$. Given these overall indicators, factor analysis was conducted with 14 items.

The factor analyses of all imputed datasets suggest that there are two latent factors – parent participation in school activities and parent involvement in the home, which accounted for a total of approximately 35%~36% of the variance. The scree plot illustrates the two distinct factors and a clear elbow cut-off (Figure 3). The initial eigenvalues showed that the first factor explained 20%~22% of the variance. Items that consistently loaded onto this first factor include: parents communicate with school regularly, parents participate in school activities. The second factor accounted for 15% of the variance. The three, four, and five factor solution was also examined as they had eigenvalues over one. The variances explained by these factors were less than 10%, however, and thus a two factor solution was preferred. Also, the eigenvalues “leveled off” on all 5 multiply imputed scree plots analyses after the two factors, and there were insufficient numbers of primary loadings on the third and subsequent factors.

Table 1 <i>Pattern Matrix Factor Loadings for Parent Involvement Factor Analysis</i>		
	School Parent Involvement	Home Parent Involvement
Read to child (P4-6)		.527
Cook with child (P4-6)		.412
Help child with homework (P4-6)		.491
Discuss school progress with child (P4-6)		.368
Help in classroom(P4-6)		.338
Take child on outings (e.g. zoo) (P4-6)		.392
Talk to teacher about child (P4-6)		.391
Get invited to school events (P4-6)		.317
Participate in school activities (T4)	.398	
Participate in school activities (T5)	.304	
Participate in school activities (T6)	.313	
Participate in school activities (T2)	.911	
Communicates with school regularly (T2)	.891	
Parents participate in school activities (T3)	.482	
<i>Note:</i> Direct oblimin rotation was used. Factor loadings above .3 are presented in the pattern matrix. Factor loadings presented are mean factor loadings across 5 multiply imputed results. (T) indicates teacher ratings, (P) indicates parent ratings, (S) indicates student ratings. Numbers in parentheses indicate grade of assessment.		

Thus, two factors – labeled as school parent involvement (factor 1) and home parent involvement (factor 2) were identified. The items that loaded on to the second factor include:

reading to child, cooking with child, helping child with homework, discussing school progress, and taking child to zoo or other similar activities. Factor loadings for each variable are presented in Table 1. Furthermore, a cross-tabulation indicating the percentage of parents that fall under high vs. medium vs. low on home parent involvement and school parent involvement are displayed in Appendix 6. Parent involvement was coded as high for the highest 1/3 of individuals, medium for the next 1/3 of individuals, and low for the lowest 1/3 of individuals.

During several steps, a total of 6 items were eliminated because they did not contribute to a simple factor structure and failed to meet a minimum criteria of having a primary factor loading of .4 or above. The items limit child's TV time, encourage child to behave, take trips to other cities, both student perceptions of parent involvement items, and the retrospective parent involvement items reported in 11th grade did not load above .3 on any factors. Factor scores for each factor were saved and used to address the second section of Question 1.

Factor scores were used in regression analyses to determine whether or not parent involvement predicts crime and educational outcomes. Parent involvement in the home and parent involvement in school were analyzed in separate regression models. Both models included early risk factors, maternal education, whether or not the child left the Chicago Public Schools system, and whether or not the child's parent involvement data was imputed as covariates. Logistic regression was used for binary outcomes (i.e. all outcomes except educational attainment). Beta coefficients and log-odds ratios are presented in Table 2. As the analyses were computed on multiply imputed data, pooled estimates are presented in the tables.

	On-time graduation			Educational attainment		College attendance			Substance Abuse			Felony arrest			Any guilty charges		
	b	s.e.	Exp(b)	b	s.e.	b	s.e.	Exp(b)	b	s.e.	Exp(b)	b	s.e.	Exp(b)	b	s.e.	Exp(b)
School parent involvement	.41***	.08	1.51	.30***	.05	.51***	.12	1.67	-.23*	.11	.80	-.29**	.10	.75	-.26*	.10	.78
Home parent involvement	.17	.11	1.18	.13*	.06	.15	.12	1.16	-.06	.13	.94	-.05	.11	.95	-.05	.11	.95

Note: Average betas, standard errors, and odds ratios across 5 multiply imputed datasets are presented. Covariates include the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch, and indicator of whether or not parent involvement was imputed, maternal education, and whether or not the child left the school because they transferred out of CPS. * $p < .05$, ** $p < .01$, *** $p < .001$

Parent involvement at school. School parent involvement positively predicted on-time graduation, educational attainment, and college attendance, while it also negatively predicted substance abuse, felony arrests, and guilty charges. For example, holding all risk factors constant, there is a 67% increase in the odds of attending college for a one unit increase in school parent involvement. Also, holding all risk factors constant, there is a 80% decrease in the odds of abusing substances for a one unit increase in school parent involvement.

Parent involvement at home. Home parent involvement positively predicted educational attainment, even after controlling for early risk factors ($b = .13, t(1366) = 2.04, p < .05$). However, home parent involvement did not predict any other adult outcome.

Question 2: Does parent involvement mediate the ECE intervention effect on educational attainment and crime behavior? Does this mediator differ by the type of parent involvement examined?

Factor scores for school and home parent involvement were used to determine the role of parent involvement in association with the CPC intervention and its long-term impact on achievement, substance abuse, and crime. Mediation models were tested according to Baron and Kenny (1986). Once again, models for school and home parent involvement were assessed independently. First, the association between CPC preschool participation and adult outcome variables were determined, while controlling for early risk factors, kindergarten achievement, child welfare from birth-3, male, African American, reason for leaving CPC preschool program, and a dummy indicator for whether or not parent involvement data was imputed. Then, the association between years of CPC preschool participation and parent involvement was determined while controlling for early risk factors. Third, the association between parent involvement and each outcome was determined. Lastly, if all three paths were significant, parent involvement and CPC participation was included in the model to determine mediation.

Table 3 <i>CPC preschool participation Predicting Adult Outcomes</i>																	
	On-time graduation			Educational attainment		College attendance			Substance Abuse			Felony arrest			Any guilty charges		
	b	s.e.	Exp (b)	b	s.e.	b	s.e.	Exp (b)	b	s.e.	Exp (b)	b	s.e.	Exp (b)	b	s.e.	Exp (b)
CPC preschool participation	.22	.13	1.23	.21*	.09	.31	.21	1.36	-.22	.16	.80	-.35*	.16	.71	-.22	.15	.80
Years of CPC preschool participation	.08	.03	1.08	.08	.05	.16	.05	1.17	-.08	.10	.92	-.21*	.10	.81	-.11	.09	.90

Note: Covariates include kindergarten reading achievement , child welfare from birth-3, male, African American, reason for leaving CPC preschool program and the following 8 early risk factors:60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch
* $p < .05$, ** $p < .01$, *** $p < .001$

CPC preschool participation was significantly associated with educational attainment and felony arrests (Table 3). This examination of direct effects found that CPC participation is positively associated with increased odds of completion of higher grades, while also associated with decreased odds for felony arrests. Holding all risk variables and kindergarten achievement constant, children had a 71% decrease in the odds of having a felony arrest when participating in the CPC preschool compared to those who did not.

The association between the number of years of CPC preschool participation and outcome variables were also examined. As presented in Table 3, the number of years of CPC preschool participation predicted felony arrest, but no other outcomes. Holding all risk variables and kindergarten achievement constant, children had an 81% decrease in the odds of having a felony arrest for every year of participation in the CPC preschool. Because these findings replicate findings the felony outcome findings from the previous model examining the association between CPC participation and outcomes, but does not provide additional information, the number of years of CPC preschool participation was removed from future analyses.

Next, the association between CPC preschool participation and parent involvement was determined. After controlling for early risk factors and kindergarten achievement, CPC preschool participation predicted school parent involvement ($b = .12, t(1530) = 2.21, p < .03$) but did not predict home parent involvement ($b = .07, t(1530) = 1.13, p = .27$).

The association between parent involvement and adult outcomes was previously determined to answer Question 1. Results are presented in Table 2. School parent involvement was predictive of all outcomes, whereas home parent involvement only significantly predicted highest grade in school completed. Moreover, CPC preschool participation did not predict home parent involvement. Thus, based on Baron and Kenny's (1986) approach, mediation for home

parent involvement was only tested on highest grade in school completed. However, mediation of school parent involvement was tested for felony arrest and educational attainment.

Table 4 <i>Parent School Involvement as a Mediator of CPC Effects on Adult Outcomes</i>						
	Educational attainment			Felony arrest		
	b	s.e.	t	B	s.e.	Exp(b)
CPC preschool participation	.16	.09	1.83	-.32*	.16	.73
School parent involvement	.30***	.05	5.91	-.29**	.10	.75
Male	-.57***	.08	-6.91	3.02***	.26	20.53
African American	-.41*	.17	-2.46	.14	.31	1.15
Child welfare birth-3yrs	-.43*	.22	-1.98	1.20**	.36	3.32
Left CPC because transferred out of CPPS	-.014	.19	-.07	.52	.31	1.69
Kindergarten reading achievement	.01***	.01	4.20	-.01	.01	.10
60%+ low income school neighborhood	.01	.10	.03	-.13	.18	.88
single parent at child birth	-.10	.11	-.94	-.06	.20	.95
teenage mother	.10	.12	.83	-.06	.22	.94
mother did not complete high school	-.36***	.09	-.39	.33	.18	.88
4 or more children in the household	-.20	.12	-1.73	.60**	.21	1.83
TANF use	-.03	.12	-.25	.84**	.26	2.33
mother unemployed at child birth	-.09	.12	-.79	-.57*	.25	.56
eligible for free lunch	-.03	.12	-.25	.19	.24	1.21
Parent involvement variable imputed or not	-.18*	.08	-2.14	.47**	.16	1.60
* $p < .05$, ** $p < .01$, *** $p < .001$						

Results from the mediation tests indicate that school parent involvement fully mediates the CPC effect on the highest grade of school completed (see Table 4). The addition of school parent involvement decreases the main effect of CPC by 20%. Also, the addition of school parent involvement accounts for an increase of 3 months of educational attainment, and thus the magnitude is of real-world importance. Furthermore, school parent involvement also partially mediates the association between CPC preschool participation and felony arrests. That is, holding all other factors constant, there is a 75% reduction in the odds of felony arrest for every unit increase in school parent involvement. Furthermore, once school parent involvement is taken into account, the effect of CPC also remains significant in determining the odds of felony arrests.

An additional Sobel test (Sobel, 1982) was conducted to examine the role of school parent involvement as a mediator of the CPC effect on felony arrests. Sobel test results indicated that school parent involvement as a mediator did not significantly differ from zero ($t = -1.64, s.e. = .02, p < .10$).

	Educational attainment		
	b	s.e.	t
CPC preschool participation	.19*	.09	2.16
Home parent involvement	.12 [†]	.06	1.95
Male	-.60***	.08	-7.21
African American	-.45**	.17	-2.67
Child welfare birth-3yrs	-.47*	.22	-2.14
Left CPC because transferred out of CPPS	.02	.19	.10
Kindergarten reading achievement	.02***	.01	5.45
60%+ low income school neighborhood	-.03	.10	-.35
single parent at child birth	-.13	.11	-1.23
teenage mother	.08	.12	.68
mother did not complete high school	-.41***	.09	-4.41
4 or more children in the household	-.22 [†]	.12	-1.94
TANF use	-.07	.12	-.54
mother unemployed at child birth	-.10	.12	-.85
eligible for free lunch	-.07	.12	-.54
Parent involvement variable imputed or not	-.23**	.08	-.28

[†] $p < .06$, * $p < .05$, ** $p < .01$, *** $p < .001$

Results from analyses examining home parent involvement as a mediator of CPC effects on educational attainment are presented in Table 5. Home parent involvement did not mediate the impact of CPC preschool participation on educational attainment in school. CPC preschool participation, however remained as a significant predictor of educational attainment, while home parent involvement approached significance. Of note, both the number of years of CPC preschool participation and a dichotomous variable indicating whether or not the child participated in the CPC at all were examined independently in the regression analyses. The dichotomous variable produced significant and robust associations with educational attainment, as reported. However, years of CPC preschool participation was not significantly associated with outcomes once covariates were entered into the model. Thus, the dichotomous CPC preschool participation variable was used for subsequent analyses.

Question 3: Which factors mediate the association between parent involvement and educational attainment and crime behavior? Does this differ by the type of parent involvement examined?

- a. Is children's self-control a mediator of the association between parent involvement and children's later educational attainment and crime behavior?
 - b. Is children's school motivation a mediator of the association between parent involvement and children's later educational attainment and crime behavior?
- To examine mediation effects, identical steps used to answer Question 2 were followed.

School parent involvement significantly predicted all outcomes, but as indicated in Question 2, because CPC only predicted educational attainment and felony arrest, the role of self-control and motivation as mediators of the association between school parent involvement and adult outcomes were assessed only for those two outcomes.

Also, as previously determined in Question 1 and 2, home parent involvement was only significantly associated with educational attainment, and thus mediation effects of self-control and student motivation on the relationship between home parent involvement and educational attainment was examined.

Self-control. As illustrated in Table 6, the association between parent involvement and self-control was assessed. Home parent involvement was not significantly associated with any

self-control variables. However, school parent involvement was significantly associated with all self-control variables. School parent involvement negatively predicted problem behaviors ($b = -.196, t(1057) = -5.43, p < .001$), and positively predicted frustration tolerance ($b = .151, t(1057) = 4.25, p < .001$), and task orientation ($b = .160, t(1057) = 4.80, p < .001$). Thus, although home parent involvement was not assessed in the subsequent mediation analyses, school parent involvement was assessed for further analysis with self-control measures as mediators of the impact of parent involvement on educational and crime outcomes.

	Problem behaviors			Frustration tolerance			Task orientation		
	B	s.e.	t	b	s.e.	t	b	s.e.	t
School Parent Involvement	-.20***	.04	-5.43	.15***	.04	4.25	.16***	.03	4.80
Home Parent Involvement	-.08	.05	-1.41	.06	.05	1.18	.09	.06	1.55

Note: Pooled estimates from 5 multiply imputed datasets are presented. Controls include kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch

Next, the association between self-control measures and later education and crime outcomes were determined. As presented in Table 7, all measures of self-control significantly predicted on-time graduation, educational attainment by the participation, college attendance, substance abuse, felony arrests and guilty convictions. As expected, problem behaviors negatively predicted educational attainment and positively predicted substance abuse and crime outcomes. Frustration tolerance and task orientation, however, positively predicted educational attainment and negatively predicted substance abuse and crime outcomes.

Table 7
Self-Control Measures Predicting Adult Outcomes

	On-time graduation			Educational attainment		College attendance			Substance Abuse			Felony arrest			Any guilty charges		
	b	s.e.	Exp (b)	B	s.e.	b	s.e.	Exp (b)	b	s.e.	Exp (b)	b	s.e.	Exp (b)	b	s.e.	Exp (b)
Problem behaviors	-.65***	.09	.52	-.45***	.05	-.90***	.15	.41	.45***	.10	1.57	.41***	.10	1.51	.39***	.09	1.47
Frustration tolerance	.58***	.08	1.79	.35***	.05	.65***	.11	1.91	-.42***	.10	.66	-.35***	.11	.70	-.39***	.10	.68
Task orientation	.67***	.08	1.96	.47***	.05	.86***	.12	2.36	-.40***	.11	.67	-.26*	.11	.77	-.27**	.10	.76

Note: Pooled estimates from 5 multiply imputed datasets are presented. Controls include kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch

* $p < .05$, ** $p < .01$, *** $p < .001$

Finally, mediation analyses were conducted to test whether self-control variables mediated the association between school parent involvement and highest grade of school completed and felony arrests. As described in Table 8, problem behaviors, frustration tolerance, and task orientation partially mediated the relationship between school parent involvement and educational attainment. Also, as illustrated in Table 9, frustration tolerance mediated the association between school parent involvement and felony arrest. The inclusion of frustration tolerance accounted for a 17% reduction in the main effect of school parent involvement on felony arrest as well as a 73% reduction in the odds of felony arrest for every unit increase in frustration tolerance. Furthermore, problem behaviors mediated the relationship between school parent involvement and felony arrest. The inclusion of problem behaviors accounted for a 31% reduction in the main effect of school parent involvement on felony arrest as well as a 43% increase in the odds of felony arrest for every unit increase in problem behaviors.

Table 8 <i>Self-Control as a Mediator of School Parent Involvement Effects on Educational Attainment</i>						
	Educational attainment					
	b	s.e.	b	s.e.	b	s.e.
School parent involvement	.25***	.06	.28***	.06	.25***	.06
Problem behaviors	-.39***	.05				
Frustration tolerance			.31***	.05		
Task orientation					.42***	.05
Adjusted R ²	.19		.17		.20	
Pooled estimates from 5 multiply imputed datasets are presented. Controls include kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch						
† P < .06, *p < .05, **p < .01, ***p < .001						

Table 9 <i>Self-Control as a Mediator of School Parent Involvement Effects on Felony Arrest</i>									
Felony arrest									
	b	s.e.	Exp(b)	b	s.e.	Exp(b)	b	s.e.	Exp(b)
School parent involvement	-.20	.13	.82	-.24 [†]	.12	.79	-.24 [†]	.12	.78
Problem behaviors	.36***	.10	1.43						
Frustration tolerance				-.32**	.11	.73			
Task orientation							-.20	.12	.82
Adjusted R ²									
Pooled estimates from 5 multiply imputed datasets are presented. Controls include kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors:60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch									
[†] p < .06, *p < .05, **p < .01, ***p < .001									

To determine the strength of the mediation effects of self-control, Sobel tests were used.

Results from Sobel tests (presented in Table 10), indicate that all mediations and partial mediations from the regressions are indeed significant.

Table 10 <i>Sobel Test: Self-Control as Mediators of School Parent Involvement and Long-Term Outcomes</i>				
Mediator	Outcome	t	s.e.	P<
Problem Behaviors	Educational attainment	4.57	.02	.001
Frustration tolerance	Educational attainment	3.57	.02	.001
Task orientation	Educational attainment	4.26	.02	.001
Problem Behaviors	Felony arrests	-3.15	.02	.002
Frustration tolerance	Felony arrests	-2.51	.02	.012
Note: Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors:60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch				

Furthermore, results indicated that all three self-control variables partially mediated the relationship between school parent involvement and all educational outcomes tested in the model (Table 8). Thus, both parent involvement and self-control independently contribute to impact educational attainment.

Student motivation. Similar to the first step in the self-control mediation analysis, the association between elementary school parent involvement and 6th grade student motivation was examined. Neither parent involvement at home nor parent involvement at school predicted student motivation, once early risk factors were entered into the model (see Table 11). Thus, all subsequent analyses of parent involvement exclude student motivation.

Table 11 <i>Parent Involvement as a Predictor of Student Motivation</i>				
	b	s.e.	b	s.e.
School parent involvement	.01	.01		
Home parent involvement			.01	.01
Male	-.06***	.01	-.06***	.01
African American	-.01	.02	-.01	.03
Child welfare birth-3yrs	-.01	.04	-.02	.04
Left CPC because transferred out of CPPS	-.02	.04	-.02	.04
Kindergarten reading achievement	.01	.01	.01	.01
60%+ low income school neighborhood	-.03	-.02	-.03	.02
single parent at child birth	.01	.02	.03	.02
teenage mother	.03	.02	.03	.02
mother did not complete high school	-.01	.02	-.01	.02
4 or more children in the household	-.02	.02	-.02	.02
TANF use	.01	.02	.01	.02
mother unemployed at child birth	-.01	.02	-.01	.02
eligible for free lunch	-.01	.02	-.02	.02
Parent involvement variable imputed or not	-.02	.01	-.02	.01

Note: Pooled estimates from 5 multiply imputed datasets are presented.

Question 4. Are family structure and maternal education moderators of mediational effects on educational attainment and crime behavior?

- a. Does family structure moderate the potential mediation of parent involvement on ECE intervention effects?
- b. Does maternal education moderate the potential mediation of parent involvement on ECE intervention effects?
- c. Does family structure moderate the potential mediation of self-control or student motivation on parent involvement and educational attainment and crime behavior?
- d. Does maternal education moderate the potential mediation of self-control or student motivation on parent involvement and educational attainment and crime behavior?

As presented in analyses for Question 2, school parent involvement mediated the

association between CPC preschool participation and the highest grade of schooling completed by the participant. Thus moderated mediation analyses were conducted for this single mediation using the methods described in this paper and in Muller, Judd, & Yzerbyt (2005).

Moderated mediation of parent involvement on CPC effects on educational attainment.

Family structure as a moderator. Moderated mediation was assessed to examine whether family structure moderated the process of school parent involvement as a mediator of the association between CPC preschool participation and highest grade of school completed. First, bivariate statistics were examined to ascertain the relationship among these variables (Table 12). Table 13 contains the regression models that estimate the moderated mediation equations. Presented in the regression table (which control for covariates) are unstandardized coefficients and their associated *t* statistic.

Table 12 <i>Descriptive Statistics and Bivariate Correlations Among CPC preschool participation, Family Structure, School Parent Involvement and Educational Attainment</i>				
Variable	CPC preschool participation (independent variable)	Family structure (moderator)	School parent involvement (mediator)	Educational attainment (outcome)
<i>M</i>	.64	(0)Single parent: 60.6% (1)Both parents: 39.4%	0	11.88
<i>SD</i>	.48	.49	.94	1.63
Correlations				
CPC preschool participation	---	.03	.12***	.11***
Family structure		---	.09**	.12***
School parent involvement			---	.27***
<i>Note:</i> Pooled estimates from 5 multiple imputed data are presented. * $p < .05$, ** $p < .01$, *** $p < .001$				

Table 13 describes Models 1 -3 which test for moderated mediation. The results from Model 1 indicate an overall effect of the treatment, CPC effect, on the outcome variable,

educational attainment. This effect is not moderated by family structure. In Model 2, the mediator, school parent involvement, is the criterion. Although the significant effect of CPC remains, the treatment by moderator effect is not present. The lack of a significant interaction here is indicative of a lack of moderated mediation. In Model 3, where educational attainment is the criterion and the mediator (school parent involvement) is also included in the model, school parent involvement is positively predictive of educational attainment, whereas all other variables and interactions are not significant.

Table 13 <i>Moderated Mediation Among Family Structure, School Parent Involvement, and CPC preschool participation on Educational Attainment</i>						
	Model 1 (Criterion educational attainment)		Model 2 (Criterion School parent involvement)		Model 3 (Criterion educational attainment)	
Predictors	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>
X: CPC preschool participation	.24*	2.00	.16*	2.29	.20	1.65
MO: Family structure	.24	1.53	.09	.83	.22	1.42
XMO: CPC*Family structure	-.19	-1.02	-.08	-.71	-.18	-.94
ME: School parent involvement					.26**	3.60
MEMO: School parent involvement*Family structure					.06	.59
<i>Note:</i> Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch * <i>p</i> < .05, ** <i>p</i> < .01, *** <i>p</i> < .001						

Maternal education as a moderator. Moderated mediation was assessed to examine whether maternal education moderated the process of school parent involvement as a mediator of the association between CPC preschool participation and highest grade of school completed.

First, bivariate statistics were examined to ascertain the relationship among these variables (Table 14). Table 15 contains the regression models that estimate the moderated mediation equations. Presented in the regression table (which control for covariates) are unstandardized coefficients and their associated t statistic.

Variable	CPC preschool participation (independent variable)	Maternal education (moderator)	School parent involvement (mediator)	Educational attainment (outcome)
<i>M</i>	.64	11.10	0	11.88
<i>SD</i>	.48	1.72	.94	1.63
Correlations				
CPC preschool participation	---	.09***	.12***	.11***
Maternal education		---	.20***	.17***
School parent involvement			---	.27***

Note: Pooled estimates from 5 multiple imputed data are presented.
* $p < .05$, ** $p < .01$, *** $p < .001$

Predictors	Model 1 (Criterion educational attainment)		Model 2 (Criterion School parent involvement)		Model 3 (Criterion educational attainment)	
	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>
X: CPC preschool participation	.83	1.46	-.21	-.60	1.02	1.80
MO: Maternal education	.15***	3.65	.04	1.33	.07	1.53
XMO: CPC*Maternal education	-.06	-1.15	.03	.99	-.08	-1.57
ME: School parent involvement					.39	1.13
MEMO: School parent involvement*maternal education					-.01	-.26

Note: Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 7 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch
* $p < .05$, ** $p < .01$, *** $p < .001$

The results from Model 1 in Table 15 indicate that the effect of the CPC preschool disappears when maternal education is entered into the model. Results from Model 2, and Model 3 further indicate that there is no moderation effect. Instead, maternal education is a significant mediator that reduces the direct effect of the CPC preschool on educational attainment.

These results examining the role of moderators on the mediation effect on CPC preschool participation, school parent involvement and later outcomes provide 2 major results. First, family structure does not play a significant role in this process as a moderator. More importantly, however, school parent involvement plays a significant role in educational attainment.

Moderated mediation of problem behaviors on parent involvement effects on educational attainment.

Next, the role of family structure and maternal education as moderators of the mediation impact of self-control variables on the association between school parent involvement and later outcomes were examined.

Family structure as a moderator. Table 16 and 17 display the bivariate correlations and regression models used to determine the moderated mediation. School parent involvement is correlated with family structure and educational attainment. However, in Table 17, once family structure is included in the model, school parent involvement family structure, and problem behaviors no longer predict educational attainment. Moreover, family structure is also not significant in Models 1-3.

Table 16
Descriptive Statistics and Bivariate Correlations Among Family Structure, Problem Behaviors, School Parent Involvement and Educational Attainment

Variable	School parent involvement (independent variable)	Family structure (moderator)	Problem behaviors (mediator)	Educational attainment (outcome)
<i>M</i>	0	(0)Single parent: 60.6%	0	11.88
<i>SD</i>	.94	(1)Both parents: 39.4%	1.0	1.63
Correlations				
School parent involvement	---	.09**	-.28	.27***
Family structure		---	-.12***	.12***
Problem behaviors			---	-.35***

Note: Pooled estimates from 5 multiple imputed data are presented.
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 17
Moderated Mediation Among Family Structure, School Parent Involvement, and Problem Behaviors on Educational Attainment

Predictors	Model 1 (Criterion educational attainment)		Model 2 (Criterion Problem behaviors)		Model 3 (Criterion educational attainment)	
	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>
X: School parent involvement	.22	1.39	-.19 [†]	-1.88	.17	.95
MO: Family structure	.11	1.13	-.05	-.81	.03	.26
XMO: School parent involvement*Family structure	.05	.45	-.01	-.05	.04	.37
ME: Problem behaviors					-.29	-1.78
MEMO: Problem behaviors*Family structure					-.07	-.60

Note: Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch
[†] $p < .06$, * $p < .05$, ** $p < .01$, *** $p < .001$

Maternal education as a moderator. The role of maternal education in the mediation process of problem behaviors was examined. Correlations presented in Table 18, indicate direct program effect on the mediator (problem behaviors) as well as the long-term outcome (educational attainment). Furthermore, maternal education was associated with school parent involvement and educational attainment, but not problem behaviors.

Table 18 <i>Descriptive Statistics and Bivariate Correlations Among Maternal Education, School Parent Involvement, Problem Behaviors and Educational Attainment</i>				
Variable	School parent involvement (independent variable)	Maternal education (moderator)	Problem behaviors (mediator)	Educational attainment (outcome)
<i>M</i>	0	11.10	0	11.88
<i>SD</i>	.94	1.72	1.0	1.63
Correlations				
School parent involvement	---	.20***	-.28***	.27***
Maternal education		---	-.06	.17***
Problem behaviors			---	-.35***
<i>Note:</i> Pooled estimates from 5 multiple imputed data are presented. * $p < .05$, ** $p < .01$, *** $p < .001$				

Results from regressions (Table 19) indicate that maternal education was significantly associated with educational attainment (Model 1), however, school parent involvement (the independent variable in the mediation process) did not significantly predict educational attainment once covariates and the moderator were included in the model. In Model 2, both school parent involvement and the maternal education predicted the mediator (problem behaviors). Model 3 includes all variables in the equation, and suggests that maternal education and problem behaviors both significantly and independently contribute to predicting educational attainment. However, the interaction variable of maternal education and school parent involvement is not significant, thus indicating that maternal education is not a moderator.

Table 19
Moderated Mediation Among Maternal Education, School Parent Involvement, and Problem Behaviors on Educational Attainment

Predictors	Model 1 (Criterion educational attainment)		Model 2 (Criterion Problem behaviors)		Model 3 (Criterion educational attainment)	
	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>
X: School parent involvement	.48	1.40	-.51*	-2.26	.18	.44
MO: Maternal education	.100***	3.52	.07**	2.65	.09**	2.85
XMO: School parent involvement*Maternal education	-.02	-.50	.03	1.43	.01	.19
ME: Problem behaviors					-.91*	-2.45
MEMO: Problem behaviors*Maternal education					.05	1.42

Note: Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch

[†]*p* < .06, **p* < .05, ** *p* < .01, *** *p* < .001

Moderated mediation of problem behaviors on parent involvement effects on felony arrest.

Family structure as a moderator. All variables entered in the model were significantly associated with one another (Table 20). In Model 1 of regression analyses (Table 21), family structure was significantly predictive of felony arrest, and school parent involvement was no longer significant. However, once all variables were included in the model (Model 3), none of the variables were predictive of felony arrest.

Table 20
Descriptive Statistics and Bivariate Correlations Among Family Structure, School Parent Involvement, Problem Behaviors and Felony Arrest

Variable	School parent involvement (independent variable)	Family structure (moderator)	Problem behaviors (mediator)	Felony arrest (outcome)
<i>M</i>	0	(0)Single parent: 60.6%	0	17%
<i>SD</i>	.94	(1)Both parents: 39.4%	1.0	.37
Correlations				
School parent involvement	---	.09**	-.28***	-.14***
Family structure		---	-.12***	-.11***
Problem behaviors			---	.25***

Note: Pooled estimates from 5 multiple imputed data are presented.
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 21
Moderated Mediation Among Family Structure, School Parent Involvement, and Problem Behaviors on Felony Arrest

	Model 1 (Criterion felony arrest)		Model 2 (Criterion Problem behaviors)		Model 3 (Criterion felony arrest)	
Predictors	<i>b</i>	Exp(<i>b</i>)	<i>b</i>	<i>t</i>	<i>b</i>	Exp(<i>b</i>)
X: School parent involvement	-.08	.92	-.19 [†]	-1.88	-.05	.95
MO: Family structure	-.61**	.55	-.05	-.81	-.36	.70
XMO: School parent involvement*Family structure	-.18	.84	-.01	-.05	-.11	.90
ME: Problem behaviors					.61	1.85
MEMO: Problem behaviors*Family structure					.04	1.04

Note: Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch
[†] $p < .06$, * $p < .05$, ** $p < .01$, *** $p < .001$

Maternal education as a moderator. Maternal education as a moderator of the mediation process among school parent involvement, problem behaviors, and felony arrest was examined. Table 22 presents correlations among the variables. School parent involvement was predictive of all variables, however, maternal education did not predict problem behaviors.

Table 22 <i>Descriptive Statistics and Bivariate Correlations Among Maternal Education, School Parent Involvement, Problem Behaviors and Educational Attainment</i>				
Variable	School parent involvement (independent variable)	Maternal education (moderator)	Problem behaviors (mediator)	Felony arrest (outcome)
<i>M</i>	0	11.10	0	17%
<i>SD</i>	.94	1.72	1.0	.37
Correlations				
School parent involvement	---	.20***	-.28***	-.14***
Maternal education		---	-.06	-.06***
Problem behaviors			---	.25***

Note: Pooled estimates from 5 multiple imputed data are presented.
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 23 presents regression analyses examining the role of maternal education among the process to problem behaviors and felony arrest. Although school parent involvement and maternal education did not have a direct effect on felony arrest, they both significantly predicted problem behaviors (Model 2). However, once all variables and interactions were included in the model, none of the variables predicted felony arrest (Model 3).

Table 23 <i>Moderated Mediation Among Maternal Education, School Parent Involvement, and Problem Behaviors on Felony Arrest</i>						
	Model 1 (Criterion felony arrest)		Model 2 (Criterion Problem behaviors)		Model 3 (Criterion felony arrest)	
Predictors	<i>b</i>	Exp(b)	<i>b</i>	<i>t</i>	<i>b</i>	Exp(b)
X: School parent involvement	.12	1.12	-.51*	-2.3	.38	1.46
MO: Maternal education	-.06	.94	.07**	2.65	-.03	.97
XMO: School parent involvement*Maternal education	-.04	.96	.03	1.43	-.05	.95
ME: Problem behaviors					.68	1.97
MEMO: Problem behaviors*Maternal education					.01	1.01
<i>Note:</i> Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch [†] <i>p</i> < .06, * <i>p</i> < .05, ** <i>p</i> < .01, *** <i>p</i> < .001						

Results from analyses examining family structure and maternal education as moderators of the mediational process among school parent involvement, problem behaviors, and later outcomes indicate the independent and significant roles of maternal education and problem behaviors in predicting highest grade of school completed. These two factors contribute to and predict educational attainment over and above school parent involvement.

Moderated mediation of frustration tolerance on parent involvement effects on educational attainment.

family structure as a moderator. The role of family structure within the mediation process among school parent involvement, frustration tolerance, and educational attainment was

examined. As Table 24 illustrates, all variables were correlated with one another. However, as presented in Table 25, family structure did not play a moderating not mediating role in the process of school parent involvement to educational attainment, once all variables were entered into the model.

Table 24 <i>Descriptive Statistics and Bivariate Correlations Among Family Structure, School Parent Involvement, Frustration Tolerance and Educational Attainment</i>				
Variable	School parent involvement (independent variable)	Family structure (moderator)	Frustration tolerance (mediator)	Educational attainment (outcome)
<i>M</i>	0	(0)Single parent: 60.6% (1)Both parents: 39.4%	0	11.88
<i>SD</i>	.94	.49	1	1.63
Correlations				
School parent involvement	---	.09**	.22***	.27***
Family structure		---	.12***	.12***
Frustration tolerance			---	.29***
<i>Note:</i> Pooled estimates from 5 multiple imputed data are presented. * $p < .05$, ** $p < .01$, *** $p < .001$				

Table 25 <i>Moderated Mediation Among Family Structure, School Parent Involvement, and Frustration Tolerance on Educational Attainment</i>						
	Model 1 (Criterion educational attainment)		Model 2 (Criterion Frustration tolerance)		Model 3 (Criterion educational attainment)	
Predictors	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>
X: School parent involvement	.22	1.39	.11	.94	.22	1.27
MO: Family structure	.11	1.13	.06	.80	.03	.25
XMO: School parent involvement*Family structure	.05	.45	.03	.35	.03	.23
ME: Frustration tolerance					.14	.87
MEMO: Frustration tolerance*Family structure					.11	1.06
<i>Note:</i> Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch [†] <i>p</i> < .06, * <i>p</i> < .05, ** <i>p</i> < .01, *** <i>p</i> < .001						

Maternal education as a moderator. The role of maternal education within the mediation process among school parent involvement, frustration tolerance, and educational attainment was examined. School parent involvement significantly predicted maternal education, frustration tolerance, and educational attainment (Table 26). Maternal education was not associated with frustration tolerance, but was positively associated with educational attainment.

Table 26 <i>Descriptive Statistics and Bivariate Correlations Among Maternal Education, School Parent Involvement, Frustration Tolerance, and Educational Attainment</i>				
Variable	School parent involvement (independent variable)	Maternal education (moderator)	Frustration tolerance (mediator)	Educational attainment (outcome)
<i>M</i>	0	11.10	0	11.88
<i>SD</i>	.94	1.72	1.0	1.63
Correlations				
School parent involvement	---	.20***	.22***	.27***
Maternal education		---	.04	.17***
Frustration tolerance			---	.29***
<i>Note:</i> Pooled estimates from 5 multiple imputed data are presented. * $p < .05$, ** $p < .01$, *** $p < .001$				

In the regression models presented in Table 27, maternal education was a significant positive predictor of educational attainment (Model 1) and a negative predictor of frustration tolerance (Model 2). When all variables and interactions were entered into the model, maternal education remained a significant and positive predictor of educational attainment, but also frustration tolerance and the interaction between frustration tolerance and maternal education were significantly predictive of educational attainment (Model 3). However, the mediator*moderator interaction was negatively predictive of educational attainment.

Table 27 <i>Moderated Mediation Among Maternal Education, School Parent Involvement, and Frustration Tolerance on Educational Attainment</i>						
	Model 1 (Criterion educational attainment)		Model 2 (Criterion Frustration tolerance)		Model 3 (Criterion educational attainment)	
Predictors	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>
X: School parent involvement	.48	1.40	.37	1.43	.24	.56
MO: Maternal education	.10***	3.52	-.07**	-2.66	.10**	3.00
XMO: School parent involvement*Maternal education	-.02	-.50	-.02	-.85	.01	.11
ME: Frustration tolerance					1.01**	3.00
MEMO: Frustration tolerance*Maternal education					-.06*	-2.11
<i>Note:</i> Pool estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch						
[†] <i>p</i> < .06, * <i>p</i> < .05, ** <i>p</i> < .01, *** <i>p</i> < .001						

Moderated mediation of frustration tolerance on parent involvement effects on felony arrest.

Family structure as a moderator. The role of family structure within the mediation process among school parent involvement, frustration tolerance, and felony arrest was examined. As Table 28 illustrates, all variables were significantly associated with one another. School parent involvement, family structure, and frustration tolerance were all significantly and negatively associated with felony arrests.

Table 28 <i>Descriptive Statistics and Bivariate Correlations Among Family Structure, School Parent Involvement, Frustration Tolerance and Educational Attainment</i>				
Variable	School parent involvement (independent variable)	Family structure (moderator)	Frustration tolerance (mediator)	Felony arrest (outcome)
<i>M</i>	0	(0)Single parent: 60.6%	0	17%
<i>SD</i>	.94	(1)Both parents: 39.4%	1.0	.37
Correlations				
School parent involvement	---	.09**	.22***	-.14***
Family structure		---	.12***	-.11***
Frustration tolerance			---	-.19***
<i>Note:</i> Pooled estimates from 5 multiple imputed data are presented. * $p < .05$, ** $p < .01$, *** $p < .001$				

Table 29 presents regression results that suggest the association between family structure and felony arrests (Model 1). However, when all variables are entered into the model, none of them significantly predict felony arrests (Model 3).

Table 29 <i>Moderated Mediation Among Family Structure, School Parent Involvement, and Frustration Tolerance on Felony Arrest</i>						
	Model 1 (Criterion felony arrest)		Model 2 (Criterion Frustration tolerance)		Model 3 (Criterion felony arrest)	
Predictors	<i>b</i>	Exp(<i>b</i>)	<i>b</i>	<i>t</i>	<i>b</i>	Exp(<i>b</i>)
X: School parent involvement	-.08	.92	.11	.94	-.04	.96
MO: Family structure	-.61**	.55	.06	.80	-.40	.67
XMO: School parent involvement*Family structure	-.18	.45	.03	.35	-.15	.86
ME: Frustration tolerance					-.39	.68
MEMO: Frustration tolerance*Family structure					-.09	.92
<i>Note:</i> Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch ¹ <i>p</i> < .06, * <i>p</i> < .05, ** <i>p</i> < .01, *** <i>p</i> < .001						

Maternal education as a moderator. The role of maternal education within the mediation process among school parent involvement, frustration tolerance, and felony arrest was examined. As Table 30 illustrates, school parent involvement, maternal education, and frustration tolerance were all significantly and negatively associated with felony arrest. Maternal education, however, was not associated with frustration tolerance.

In Table 31, school parent involvement is no longer predictive of the mediator, frustration tolerance, nor felony arrest, once maternal education was included in the model. Moreover, in Model 3, none of the variables nor the interactions significantly predict felony arrest.

Table 30
Descriptive Statistics and Bivariate Correlations Among Maternal Education, School Parent Involvement, Frustration Tolerance and Educational Attainment

Variable	School parent involvement (independent variable)	Maternal education (moderator)	Frustration tolerance (mediator)	Felony arrest (outcome)
<i>M</i>	0	11.10	0	17%
<i>SD</i>	.94	1.72	1.0	.37
Correlations				
School parent involvement	---	.20***	.22***	-.14***
Maternal education		---	.04	-.06***
Frustration tolerance			---	-.19***

Note: Pooled estimates from 5 multiple imputed data are presented.
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 31
Moderated Mediation Among Maternal Education, School Parent Involvement, and Frustration Tolerance on Felony Arrest

Predictors	Model 1 (Criterion felony arrest)		Model 2 (Criterion Frustration tolerance)		Model 3 (Criterion felony arrest)	
	<i>b</i>	Exp(<i>b</i>)	<i>b</i>	<i>t</i>	<i>b</i>	Exp(<i>b</i>)
X: School parent involvement	.12	1.12	.37	1.43	.22	1.25
MO: Maternal education	-.06	.94	-.07**	-2.66	-.04	.96
XMO: School parent involvement*Maternal education	-.04	.96	-.02	-.85	-.04	.96
ME: Frustration tolerance					-.61	.54
MEMO: Frustration tolerance*Maternal education					.01	1.01

Note: Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch
[†] $p < .06$, * $p < .05$, ** $p < .01$, *** $p < .001$

Results from analyses examining family structure and maternal education as moderators of the mediational process among school parent involvement, frustration tolerance, and later outcomes indicate that both maternal education and frustration tolerance, independently have a significant impact on educational attainment. Furthermore, maternal education and frustration together (an interaction) is also predictive of educational attainment.

Moderated mediation of task orientation on parent involvement effects on educational attainment.

Family structure as a moderator. The role of family structure within the mediation process among school parent involvement, task orientation, and educational attainment was examined. As Table 32 illustrates, all variables were significantly and positively associated with one another. Results from regression analyses (Table 33) indicate the independent and significant role of task orientation on educational attainment (Model 3), above and beyond the impact of school parent involvement, family structure, and the interaction variables.

Table 32 <i>Descriptive Statistics and Bivariate Correlations Among Family Structure, School Parent Involvement, Task Orientation and Educational Attainment</i>				
Variable	School parent involvement (independent variable)	Family structure (moderator)	Task orientation (mediator)	Educational attainment (outcome)
<i>M</i>	0	(0)Single parent: 60.6% (1)Both parents: 39.4%	0	11.88
<i>SD</i>	.94	.49	1	1.63
Correlations				
School parent involvement	---	.09**	.25***	.27***
Family structure		---	.12***	.12***
Task orientation			---	.37***
<i>Note:</i> Pooled estimates from 5 multiple imputed data are presented. * $p < .05$, ** $p < .01$, *** $p < .001$				

Table 33 <i>Moderated Mediation Among Family Structure, School Parent Involvement, and Task Orientation on Educational Attainment</i>						
	Model 1 (Criterion educational attainment)		Model 2 (Criterion Task orientation)		Model 3 (Criterion educational attainment)	
Predictors	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>
X: School parent involvement	.22	1.39	.12	1.14	.17	.99
MO: Family structure	.11	1.13	.05	.77	.03	.28
XMO: School parent involvement*Family structure	.05	.45	.03	.39	0.4	.34
ME: Task orientation					.42**	2.64
MEMO: Task orientation*Family structure					.02	.18
<i>Note:</i> Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch [†] <i>p</i> < .06, * <i>p</i> < .05, ** <i>p</i> < .01, *** <i>p</i> < .001						

Maternal education as a moderator. The role of maternal education within the mediation process among school parent involvement, frustration tolerance, and educational attainment was examined. As 34 indicates, school parent involvement was positively associated with maternal education, task orientation, and educational attainment. Maternal education was associated with educational attainment but was not associated with task orientation.

Table 35 presents the results from regression analyses. Maternal education consistently and positively predicted educational attainment, even after including all variables (Model 1 and 3). Furthermore, task orientation also positively predicted educational attainment in Model 3.

Table 34
Descriptive Statistics and Bivariate Correlations Among Maternal Education, School Parent Involvement, Task Orientation and Educational Attainment

Variable	School parent involvement (independent variable)	Maternal education (moderator)	Task orientation (mediator)	Educational attainment (outcome)
<i>M</i>	0	11.10	0	11.88
<i>SD</i>	.94	1.72	1.0	1.63
Correlations				
School parent involvement	---	.20***	.25***	.27***
Maternal education		---	.05	.17***
Task orientation			---	.37***

Note: Pooled estimates from 5 multiple imputed data are presented.
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 35
Moderated Mediation Among Maternal Education, School Parent Involvement, and Task Orientation on Educational Attainment

Predictors	Model 1 (Criterion educational attainment)		Model 2 (Criterion Task orientation)		Model 3 (Criterion educational attainment)	
	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>
X: School parent involvement	.48	1.40	.41	1.67	.24	.61
MO: Maternal education	.10***	3.52	-.01	-.76	.09**	2.88
XMO: School parent involvement*Maternal education	-.02	-.50	-.02	-.99	.01	.05
ME: Task orientation	.				.86*	2.51
MEMO: Task orientation*Maternal education					-.04	-1.26

Note: Pooled estimates from 5 multiple imputed data sets are presented. Regression analyses controlled for the following controls: kindergarten reading achievement, male, African American, child welfare birth-3, indicator if parent involvement was imputed, and the following 8 early risk factors: 60%+ low income school neighborhood, single parent at child birth, teenage mother, mother did not complete high school, 4 or more children in the household, TANF use, mother unemployed at child birth, eligible for free lunch
[†] $p < .06$, * $p < .05$, ** $p < .01$, *** $p < .001$

Results from analyses examining family structure and maternal education as moderators of the process among school parent involvement, task orientation, and later outcomes indicate the unique contribution of maternal education and task orientation in predicting educational attainment. These two factors predict educational attainment above and beyond school parent involvement.

Although neither family structure nor maternal education moderated the mediation process among school parent involvement, self-control variables, and educational and crime outcomes, these results suggest the *differential* impacts that school parent involvement, self-control, family structure, and maternal education have on educational attainment and felony arrests. As predicted, the process underlying these associations differ based on the outcome of interest. Maternal education plays a critical role in educational attainment – as it mediates the impact of school parent involvement on educational attainment. Further, family structure was found to mediate the impact of school parent involvement on felony arrest. These results from the moderated mediation analyses provide valuable, specific information on the complex processes among these factors.

Robustness Testing

The results presented thus far have also been examined through alternative methods of testing to understand the robustness of the effects found in the main analyses of Questions 1-4.

Early vs. later parent involvement. Parent involvement variables were categorized into early (1st-3rd grade) vs. later (4th-6th grade time periods). Exploratory factor analyses with a direct oblimin rotation were conducted for both the original data and imputed data. Table 36 illustrates the resulting factors. For both specified time periods, there are no cross-over of items between factors. Items loading onto a Factor 1 in the original sample are also loading onto Factor 1 in the imputed sample. Furthermore, for both the original and imputed data, across both time points,

items loading on to Factor 1 vs. Factor 2 are similar to the item loadings presented in the main analyses (see Question 1 of results section).

Table 36 <i>Factor Analyses of Early vs. Later Parent Involvement</i>				
	1 st -3 rd grade parent involvement		4 th -6 th grade parent involvement	
	Original	Imputed	Original	Imputed
Factor 1	<ul style="list-style-type: none"> • Change entering high school without being held back (.99) • Change graduating from high school (.77) 	<ul style="list-style-type: none"> • Chance entering high school without being held back (.88) • Chance graduating from high school (.94) 	<ul style="list-style-type: none"> • How often do you read to child (.76) • How often do you help child with homework (.56) 	<ul style="list-style-type: none"> • How often do you read to child (.76) • How often do you help child with homework (.56) • How often do you cook with child (.39) • How often do you take child to zoo (.37)
Factor 2	<ul style="list-style-type: none"> • Parent participates in school activities -2nd grade (.91) • Parent communicates regularly with school (.80) • Parent participates in school activities – 3rd grade (.52) 	<ul style="list-style-type: none"> • Parent communicates with child’s school (.69) • Parent helps in child’s classroom (.48) • Parent talks with teacher about child (.76) • Parent attends parent meetings (.56) 	<ul style="list-style-type: none"> • How often do you help in classroom (.39) • How often do you talk to teacher about child (.50) • How often do you get invited to school events (.49) 	<ul style="list-style-type: none"> • How often do you talk to teacher about child (.50) • How often do you get invited to school events (.49) • How often do you discuss school progress with child (.36)
Variance explained	35.65%	35.06%	33.12%	33.12%
<i>Note:</i> Factor scores below .3 are not presented. Numbers in parentheses indicate factor loadings for its corresponding factor).				

Results from these factor analyses testing for robustness, confirm the item loadings of the factor analyses presented in the main analysis. However, as Costello & Osborne (2005) and others argue, factors must have a minimum of three item loadings to be considered as a unique factor. Factor 1 in both early and later parent involvement factor analyses only have two items loading at above the .3 cut-off. Thus, full analyses of Questions 1-4 were not pursued any further for early vs. later parent involvement robustness testing.

Non-imputed parent involvement variables. Factor analyses of 2nd-6th grade parent involvement variables were re-analyzed using non-imputed original parent involvement variables. Identical results to the main dissertation study emerged: factor analyses produced two distinct dimensions- home parent involvement and school parent involvement (Table 37).

Regression analyses were used to examine the association between these alternative parent involvement factors and later outcomes. One major difference of particular importance emerged: home parent involvement was found to predict self-control variables (Table 38). In the main analyses reported in this dissertation study, home parent involvement did not predict any of the self-control variables. Of note however, is that home parent involvement positively predicted trouble making behavior and frustration tolerance when non-imputed parent involvement variables were examined during robustness testing. However, coefficients were not consistent (Table 38); home parent involvement positively predicted trouble making behaviors (an anti-social behavior) while also positively predicting frustration tolerance (a pro-social behavior). These results parallel findings from other studies that have reported negative associations of home parent involvement with children's outcomes. One hypothesis for these conflicting results is that it is unclear whether parents increase home parent involvement for a) children who have been demonstrating poor academic performance at school, or b) children who have been demonstrating academic excellence. Further discussion of this issue is presented in the Future Directions for Research section in Chapter 5.

Table 37. <i>Factor Loadings of Parent Involvement Variables</i>				
	Structure Matrix		Pattern Matrix	
	Home involvement	School Involvement	Home Involvement	School Involvement
Reading to child	.762	.239	.822	
Cooking with child	.488	.221	.489	
Discuss school with child	.464	.230	.453	
Help child with homework	.487	.220	.487	
Help in classroom	.250	.545		.543
Take child to zoo, aquarium etc.	.388	.269		
Talk to teacher about child	.241	.461		.443
Participate in school activities	.354	.756		.749
Get invited to school events	.184	.455		.468
Take trips to other cities with child	.254	.194		
How far in school will child get?	.265	.104		

*Note: Factor loadings presented are results post rotation (direct oblimin).
Factor1 and 2 are correlated at $r=.453$.
Factor loadings above .4 are presented in the pattern matrix*

Table 38.
Parent Involvement as a Predictor of Self-Control Variables

	Trouble making behaviors	Frustration tolerance
	β	
Home parent involvement	.15**	.09^t
School parent involvement	-.09^t	-.08
CPC participant	.02	.03
60%+ poverty school neighborhood	-.02	.09*
Free lunch eligibility	-.03	.04
Mother unemployed at child's birth	.01	.09
TANF recipient	-.13*	-.16**
4+ children in household	.02	.05
Mother did not graduate high school	-.05	-.10*
Teenage mother	.02	-.01
Single parent at child birth	-.08	-.04
Kindergarten reading achievement	.09*	.17**
R ²	.06**	.08**

Teacher vs. parent ratings of parent involvement. Factor analyses of parent involvement items were re-analyzed separately for parent ratings and teacher ratings of parent involvement. There were 13 parent rated parent involvement items and 6 teacher ratings of parent involvement. Table 37 presents results from the factor analysis of parent ratings and Table 38 presents results from the factor analyses of teacher ratings.

Exploratory factor analyses were conducted on the parent rated items of parent involvement. As illustrated in Figure 4, a one factor

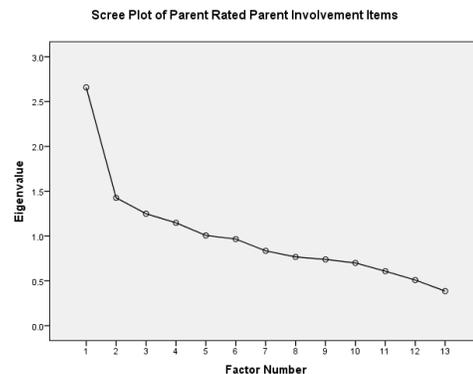


Figure 4. Factor Analysis of Parent Rated Parent Involvement Items

solution was identified (eigenvalue = 2.46). 19%-20% of the variance explained was accounted for by this single factor. Table 39 indicates the items that loaded on to this single factor at above the .4 cut-off.

Parent-Rated Parent Involvement Items	Factor loadings
How often do you read to child	.49-.64
How often do you cook with child	.40-.50
How often do you help child with homework	.46-.57
How often do you discuss school progress with child	.38-.49
How often do you help in classroom	.26-.40
How often do you limit child's TV time	
How often do you encourage child to behave	
How often do you take child to zoo	.26-.44
How often do you talk to teacher about child	.24-.40
How often do you get invited to school events	
How often do you take trips to other cities	
How often did you participate when your child was in 1-3 rd gr	
How often did you participate when your child was in Prek-k	
Note: As multiply imputed data was used, ranges of factor loadings across 5 imputed data sets are presented. Factor loadings less than .4 are suppressed	

As illustrated in Figure 5, a one factor solution was appropriate for the teacher rated parent involvement items as the elbow of the scree plot bends at factor one. Depending on the

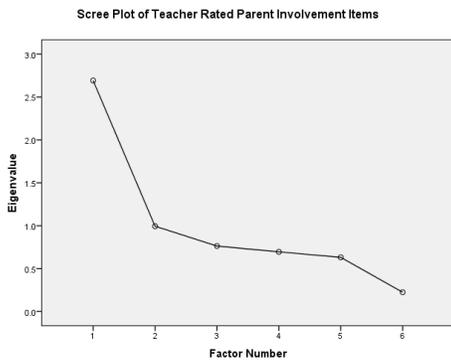


Figure 5. Factor Analysis of teacher rated parent involvement items

imputed data, 44-46% of the variance was accounted for by this first factor with an eigenvalue ranging between 2.65%-2.79%. Further, as detailed in Table 38, Parents participation in school activities (rated by teachers in 2nd, 3rd, and 4th grade) as well as teachers ratings of parent communication with school (2nd grade) loaded onto a single factor at above the .4 cut-off. These same items

also loaded on to the school parent involvement factor in the main analysis (at above the .4 threshold). Further, these items are the same items that were included to create the school parent involvement factor scores used in the main regression analyses.

Table 40 <i>Factor Analysis of Teacher-Rated Parent Involvement</i>	
Teacher-rated parent involvement item	Factor loading
Parent participates in school activities (4 th grade)	.37-.43
Parent participates in school activities (5 th grade)	
Parent participates in school activities (6 th grade)	
Parents participate in school activities (2 nd grade)	.88-.91
Parents communicate with school regularly (2 nd grade)	.85-.87
Parents participate in school activities (3 rd grade)	.43-.50
Note: As multiply imputed data was used, ranges of factor loadings across 5 imputed data sets are presented. Factor loadings less than .4 are suppressed	

As illustrated by the two tables presented here, neither parent ratings of parent involvement nor teacher ratings of parent involvement alone can fully capture the variety of activities that seem to be occurring – home parent involvement and school parent involvement. Thus it is necessary to use both items, as conducted in the main analysis. Of importance is the specific item loadings on to the home and school parent involvement factors – items are differentially loading onto the two factors – identical to the original study. Thus these tests further support the findings from the main analyses.

Chapter 4

Discussion

The present dissertation study examined the role of parent involvement, to the extent of parents' behavioral engagement in supporting their children's development, as opposed to parenting styles or parent-child interactions. In this investigation of parent involvement processes, there were three major goals. The first was to statistically identify distinct categories of parent involvement, as previous literature indicated the possibility of a single category or up to six categories of parent involvement (Question 1). Furthermore, of particular interest, was the differential impact of parent involvement on various child outcomes, within the context of the Child-Parent Center early childhood intervention program (Question 2). A second goal was to explore relations between parent involvement and various long-term outcomes, and the mechanisms through which home and school parent involvement impacts these outcomes (Question 3). Specifically, children's self-control and academic motivation were examined as mediators within the parent involvement-child development process. The third goal was to examine subgroup effects for which parent involvement has the strongest impact on child outcomes (Question 4). Two major early protective factors that have been identified in the literature as associated with parent involvement were examined: family structure and maternal education. The results of these three major goals have collectively shed light on the complexities as well as the critical role of parent involvement in children's academic achievement.

With regard to the first goal, the results support a two category model of parent involvement – the first category is school parent involvement and the second category is home parent involvement. These two dimensions of parent involvement support the idea that parent involvement can occur in different ways. Interestingly, school and home parent involvement play different roles within the context of the Child-Parent Center (CPC) program and children's

outcomes. School parent involvement mediated the association between 1. CPC preschool participation and the highest grade of school completed, as well as 2. the association between CPC preschool participation and felony arrest. However, when home parent involvement was included in the model predicting educational attainment, home parent involvement did not mediate the association between CPC preschool participation and educational attainment – instead, CPC preschool participation remained a significant predictor of educational attainment.

The differential findings in the present study on the impact of school parent involvement vs. home parent involvement on children's long-term outcomes supports previous literature. The significant role of school parent involvement on children's academic achievement has been previously documented by many researchers (e.g. Barnard, 2004; Fan & Chen, 2001; Jeynes, 2007; Steinberg et al., 1992). Thus, among the present dissertation findings, it is of particular interest that school parent involvement *also* predicts occurrences of felony arrests. Although this idea was proposed by criminologists (e.g. Gottfredson & Hirschi, 1990), the present study empirically tests and confirms the hypothesis while using an ecological model. Moreover, both CPC participation and school parent involvement independently contributes to the reduction of felony arrest. The direct impact of CPC preschool participation on felony arrest remained significant, but school parent involvement was also critical in reducing the likelihood of felony arrest as the CPC impact was also transferred *through* increasing school parent involvement.

Unlike school parent involvement, however, home parent involvement did not mediate the association between CPC participation and children's later outcomes. Although home parent involvement was initially significantly associated with a variety of outcomes, once examined among covariates and within the CPC intervention, its direct effects disappeared. Furthermore, not only was the effect of home parent involvement inconsistent across outcomes and mediators, the coefficients were also inconsistent (i.e. home parent involvement predicting negative and positive outcomes). These findings are not surprising and support previous findings regarding the

process and impact of home parent involvement on children's long-term outcomes. In a meta-analysis of 25 empirical studies examining the impact of multiple dimensions of parent involvement on students' academic achievement, Fan and Chen (2001) found that home parent involvement (e.g. parents supporting children at home with their schoolwork) had the weakest relationships with students' achievement. Further, their findings supported a previous study by Singh et al. (1995) which found that home supervision of children actually produced a very small *negative* effect on academic achievement. Many other researchers studying the relationship between parent involvement and student achievement have demonstrated a significant negative association (e.g. Milne, et al., 1986; Sui-Chu & Willms, 1996; Nokali, Bachman, & votruba-Drzal, 2010). Fan and Chen (2011) propose that the weak relationship between home parent involvement and achievement is observed because for some parents, parent involvement is increased as a result of poor academic performance of the student in the first place. Certainly, the opposite motivation is true for other parents – they are involved as a *result* of their child's academic success and overall value in education. This issue regarding motivation of parents' involvement in the home and its long-term impact on children may potentially have two paths and needs further examination in the future. Despite the lack of long-term effects found of home parent involvement in the present study, home parent involvement should not be dismissed as an important element to children's development. The present study did indeed find significant effects of home parent involvement in children's development – it is only in the long-run that the home parent involvement direct effects disappear. This may suggest that home parent involvement serves as an initial step to promote other factors important to children's development, and perhaps this process changes as children develop.

The second goal of the study was to examine the differential pathways of these two types of parent involvement across multiple domains of outcomes. School parent involvement positively predicted frustration tolerance and task orientation, and negatively predicted problem

behaviors, while home parent involvement did not predict any measures of self-control. Furthermore, when the role of self-control within the context of school parent involvement impacting educational attainment and felony arrest was examined, children exhibiting problem behaviors (and indicator of lack of self-control) reduced educational attainment and predicted felony arrest, while children exhibiting frustration tolerance predicted higher educational attainment and a reduction in felony arrests. These findings show that school parent involvement is important through two mechanisms. First, school parent involvement leads to a decrease in children exhibiting problem behaviors in the classroom, and increases children's ability to tolerate frustrating situations and stay task oriented - which leads to an increase in educational attainment and a decrease in criminal behavior. Second, school parent involvement also continues to have a direct impact on children's educational attainment, above and beyond its impact on children's self-control skills, even after taking into account early achievement and risk factors. These findings highlight the consistent and powerful impact of school parent involvement across academic and socio-emotional domains of children's development.

The third major goal of the study was to examine whether the process of school and home parent involvement on children's development differed by the presence of protective factors. To this extent, years of maternal education and the presence of two biological parents were examined as moderators. First, the process of parent involvement was not different for children raised by single parents and children raised by two parents since birth. Thus, school parent involvement equally benefits educational advancement for children from different family structures. Of note, however, is that the inclusion of family structure eliminated the once significant impact of school parent involvement on felony arrest. Thus, being raised by a single parent was more predictive of felony arrests than parents' school involvement status.

The results from analyses examining maternal education suggest the importance of maternal education in predicting children's educational attainment. Once maternal education is

taken into account, school parent involvement no longer is a significant predictor of educational attainment (in the presence of early risk factors and early achievement). Of note, maternal education, children's problem behaviors, and children's ability to remain task oriented, all independently predict educational attainment through the initial impact of school parent involvement. Furthermore, as for moderating effects examined, the interaction between maternal education and children's ability to tolerate frustration significantly predicted educational attainment. Thus, children with parents of higher education and children who had the ability to tolerate frustration, were able to attain higher levels of education.

Contributions to the Field

The field of parent involvement research is expanding, particular as the importance of parent involvement is growing and is thus included as a key alterable mechanism in the prevention science field. In addition to complimenting previous literature on parent involvement, the present study's findings on the differential impact of school and home parent involvement (Goal 1) provide unique contributions to the parent involvement research field. First, this study has identified two distinct dimensions of parent involvement – home and school parent involvement. The robustness of these dimensions were tested across numerous multiply imputed data, early vs. later parent involvement data, and by varying sources of report and provides confidence in these findings. Of particular note is the inclusion of both teacher ratings and parent ratings of parent involvement. Instead of choosing a source of report (i.e. teacher or parent or student) the present study examined parent involvement dimensions using both sources of report. Furthermore, these identified dimensions were used to predict long-term outcomes. It is of particular importance that *both home and school parent involvement* were found to impact children's educational attainment – even after controlling for early risk factors. Moreover, results from analyzing the school parent involvement dimension has advanced knowledge in the field by indicating the multi-contextual effect of school parent involvement across an array of

developmental outcomes. These results emphasize the significant impact of school parent involvement on children's development and provide evidence for why early childhood programs and policies should require resources and opportunities for school parent involvement.

Results from the analyses that sought to provide answers to Goal 2 uniquely identified three important pathways through which school parent involvement during childhood impacts long-term outcomes. School parent involvement decreases problem behaviors and increases children's abilities to tolerate frustration during middle childhood. These direct impacts on children persist and are reflected during young adulthood through higher educational attainment and decreased rates of felony arrests. Moreover, findings from the present study highlight the powerful direct impact of school parent involvement on later outcomes – even after controlling for early risk factors and self-control skills during middle childhood. Analyses aimed at Goal 2 provide strong evidence that the impact of school parent involvement is robust and important for children's acquisition of skills that remain essential for adults.

Lastly, the results from analyses addressing the 3rd Goal provided important answers to questions about the role of family structure and maternal education on the parent involvement process. The first substantial contribution to the field of parent involvement research is that the presence or absence of two parents does not impact the role of parent involvement on children's development. Regardless of whether or not a child is raised in a single parent family or a two parent family, school parent involvement plays a critical role in children's long-term development. The field of parent involvement has questioned whether the impact of parent involvement differs by family structure because resources and opportunities may differ by family structure. However, it is now clear that the influence of school parent involvement is independent of family structure and is beneficial for all families. Another major contribution of addressing Goal 3 lies in understanding the role of maternal education on children's educational attainment. The effect of maternal education was found to significantly impact children's

educational attainment, in particular, when children had high levels of frustration tolerance. Frustration tolerance reflects self-control skills and is an indicator of children's ability to regulate their behavior. This finding advances knowledge and practice in the field of education by documenting the importance of *both* parental education and support in children's development of frustration tolerance.

The mechanisms among CPC intervention, school/home parent involvement, self-control, and long-term outcomes that were uncovered through the present dissertation study provide the foundation for structural equation modeling analyses (SEM). Now that specific predictive associations are known, researchers can take the next step to identify larger pathways, and for example, the parent involvement mechanism can be examined in conjunction with other large-scale mechanisms. The results from the present study highlight the significance of moving away from a single factor conceptualization of "parent involvement" to a multidimensional approach – one where home and school parent involvement processes are examined independently. This suggests that SEM studies examining the process of parent involvement should include differential pathways for home and school parent involvement, and that different mediators and outcomes should be examined. Because of the findings presented in this study, it is now imperative to identify specific mechanisms of parent involvement, and how these mechanisms jointly operate in shaping the developmental trajectory of a child.

Limitations

A number of limitations of this study merit consideration. Most notably, as the data longitudinally follows participants for over two decades, there is missing data due to attrition. Fortunately, as childhood data collection spans over a decade, even if there is missing data at a certain time point, data for that individual exists before or after the specific time point. Thus, multiple imputation was possible to conduct based on the multiple sources of information available across time. Along with multiple imputation procedures, robustness testing accounting

for missing data was also conducted, and provided similar major results as those reported in the main study.

However, some minor differences were revealed during the robustness testing. First, when non-imputed parent involvement data was used, home parent involvement and school parent involvement were both identified as distinct dimensions of parent involvement. Yet, upon further analysis using these dimensions, school parent involvement was found to be predictive of educational outcomes, while home parent involvement significantly predicted all self-control variables. Unfortunately, the home parent involvement results were not replicated in the main study using multiply imputed data. An explanation for this discrepancy lies in the complex construct of “home parent involvement.” Home parent involvement can be a catalyst for positive behavior, but it can also be a result of children’s negative behavior. Additional analyses of the impact of school vs. home parent involvement were examined using a variety of multiply imputed data (e.g. using all parent involvement data from parent, teacher, student sources only, using parent involvement data and early risk factors, early vs. later parent involvement data) and although school parent involvement remained a significant predictor of educational attainment, the impact of home parent involvement on self-control mirrored those reported in the results of the main study. This missing data limitation is reflected only in the home parent involvement results, not in the school parent involvement results. Moreover, this limitation is important in so far that these complicated findings regarding home parent involvement urge the necessity of further examination of factors that lead to parent involvement and whether there is more than one pathway through which home parent involvement impacts children’s development. This is a critical area that future directions of parent involvement research must investigate to comprehensively capture the ecological process of parent involvement in children’s development.

Another limitation of this study lies in the source of parent involvement reports. Parent involvement ratings used in the main analyses of the present study were reported by both parents

and teachers, depending on the item. As previously examined by Bakker et al. (1999), parent reports and teacher reports of parent involvement each have limitations. Teacher reports of parent involvement at home have been criticized for bias – teachers are not truly aware of the day to day activities a parent engages in with the child. Therefore, teacher’s ratings of home parent involvement tend to reflect biases based on socio-contextual factors known about the family (e.g. maternal education, risk status). However, parent ratings of parent involvement also suffer from a major flaw. Unlike teachers who are exposed to a variety of parenting styles and interact with numerous parents on a daily basis, parents may not necessarily be aware of their own level of parent involvement in relation to other parents’ or typical levels of parent involvement. Thus, one parent who attends a monthly PTA meeting may consider herself as “high” on school parent involvement, but another parent who volunteers and reads to children every week may also consider herself as “high” on school parent involvement. The problem lies in the parents’ validity in their assessment of their own level of parent involvement behaviors (Morshbach & Prinz, 2006). Given the limitation of both teacher and parent reports of parent involvement, the present study examined the construct, “parent involvement,” using both sources of reporting. Furthermore, for robustness testing, the present study also examined the dimensions of parent involvement when only parent rated items of parent involvement were used and when only teacher rated items of parent involvement were used. Parent ratings produced a single dimension – home parent involvement, while teacher ratings produced a different single dimension - school parent involvement. This suggests that both sources of parent involvement are critical to fully capture parents’ engagement in their children’s development – as was conducted in the present study. However, as this issue is a critical one in the parent involvement research field, it would be valuable for future studies to examine various types of parent involvement activities by triangulating multiple sources of informants. It would also be beneficial for researchers to understand where the biases occur, and whether or not there are specific dimensions that should

utilize one source of information over another. Moreover, the contextual factors that may be associated regarding potential biases should also be examined (e.g. poverty status of families, parental education status). The present study sheds light towards this direction in suggesting a distinction between parent involvement dimensions as rated by parents and teachers.

Third, the sample was drawn from a low-income, high-risk population in an urban community – with a 97% majority of the population being African American. This is because the original CPC intervention program was developed with this targeted, low-income, primarily African American, Chicago population in mind, the findings are valuable and hold true for families currently in the CPC preschool program in Chicago. In particular, the present study has contributed the identification of the importance of school parent involvement to children's educational outcomes and the mechanisms through which these processes take place among the CPC preschool program families in Chicago. Despite the limited demographic scope of this sample, the association found between parent involvement and children's later outcomes is supported by other studies that have examined similar parent involvement questions among diverse populations (e.g. Fan & Chen 2001; Jeynes, 2007; Mau, 1997). Although we are confident in the association between parent involvement and student's academic outcomes, with the recent expansion of early childhood intervention programs across numerous demographics, there is indeed a need for future research to examine cross-cultural differences in the unique categories of parent involvement and its impacts across children's developmental outcomes.

Despite the aforementioned limitations, this study provides motivation for comprehensive, longitudinal studies of parent involvement to effectively implement school parent involvement efforts with high parent responses and strong impacts on children's long-term development across multiple domains. Many of these flaws are unavoidable as parent involvement is a nebulous construct, but further research examining the intricacies of parent involvement as it relates to impacting children's development through various mechanisms will

help the field understand how to effectively implement parent involvement strategies that may be supported through the school system.

Chapter 5

Future Directions and Policy Implications

Policy Implications and Recommendations

The valuable role of parents in children's development is currently reflected in government policies such as No Child Left Behind Act, 2101(4) (U.S. Congress, 2001), the reauthorization of Title 1, and numerous parent involvement intervention programs (e.g. Fan & Chen, 2001; Jeynes, 2005; Reynolds, 2000). These policies mandate the active participation of parents in their children's educational development. However, despite this mandate, there is no system set up for data collection and enforcement of these requirements. Therefore, until this present study it has been unclear whether and how parent involvement at home or parent involvement at school is most effective in supporting successful development in children. Results from the present dissertation study highlights the differential importance of both school and home parent involvement as they differentially predict children's immediate and long-term positive outcomes. Specifically, findings from the present study as well as previous research emphasize the critical importance of school parent involvement to children's educational attainment and reduction in criminal behaviors. Therefore, education policy should endorse school parent involvement in particular, in so far as it promotes children's ability to stay task oriented, tolerate frustration, and decrease problem behaviors at school over time. These abilities that encourage children's self-control leads children on a trajectory towards successful socio-emotional development and educational attainment throughout grade school and beyond.

The endorsement of school parent involvement involves multiple layers of resources and supports among the school, family, and community. If parent involvement is implemented effectively, it may provide children with resources that lead to long-lasting impact. It is because of these multi-layered influences that interact across multiple contextual domains that early

childhood programs emphasizing parent involvement have been shown to produce large return on investments, across time. Thus, in order to maximize the effectiveness of early childhood programs, it is imperative that school parent involvement is included as a key initiative in early childhood education policy to help ensure long-term academic and social well-being in children. To this extent, school personnel must also acknowledge differentiation of parent involvement by demographics of families and help support parents by providing numerous resources and support services that parents feel comfortable accessing. The success of a parent involvement program in any school requires the collaboration of school staff (e.g. teachers, principals, social workers), families, and the community as a whole, within a political climate that endorses and assists in the cross-collaborative efforts of providing the best opportunities for children.

Based on the findings from the present study, the following specific parent involvement strategies are recommended.

1. Schools should endorse and provide opportunities (e.g. workshops, activities, PTA meetings) that help support and encourage parents' involvement in school. The provision of resources and opportunities for families will help entice parents to set foot onto the school grounds and interact with the school system and staff. This would help promote parent involvement occurring within the school.
2. Schools should actively make efforts to welcome parents into the school and reach out to families who are less involved. As school parent involvement is a critical component impacting children's educational and socio-emotional development, efforts to encourage parent involvement for all families should be supported.
3. Early home parent involvement in conjunction with school parent involvement, should be endorsed by the school. Promoting activities that parents can do at home with their child (e.g. reading to their child, making crafts with their child)

is important to children's development. Home parent involvement should not be replaced by school parent involvement, but rather promoted simultaneously.

4. Schools should identify a teacher or a staff that maintains contact with parents and ensures that families are involved throughout the year. This role is critical as direct communication between school staff and families is necessary to provide an accurate assessment of parents' involvement that is not biased by the family's demographic background.

Future Directions for Research

While the present study has highlighted the role of school parent involvement and its pathways in impacting children's long-term outcomes, many unanswered questions remain. It is recommended that future parent involvement research is conducted in light of the following unresolved issues to effectively move the field forward and produce research findings that can be immediately implemented into current programs and policies.

Measuring and understanding home parent involvement. Findings from the present study identified two distinct dimensions of parent involvement – school parent involvement and home parent involvement. However, analyses from robustness testing produced mixed results for determining the impact and pathways of home parent involvement on children's socio-emotional development. Furthermore, the duration of the impact of home parent involvement is also unclear. What is required to clearly understand the role of home parent involvement is 1. to determine the motivation behind home parent involvement and 2. specific strategies/activities of home parent involvement that are predictive of long-term positive outcomes in children. Moreover, effective strategies and pathways for successful influences of parent involvement may differ by children's early behaviors. For example, the most effective strategy of home parent involvement may differ for a child who has been performing poorly at school compared to a child who has been excelling in school.

Mechanisms. The present dissertation study has laid the groundwork for further investigation of the longitudinal process among which early childhood education interventions, through school parent involvement, impacts children's educational attainment and felony arrests. This process merits further examination with additional layers of protective factors using path analysis to understand this complex process globally, across time. One possible path that may be examined in the future is the influence of parent's attitudes about the school and the value of education. It would be interesting to examine whether parents' attitudes change as a result of parent involvement and whether this change impacts the effectiveness of parent involvement. Another larger process oriented approach within the examination of the role of parent involvement is to examine the trajectory of parent involvement influences over time and whether different types of parent involvement produce different paths of effectiveness over time. Furthermore, a consideration of the role of the *school environment* may be of value in future studies. Taking into account school quality, teacher turn-over rates, mobility rates of families within the school may help inform researchers why some parents are more involved than others, and how the process may differ based on context.

While the focus of the present study examined long-term educational and crime outcomes, other long-term outcomes relevant to later age may also be investigated. First socio-economic outcomes, such as income and assets could be explored. This type of data is more consistent in later life as opposed to young adulthood. Further exploring longer-term effects of parent involvement, the next large step in the field is to determine the intergenerational effect of parent involvement. Do children raised with high levels of parent involvement become parents who are also highly involved in their children's schooling? Furthermore, what are the mechanisms that transfer the impact of the initial parent involvement to the next generation? Understanding and determining the answers to these questions would allow researchers and

practitioners to effectively implement parent involvement strategies to promote children's well-being across generations.

Moreover, future studies should examine the role of specific, alterable, low-cost components within an early childhood program that would aid in the process of parent involvement and produce large impacts on children. For example, determining resources that are frequently used by parents at home, or identifying workshops and events that offer tangible resources for families would not only help support but increase parent involvement. The significant and long-term impact of parent involvement is known. What the field now needs is the identification of alterable components that can produce and sustain the positive effects in children that is achieved through childhood parent involvement.

Demographic, socio-contextual factors. Another important step in understanding and effectively implementing parent involvement strategies would be to understand whether or not this process differs across different subcultures. There is evidence that the most effective type of parent involvement on children's development differs by the population examined. For example, Mau (1997) has examined the differential impact of parent involvement on children's academic achievement in Asian, African American, Hispanic, and White populations and has found that the most effective type of parent involvement differs by culture and the frequency of parent involvement in different types of parent involvement also differ. Particularly when parent involvement is utilized as a critical element for change in childhood education intervention programs (e.g. Head Start) that serve a variety of socioeconomic minorities, cultural sensitivity is a critical factor that must be addressed within the implementation of the intervention.

Unanswered Questions For the Field

Dosage/frequency of involvement. Despite the plethora of research documenting the short and long-term impacts of parent involvement the optimal frequency of parent involvement is still to be determined. It is unclear whether there is a minimal or cut-off "dosage" for which

parent involvement has the largest impact on children's development. This is a challenging issue as the optimal frequency of parent involvement may differ by type of parent involvement (e.g. reading to a child vs. attending school assemblies). Furthermore, accurately measuring the frequency of all the possible varieties of parent involvement is nearly impossible – but would be necessary in order to understand the ideal frequency of parent involvement for children's development. Moreover, the optimal frequency by type of parent involvement is likely to change based on the age of the child, and thus a longitudinal approach would be necessary to examine this question. Although we are currently not at a point where we can answer such questions, future research may provide longitudinal data on large samples of children and their parents to shed light on the optimal frequency of parent involvement. This information would be of incredible value, as schools would then be able to advocate or require a specific dosage of parent involvement based on evidence.

Key to effective parent involvement – specific behaviors vs. core elements. Lastly, despite the focus of school and home parent involvement in the present study and within the parent involvement literature, it is unclear whether the key to effective parent involvement lies within specific behaviors (e.g. reading to child every night, volunteering as room mom every month) or core elements (e.g. spending time with child on a particular activity across contexts). Although efforts are being placed to identify specific strategies of parent involvement that produce the largest gains in children, there is also a possibility that it is not a set of specific parent involvement strategies that is critical, but, core elements within parent engagement behaviors (e.g. families directly communicating in some form with school staff). These questions are all unanswered, but, further research will lead the field to answering these questions which will inform the requirements and expectations of early childhood education programs and policies in the future.

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Appendix 1

<i>Teacher and Parent Ratings of Parent Involvement Items 1st-3rd grade</i>							
variable	Rated by...	grade	Description	Mean	Min/Max	Original n	% imputed
p2q10	Parent	2 nd	Read to child	4.81	1/7	510	
p2q11	Parent	2 nd	Cook with child	4.27	1/7	511	
p2q12	Parent	2 nd	Go on outings with child	4.96	1/7	516	
p2q13	Parent	2 nd	Discuss school progress with child	5.96	1/7	513	
p2q14	Parent	2 nd	Communicate with child's school	3.74	1/7	509	
p2q16	Parent	2 nd	Help in child's classroom	2.14	1/7	500	
p2q17	Parent	2 nd	Talk with teacher about child	3.72	1/7	509	
p2q18	Parent	2 nd	Attend parent meetings	2.42	1/7	501	
p2q4	Parent	2 nd	Chance of entering H.S. without being held back	4.28	1/5	512	
p2q5	Parent	2 nd	Chance of graduating from high school	4.35	0/9	508	
p11q21a	Parent	11 th retro.	Frequency of parent involvement during grades 1-3rd	3.85	0/9	736	52%
p11q9	Parent	11 th retro	Frequency of parent involvement during preschool	4.26	0/5	741	52%
s3q23	Student	3 rd	My parent helps me with my homework	2.28	0/5	1095	
s3q33	Student	3 rd	My parent asks about school	2.30	0/5	1091	
t1q16	Teacher	1 st	Parent participation in school activities	2.62	0/7	1136	
t2q16	Teacher	2 nd	Parent participation in school activities	2.66	0/7	940	
t2q14	Teacher	2 nd	Parent communicates with school regularly	2.98	0/7	946	
t3q16	Teacher	3 rd	Parent participation in school activities	2.50	0/7	1118	
Note: Percent of imputed parent involvement items are displayed for parent involvement items used in the factor analyses. The other items were used to predict the multiply imputed items.							

Appendix 2

<i>Teacher and Parent Ratings of Parent Involvement Items 4/6th grade</i>						
Variable	Rated by...	Description	Mean	Min/Max	Original n	Percent imputed
p46q13	Parent	Read to child	3.16	0/8	744	52%
p46q14	Parent	Cook with child	3.41	0/8	745	52%
p46q15	Parent	Help child with homework	4.36	0/9	749	51%
p46q17	Parent	Discuss school progress	4.24	0/9	744	52%
p46q18	Parent	Help in classroom	1.50	0/5	730	53%
p46q25	Parent	Limit child's tv time	2.34	0/4	750	51%
p46q27	Parent	Encourage children to behave	2.92	1/4	745	52%
p46q28	Parent	Take child on trips like the zoo	2.09	0/4	749	51%
p46q29	Parent	Talk to teacher about your child	2.35	0/4	753	51%
p46q31	Parent	Get invited to school events	2.29	0/5	739	52%
p46q32	Parent	Take trips to other cities	1.81	0/4	745	52%
t4q16	Teacher	Parent participates in school activities	2.57	0/7	816	
t5q16	Teacher	Parent participates in school activities	2.49	0/7	799	
t6q7	Teacher	Parent participates in school activities	2.42	0/7	800	
Note: Percent of imputed parent involvement items are displayed for parent involvement items used in the factor analyses. The other items were used to predict the multiply imputed items.						

Appendix 3

<i>Sample Size and Statistics of Variables in Analyses</i>					
	N	Min.	Max.	Mean	SD
CPC preschool participation	1,539	0	1	.64	.48
Years of CPC preschool participation	1,539	0	2	1	.84
School parent involvement	1,539	-2.80	2.99	0	.94
Home parent involvement	1,539	-2.49	2.62	0	.81
Mediators					
Student self-control (grade 6-7)	1,058	20	100	60.8	16.8
Student motivation (grade 5)	809	8	20	16.1	2.24
Kindergarten word analysis	1,531	19	97	59.69	13.67
Moderators					
Family structure	1,105				
Single parents			n = 759, 68.7%		
Both parents			n = 346, 31.3%		
Maternal education	1,475	6	17	11.10	1.72
Covariates					
Risk index	1,539	0	7	5.0	1.69
60%+ poverty in school area	1,539	0	1	.76	.43
Single parent at birth	1,539	0	1	.76	.42
Teen mom	1,539	0	1	.16	.37
Mom did not complete high school	1,539	0	1	.54	.50
4 or more children in household	1,539	0	1	.17	.37
TANF participation	1,539	0	1	.63	.48
Unemployed mother	1,539	0	1	.66	.47
Eligible for free lunch	1,539	0	1	.84	.37
African American	1,539	0	1	.93	.26
Male	1,531	0	1	.50	.50
Child welfare age 0 to 3	1,539	0	1	.04	.19
Outcomes					
Education					
On time graduation	1,421	0	1	.41	.49
Highest grade completed	1,367	3	16	11.88	1.63
Some college attendance	1,371	0	1	.31	.31
Adult crime					
Felony arrest	1,418	0	1	.19	.39
Conviction	1,418	0	1	.23	.42
Substance Abuse	1,203	0	1	.26	.44

Appendix 4

<i>Correlation Matrix of Predictors, Mediators, Moderators, and Outcomes</i>															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. School PI		.30**	.20*	.36**	.39**	-.44**	.06	.35**	.06	.37**	.31**	.24*	-.06	-.20*	-.18
2. Home PI		--	.13	.17	.18	-.07	.01	.05	.02	.04	-.03	-.02	-.06	-.04	-.01
3. CPC preschool participation			--	.07*	.10**	-.05	.07*	.02	.09**	.09**	.11**	.07**	-.09**	-.08**	-.08**
4. Frustration tolerance				--	.72**	-.69**	.13**	.14**	.04	.33**	.29**	.25**	-.23**	-.19**	-.23**
5. Task orientation					--	-.77**	.17**	.12**	.05	.37**	.37**	.30**	-.27**	-.21*	-.24**
6. Problem behaviors						--	-.12**	-.14**	-.06	-.35**	-.35**	-.25**	.28**	.25*	.27**
7. Motivation							--	-.01	-.01	.02	.08*	.05	-.10**	-.07*	-.09**
8. 2 parent family								--	.07*	.14**	.15**	.13**	-.14**	-.08**	-.13**
9. mom HS dropout									--	.16**	.17**	.12**	-.04	-.06*	-.09**
10. On-time graduation										--	.53**	.33**	-.37**	-.31**	-.33**
11. Educational attainment											--	.54**	-.33**	-.26**	-.28**
12. Some college attendance												--	-.20**	-.15*	-.17**
13. Substance abuse													--	-.65**	.68**
14. Felony arrest														--	.81**
15. Guilty charges															--
<i>Mean</i>	0	0	.64	0	0	0	0	1.31	.54	.41	11.88	.31	.26	.19	.23
<i>Standard deviation</i>	.94	.81	.48	1	1	1	.23	.46	.50	.49	1.63	.31	.44	.39	.42
Note: Pooled estimates from 5 multiply imputed datasets are presented.															

Appendix 5

<i>Correlation Matrix of Independent Variables, Mediators, Moderators, and Outcomes with Covariates</i>											
	60%+ poverty area	Single parent	Teen mom	4+ children home	TANF participation	Mom unemploy- ed	Free lunch eligible	Kindergarten achievement	African American	Male	Child welfare 0-3
1. School PI	-.06	-.10**	-.09**	-.03	-.14**	-.12**	-.09**	.24**	-.031	-.08**	-.04
2. Home PI	.05	-.02	.03	-.05	.05	.02	.07*	.04	.02	-.03	.01
3. CPC preschool participation	.05*	.01	-.02	-.02	.1	.03	.02	.21**	-.01	-.05	-.05
4. Frustration tolerance	.04	-.11**	-.03	.02	-.14**	-.11**	-.04	.18**	-.09**	-.20**	-.04
5. Task orientation	-.01	-.06*	-.01	-.01	-.11**	-.10**	-.06*	.28**	-.07*	-.32**	.01
6. Problem behaviors	.03	.06	.01	.01	.14**	.08**	.10	-.26**	.08*	.27**	.01
7. Motivation	-.05	.02	.05	-.05	.01	-.01	-.02	.06	-.01	-.12**	-.01
8. Family structure	-.03	-.34**	-.11**	.09**	-.32**	-.20**	-.16**	.05	-.16**	-.06	.01
9. Maternal education	-.01	-.07*	-.26**	-.09**	-.13**	-.14**	-.12**	.18**	.28**	-.02	-.06*
10. On-time graduation	-.01	-.10**	-.05*	-.02	-.20**	-.14**	-.09**	.20**	-.03	-.21**	-.05
11. Educational attainment	-.03	-.09**	-.06*	-.05	-.18**	-.15**	-.09**	.20**	-.07*	-.20**	-.08**
12. Some college attendance	-.01	-.06*	.01	-.04	-.12**	-.11**	-.06*	.16**	-.05	-.09**	-.06*
13. Substance abuse	-.06	.01	.04	.02	.06*	.04	-.04	-.10**	.01	.47**	.06*
14. Felony arrest	-.02	.01	.03	.05*	.07**	.02	.04	-.09**	.01	.39**	.08**
15. Guilty charges	-.02	.02	.08**	.03	.07*	.03	.02	-.10**	.01	.41**	.07*
<i>Mean</i>	.76	.76	.16	.17	.63	.66	.84	59.69	.93	.50	.04
Standard deviation	.43	.42	.37	.37	.48	.47	.37	13.67	.26	.50	.19

Note: Pooled estimates from 5 multiply imputed datasets are presented.

Appendix 6

<i>Crosstabulation of Trichotomized Home and School Parent Involvement</i>				
		School parent involvement		
Home parent involvement		Low	Medium	High
Low		13.5% (207)	12.2% (167)	7.8% (125)
Medium		10.9% (187)	11.4% (176)	9.5% (170)
High		8.2% (119)	11.1% (146)	15.4% (237)
<p>Note: Percentage of participants in each cell were averaged across 5 multiply imputed parent involvement data sets. Sample sizes are noted in parentheses for each cell. Home and School parent involvement was coded as follows: High = highest 1/3 of involved individuals, Medium = middle 1/3 of individuals, and Low = lowest 1/3 of individuals.</p>				