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Cross-cultural research on parent–maintained multigenerational families with co-resident grandparents has shown largely positive outcomes for children, but few studies have explored the potential impact of this type of household structure on children in the American context. The goals of the current study were to investigate the association between grandparent co-residency in stable two-parent families and children's early cognitive development (at ages 9 months and 2 years), and to examine whether grandparents' provision of child care moderated this association. A secondary set of questions asked whether the pattern of associations under study varied by children's ethnoracial background (White, Black, Hispanic, Asian, or Other). Data for this study were drawn from the first two waves of the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), a unique, prospective study of development for a nationally representative sample of children born in the U.S. in 2001. Analyses focused on the 6,950 children who lived in stable two-parent families during their first two years of life. Descriptive results show that 11.3% of infants living in stable two-parent families in this national sample had at least one grandparent living with them during their first two years of life. A series of multivariate logistic regressions indicated that grandparent co-residency was a more likely occurrence for children with younger mothers, children in families below the poverty threshold and those receiving federal benefits, children in families with higher incomes (once poverty was accounted for), first born children and Asian children. Interesting differences emerged in the pattern of correlates of grandparent

co-residency across ethnoracial groups. Poverty and federal assistance were the strongest predictors of co-residency for White, Hispanic, and “Other” families; whereas higher income was associated with co-residency for Black and Asian families. Hypotheses about the association between grandparent co-residency and children’s early cognitive development were not supported (for the full sample or any of the ethnoracial groups); however, supplementary analyses provided suggestive evidence of higher test scores at 9 months for children with co-resident grandmothers, and higher test scores at age 2 for children with co-resident grandfathers. I found no evidence that grandparent provision of child care moderated this association. Implications for future research and recommendations are further discussed.

CO-RESIDENT GRANDPARENTS AND CHILDREN'S
EARLY COGNITIVE DEVELOPMENT

by

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I dedicate this dissertation to my Mother, Neelam Vadehra, to whom I owe my life.
Without you Mom, this would not have been possible.

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of
The Graduate School at The University of North Carolina at Greensboro.

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TABLE OF CONTENTS

	Page
LIST OF TABLESvi
LIST OF FIGURES	vii
CHAPTER	
I. INTRODUCTION	1
II. THEORETICAL PERSPECTIVE	6
III. REVIEW OF LITERATURE	16
IV. RESEARCH QUESTIONS AND HYPOTHESES	27
V. METHODOLOGY	30
VI. RESULTS	48
VII. DISCUSSION	61
REFERENCES	77
APPENDIX A. TABLES AND FIGURES	87

LIST OF TABLES

	Page
Table 1. Weighted Descriptive Statistics for Full Study Sample and by Grandparent Co-residency Status (n=6950).....	88
Table 2. Weighted Descriptive Statistics for Grandparent Characteristics Within Grandparent Co-resident Subsample (n=800)	90
Table 3. Logistic Regression Predicting Likelihood of Grandparent Co-residency Over 2 years.....	91
Table 3a. Logistic Regression Predicting Likelihood of Grandparent Co-residency (Over 2 years) Across Ethnic Groups.....	93
Table 4. Testing Association Between Grandparent Co-residency and Children’s Bayley Test Scores (At 9 months) using OLS Regression	95
Table 4a. Testing Association Between Grandparent Co-residency and Children’s Bayley Test Scores (At 2 years) using OLS Regression	97
Table 4b. Testing Association Between Grandparent Co-residency and Children’s Bayley Test Scores (At 2 years) Across Ethnoracial Groups using OLS Regression.....	99
Table 5. Testing Grandparent Primary Careprovider as Moderator in Association Between Grandparent Co-residency and Children’s Test Scores.....	101
Table 5a. Testing Grandparent Primary Careprovider as Moderator in Association Between Grandparent Co-residency and Children’s Test Scores by Race Over 2 years.....	102

LIST OF FIGURES

	Page
Figure 1. The Multigenerational Processes Framework.	15

CHAPTER I

INTRODUCTION

Early childhood is recognized as a critical phase for cognitive development, laying the building blocks for later success. Although the impact of family structure on children's cognitive outcomes has been well documented, studies have tended to focus on the nuclear family (i.e., parents and their children). Yet, multigenerational households in the U.S. are at an all time high; more than 4.3 million (or 6%) of the 76 million households are classified as 'multigenerational' families that include grandparents, parents, grandchildren and other family members (Lofquist, 2012). Furthermore, this experience appears to be more common for young children; nearly 25% of young children (8 years and below) in American households have experienced living in a three-generation family structure (Pilkaukus & Martison, 2014). Although multigenerational families have grown significantly in the recent years, we know relatively less about young children's development in these household structures compared to those in more 'traditional' nuclear households.

The relatively limited existing research on multi-generational households in the U.S. has focused primarily either on grandparent-maintained households (such as custodian grandparents), grandparents in single-parent households, (Breidenstein, 2003; Dunifon & Kowaleski-Jones, 2007; Pong & Chen, 2010), or grandparenthood among African-Americans and other minorities living in stressful contexts (Bengtson, 2001;

Biblarz, Casper, & Jayasundhara, 2009); however, all of these structures may tend to come about in response to family crisis. This work on multigenerational households, which often uses two-parent families as the comparison group, indicates negative cognitive and behavioral outcomes for children with grandparent co-residency (Mollborn, Fomby & Dennis, 2011) and positive outcomes for children growing up in nuclear families versus extended households (Dunifon & Kowaleski-Jones 2007; Monserud & Elder, 2011). By comparing children in stable, nuclear families as the reference group to which other children are compared; research has provided an incomplete assessment on the association between family structure and child outcomes (Mollborn, Fomby, & Dennis, 2011).

Studies looking specifically at the growing population of co-resident grandparents in parent-maintained households (with both the parents residing in the households) and their impact on children have been particularly limited, even though cross-cultural research on co-resident grandparents living in two-parent families has shown largely positive association with child wellbeing (Pong & Chen, 2010). More specifically, international studies on grandparents' roles in parent-maintained homes have shown positive cognitive, social, and academic outcomes for adolescents (e.g., Chu, Xie, & Yu, 2011; Copen & Silverstein, 2008; Ofahengaue-Vakalahi, 2011; Pong & Chen, 2010). This work suggests that co-resident grandparents in the home may be more invested in their grandchildren's lives than any other kin and are actively involved in coparenting and taking care of the child (Zheng & Xie, 2011).

Previous research has been mired with selection issues, because grandparent co-residency in the US is non-normative and often arises under stressful circumstances (Biblarz, Casper, & Jayasundhara, 2009). Likewise, a critical barrier to progress in the field of grandparent research has been the neglect of the growing heterogeneity in the contextual experiences of grandparenthood (Coall & Hertwig, 2010). It is only recently that national data sets and the Census Bureau have started looking into expanded definitions of household structure that include co-resident grandparents as household members. This methodological improvement in the field has given investigators a chance to examine the growing population of co-resident grandparents in two parent-maintained families. According to the US Census Bureau (2012, own analysis), there are more than one million families with co-resident grandparents in two parent-maintained families today. Yet, we have limited information on children growing up in such families.

The present study seeks to address several gaps in the literature by examining the growing, but understudied population of grandparents who live with their grandchildren in stable two-parent families and the extent to which their presence is associated with children's early cognitive skills, taking into account background selection factors. The potential moderating role of grandparents as primary child care providers is also investigated given that this may be an important area of variation in grandparents' experiences with their grandchildren. All of the associations of interest are examined for the full sample as well as separately for five broad ethnoracial categories (White, Black, Hispanic, Asian and Other).

The contributions of this study are three-fold. First, using nationally representative data, this study provides much needed information about the characteristics and correlates of grandparent co-residency in two-parent homes, as well as its associations with developmental outcomes during children's first years of life, when extended households are most common in the United States (Livingston & Parker, 2010). This initial analysis of the correlates of co-residency then informed the analysis testing the association between co-residency and children's cognitive scores, helping to account for extraneous variables. Much of the existing research on grandparent effects has been affected by the statistical issue of selection bias (Hao & Matsueda, 2006). Selection issues are important to consider in estimating the effects of grandparent co-residency, as many of the factors that lead to the establishment of multi-generation households may also have implications for children's development. For example, low income may be associated with both the likelihood of co-residency and children's cognitive scores. Low income or economic hardship may lead to grandparent co-residency (e.g., as families try to pool resources) and is also a factor known to negatively impact children's cognitive development. Thus, the study will contribute by helping to identify potential selection factors that may be important to control for in the analysis of the association between co-residency and children's development.

Second, past research examining grandparent co-residency has often used cross-sectional designs, whereas this investigation will analyze two waves of data (age 9 months and 2 years), focusing primarily on children's test scores at age 2, and predicting them from co-residency over the child's first two years of life. Children's cognitive

outcomes are expected to be more positive in households with co-resident grandparents than in families reporting no co-residency during this time. The proposed study is innovative in its focus on young children, who may benefit from the presence of co-resident grandparents in ways that are unique compared to other age groups. Early childhood is a critical period for rapid advancements in cognitive development, thus the impact of co-resident grandparents on children's cognitive scores maybe stronger during this phase.

Lastly, another contribution of my study is that it moves beyond the direct effects approach to examine the role of grandparent caregiving as a potential moderator of the linkage between co-residency and children's early cognitive development. This represents the first study to investigate whether associations between grandparent co-residency and young children's outcomes vary according to the caregiving responsibilities of the grandparent. Research on kinship caregiving and child outcomes has tended not to distinguish grandparents from other 'kin' or 'extended members' caregivers, and has focused on non-resident kin (Mollborn, Fomby & Dennis, 2010; Monserud & Elder, 2011). Findings from this literature indicate worse cognitive outcomes for children in relative care as compared to outcomes for children in other childcare arrangements (Fuller-Thomson & Minkler, 2001; Williams, 2011). However, with relative care conceptually defined as including a broad spectrum of kin, the contribution of co-resident grandparent caregivers remains unclear. Compared to other kin, grandparents may have a unique effect given the potential for greater interest or investment in their grandchildren.

CHAPTER II

THEORETICAL PERSPECTIVE

Grandparenting is regarded as a dynamic and complex social construct. In order to understand the various dimensions of grandparent-grandchild connections, there is a need for a conceptual framework that will incorporate its multifaceted nature and integrate the pieces together. Surprisingly, in spite of an acknowledgment of the crucial role that grandparents play as family members and care providers, there is a lack of clarity about theoretical frameworks that can provide an in-depth insight as to how proximal and distal processes interact with the grandparenting role and affect child outcomes, within the frame of time and context. Although there are multiple frameworks on parenting, there is not much discussion in the empirical field towards refining theories specific to grandparenting.

The grandparent role in the U.S. has witnessed a shift due to radical changes in the family structure over the past two decades. A rise in teenage pregnancies, single-parenting, economic recession, and higher divorce rates have led to an increasing involved role for grandparents than ever before. At present, multigenerational households are the primary context for grandparent involvement and grandparent caregiving in US. Studies report mixed findings regarding outcomes for grandchildren growing up in such families. Many researchers contend that this may be, in part, because of the lack of clear

theoretical foundations that explain multigenerational family processes (Bates, 2009; Coall & Hertwig, 2010).

There is a dearth of *theoretically sophisticated* studies that have looked at the effects of grandparent co-residency on child outcomes. Most of the research looks at the *'presence'* of grandparents, rather than *'activities'* that grandparents do. Although with methodological advancements, researchers have examined the pathways of influence in the grandparent-grandchild relationship, a majority of the studies have looked at parenting characteristics as the mediating mechanism for the grandparent effects on child outcomes (e.g., Barnett et. al., 2010). For example, studies have found that parenting behaviors (such as sensitive parenting) account in part, for grandparent's effects on children's outcomes, such that highly educated grandparents can improve parent's knowledge and skills, which in turn can translate to better educational outcomes for children. Other studies have also found similar results – for example, Cherlin and Futersberg's study (1986, as cited in Zheng & Xie, 2011) found that grandparents' effects on intergenerational transmission of values was completely mediated through the parents. The authors noted that “grandparents pass on their legacy to their grandchildren if and only if they are successful in transmitting their values to their children” (p.5). In general, studies have found negative effects for three-generational households perhaps because “taking more than two consecutive generations into account adds very little additional explanatory power to the analysis of intergenerational mobility” (Zheng, p. 8). Although this may be true, we risk masking the unique effects of grandparents on child outcomes. For example, we know little about grandparents' parenting skills and how they can

influence child outcomes (Monserud & Elder, 2011), but this is largely ignored in studies. The field's current focus on the middle generation as the mediating mechanism is also in part because of the dominant theoretical lens on grandparenting that has been derived from the parenting literature. Evolutionary and economic accounts on grandparent investment will argue that parents have a more direct interest or altruistic motive than grandparents do for investing resources in children (Friedman, Hechter, & Kreiger, 2008). In addition, with increasing racial and ethnic diversity in multigenerational households, there is even more heterogeneity in grandparenting experiences than ever before, such as heterogeneity in living arrangements, residency status, and cultural beliefs and practices. Often, even in studies that do find positive effect of grandparent co-residency on various dimensions of child-wellbeing, investigators often state that the pathways through which grandparents influence the outcomes is unexplainable. For example, a study by Dunifon and Kowaleski-Jones (2007) found a positive association, in some instances, between grandparent co-residency in single mother families and children's cognitive scores; however, the investigators noted that "the exact pathway through which grandparents' influence is exerted, however, is still unclear" (p. 478).

Framework for Multigenerational Family Processes

The Multigenerational Processes Framework was proposed by Pong and Chen (2010). According to the authors, this conceptual framework helps specify "how family processes may mediate the effects of co-resident grandparents on grandchildren's educational outcomes" (p.4). The framework includes three dimensions of family processes; socialization, family dynamics, and the flow of domestic services. The

framework is designed specifically to better understand the potential role of co-resident grandparents, who are conceptualized to be living in four forms of multi-generational families (two-parent, single-parent, stepparent families, and skipped generation families). The framework specifies the pathways of influence between co-resident grandparents and grandchildren to be direct, indirect, and “in both positive and negative ways” (p. 6). I will now summarize the main concepts of the framework.

Socialization

The dimension of socialization suggests that co-resident grandparents affect children’s educational outcomes by serving as positive or negative socializing agents. For example, grandparents with high education levels positively influence children’s educational outcomes by being equipped with skills and knowledge to teach their grandchildren. Similarly, grandparents with low education levels can also contribute to children’s education. For example, by talking about their life experiences, grandparents can help children develop an understanding of their current situation in perspective. Also, grandparents can affect the educational outcomes of grandchildren by serving as a positive role model for norms and values. Teaching the value of respect can contribute to better relationships with teachers and others at school. Pong and Chen also acknowledge that socialization effects can be negative as well. For example, “family values may not catch up with emerging modern values embedded in a new economic order reproduced in school and thus lead to negative educational achievement outcomes” (p. 7).

Family dynamics: congruence or discord

Family dynamics between the parents and grandparents, such as congruence or discord affects the children. Positive relationship between the elderly parents and the parents facilitate positive transmission of norms and values for the children. Similarly, disconnect between grandparents and parents can make the children feel confused and cause psychological stress, leading to adjustment problems in school. This can be taken a step further, i.e., family dynamics between grandparent-parent can be proxied by looking at relationship quality within this dyad and how it effects grandparent involvement in children. For example, findings from a study by Barnett and his colleagues (2010) reported strong associations between parent's report of their current relationship with the grandparent and the grandparent's current involvement, especially for the mother ($r = .39, p < .001$).

Flow of domestic services: upward or downward

Domestic services offered by the grandparents, such as caregiving and help in household chores, indirectly affect the parent-child activities either in an upward or downward flow. Grandparent's help may give the parents more time to be with the children and teach them. Likewise, this may also give the mother time for employment, which might have mixed results for the child's wellbeing. Also, Pong and Chen state that domestic services can flow upward as well. Failing health of the grandparent may result in the grandchild caring for them, or putting a drain on the family resources, thereby negatively affecting children's education.

Multigenerational Framework: How Does it Contribute?

As noted previously, there is a lack of a comprehensive theoretical framework that unifies the ‘isolated’ pieces together. The Multigenerational Processes Framework (MPF) is one of the first attempts to look at the processes related to the role of grandparenting in extended families. The literature on grandparenting has theoretically looked at grandparent influences as ‘direct’ and ‘indirect’. For example, as will be discussed in the literature review, grandparents have been conceptualized to impact grandchildren directly through services such as caregiving, teaching the child academic concepts or helping with homework, and role modeling prosocial behavior. Grandparents can also improve children’s wellbeing through indirect influences, such as their presence or help at home paving the way for parents to have more time and resources to devote to the child. For example, studies have shown that the presence of grandparents gives mothers time for maternal employment (Goodfellow & Lavery, 2003; Gordon, Chase-Lansdale, & Brooks-Gunn, 2004) and maternal education (Unger & Cooley, 1992), hence improving the financial stability of the household. This in turn can help improve the child-centeredness of the home environment since the mother has more resources to contribute towards books, or other cognitively stimulating activities for the child. The multigenerational framework helps to put this literature into perspective, i.e., by defining the pathways for the direct and indirect influences through which this channel of influences can take shape. For example, grandparents can directly influence children through *socialization processes*, or, indirectly through intergenerational processes, such

as relationship quality between generations, proxied through *'family congruence and discord'*.

Pong and Chen's model is a cross-cultural framework that was developed and applied to a study based in Taiwan. Although the cross-cultural validity of this model has yet to be examined, it is not unreasonable to argue that this framework is quite applicable to the cultural context of the U.S. as well. Grandparent co-residency with their grandchildren in multiple living arrangements has increased tremendously over the years.

Pong and Chen propositioned that this framework helps to answer the question *'What kind of co-residence benefits the children most?'* (p. 9), suggesting that Taiwan represented an ideal setting for applying their framework because patterns of grandparent co-residency in Asia are very diverse and different from Western societies, in terms of numbers, types and styles. Yet, it is hard to determine how different because many facets of grandparent co-residency in the U.S. remain unexplored, such as grandparents in two-parent families. There is also not much information available about grandparent co-residency in immigrant families who may share norms of filial piety and family obligations. Although most of the U.S. grandparenting research has looked at African-American households, the cultural and historical role of grandparents in African-American homes has rarely been considered (Jimenez, 2002). As such, the multigenerational framework might contribute to a better understanding of the structural complexities of grandparenting in the U.S. context as well.

By accounting for time of grandparent co-residency (which can be proxied through factors such as *'long term co-residency'* and *'short term co-residency'*), this

framework contributes to understanding the impact of long term co-residency on children. Findings based on samples in Taiwan and China has supported the benefits of long term co-residency on children's educational outcomes (e.g., Zheng and Xie, 2011). Similarly, findings from Pong and Chen's study indicated that families who '*recently transitioned*' into co-residency were no different than families who '*never transitioned*' into co-residency. Furthermore, the results indicated the worst outcomes for children who '*never co-resided*' or '*recently transitioned out*'.

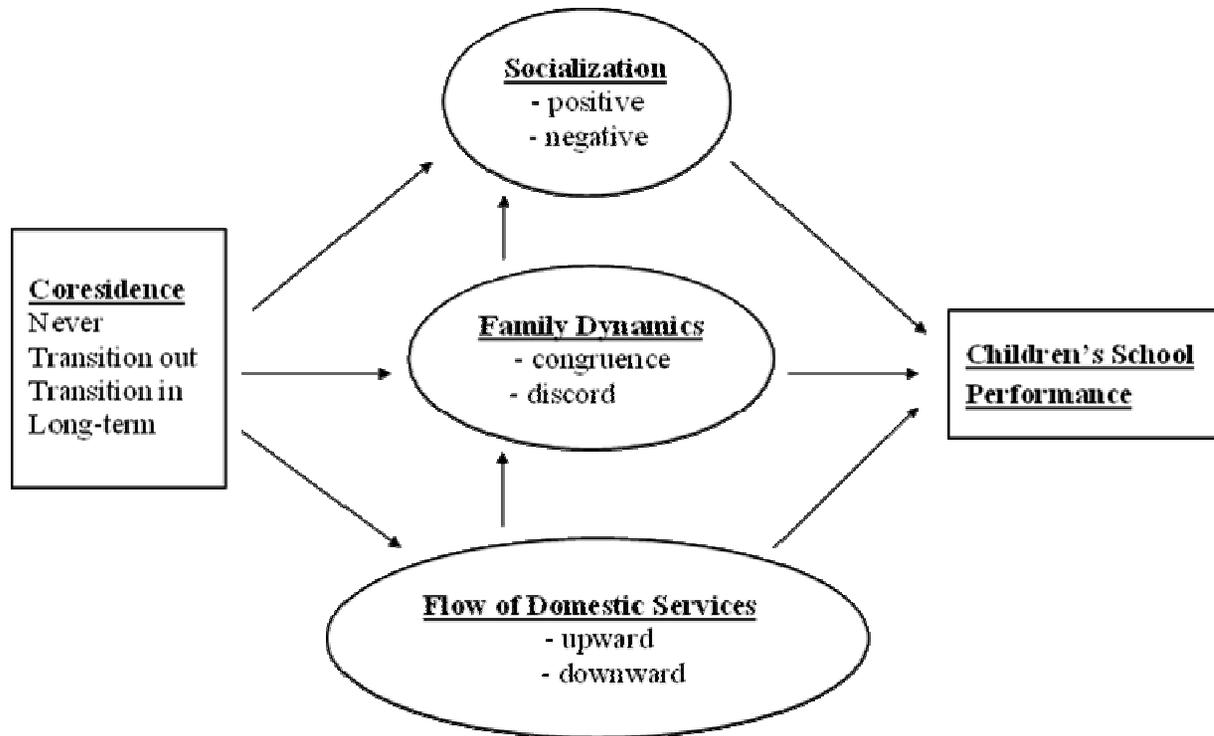
One probable reason for some findings of a negative association between grandparent co-residency and child outcomes based on U.S. samples is that almost all of these investigations have been cross-sectional in nature, disregarding family transitions, and number of years in grandparent co-residency. According to Amato (2000, as cited in Pong & Chen, 2007), short-term residency as well transitioning between residency is conceivably linked to "family discord (rather than congruence), because family structural change entails stress on family members" (p. 11).

In sum, the Multigenerational Processes Framework is a theoretical advancement in understanding family processes in multigenerational households. Although it is beyond the scope of this study to test specific processes related to the impact of co-resident grandparents on grandchildren, this model provides a theoretical lens for this study and will serve as a useful framework for interpreting the results. By giving attention to '*which type of co-residency*' is beneficial to child outcomes, the framework helps in formulating the hypotheses for the current study. As noted above, long-term co-residency has been predicted to have the most significant positive impact on grandchildren's school

adjustment and test scores. Although the current study did not analyze the impact of long-term co-residency on grandchildren's early cognitive skills, but, by utilizing data from two Waves (9 months and 2 years), as well as evidence from preliminary analyses indicating that families in co-residency did not transition out between these 2 Waves implies a '*stable*' co-residency for the first two years. Thus, the present study hypothesizes that children in co-resident households will have higher cognitive scores than children from two-parent families that did not have a grandparent at 9 months and 2 years.

Lastly, the study employs the multigenerational framework to investigate whether grandparents serving as children's primary care providers, hypothesized as a '*domestic flow of service*', moderate the association between grandparent co-residency and children's cognitive skills. If grandparents' provision of child care operates as a moderator, then the pathways of *socialization* can help guide an examination of the mechanisms that might explain the findings. As a future recourse, socialization can potentially be proxied by assessing child-centered activities or resources at home. For example, the concept of socialization in the framework implies that grandparents can contribute to children's test scores by engaging in cognitively stimulating activities, such as reading books and teaching mathematical concepts. Children with co-resident grandparents serving as primary care providers may experience homes that have more child-centered materials (e.g., more books), and activities (e.g., reading and trips to the library).

Figure 1. The Multigenerational Processes Framework. Reprinted from “Educational success of Taiwanese children: The role of grandparents”, by Suet-Li Pong and Vivien W. Chang, 2007, Conference Papers -- American Sociological Association, p. 42. Copyright by American Sociological Association



CHAPTER III

REVIEW OF LITERATURE

Grandparent Involvement: Pathways of Influence

Grandparents are the primary source of kinship caregiving across many societies, extending their support to families and children in several ways. A glance across the grandparenting literature reflects a usage of several terms used to describe the role of grandparents aptly portraying the significance of grandparenthood; such as ‘cultural preserver’, ‘mentor’, ‘advisor’, ‘valued elder’, and ‘companion’ (Kivnick, 1983; Landry-Meyer, 2004). In the US, caregiving has become the main type of grandparent involvement in children’s lives leading to grandparents being termed as ‘co parent’, ‘alternate parent’, and ‘surrogate parent’ to the children. Changes such as absence of mothers due to employment, or family disruptions such as divorce, teenage pregnancy, and single mothers have led grandparents to be directly involved in children’s lives as their primary caregivers, in some cases even being the only adult figure in the child’s lives (custodian grandparents).

Research studies have identified several pathways through which grandparents’ involvement can affect grandchildren’s lives (direct, indirect, and symbolic). According to Cochran and Brassard (1979, cited in Denham & Smith, 1989), the direct influences include providing “cognitive and social stimulation, direct support, observational models for the child, and provision of opportunities for active participation” (p.346). In the

literature, grandparent caregiving has received most attention as the direct source/measure of grandparent involvement. It has been measured in terms of ‘number of caregiving hours’ that grandparents engage in. Hirshorn’s (1998, cited in Tomlin, 1998) classification of the grandparent caregiving comprehensively provides a summary of the basic parameters of grandparent caregiving. She differentiated between 9 types of grandparent caregiving according to the continuum of time and responsibility. The time frame of caregiving ranges from providing *occasional/emergency* (e.g., less than 10 hours of caregiving in a month), *short term* (e.g., 10-20 hours of caregiving in a month), and *routine/long term help* (e.g., more than 30 hours of caregiving per week); whereas the level of responsibilities range from grandparents being occasional helpers, co parent, to being surrogate parents to the child.

There are several factors that influence the grandparent-grandchild caregiving. Grandparent characteristics (such as age, gender, education, health, welfare benefits), parent characteristics (parent age, gender, marital status, mother employment, parent wellbeing), and household characteristics (such as living arrangement, income, home quality) have all been suggested factors influencing grandparents being more or less involved in children’s lives. For example, grandparents are more likely to be involved in younger children’s care (under age 6) than older children (U.S Census Bureau, 2011a). Census data reports suggest that grandmothers are the primary caregivers for most of the children growing up in multigenerational households (Porter et. al, 2010). Parent characteristics are also significant factors that influence grandparent involvement. Grandparents are more likely to be involved in households with single mothers and

teenage mothers (Mutchler, Lee, & Baker, 2002). Structural factors such as geographical proximity are also reported as decisive factors for grandparent involvement. For example, grandparents who live in the household or near the household will be more likely care for the children. Lastly, cultural factors such as norms and traditions, and societal factors (such as modernization, migration, and acculturation) are also factors that can influence grandparents being more or less involved (Kurrien & Vo, 2004). For example, ethnographic research on cultural variations in grandparenting, such as the Whitting's 'Six Cultural study,' typically suggest that Confucian norms of 'filial piety' (i.e., respect, care, and obedience for elders and one's parents) is the most important cultural value that defines grandparenting and how involved grandparents would be in certain societies. Grandparenting in traditional societies is often characterized by intergenerational coresidence, which is posited to be due to the norms of coresidency for extended family members, especially grandparents. According to Sandel, Cho, Miller, and Wang (2006), although there is some universality in the activities that grandparents do with children, the contrast lies in the interpretation of the tasks. For example, a study by Sandel and his colleagues (2006) compared European-American and Taiwanese grandmothers' folk theories about their grandparenting role. In-depth qualitative interviews revealed that although grandmothers in both the cultures saw their role as limited and secondary to the mother, they interpreted their roles differently.. Although involved in similar activities with the grandchildren, the European American grandmothers in the study saw their role as more of a 'companion' to their grandchildren, whereas the Taiwanese grandmothers perceived their role as 'disciplinarian', 'adviser' to

daughter-in-law on matters of child rearing. The Taiwanese grandmothers interpreted their role as being active only till the child was very young and intended to relegate their duties once the child was older. In contrast, American grandmothers provided caregiving ‘only when asked’ by the mother. The authors suggested that these differences highlighted the variation in grandparenting across different cultural contexts.

In a similar study, Nagata, Cheng, and Tsai-Chae’s (2010) sought to explore the grandparenting styles of Chinese-American grandparents. According to the researchers, in addition to values of *xiao shun* (expression of filial piety), *zun zhong* (norm of respect to elders) was an important characteristic that emerged from the participant’s responses. Findings suggested that as predicted by Confucianism norms, Chinese-American grandparenting was characterized by significant levels of coresidency. However, the grandmothers evaluated their positive interactions with grandchildren on the basis of *zun zhong*, rather than emotional or geographical closeness, which tend to be typically predictors for grandparent involvement in Western societies. Coresidency did not translate to the ‘companionate’ or ‘involved’ grandparenting styles as expected.

Lastly, another important domain that reflects cultural variations in grandparenting comes from the research on the indigenous Native American cultures. According to Vakalahi, Toafa, and Moala (2008), ‘cultural preserver’ is a very important dimension of grandparenthood in the Tongan tribal culture which is an indigenous native community belonging to Pacific Islands. According to Vakalahi (2011), “for the Pacific peoples, constant interaction with grandparents has significant protective meanings and implications for human relationships during childhood and throughout the life course” (p.

581). Tongan grandparents are traditionally regarded as an *authority* rather than *adviser* on caregiving and are equally part of childrearing process along with the parents.

In order to highlight the key role of grandparenting as an ‘intrinsic’ aspect of Tongan culture, Vakalahi, Toafa, and Moala (2008) proposed a cultural model on grandparenting adapted from their previous indigenous *Ho’okele* model (Vakalahi, Hefferman, & Johnson, 2007). The Ho’okele model is a Pacific Islander model on the concept of grandparenting in the Tongan community that seeks to understand the intergenerational processes that affect grandparenting and act as protective factors for the Tongans in times of migration.

The model proposes grandparents as the bridge between multiple generations (grandparents, parents, and children) and the context (family, community, and culture), and stresses the interconnectivity between all the parts of the system in order for the model to function. Grandparents are entrusted with the critical role of facilitating the intergenerational transfer of the values and traditions of the Tongan culture between the parents and the children.

Guided by the Ho’okele model of grandparenting, Vakalahi and his colleagues (2008) devised a qualitative study to investigate the intrinsic nature of Tongan grandparents. The study aimed at understanding the meaning and role of Tongan grandparenting, and the relationship between the grandparents and grandchildren. In-depth interviews of 24 Tongan grandparents and 30 grandchildren living in Tonga and Hawaii revealed that for the grandparents, grandparenthood meant “unconditional love”, being the alternate parents to grandchildren, and to guide, mentor and advise the

children. Grandparenting meant “an opportunity to bless, love, respect, care, teach, support, and, most important, spoil grandchildren, and as doing the best for them, even beyond what was done for their own children” (p.313). Many grandparents reflected on the permanency of their role as a cultural preserver; for example, several mentioned that “the cultural role of grandparents is the same yesterday, today, and forever” (p. 314).

As noted above, societal factors such as migration can also significantly impact or change the traditional norms of grandparenting, or how involved grandparents are in children’s lives. An important stream of research that has highlighted this change is the research done on grandparenting in Vietnamese immigrants, post the Civil War in 1975.

The Civil War in Vietnam in 1975 forced many Vietnamese to flee and migrate to different parts of the world. Mostly, Vietnamese refugees deflected to countries such as America and Australia. The Vietnamese culture, a fiercely traditional society governed by norms of filial piety (such as deference towards the elders and intergenerational coresidence), faced a sudden erosion in their societal structure. Many children had to leave their elderly parents behind, and migrate to other countries and start a new life afresh. A fraction of the elderly Vietnamese who managed to migrate sooner or later to join their children faced difficulties adjusting to a new cultural milieu. For example, feelings of social isolation due to language barriers, facing challenges adapting as a refugee and a ‘family reunion migrant’ (Tingvold, Middelthon, Laeen, & Hauff 2011).

The impact of the migration on the Vietnamese grandparent’s psychological well-being and relational dynamics with their grandchildren was the subject of an exploratory study by Vo-Thanh-Xuan and Rice (2000), who were interested in the changing role of

grandparents for Vietnamese refugees based in Australian. Focus groups with 36 grandparents from various social and educational backgrounds revealed demographic changes in family structure, such as the intergenerational norms of coresidency being replaced by nuclear households. Interestingly, in terms of their grandparenting roles, many of them perceived their role as a ‘family historian’- an important link for connecting the grandchildren to their past. The grandparents structured their grandparenting activities in accordance to fulfilling this role. For example, “inviting their children and grandchildren over to eat and talk about Vietnamese traditions and customs and past family stories” (p. 278), or taking “every opportunity to tell family stories to their grandchildren” (p. 278).

Other dimensions included becoming a responsible role model for the grandchildren in this new culture; such as maintaining a healthy lifestyle, planning family reunions to give the children an opportunity to meet their relatives. In addition, the grandparents also perceived their role as a ‘teacher and mentor’, or ‘more of a friend’ for the child. Interestingly, the grandparents also viewed themselves as a ‘student’, learning English and Australian culture from grandchildren. Overall, many felt that they were more involved in their grandchildren’s lives in this new culture than they were, or would have been, in Vietnam. From a culture where ‘distancing’ from grandchildren was a traditional norm for grandparents, the elders in the Vietnamese refugee community sought to adapt themselves by making a profound effort to connect with their grandchildren and not lose their identity in the process. The participants not only cared for their grandchildren in the absence of the working parents, but also actively undertook

the role of a ‘cultural teacher’ and ‘cultural historian’ in order to socialize their grandchildren and help them stay connected to their roots.

Thus, researchers need to pay attention to how grandparenting is constantly redefined in times of contextual changes, because it has implications not only on the well-being of the grandparents, but also affect the grandparent-grandchild relationship.

Grandparent Involvement and Child Outcomes

A review of the literature reveals several important insights. First, compared to findings from cross-cultural studies, studies on impact of grandparenting on young children’s outcomes in American context is comparatively limited, reporting mixed outcomes for children in grandparent care. Second, most of the studies have only focused on specific ‘measurable’ outcomes; that is, findings related to mostly cognitive and social outcomes in children (e.g., Carlson & Corcoran, 2001; Jason & Douglas, 2011; Mollborn, Fomby, & Dennis, 2011; Monserud & Elder, 2011). Lastly, much of the literature has examined outcomes of children as a result of living with grandparents in disrupted households (such as single-parent, teenage mothers, custodian grandparents).

In terms of variables assessed, the focus has been on testing specific hypotheses classified broadly on combination of variables such as household characteristics (e.g., family structure, income), parental characteristics (maternal employment, marital status, age), grandparent characteristics (educational attainment of grandparent, gender, SES) and testing its effect or correlation with grandparent presence and child outcomes (e.g., Mollborn, Fomby, & Dennis, 2011; Monserud & Elder, 2011). Overall, there are several pathways that have been suggested to influence the effect of grandparent co-residency on

child outcomes; such as cognitive stimulation, emotional advice, parental stress, relationship quality as potential pathways through which grandparents can directly or indirectly influence child outcomes (for e.g., Barnett, Scaramella, Neppl, Ontai, & Conger, 2010; Dunifon & Kowaleski-Jones, 2007). For example, a study by Barnett and his colleagues (2010) found that parent reported relationship quality between parents and grandparents significantly predicted grandparent involvement in grandchildren's lives. In addition, gender of the grandparent was associated with grandchild involvement. Grandmothers who have a positive relationship quality with their daughters were reported to be more involved in their grandchildren's lives.

Research has also reviewed how the impact of extended family structure on child outcomes may differ by race (e.g., Kataoka-Yahiro Ceria, & Caulfield, 2004). However, we have limited information on grandparent caregiving in ethnic minority families such as Asian-American and Hispanic grandparents as most of the research has evaluated findings for European-American and African-American families (Kurrien & Vo, 2004). However, a recent study by Pilkauskas (2014) examining the relationship between 3 generation-coresidence and children's school readiness outcomes in early childhood using the ECLS-B national data set was the first study to include an investigation of school readiness outcomes for Asian, Hispanic, and Native American families in the sample. The findings suggested more expressive language and less externalizing behaviors for immigrant children. In particular, the study found an interaction between race and nativity for Hispanic children. The interaction revealed that the positive association for Hispanic children was concentrated for Hispanic immigrant children, but

not Hispanic Native children. Apart from this recent study, there is no other reported investigation that has thrown light on race and ethnic differences for grandparents in extended households and child effects.

Findings linking grandparent living arrangements to children's well-being are mixed, with some studies showing detrimental effects on children, such as higher behavior problems (Pittman & Boswell, 2008 as cited in Dunifon, 2013) and lower educational attainment (e.g., McLanahan & Sandefur, 1994 as cited in Dunifon, 2013), and others reporting positive findings for educational attainment and behavioral adjustment of adolescents growing up in multigenerational households (e.g., DeLeire & Kalil, 2002). Major highlights of the research on grandparent co-residency and child outcomes in multigenerational households are discussed below.

Child Outcomes in Multigenerational Households

Research on the implications of children growing up in three-generational families has typically focused on children who were born to teen mothers or single mothers. Single-parent families represent a difficult context for child well-being; with almost 41% of single parent households in US classified living below the poverty threshold (U.S Census Bureau, 2011a). Generally, studies have reported negative outcomes for children living with a single parent, with detrimental effects for educational attainment and behavioral outcomes due to economic hardships prevalent in such households (Jimenez, 2002). However, with recent census data indicating a sizeable population of co-resident grandparents in single-mother households, family scholars began diverting their attention to such families in the hope that having grandparents at

home will act as a buffer against the negative effects of the single-parent family structure. One area that has received support is the potential contribution of grandparent co-residency on economic wellbeing of the children in single parent households. Research suggest that grandparents can contribute directly (through welfare benefits, additional income) and indirectly (improving relationship quality between mother-child by alleviating parenting stress through added monetary resources). Apart from economic well-being, findings for other outcomes such as cognitive achievement and social competence indicate mixed outcomes for grandparent co-residency and child outcomes in single parent families. For example, DeLeire's study (2002) reported that adolescents from single-parent families with grandparents were more likely to graduate from high school than adolescents without grandparents. However, other studies have shown high dropout rates for adolescent in three-generational households (e.g., McLanahan & Sandefur, 1994 as cited in Dunifon, 2013)

Another study by Unger & Cooley (1994 as cited in Dunifon & Kowaleski-Jones, 2007) reported that grandparent co-residency contributed to a cognitively stimulating environment more for Blacks than White households, whereas others have suggested that having a grandparent at home puts a strain to the parent's resources, leading to inability to provide a cognitively stimulating environment for children.

Overall, although studies have addressed the impact of grandparenting on child outcomes, the research is limited and needs further examination, which the present study seeks to address.

CHAPTER IV
RESEARCH QUESTIONS AND HYPOTHESES

RQ1. What are the correlates of grandparent co-residency in two-parent families with young children? And, do these correlates vary across different ethnoracial groups?

- HQ1.1. I hypothesize that grandparent co-residency will not be randomly distributed across families, but rather associated with certain characteristics of children, families, and households. Specifically, I expect that two-parent families with co-resident grandparents are more likely than those without co-resident grandparents to be characterized by higher incomes, mothers who are employed, more highly educated parents, older parent age, immigrant status, worse child health, and having a first born child.
- HQ1.2. I hypothesize that there will be significant differences in the correlates of co-residency for different ethnoracial groups.
 - (a) I expect that grandparent co-residency in White households is more likely to be associated with worse child health, higher rates of maternal employment, and lower household income than compared to other ethnic groups.
 - (b) I expect that grandparent co-residency in Asian households is more likely to be associated with higher household income and higher parental education, than compared other ethnic groups.

RQ2. What is the association between grandparent co-residency in two-parent families and children's cognitive skills at age 9 months and 2 years? And, is this association moderated by race/ethnicity?

- HQ2.1. I hypothesize that children in two-parent families with co-resident grandparents will have higher cognitive scores at 9 months and 2 years than children in such households without co-resident grandparents, after controlling for key child, family, and household characteristics identified from RQ1. In addition, I expect that the association will be stronger at two years than at 9 months, because of cumulative effects of stable co-residency.
- HQ2.2. I hypothesize that the association between grandparent co-residency at age 9 months and 2 years will vary depending on the ethnoracial group of the child, such that the association will be more positive for children in Asian and Hispanic families than children in White and Black families.

RQ3. Is the association between grandparent co-residency and children's cognitive outcomes at 9 months and 2 years moderated by whether the grandparent serves as a primary care provider for the child? And, how does this vary across different ethnoracial groups at both the waves?

- HQ3.1.1 I hypothesize that the association between grandparent co-residency and children's cognitive outcomes will be more positive in families where the grandparent serves as a primary care provider compared to families in which they do not serve in this role.

- HQ3.2. I hypothesize that there will be significant differences in this moderated association for different ethnoracial groups, such that this association will be more positive for Asian and Hispanic families in the study than other groups.

CHAPTER V

METHODOLOGY

As noted earlier, the aims of the current study are: (1) to investigate the demographic correlates of grandparent co-residency in two-parent families; (2) to investigate the association between grandparent co-residency and children's early cognitive skills within stable two-parent families; and, (3) to test the moderating effect of primary care provider grandparents on the association between grandparent co-residency and children's cognitive outcomes. All the associations were examined for the full sample and then separately for five ethnoracial groups (White, Black, Hispanic, Asian, Other). The focus of the study is on the test scores at age 2, predicted from co-residency over the child's first two years of life (9 months and 2 years). To address these aims, data were drawn from the first two waves of the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B).

In this investigation, two-parent families were defined as families with respondent mother and father (biological/adoptive/stepparent/foster guardian) residing with the child either through marriage, or cohabitation. Grandparent co-residency was defined as having at least one grandparent (maternal or paternal) residing in the household during the child's first two years of life. Grandparents were considered primary child care providers if they were identified by the parent as providing child care on a regular basis for more

than 10 hours per week. Children's early cognitive skills are assessed using standardized measures of cognitive development at ages 9 months and 2 years.

Data Source and Participants

The Early Childhood Longitudinal Study-Birth Cohort (ECLS-B) is a multisource, multimethod longitudinal study focusing on the early experiences of children born in the United States. The study is part of a broader national survey effort conducted by the U.S. Department of Education, which involves a birth (ECLS-B) and two kindergarten (ECLS-K) cohorts. The ECLS-B study focused on the social and contextual influences that impact children's early development and later transitions to formal schooling. Based on a list-frame, clustered sampling design, a nationally representative cohort of approximately 10,700 children born in 2001 were followed from birth through kindergarten entry, with data collected at 9 months (T1), 2 years (T2), 4 years (T3), and kindergarten entry (T4). The current study will focus on data from the first two waves (T1, T2), given interest in this developmental period. Births were sampled from 96 core sampling units (PSUs) comprising of counties and county groups. Oversampled subpopulations included minority population, twins, and very low birth weight children. Children born to mothers below the age of 15 were not included in the initial sampling frame, thus the findings from the study are not representative of children of very young mothers. The methods for data collection included home visits involving parent interviews, direct child assessments, and childcare provider interviews.

The ECLS-B is the first nationally representative survey to provide comprehensive data that covers critical aspects of early development, such as children's

health and well-being, nutrition, children's transition to non-parental care and early school. Strengths of the ECLS-B data over other datasets include its representativeness, its size, and its use of direct child assessments not previously available for this age-range. Thus, the ECLS-B moved beyond relying on maternal reports and employed a wide range of measures to give an in-depth understanding of the focal child's development at critical time points. For the purposes of this study, the ECLS-B is an excellent resource due its longitudinal nature, use of multiple measures assessing early cognitive development, information available on extended household members residing in the home at each time point, and several measures of grandparent involvement in children's lives.

Data Collection Procedures

The mother of the focal child was regarded as the primary parent and included as the primary respondent for the parent interview whenever possible (approximately 95% of the time). The primary parent was interviewed at each wave, with the calculated weighted response rates being 74% at T1 (Nord et. al., 2006). The retention rate was 93% at T2. The inclusion of replication weights adds to the strength of the representative nature of the study for the birth cohort of 2001 because it allows for adjustments for non-response of sample participants and also corrects for oversampling bias. The ECLS-B data set includes several weights for each time point. For this study, based on the research questions and study components used, population based weight adjustments for T1 (W1C90) and T2 (W2C0) were included in the analyses. Also, in accordance with confidentiality requirements of the NCES, all unweighted sample sizes reported here have been rounded to the nearest 50.

Beginning at 9 months, home visits were conducted at each time point that consisted of parent interviews and child assessments. The primary parent was interviewed using a computer-assisted personal interview (CAPI) and a parent self-administered questionnaire (SAQ). Bilingual interviewers were trained to conduct the interviews primarily in English and Spanish (if required). Also, provisions were made to accommodate parent interviews in other languages if needed. The parent data provided information on the family structure (including information on biological father and extended family members living in the household), childcare arrangement, child development, home environment and social support, amongst other variables. The direct child assessments during the in-home visits included videotaping of parent-child interactions. The home assessment sessions measured children on important developmental skills related to cognitive, social, and behavioral domains at the particular time point.

Analysis Sample

As the focus of the proposed study is on the influence of co-resident grandparents for young children in two-parent families, the analysis was limited to a subsample of families where both parents lived in the home during their child's first two years of life (n= 6950; 68% of the sample with T2 data). As noted above, this population has been underrepresented and understudied in the literature on extended households and child well-being. Restricting the sample to stable two-parent families avoids confounding the effects of grandparent co-residency and other household transitions (e.g., when parents move in with grandparents following a separation or divorce).

Excluded from the sample were families who reported three or more grandparents living in the home (n=50) given that this might be a particularly unique household structure. Further excluded from the analysis were children with missing test scores (n=250). Quality control analyses of the final dataset (n=6950) revealed no missing data on the key variables of interest.

Although the main study included data collected from resident and non-resident fathers, for the purpose of this investigation, only resident fathers (biological, adoptive, foster, or stepfather,) who lived with the child and mother (biological, adoptive, foster or stepmother) at both the phases were included. Overall in my study, with the exception of a few families, biological mothers (99.8%) were the primary respondent for the parent interview.

Sample characteristics of the study revealed that, of the 6950 children living in two-parent families between birth and age 2, 12% had co-resident grandparents (n=800) living in the household at any time point; in addition, 50% of co-resident grandparents (n=400) served as the child's primary child care provider at either 9 months or 2 years. Of the 6100 children in two-parent families with non-resident grandparents, 1700 were in grandparent care as their primary child care arrangement. Across the two time points, none of the grandparent co-residency families transitioned out of the co-residency, indicating a stable co-residency. However, a small number of families (n=200) reported a grandparent in the home at 2 years that was not present at the time of the 9-month interview; in other words, they appeared to have joined the home sometime between 9 months and 2 years.

Measures

Children's early cognitive skills

Children's early cognitive development was assessed through standardized measures administered during the home visits. As part of the 9-month and 2-year home visit, children were administered the Bayley Short Form—Research Edition (BSF-R), a measure constructed from a reduced subset of items from the Bayley Scales of Infant Development, Second Edition (BSID-II). The BSF-R was specifically designed for the ECLS-B data to measure children's gross and fine motor skills, language skills, and children's emotion regulation from infancy to preschool in home-based setting (Nord et al., 2006). The BSF-R is divided into two parts, i.e., mental and motor subscales. For the present study, BSF-R mental scales were used as it focuses on children's early cognitive development.

The BSF-R mental scales consisted of 19 core items (ranging in difficulty from 7-37 months) with child responses scored as 'credit/no credit'. The scale was age-standardized by administering additional items that tested the lower and higher ability range of the children. Based on the performance and difficulty level of the 19 core items, children at both the time-points were provided with 5 basal items (appropriate for kids as young as 9-12 months) and 9 ceiling items (appropriate for kids as old as 42 months). Children who got less than 4 out of the 19 core items correct were administered the 5 basal items, and children who got credit for more than 14 core items were given the additional high ability assessing 9 ceiling items.

Scoring for the items were developed using Item Response Theory (IRT) calibration and scoring procedure. For the BSFR mental scale, children were scored on a continuous scale with values ranging from 0 to 178, with an average mean of the 50 and standard deviation of 10. Missing value was scored as system missing (-99). Both the BSID-II and the BSF-R scales have shown evidence of being valid measures of IQ in the past (Siegler, 2007). In terms of reliability and validity, the BSID-II has been recognized as a psychometrically rigorous standardized measure of developmental status of children in the age group of 1-42 months (Nord et. al, 2006).

Grandparent co-residency

Grandparent co-residency was assessed through information collected about household structure from the parent interviews during home visits at Time 1 and Time 2. To complete the household roster, mothers were asked a series of questions about the identity and characteristics of each household member, including age and relationship to the child. The ECLS-B data do not provide information to distinguish between maternal and paternal grandparents or to indicate the duration of the co-residency. Despite this limitation, the ECLS-B provides good information on extended household members, which was useful in examining the correlates of grandparent co-residency and its influence on child outcomes. Information about grandparent residency in the family was assessed from the question - *“Please tell me the names and ages of all the other people who normally live here. Please do not include anyone staying here temporarily who usually lives somewhere else”*. Subsequently, mothers were probed further by asking them to *“name the person’s specific relation to the child”*. Response options included one

or more set of grandparents, cousins, uncles, aunt, and other kin. From this information, I created a dichotomous variable for '*grandparent co-residency*' indicating whether a grandparent (grandmother, grandfather, or both) co-resided in the home at any time during the child's first two years (0=no; 1=yes). In order to gain further inside into the distribution of grandparent co-residency, using the same information, a set of three dummy variables (0=no; 1=yes) were created for each time point to indicate if the household is '*grandmother-only*', '*grandfather only*', or '*grandmother and grandfather*'.

Lastly, another relevant grandparent characteristic included in the present study was grandparent age (Burnette, 2009; Crewe, 2007; Whitley, Kelley, & Sipe, 2001; Smith-Ruiz, 2008). New indicators (continuous string) for grandmother age and grandfather age were created for T1 and T2. For families with more than one grandparent, a new variable was computed taking into account the age of the youngest grandparent amongst the two.

Grandparent as primary child care provider

Information on childcare arrangements obtained during the parent interviews at 9 months and 2 years was utilized to gain information about co-resident grandparents (co-resident or non-resident) who serve as children's primary childcare providers. As part of the parent interviews at 9 months and 2 years, the parents were asked a series of questions about their child's early care arrangements, including their primary care arrangement (i.e., the one in which the child spent the most hours). If the child was reported to be in a 'regular nonparental care' arrangement, then information was collected on the type of the setting (Head Start, center-based care, home-based care with

a relative, or home-based care with a nonrelative). For cases where mothers indicated using ‘home based care with a relative’, they were asked to identify which relative (grandparent, aunt, uncle, brother, sister, or other relative) provided the primary childcare. For the present study, a dichotomous indicator was created to indicate whether or not a grandparent served as the child’s primary childcare provider at 9 months and/or 2 years (0=no; 1=yes). Specifically, grandparents were considered primary child care providers if they were identified by the parent as providing care for the child on a regular basis for at least 10 hours per week (and in the case of multiple arrangements, is the provider with whom the child spends the most time).

Control: Household, Child, and Parent Characteristics

As the association between co-resident grandparents and children’s early cognitive development can be influenced by extraneous variables, all analyses controlled for key child, family and household characteristics.

Household characteristics

The household characteristics believed to be potentially important in understanding grandparent co-residency and/or children’s development included: race/ethnicity, immigrant status of the parents, home language is English at Wave 1, household income poverty status, whether the family received any federal public assistance in the child’s first two years (TANF, WIC, Food Stamps, or Medicaid), urban residency, number of adults in the household at 9 months, number of children in the household at 9 months, and whether the child was in any nonparental care arrangements at either time point.

The original 8 categories for race/ethnicity in the parent questionnaire were recoded into five categories for the purposes of this study. Five new dummy variables (0/1) were created to represent the child's ethnoracial identity according to the parent - responses- *White, Black, Hispanic, Asian, and Other*. The original categories for the multiracial minorities in the main study (Native Hawaiian, American Indian/Alaska native, and more than one group/Non Hispanic) were merged into '*Other*' because they represented an insufficient sample size. Immigrant status was dummy coded as 0= native born (if both parents were born in the U.S.) and 1=immigrant (if one or both parents were born outside the U.S.). The ECLS-B data does not provide information about grandparents' birthplace. Therefore, the coded variables represent only first generation nativity status of the parents.

Studies in the past have shown financial deprivation as a significant cause of children's poor development (Carlson and Corcoran, 2001). The economic well-being of families in this present study was proxied through three indicators - *annual household income, poverty status, and receipt of federal assistance*. The original categories of annual household income ranging from 1 (\$5,000 or less) to 13 (\$200,000 or above) were retained. Next, *poverty status* was coded as "1" if family was determined to be below poverty threshold level as compared to guidelines issued by the U.S Census Bureau (2012). The *federal assistance* variable captured information across 9 months and 2 years and was coded as "1" if mothers reported receiving any food stamps, federal cash assistance (TANF), WIC, or SSI benefits during the child's first two years of life, and "0" if they did not report any receipt of public assistance. Finally, an indicator of *urban*

residence (0=no; 1=yes) was included given evidence of the relevance of community context for family experiences and child outcomes.

Child characteristics

The analyses controlled for child characteristics including child gender (1=girl, 0= boy), first born status (1/0), low birth weight (1/0), and multiple birth status (child born twin/triplet at birth) as prior research has linked these characteristics to grandparent co-residency and/or children's cognitive skills.

Parent characteristics

Parental characteristics controlled for in the analysis included age of the mother at the time of the child's birth, parents' highest level of education (across mothers and father), whether mother was employed in the year prior to the child's birth, mother's employment status and marital status of the parents at 9 months (married/not married). Mother's age was recoded into an ordinal interval with 4 ranges as response options (20-25, 26-30, 31-35, and 35 and older). Education level of parents was recoded categorically from 0 to 5 with 0= less than high school, 1= high school, 2= some college, 3=associate's degree, 4= bachelor's degree, 5= advanced degree. In the 9 month parent interview, mothers were asked if they were employed at some point in the 12 months prior to the child's birth. This variable is coded as "1" when mothers reply yes to this question, and "0" for no. At 9 months, mother's employment status is coded as "1" if the mother indicated that she was employed for any hours, and "0" if not.

Data Analysis Plan

All of the analyses for the present study were conducted using STATA version 12. The preliminary analyses explored descriptive characteristics of the sample and mean level differences for all the study variables by residency status (grandparent co-residency in two-parent families versus no grandparent co-residency in two-parent families). A series of regression models (simple logistic regression and OLS regression) were tested to address the main research questions. All analyses were weighted using the appropriate sampling weights provided by ECLS-B program staff. Since information about the key analysis variables was extracted primarily from the parent-interview questionnaires and child assessments, I used the ECLS-B weights designated for these components at 9 months (W1C0) and 2 years (W2C0).

The initial research design for this study involved looking at changes in grandparent co-residency over time, under the assumption that there would be a group of children with co-resident grandparents at Time 1 (9 months) only, a group with co-resident grandparents at Time 2 (2 years) only, and a third group with co-resident grandparents at both time points (T1-T2). However, as noted previously, preliminary quality control analyses revealed high levels of stability in grandparent co-residency; the majority of co-resident grandparents were present at both time points ($n=600$, 78%), a small group of grandparents ($n=200$) were present T2, but not T1 (i.e., they joined the household sometime between 9 months and 2 years), and no co-resident grandparents who were present at T1 transitioned out of this status by T2. For this reason the variable capturing grandparent co-residency at 2 years (T2) is equivalent to the variable

identifying whether the child had a co-resident grandparent at either time point (T1/T2). Hence, for many of the subsequent analyses and presentation of the results, I focus on two variables T1 (9 months) and T1/T2 (over 2 years).

Research Question 1

The aim of the first set of research questions was to examine the correlates of grandparent co-residency in two-parent families as well as to test if these correlates varied across different ethno-racial groups. This analysis provided descriptive information about an understudied population (co-resident grandparents in two-parent families) and helped identify potential selection factors that were important to control for in addressing RQ2. To examine the question and hypotheses for this first research question, a multivariate logistic regression model predicting grandparent co-residency from a detailed set of child, parent, and household characteristics was used. This regression technique is preferred for use in studies predicting associations among categorical predictors and binary outcomes (Schumacker & Lomax, 2004). Specifically, I examined (HQ1.1) whether families with grandparent co-residency systematically differed on key demographic variables from families without grandparent co-residency; and, (HQ1.2.) whether the predictors of co-residency differed across the five broad ethno-racial groups under study (White, Black, Hispanic, Asian, Other).

The main analyses involved testing the hypotheses (HQ1.1) and (HQ1.2) using simple logistic regressions predicting grandparent co-residency at T1/T2 for the full sample and for each ethno-racial group. The binary dependent variable in each regression equation was grandparent co-residency (i.e., grandparent co-residency vs. without

grandparent co-residency). The demographic predictors included in the main analyses models were –child gender, birth status (first born), multiple birth, child health status (very low birth weight), race, immigrant status, English speaking, income level, poverty status, federal benefits, urban residency, number of children younger than 18 in the household, parent education level, marital status, age of mother at birth of child, and mother employment one year prior to birth of child. The base models were estimated to examine the relationship between the covariates and the binary dependent variable. All of the predictors were entered simultaneously in the regression to estimate their effects on grandparent co-residency using the following equation:

$$\text{Logit } \{P (y=1)\} = \alpha + \beta_1x_1 + \dots\beta_kx_k$$

Here, the parameter $P (y=1)$ is the probability of co-residency at T1/T2; $y= 1$ denotes co-residency; $\beta_1- \beta_k$ represents regression coefficients indicating the effect of predictors 1 through k controlling for all other predictors. Jackknife replication method estimation was used to predict the values that best fit the data, since all analyses were weighted and Jackknife method standardizes the standard error terms.

In order to test hypothesis HQ1.2 regarding ethno-racial differences, the same set of analyses were repeated, but for each ethno-racial group separately. Therefore, five separate multivariate logistic regressions models (one for each race subgroup) were run with all the correlates entered in one equation, testing the magnitude and direction of the effects for each racial group separately.

As mentioned earlier, the majority of co-resident grandparents in this sample were present in the household at both 9 months and 2 years, with the exception of the 177 grandparents that became “co-residers” between the two time points. To determine whether (and how) this group might differ from the other co-resident grandparents, a sensitivity analysis was conducted for RQ1 that compared the correlates of co-residency at 9 months to the correlates of co-residency at 2 years, using the same logistic regression models described above. The results of this analysis is not included in the tables, but discussed in text.

Research Question 2

The second set of research questions addressed whether grandparent co-residency was associated with young children’s cognitive development (at age 9 months and 2 years) in stable two-parent families and how this association varied by race/ethnicity. In order to minimize the potential for selection bias in the estimates of the effect of grandparent co-residency on cognitive skills, two analytical approaches were used to adjust for observed and unobserved heterogeneity. First, two separate regression models were computed for age 9 months and 2 years, whereby Ordinary Least Squares (OLS) regression was performed regressing children’s Bayley mental test score on grandparent co-residency using clustered sample errors. Regression is a preferred method of analysis for this aim since the outcome variable (cognitive skills) is measured in a continuous form in ECLS-B as well as for power considerations (Baron & Kenny, 1986). The equation estimated was as shown in Equation 1:

$$Y_{it} = \alpha + \beta_1 X_{1,it} + Z_{it} \gamma + e_{it} \quad (1)$$

Here, Y_{it} is the cognitive scores of child i at time t . The vector X_1 represents grandparent co-residency with zero co-residency as the omitted category. β_1 represents the regression coefficients, and Z_{it} represents the vector of covariates. Since the omitted category in this equation is grandparent non co-residency (0= no co-residency at any time point), a significant coefficient would indicate that cognitive skills of children with co-resident grandparents were significantly different from those without co-resident grandparents. Next, using the same strategy, five separate regression models were computed for the ethno-racial subgroups (White, Black, Hispanic, Asian, Others).

Although the detailed nature of the ECLS-B allows for the inclusion of many observed characteristics of children and families, there is still the possibility for unmeasured or unobserved selection factors that may bias the results. For example, unobserved events happening prior to 9 months (such as families who were on federal benefits prior to co-residency at 9 months but not later) might be significantly correlated with grandparent co-residency at 9 months. However, this increased financial assistance may be associated with higher test scores for children, thus inflating /overestimating the associating between grandparent co-residency and children's cognitive test scores. In order to address this concern for unaccounted extraneous variables biasing the results, a secondary, sensitivity analysis examined the association between co-residency and children's test scores at T2 (age 2) controlling for children's 9-month test scores. This analysis represents a more rigorous (or conservative) test of the hypotheses because it asks whether grandparent co-residency is associated with children's development after

controlling for all of the stable (time-invariant) unobserved child and family characteristics that contribute to children's Bayley scores at 9 months. Even though this sensitivity analysis further helps address issues of selection bias, it cannot account for time varying factors, leaving a possibility of bias remaining.

Research Question 3

The third set of research questions addressed whether the association between grandparent co-residency and children's cognitive skills varied depending on the caregiving role of the grandparent (i.e., whether or not they are the child's primary care provider apart from parents) and whether this varies by race. This research question was analyzed by computing two sets of OLS regression models. First, as in the previous analyses, two separate regression models assessed the moderating effect of grandparent care provision on the association between grandparent co-residency at 9 months, and then at 2 years. Then a second series of regressions, one for each of the five ethno-racial groups, were computed. The following regression equation was estimated for each model:

$$Y = \beta_0 + b_1X_1 + b_2X_2 + b_3(X_1*X_2) + \dots b_iC + \dots E$$

Here, Y represents the outcome variable (children's Bayley mental test scores); b_1 is a dichotomous indicator of grandparent co-residency, b_2 is a dichotomous indicator of whether the grandparent served as the primary child care provider, and C represents the vector of covariates. Dummy variables for both the predictors (with dummy coding 0/1)

were used in the equation. The analysis involved entering the predictor and moderator variables into the equation first, followed by the interaction term (b_3).

If the results suggested a statistically significant interaction, the next step was to do a post-hoc probing of the moderation effects (i.e., plotting regression lines for each level of the moderator) to specifically elucidate the specific conditions under which grandparent co-residency is related to children's cognitive skills.

CHAPTER VI

RESULTS

Preliminary Analyses

According to Jason and Ready (2011), grandparent's influence on children is most likely to be exerted through demographic and socio-economic factors, such as household structure and income status. Therefore, in order to understand the effects of grandparents, it is pertinent to compare how families with co-residency differ from families without co-residency on key demographic variables such as household, familial, and social characteristics. Thus, preliminary analyses were conducted to examine the descriptive properties of the key demographic variables under study. Then, to investigate mean differences between two-parent families with and without grandparent co-residency, a series of independent sample t-tests were conducted. The results of these preliminary analyses are summarized in Table 1 and described below. The first two columns display the means and standard deviations for key demographic variables for the full sample of two-parent families. Columns 3-7 in Table 1 provide descriptive characteristics for families with no grandparent co-residency and those with grandparent co-residency, along with the results of t-test comparisons between the two groups.

Considering *household characteristics* first, the full sample means indicate that the majority of two-parent families with a child born in 2001 were (non-Hispanic) White

(61.99%) or Hispanic (24.60%); followed by smaller populations of Black (6.33%), Asian (3.19%), and Other (3.89%) families. The t-tests revealed significant differences by race in the composition of families with and without grandparent co-residency during children's first two years. Whites comprised a larger proportion of the families without grandparent co-residency (62.85%) than families with grandparent co-residency (42.65%), whereas grandparent co-residency was significantly more likely than not in Hispanics and Asian families. In contrast, Black families were more evenly distributed across the two types of structures, which may appear at odds with the literature indicating high rates of grandparent co-residency for this racial group; however, this might be explained by the fact that this particular sample is limited to stable two-parent families.

Almost 27% of the two-parent families in the full sample included at least one parent who was an immigrant, but the likelihood of this characteristic varied across the two subsample structures. As shown in Table 1, 26.42% of children without grandparent co-residency had an immigrant parent; whereas this was true for 37.08% of children living with a co-resident grandparent ($t = -2.25, p < 0.05$). As a comparison point, national estimates based on census data find that children in parent-maintained households with co-resident grandparents are 41% more likely to have a foreign born parent (U.S Census Bureau, 2012). Along with this, families with a co-resident grandparent were less likely to speak English as their primary home language ($M = 64.94, SE^2 = 0.05$) than families without a co-resident grandparent ($M = 80.77, SE^2 = 0.07$); $t = 3.05, p < 0.05$.

In terms of indicators of economic well-being, 15.05% of the two-parent families in the full sample were identified as having incomes below poverty level and

approximately 46% reported receiving some type of federal assistance (WIC, food stamps, cash assistance or Medicaid) during their child's first two years of life. However, group differences across the co-residency subsamples revealed significant differences for all measures of economic well-being (average income, poverty status, and federal assistance), generally indicating that families with grandparent co-residency were more economically disadvantaged than families without grandparent co-residency. Families with grandparent co-residency had significantly less income ($M=7.20$, $SD= 3.21$) than families without grandparent co-residency ($M=8.16$, $SD= 3.1$); $t= 3.16$, $p <0.05$. Moreover, families with grandparent co-residency had almost double the rates of poverty and federal assistance use. The finding that multigenerational households were poorer and received more federal benefits than nuclear family households is consistent with previous studies on extended households (Mollborn, Fomby, & Dennis, 2011). Next, 85% of the two-parent families were characterized by urban residency, with families in this sample having an average of 2.10 children below 18 in the household. However, urban residency and number of children was evenly distributed across the two family structures. There was, as might be expected, a significant difference across the two groups for number of adults living in the household, with co-residency families comprised of more adults at home ($M=3.44$, $SE^2 = 0.16$) than families without co-residency ($M=2.09$, $SE^2 = 0.03$); $t= -9.56$, $p<0.001$.

An examination of *child characteristics* within this sample revealed that for approximately a third of two-parent families (37.24%), the study child was their first-born child. Furthermore, the descriptive analyses on child characteristics across the two

family structures revealed significant mean level differences on birth order (first born). Families with co-resident grandparents ($M=46.68$ $SE^2= 0.5$) were almost 30% more likely to have a first born child than nuclear families with no grandparent co-residency ($M=36.00$ $SE^2= 0.49$); $t= -2.86$, $p= 0.05$. The incidence of multiple births and low birth weight were low in this sample, and did not vary by household structure.

Descriptives on *parent characteristics* revealed that the average age of mothers at the time of their child's birth was approximately 29 years, which was more than 5.81 standard deviations higher than the national ECLSB estimate (meaning that mothers in two-parent families were likely to be older than in other family structures). In addition, 72.25% of the mothers were employed prior to the birth, and 53.01% reported being employed at the time of the 9 month interview. Mean differences on parent characteristics by grandparent co-residency status revealed differences by parent education level, marital status (at 9 months) and maternal age at birth of child. Parents in grandparent co-residency were less educated ($M=2.64$ $SE^2= 0.33$) than parents in coresidency ($M=3.29$, $SE^2= 0.35$). Mothers in families with grandparent co-residency were, on an average, 6 years younger ($M=22.25$ $SE^2= 6.53$) than mothers in families without co-residency ($M=28.96$ $SE^2= 5.82$). For marital status, 69.42% of the parents in co-residency households were married at 9 months as compared to 86.46% in households with no co-residency, $t=4.00$, $p<0.001$. No significant differences were found on mean scores for mother's employment status one year prior to birth of the child or at 9 months. These findings suggest that more than mother's employment, mother's age at the time of

childbirth might be a key selection factor influencing decision to select into grandparent co-residency.

Table 2 presents basic descriptive statistics on grandparent characteristics for the co-resident subsample; the average age of co-resident grandparents at 9 months was approximately 54 years, though there was quite a bit of variation around this mean ($M=53.67$, $SD = 11.05$). A breakdown of the living arrangements within families with grandparent co-residency over 2 years (T1/T2) revealed that a majority (44.87%) of the families included both a grandmother and grandfather ($n= 700$), followed by 43.52% grandmothers-only households ($n= 600$), and 11.61% grandfather-only households ($n= 150$).

Correlates of Grandparent Co-residency

For the first set of research questions, a series of simple logistic regression models was computed to identify the household and family-level characteristics that predict grandparent co-residency in two- parent families, within the ECLS-B sample. First, multivariate logistic regression models were estimated to predict the relative odds of grandparent co-residency during the first 2 years (T1/T2) according to key household, child, and parent characteristics. In other words, demographic indicators identified from the literature on grandparenting were entered in the logistic regression models to test the associated odds of grandparent co-residency (binary outcome 1/0). As part of the main analyses, these differences were examined across the five ethno-racial groups (White, Black, Hispanic, Asian, Others) as well, using the same set of predictors. To account for attrition and oversampling, all of the analyses were weighted using the appropriate

sampling weights (as described in the previous section). Because of the complex sampling design, standard errors were estimated using a Jackknife series method. Table 3 presents the results of the model determining the odds of grandparent co-residency in two-parent families with young children. The results of the models for each of the five ethno-racial groups are summarized in Table 3a.

The full sample results (Table 3) revealed some interesting findings that had implications for the subsequent analyses. Overall, I found support for the hypothesis that grandparent co-residency is not randomly distributed in the population, but rather associated with certain characteristics of children, families, and households. In particular, the most significant predictors of grandparent co-residency over children's first 2 years of life were indicators of 'economic well-being' (household income, poverty status, and federal assistance), followed by race/ethnicity.

All measures of economic well-being were found to be significantly correlated with grandparent co-residency. For every unit increase in income, the odds of grandparent co-residency increased by 1.34 times ($OR=1.34$, $SE^2=0.13$, $p<.001$). However, compared to families at/above the poverty threshold level, families below the poverty threshold had almost 4 times more likelihood to reside in co-resident households ($OR= 3.72$, $SE^2 = 1.48$, $p<.001$). Likewise, being in a family that had received federal benefits (versus not) increased the likelihood of grandparent co-residency by more than two times ($OR =3.53$, $SE^2 = 1.08$, $p<.01$).

Examining the ethno-racial differences in the likelihood of grandparent co-residency (Table 3) revealed some interesting findings. In comparison to Whites, only

Asian families had a significantly different likelihood of having a co-resident grandparent. Asian families were 5.77 times more likely than White families to experience grandparent co-residency ($OR=5.77$, $SE^2 = 2.08$, $p<.000$), a result that is consistent with previous findings (Kochhar & D’Vera, 2011; Treas & Batalova, 2011). Contrary to expectations, the odds of co-residency were not significantly higher for Hispanic and Black families than White families, once other sociodemographic characteristics of children, parents, and household were taken into account. Only one child characteristic was found to be a significant predictor of grandparent co-residency; that is, being a first born child increased the odds of having co-resident grandparents on the order of 1.54 times ($OR=1.54$, $SE^2=0.30$, $p <0.05$). Examining the associations between parent-level characteristics and grandparent co-residency indicated that parents with higher education ($OR=0.76$, $SE^2=0.30$, $p < .01$), and mothers with older age ($OR=0.91$, $SE^2=0.03$, $p<.01$) had significantly lower odds of grandparent co-residency.

Table 3a presents the odds ratio for significant predictors of grandparent co-residency over the child’s first two year for each ethno-racial group. In these results, I found partial support for the hypothesis that the correlates of grandparent co-residency would vary across ethno-racial groups. Across all the ethno-racial groups, specific indicators of economic wellbeing were consistently related to likelihood for grandparent co-residency. In particular, higher household income was associated with a greater likelihood of co-residency across all the five groups. At the same time, poverty status was significant positive predictor of co-residency for Whites ($OR= 1.34$, $SE^2= 0.13$, $p<0.05$)

and Hispanics ($OR= 3.66, SE^2= 2.24, p<0.05$), but not for Asians, Blacks, or ‘Others’. Household receipt of federal public assistance benefits was found to be a significant predictor (predicting a higher likelihood of co-residency) only for Whites and the ‘Other’ group. Finally, for White families only, higher levels of parent education were associated with lower odds of grandparent co-residency ($OR= 0.70, SE^2= 0.10, p<0.05$). Maternal age at childbirth was also found to be negatively correlated with coresidency for three groups: White ($OR= 0.89, SE^2= 0.04, p<0.01$), Hispanic ($OR= 0.93, SE^2= 0.03, p<0.05$), and Asian ($OR= 0.94, SE^2= 0.03, p<0.05$); the direction of these estimates indicates that older maternal age was associated with lower odds of co-residency. Lastly, out of all the child characteristics examined, only being the first born child was significantly associated with odds of co-residency, but only for Blacks ($OR= 7.17, SE^2= 6.93, p<0.05$); first-born children in Black families were more than 7 times more likely to have a co-resident grandparent than later born children in Black families.

Sensitivity analyses

To get a better sense of how robust (or sensitive) the results were to different models specifications, a series of supplemental analyses were conducted predicting grandparent co-residency at 9 months (T1) (for the full sample and each ethno-racial group) to examine whether the pattern of results differed from the models estimated for T1/T2 period given that an additional 177 families transitioned into grandparent co-residency at T2 (2 years). The results for this set of analyses are not presented in tables, but described here. Compared to the main result models, the analysis for T1 indicated the same set of significant predictors of grandparent co-residency, with one exception. Being

Hispanic was a significant predictor of grandparent co-residency at 9 months ($OR=1.68$, $SE^2=0.36$, $p < 0.05$), but not over the first two year period. This suggests that the group of grandparents who became co-residents between 9 months and 2 years were predominantly non-Hispanic.

Grandparent Co-residency and Children's Cognitive Skills

Analyses for the second set of research questions addressed whether grandparent co-residency was associated with young children's cognitive development in stable two-parent families, controlling for key demographic variable. In addition, the analyses also explored differences in this association across ethno-racial groups. First, two separate Ordinary Least Squares (OLS) regression analyses were conducted, regressing children's Bayley mental test scores (at 9 months and then at 2 years) on grandparent co-residency using clustered sample errors.

The findings from the analyses (see Model 1 in Table 4) showed no significant association between grandparent co-residency and children's cognitive skills at 9 months ($\beta=0.93$, $SE^2=0.64$); $t=1.46$, $p=0.15$). Covariates that were significantly associated with children's test scores were all of the *child characteristics* (child is a girl, first born status (multiple born, first born, low birth weight), and select household characteristics, such as immigration status, but not race; and urban residency. All of these significant covariates (except child is a girl) were associated with lower test scores. Overall, the full model explained only a small amount of variance (5%) in children's cognitive test scores at 9 months; $R^2 = .0396$, $F(19, 72) = 19.55$, $p > 0.000$.

A similar pattern of results (see Model 2 in Table 4a) was observed at 2 years, though the overall model explained more of the variance (18.73%) in children's test scores than at 9 months ; $R^2 = .1873$, $F(19, 161) = 28.26$, $p > 0.000$. Again, the results indicated no significant association between having a co-resident grandparent in the home and children's test scores at 2 years ($\beta = 0.19$, $SE^2 = 0.90$); $t = 0.21$, $p = 0.831$. The covariates that were positively associated with test scores at 2 years were child gender (girl), income and parent education. Birth status (multiple birth, low birth weight) and being Black were associated with lower test scores at 2 years. Similarly, when analyses were conducted separately for each ethno-racial group, no significant associations between co-residency and cognitive skills emerged (see Table 4b).

Sensitivity analyses

While my primary approach to examining whether the association between grandparent co-residency and children's cognitive skills varied for different ethno-racial groups was to run separate models (allowing the covariates to operate differently for each group), I also ran a supplementary analyses using the full sample that included interaction terms for grandparent co-residency and indicators for each of the ethnoracial groups. This model did not yield any significant findings related to coresidency.

To examine whether particular types of grandparent co-residency (grandmother and grandfather, grandmother only, or grandfather only) might be associated with child outcomes in unique ways, sensitivity analyses were conducted including indicators for each type of grandparent co-residency separately (with no co-residency as the omitted group). The results from these models are not presented in tables. Similar to the main

results, these models did not reveal any statistically significant associations between co-residency and children's cognitive test scores; however, two trend-level findings are notable and given further consideration in the discussion section. First, children in homes with only co-resident grandmothers (vs. grandfather only or both grandparents) had higher cognitive scores at 9 months of age than children in families with no co-resident grandparents ($p=.07$). Interestingly, at age 2, the models provided suggestive evidence that it is children with only co-resident grandfathers that have higher cognitive scores than children with no co-resident grandparents ($p=.14$).

Moderating Role of Grandparents as Primary Child Care Providers in Association Between Grandparent Co-residency and Children's Early Cognitive Skills

In order to examine the potential moderating effect of grandparents' provision of child care on a regular basis, regression models—similar to those tested for Research Question 2, but including an indicator of the grandparent as the child's primary care provider and an interaction term for grandparent co-residency x grandparent care provider—were computed for each time point, for the full sample and then separately for each ethnoracial group. Based on the findings in the previous models, the covariates entered for testing moderation effects included *child characteristics*- child gender, birth status (multiple born, first born, low birth weight); *household characteristics*- immigrant status, language spoken at home (English), income, federal benefits, urban residency, children less than 18 present in the household; and, *parent characteristics*-marital status, mother employed prior to birth of child, and age of mother at birth of the child.

Results for the full sample (shown in Table 5) indicated that grandparent caregiving did not moderate the association between grandparent co-residency and children's cognitive scores at 9 months or at 2 years. I hypothesized that the association between grandparent co-residency and children's cognitive outcomes would be more positive in families where the grandparent also serves as a primary care provider compared to families in which they do not serve in this role. I found that the interaction terms between grandparent co-residency status and care provider status were non-significant at both time points (9 months and 2 years. At 9 months (T1), each unit increase in the interaction between grandparent co-residency and care provision resulted in increase in children's cognitive test scores by a factor of 0.19, however this increase was not significant at $p=0.890$; ($\beta=0.19$, 95% CI (-2.492, 2.867); $t=0.14$, $p=0.890$). At 2 years (T1/T2), the coefficient on the interaction variable implies a change in children's test scores by 1.14, but this result was statistically insignificant ($\beta=1.14$, 95% CI (-3.37, 5.65), $t=0.50$, $p=0.619$). The results for the regression coefficients for the primary variables are summarized in Table 5.

Examining the results of the models run separately for each ethnoracial group confirms the full sample finding that grandparent care provision does not appear to moderate the association between co-residency and children's cognitive test scores. The values of the coefficients for each ethnoracial group are summarized in Table 5a. I had hypothesized that there would be significant differences in this moderated association for different ethnoracial groups, specifically that the association between grandparent co-

residency and children's test scores would be more positive for Asian and Hispanic families than for other groups; however, I did not find support for this assumption.

CHAPTER VII

DISCUSSION

This study examined the context of co-resident grandparenting in stable two-parent families with young children using a national dataset. With the changing structure of multigenerational households, there is a need to re-examine the potential strengths of grandparents and the unique contributions they can make to young children's development. However, there is limited information on grandparenting and child functioning in early childhood, with previous studies restricting their focus to the association between 3-generation coresidence and older children's wellbeing in family structures that emerge in response to crisis, such as teenage pregnancy, divorce, and single parenthood. In a majority of these studies, selection bias is an issue that has not been fully addressed given the challenges of doing so. Many of these extended households may come about in response to family circumstances and experiences such as poverty, which are related to child outcomes as well. Thus, the mixed outcomes reported for children growing up with grandparents may be a result of unaccounted selection factors. Moreover, most of the studies have been limited by cross-sectional research designs, giving an incomplete account of grandparenting and its association with child outcomes over time.

The focus of this study is to extend the research on grandparenting, by examining whether very young children growing up in stable two-parent families with co-resident grandparent(s) have different outcomes than children growing up in two-parent families without grandparent co-residency. This is a unique and emerging family structure that has not been explored in the American context, barring one recent study that considered a variety of grandparent households (Pilkaukus & Martison, 2014). According to the latest Census data, since 2007 there has been an increase in two-parent families selecting into grandparent co-residency (Livingston, 2013; Livingston & Parker, 2011). Yet, we know little about the demographic profiles of these families and the possible effects on young children growing up in this structure. The first aim of the study was to investigate the correlates of grandparent co-residency in two-parent families with very young children using the information on extended household members from the ECLS-B national dataset.

Next, within this selected subsample of two-parent families, the study examined the association between grandparent co-residency and young children's cognitive test scores. Cross-cultural research has suggested positive outcomes for children growing up with grandparents. However, empirical evidence from American studies report mixed outcomes for children, perhaps partly because of the cross-sectional nature of these investigations and the literature's focus on outcomes for older children. Hence, by focusing on two time points (9 months and 2 years), my study provides a better explanatory power for the findings. Moreover, by examining the cognitive outcomes for infants and toddlers as the focal age group, the current study eliminates the threat that any

associations between grandparent co-residency and children's cognitive scores maybe explained by concurrent experiences at school.

Lastly, the study also examined grandparent caregiving as a potential moderating condition under which this association is strengthened (i.e., that children with coresident grandparents who are also their primary care provider may have the most positive outcomes). Data on early childcare shows that grandparents form a crucial group for providing home-based relative care (Fuller-Thomson & Minkler, 2001; Belsky et al., 2007; Porter et. al, 2010). Based on empirical evidence from cross-cultural investigations, this study is premised on the assumption that co-resident grandparents who also serve as the child's primary care provider will have a more positive influence on children's test scores than co-resident grandparents who do not serve in this role.

Overall, all the research questions were examined not only for the full sample but within each of the five major ethnoracial groups, given that grandparenting is a social context strongly impacted by cultural norms and values.

Correlates of Grandparent Co-residency in Two-parent Families with Young Children

My first research question inquired into the link between key demographic characteristics and grandparent co-residency. Preliminary descriptive analyses revealed several significant mean level differences between two-parent families with grandparent co-residency and two-parent families without grandparent co-residency on key demographic variables. In particular, Asian and Hispanic families were more likely to have grandparent co-residency than not, but this was not the case for Black families.

Also, as expected, Whites in the sample comprised the largest proportion of families without grandparent co-residency. Next, all economic indicators (income, poverty status, and federal benefits) were found to be significantly different across the two family structures. Families with co-residency were in the lower income bracket, on federal assistance, and more likely to be below poverty than families without co-residency. Other significant group differences revealed that families with co-resident grandparents were characterized by younger mothers, the study child being first born, at least one immigrant parent, lower rates of English as the home language, lower levels of parent education, as well as lower rates of parental marriage at 9 months..

To more formally test which socio-demographic characteristics are associated with grandparent coresidency in two-parent families, simple logistic regressions were run predicting co-residency in the first two years after a child's birth (T1/T2) from child, parent, and household characteristics identified from literature revealed. These analyses revealed some interesting findings and confirmed my hypothesis that grandparent co-residency would not be randomly distributed across families, but rather associated with certain characteristics of children, parents, and households. Overall, for the full sample, I found partial support for the hypothesis (HQ1.1). Given that no prior work has been done to explore the demographic profile of grandparent co-residency in stable-two parent households, it is difficult to discuss the findings in relation to previous research. However, consistent with previous studies of demographic trends in extended households (Crosnoe & Wildsmith, 2007; Pilkaukus & Martison, 2014; Sun & Li, 2014), socio-

economic variables and race/ethnicity were found to be significant predictors of grandparent co-residency.

As found in the preliminary analyses, indicators of economic well-being were significantly associated with likely of co-residency. Although higher income significantly increased the odd of co-residency, being poor also significantly increased the likelihood of co-residency. Together, these results potentially suggest a curvilinear relationship; i.e., families with the most and least economic resources are most likely to be characterized by grandparent co-residency. Families who are poor are more likely to include grandparents, but so are families with higher incomes. This may be a trend unique to grandparent co-residency in two-parent families, because demographic trends collected from national data sets and Census Bureau primarily suggest a non-curvilinear between economic resources and grandparent coresidency in multigenerational households. Multigenerational households in general are economically disadvantaged, with low income, federal assistance and poverty status reported as significant predictors for grandparent co-residency. Interestingly, the poverty measure in the ECLS-B data set takes into account family size, so it may be that even though families with higher incomes are more likely to have coresident grandparents, they also need to spread their resources among more people, which may lead to higher rates of poverty. However, this needs to be confirmed in future studies of the context of grandparent co-residency in two-parent families.

In terms of parent and child level correlates, findings suggest that more than maternal employment, being a younger mother at the time of childbirth might be a key

selection factor influencing decisions about grandparent co-residency. Mothers being employed prior to the birth of the child was not significantly (but approaching significance at $p=.097$) related to likelihood of grandparent co-residency at any time-point. Results also indicate that becoming first time parents might be a possible reason for families selecting into co-residency; having a first born child was associated with a higher likelihood of grandparents coresiding. Perhaps the reason for grandparents selecting into co-residency is to help the young mothers with their parenting skills, and has less to do with maternal employment. However, immigrant status, being Black and having a child with low birth weight were not significant predictors of co-residency.

Interestingly, when all of the socio-demographic characteristics were taken into account simultaneously, only being of Asian descent (versus another race/ethnicity) was associated with a higher likelihood of grandparent co-residency. The previously significant mean-level differences found for Whites and Hispanics disappeared, but persisted only for the Asians. As an example, based on simple mean comparisons, Hispanic families are more likely than some other groups to have co-resident grandparents. However, this may be because they are also more likely to have some of the other characteristics associated with co-residency – being an immigrant, poverty, low parent education. Once these characteristics are controlled for in the logistic regression, being Hispanic no longer makes co-residency more likely. However, for Asians, it is possible that factors over and above socio-demographic characteristics predict the selection into grandparent co-residency. As suggested by prior studies (Sandel, Cho, Miller, & Wang, 2006; Thang, Mehta, Usui, & Tsuruwaka, 2011; Yasuda, Iwai, Yi, &

Xie, 2011), grandparent co-residency in two-parent families is a normative pattern in Asian families, influenced by cultural norms of ‘respect for hierarchy’ and ‘filial piety.

On the other hand, surprisingly, although multigenerational households with grandparent co-residency is often considered normative for ‘Blacks’ in the U.S., Black two-parent families in the current study were as likely to live without grandparents in the home as they were to live with grandparents. This suggests that grandparent co-residency for Blacks may be a more normative pattern in crisis situations such as single-parent households and skipped parent households, but not in two-parent families. It is notable, however, that having a first-born child was a very strong predictor of co-residency in Black families; perhaps grandparents in these families are most likely to help on a short-term basis during the transition to parenthood.

Next, examining the correlates of grandparent co-residency across the five ethnoracial groups in my study partially supported my assumption (HQ1.2) that there would be different patterns for different groups. Across all of the groups, specific indicators of economic wellbeing were consistently related to likelihood for grandparent co-residency. In particular, higher household income was associated with a greater likelihood of co-residency across all the five groups. Contrary to my assumption, however, child health, parent education, and maternal employment prior to the birth of the child did not significantly predict differences between the White and Asian groups in my study.

Grandparent Co-residency and Children’s Cognitive Development

Overall, results from the analyses did not support my hypotheses for this research question. Regression coefficients at both the time points and for each ethnoracial group

remained insignificant. Since the grandparents were not directly asked about the type of activities they do with the children, it is possible that the Bayley Mental test scores does not adequately capture specific aspects of cognitive stimulation that may be unique to grandparents, for example- teaching basic numeric and literacy concepts to children. The Bayley mental test scores were scored as an observational tool scoring parent-child interaction and did not ask/observe the grandparents *directly* on the type of activities they might be doing with the kids. However, this is difficult to ascertain, since my study did not explore the activities, but looked at whether the presence of grandparents in the home had a significant association with children's test scores.

Another possible reason for insignificant findings reported in this study could be the socio-economic disadvantages (such as generational gap in education) in grandparenting rendering many of the grandparents inefficient in cognitively stimulating the grandchild. According to Uhlenberg and Kirby (1998), "educational gaps between the parents and grandparents of children might indicate the extent to which differences in educational attainment limit the role that grandparents play" (p. 35). U.S Census Bureau data from 1995 (cited in Uhlenberg & Kirby 1998) indicates historical gaps in grandparent education from 1930 to 1960; with grandparents born in the 1930-1940 cohort (during the time of World War and socio economic disadvantages such as Slavery) more educationally disadvantaged than grandparent born in later cohorts. A recent study by Jason and Ready (2011) found a significant association between grandparent educational attainment and children's cognitive outcomes, with the effect persisting even after controlling for socio-economic and demographic characteristics. Specifically,

preschool children with educationally advantaged grandparents (college educated) had stronger literacy and mathematical skills at the beginning of formal schooling. Thus, it may be possible that ‘within-group’ differences due birth cohort effects may influence the association between grandparent co-residency and children’s cognitive outcomes.

However there may be other untapped potential strengths of grandparenting that needs to be explored. For example, grandparent’s may not equipped with cognitive skills, but may significantly contribute to young children’s socialization skills and moral development; a possibility that be explored by investigator in future research studies.

Moderating Role of Grandparents as Primary Child Care Providers

Empirical literature and the Multigenerational Processes Framework informed the hypothesis that co-resident grandparents residing in stable two-parent families who also served as the focus child’s primary careprovider would moderate the association between grandparent co-residency and children’s cognitive test scores. According to demographic data from the Pew Research Center (2011), one fourth of the grandparents (2.7 million) co-residing in some form of extended households with young grandchildren are also serving as the child’s primary care provider, especially for children in the age group of 0-2 years. This number has been steadily increasing since the onset of the economic recession in 2007. Literature on grandparenting has suggested that there are several factors that lead to the level of caregiving responsibility, and type of caregiving role adapted by the co-residing grandparents (Hirshon, 1998). In some families, the role of the grandparents can be limited to routine childcare tasks’ with limited responsibilities, such as assisting the parent in daily physical care of the child. Caregiving can also be in the

form of emergency caregiving for a short time in situations such as maternal employment. For example, in families with young children, or new parents with young mothers, grandparents are more likely to adapt into the role of ‘coparent’ in order to help diminish the pressure on the parents, and also to teach parenting skills to the parents. Based on this assumption, I hypothesized that the effect of co-resident grandparents on children’s cognitive outcomes will be amplified for families where the co-resident grandparent also serves as the primary care provider. Next, I hypothesized that this association will vary by race. For example, White households are more likely to be characterized by the norm of non-interference, limiting the level of responsibility on the coresident grandparent serving as the primary caregiver of the children. Whereas cultural norms of *filial piety* and grandmothers as nurturing child rearers may be more characteristic of other ethnic groups such African-Americans, Asians, and Hispanics.

To address this question, two sets of OLS regression models were computed; the first set addressing the main effect, and the second set (5 models) examined the differences by race. Results from the analyses did not support my assumption; inclusion of the moderating variable did not have a significant association on the main effect between grandparent co-residency and grandchild’s cognitive scores (for the full sample or within any particular ethnoracial group). It may be possible that grandparent careproviding does not influence grandparent’s impact on children’s cognitive stimulation. However, the limited information on the type of roles and responsibilities undertaken by the co-resident grandparent care providers in the ECLS-B data set inhibits further understanding of this unique group. Second, lack of conceptual clarity in defining

‘grandparent caregiving,’ as I already discussed, may render many important aspects of grandparenting care oblivious to researchers. A study by Baydar and Brooks-Gunn (1998, cited in Fuller-Thomson, Minkler, & Driver, 2001) reported more than 43% of the grandparents provided occasional but undefined caregiving to grandchildren. Findings from a study exploring the nature grandparent caregivers (Hayslip & Kaminski, 2005) created a typology of grandparent child caregiving by defining caregiving on a continuum of 5 categories, ranging from self-defined primary caregiver category (custodial grandparents) to four groups who did not define themselves as the primary caregiver (extensive, intermediate, occasional, and non-caregivers). Limiting the analysis to grandparents providing occasional care (40.4%) revealed that almost 15% grandparents provided extensive childcare. Interestingly, this result was much higher than the nationally reported estimate of 5.4% of all preschoolers being cared by grandparents in households with full-time employed mothers.

Results from OLS regression models evaluating the differences by race also did find significant differences by ethno-racial composition. This was surprising, given that past research has strongly suggested different caregiving patterns by race (Hirshon, 1998; Thang, Mehta, Usui, & Tsuruwaka, 2011; Vakalahi, Toafa, & Moala, 2008;). It may be possible that language fluency might have been a barrier in adequately tapping the important indicators. Culturally specific aspects of grandparent caregiving such as ‘undefined caregiving’ discussed above, which might have been relevant for this analysis, but may not have been captured from the parent interviews, remains an unexplored aspect for future research studies to account for.

Limitations

To understand the findings of this study in the broader context, it is important to acknowledge its limitations, which may help inform future research pursuing this line of investigation. First, although the ECLS-B data set provided information on the extended household members as well as information on relative kin identified as the primary care provider, this information was limited to basic demographic information about each household member; such as age, gender and relationship to the child. Critical pieces of information on grandparents' characteristics, such as grandparent education or employment, are not reported in this dataset.

Second, there was no information available on family transitions prior to 9 months, which may have underestimated the results for grandparent co-residency, i.e., raising the possibility that some families that were in co-residency at some point were not observed. As discussed previously, studies have highlighted the importance of accounting for transitions into and out of co-residency (Mollborn et al., 2012; Pong and Chen, 2010; Zheng & Xie, 2011). Recent transitions can contribute to stress, hence indirectly negatively affecting children. However, by observing grandparent co-residency at two time points (9 months and two years), this study accounted for family transitions between the two time points, though it may be possible that some families who experienced transitions before 9 months remained unaccounted.

Third, it may be possible that important variations for group comparisons were masked because of small sample sizes for key variables under study. For example, the 'Other' group (Native American, Hawaii Pacific Islanders, and families who identified

as Multiracial) was a very heterogeneous group because of small cell counts. As indicated by previous studies on grandparenting in ethnic Native groups (Pacific Islanders, Tongan tribe), some of these minority groups maybe characterized by cultural norms for coresidency (Vakalahi, 2011; Vakalahi, Heffernan, & Johnson, 2007; Vakalahi, Toafa, & Moala, 2008). The use of sampling weights in ECLS-B accounted for some of these sampling differences in my study, although the possibility of bias remains.

Fourth, the study could not go beyond examining the ‘presence’ of grandparents as co-residents or caregivers because the ECLS-B did not collect information about grandparents’ activities. Exploring the mechanisms through which grandparent caregiving contributes to children’s cognitive stimulation, such as possible activities that grandparents might be doing with the grandchildren during caregiving is a critical piece to examine. By investigating grandparent caregiving as the moderating condition, this study moved beyond examining parenting effects as the primary channel through which grandparents influence grandchildren’s wellbeing.

Future Recommendations

Conceptually, a lack of clarity in defining grandparenting may render many important aspects of grandparenting care oblivious to researchers. Family scholars need to revisit and reconceptualize certain relevant constructs such as, (a) grandparent co-residency (short-term versus long-term co-residency; grandparent co-residency in one-parent family versus grandparent co-residency in two-parent families); and (b) caregiving by co-resident grandparents versus caregiving by non-resident grandparents.

Theoretically, the lack of a unifying theory on grandparenting makes it difficult to understand the quality and mechanism of grandparents' influence on grandchildren (Tomlin, 1998). In order to further validate the relevancy of the Multigenerational Processes Framework for samples beyond the original Taiwanese study, we need to replicate similar studies in different settings. The racially diverse immigrant population in the U.S represents an interesting context for exploring the adaptability of the framework.

First, a limitation of the MPF model is the lack of clarity on the impact of culture on the model, i.e., how would the model explain cultural variations in grandparenting? For example, although there is a substantial immigrant population with grandparent co-residency, it will be interesting to explore how acculturative processes can impinge on the dynamics of grandparenting and how well we can adapt the framework according to these contextual processes. It is plausible that the intergenerational processes as suggested by the MPF (socialization, family discord/congruence, and flow of domestic services) are all embedded within the cultural context. For example, for immigrant families, adapting to the new mainstream culture (acculturation) might pose different set of challenges for the immigrant grandparents (such as lack of language proficiency, sense of loss of identity, adjustment issues) as compared to Native grandparents. These acculturative stresses might indirectly affect the grandparent-grandchild relationship by impacting the intergenerational processes. For example, adjustment issues might lead to family discord rather than congruence, or, cultural variations in immigrant families; such as the value of respect for elders might lead to upward flow of service from the parents to grandparents. In addition, how would traditional roles defined for grandparenting impact the cognitive

outcomes for children? For examples, in families where the cultural norm of respect for elders and hierarchy is expected from grandchildren, how does this role impact grandparent involvement in cognitively stimulating the grandchild as compared to families where grandparents are expected to be a coparent to the child?

Second, we also need to account theoretically for the differential effects of grandfathering versus grandmothering in the framework. Results from the sensitivity analyses from my study suggests that grandmothers were associated with more positive scores at 9 months and grandfathers are associated with more positive scores at 2 years. Recent research on grandfathering suggests differences in the socialization practices of grandfathers (Bates, 2009; Michalski, 2010). Many grandfathers are equally involved in caregiving, but their unique contributions remain understudied (Bates, 2009; Dollahite & Hawkins, 1998). In this context, how these gender differences might affect the postulates of the framework, again in terms of socialization, flow of services, and family dynamics still needs to be examined further.

Methodologically, we need longitudinally designed studies to compare the impact of long-term grandparent co-residency versus short-term grandparent co-residency, and also designs that can statistically account for other structural factors such as family transitions, and number of years in grandparent co-residency. In addition, we need to supplement quantitative studies with more qualitative studies to explore other facets of grandparenting. Future research studies need to incorporate and use validated measures unique to grandparenting including multiple reporters and multiple methods (e.g., grandparent self-reports and observations of grandparent-grandchild interactions). An

issue with research on young children's outcomes is that it is difficult to interview children and report on their well-being. This is one of the reasons research on multigenerational households and child outcomes have focused on adolescent samples and not younger children. However, this can be accounted for by devising studies that use observational techniques to investigate grandparent-grandchild relationships.

Lastly, in terms of *measures*, there is a need to incorporate grandparent-reported measures to understand grandparent effects. Most of the research on grandparents and child outcomes has relied on parent reported measures as the main source of information. This represented a limitation for my study as well. The cognitive measure (Bayley Mental test score) was designed by scoring parent-child interactions.

Overall, the current study sought to provide much needed information about coresident grandparents in two-parent families with very young children given the changing trends of multigenerational households in the U.S., and to provide a foundation for future studies to explore the mechanisms that mediate the association between grandparent co-residency and child outcomes. Findings from my study revealed several differences in the characteristics of families with grandparent co-residency and without grandparent co-residency. Further research is needed to explicate the impact of these differences on children's well-being.

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APPENDIX A
TABLES AND FIGURES

Table 1

Weighted Descriptive Statistics for Full Study Sample and by Grandparent Co-residency Status (n=6950)

Variables	Mean/%	Std. Deviation	No Co-resident Grandparent (T1/T2)		Co-resident Grandparent (T1/T2)		T-Test
			Mean /%	SE ²	Mean /%	SE ²	
Household Characteristics							
Race							
White	61.99 %		62.95%		42.67%		***
Black	6.33 %		6.50%		6.21%		
Hispanic	24.60%		23.93%		38.19%		*
Asian	3.19 %		2.78%		8.09%		***
Other	3.89 %		3.84%		4.85%		
Nativity							
Immigrant (at least 1 parent immigrant)	26.80 %		26.42%		37.08%		**
Home language is English at T1	80.04 %		80.77%		64.94%		**
Economic well-being							
Household Income (1-13)	8.17	3.08	8.16	0.97	7.21	0.85	***
Below Poverty at T1	15.04 %		14.57 %		30.10%		***
Family received any federal benefits in child's first two years (T1/T2)	45.96 %		44.26 %		74.13%		***
Urban Residency	85.34 %		85.45 %		86.31%		
Number of Adults in Household at T1	2.22	0.65	2.09	0.03	3.44	0.16	***
Number of Children in Household at T1	2.10	1.14	2.10	0.07	2.15	0.10	

Note. Statistically significant differences ($p < .05$) are noted in italics. The first two columns represent statistics for two-parent families.
[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 1 (continued)

Variables	Mean/%	Std. Deviation	No Co-resident Grandparent (T1/T2)		Co-resident Grandparent (T1/T2)		T-Test
			Mean or %	SE ²	Mean or %	SE ²	
Child Characteristics							
Female	48.55%		48.07%		50.26%		
Multiple Birth (twins/triplet)	3.27%		3.40%		3.06%		
Child is first born	37.24%		36.00%		46.68%		*
Low Birth Weight	1.13%		1.13%		1.35%		
Parent Characteristics							
Education Level							
Highest parent education (1-5)	3.26	1.20	3.29	0.35	2.64	0.33	***
Mother	2.90	1.22	2.94	0.36	2.30	0.32	***
Father	2.90	1.26	2.93	0.33	2.30	0.25	***
Age of Mother on Birth Certificate	28.7	5.81	28.97	1.42	22.25	1.36	***
Mother employed in the year prior to child's birth	72.25%		52.76%		50.79%		
Employment Status of Mother at T1	53.01%		52.76%		50.79%		
Marital status							
Married at T1	84.55%		85.46%		69.42%		***

Note. Statistically significant differences ($p < .05$) are noted in italics. The first two columns represent statistics for two-parent families.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2

Weighted Descriptive Statistics for Grandparent Characteristics Within Grandparent Co-resident Subsample (n=800)

Variables	Mean or %	Std. Deviation
Grandparent Co-residency Type		
Grandmother-Only Household T2 (2 years)	40.00 %	
Grandfather-Only Household T2 (2 years)	12.08 %	
Two Grandparent Household (Grandmother & Grandfather)	46.00%	
Grandparent Co-resident as Primary Care Provider		
Grandparent as Primary Careprovider T1 (9 months)	39.00%	
Grandparent as Primary Careprovider T2 (2 years)	24.40%	
Grandparent as Primary Careprovider at either T1 or T2	40.60%	
Grandparent Co-residency by Age		
Average Age of Grandparent (9 months)	53.67	11.67
Grandmother-only Age T1 (9 months)	53.50	10.95
Grandfather-only Age T1(9 months)	55.60	11.26

Table 3

Logistic Regression Predicting Likelihood of Grandparent Co-residency Over 2 years

Models	Grandparent Co-residency (T1/T2)	
	Odds Ratio	SE ²
Household Characteristics		
<i>Race (excluded-White)</i>		
Black	0.98	0.41
Hispanic	1.31	0.38
Asian	5.77 ***	2.08
Other	1.53	0.56
<i>Nativity Status</i>		
Immigrant (at least 1 parent immigrant)	0.62	0.22
<i>Home language</i>		
Home Language is English	0.62	0.27
<i>Economic well-being</i>		
Household Income	1.34 ***	0.08
Poverty Status (0/1)	3.72 ***	1.48
Federal Benefit Receipt (0/1)	3.53 ***	1.08
Urban Residency	1.11	0.31
Number of Children in Household at 9 months	1.07	0.14

Note. Statistically significant differences ($p < .05$) are noted in italics.

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3 (continued)

Models	Grandparent Co-residency T1/T2	
	Odds Ratio	SE ²
Child Characteristics		
<i>Child Gender</i>		
Female	1.17	0.23
<i>Birth Status</i>		
Multiple Birth-twin or triplets	1.01	0.35
Child is first born	1.54 *	0.30
<i>Child Health at Birth</i>		
Very low birth weight	1.00	0.24
Parent Characteristics		
<i>Education Level</i>		
Highest level of parent education	0.76	0.08
Age of Mother on Birth Certificate	0.91 **	0.03
Mother employed in year prior to child's birth	1.12	0.32
<i>Marital status</i>		
Married at T1 (9 months)	0.87	0.21

Note.. Statistically significant differences ($p < .05$) are noted in italics.

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3a

Logistic Regression Predicting Likelihood of Grandparent Co-residency (Over 2 years) Across Ethnic Groups

Models	White		Black		Hispanic		Asian		Other	
	Odds Ratio	SE ²	Odds Ratio	SE ²	Odds Ratio	SE ²	Odds Ratio	SE ²	Odds Ratio	SE ²
Grandparent co-residency over 2 years										
Household Characteristics										
<i>Nativity Status</i>	--	--	--	--	--	--	--	--	--	--
Immigrant (at least 1 parent immigrant)	--	--	--	--	--	--	--	--	--	--
<i>Home language</i>										
Home Language is English	--	--	--	--	--	--	--	--	--	--
<i>Economic well-being</i>										
Household Income	1.34*	0.13	1.63 *	0.38	1.35**	0.12	1.31*	0.13	1.57 *	0.34
Poverty Status	5.00**	2.77	--	--	3.66*	2.24	--	--	--	--
Federal benefits	3.68 **	1.68	--	--	--	--	2.77 ⁺	1.49	5.93 *	4.35
Urban Residency										
Number of Children in Household at 9 months	--	--	--	--	--	--	--	--	--	--

Note. Statistically significant differences ($p < .05$) are noted in italics. SE²- Standard errors computed using Jackknife Method. All analyses are weighted. Only statistically significant analyses are presented

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3a (continued)

Models	White		Black		Hispanic		Asian		Other	
	Odds Ratio	SE ²								
Grandparent co-residency over 2 years										
<i>Child Gender</i>										
Female	--	--	--	--	--	--	--	--	--	--
<i>Birth status</i>										
Multiple Birth-twin or triplets	--	--	--	--	--	--	--	--	--	--
Child is first born	--	--	7.17 *	6.93	--	--	--	--	--	--
<i>Child Health at Birth</i>										
Very low birth weight	--	--	--	--	--	--	--	--	--	--
Parent Characteristics										
<i>Education Level</i>										
Highest level of parent education	0.70 *	0.10	---	--	--	--	--	--	--	--
Age of Mother on Birth Certificate	0.89 **	0.03	--	--	0.93*	0.03	0.94*	0.03	--	--
Mother employed in year prior to child's birth	--	--	--	--	--	--	--	--	--	--
<i>Marital status</i>										
Married at T1 (9 months)										

Note. Statistically significant differences ($p < .05$) are noted in italics. SE²- Standard errors computed using Jackknife Method All analyses are weighted. Only statistically significant analyses are presented
⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

Testing Association Between Grandparent Co-residency and Children's Bayley Test Scores (At 9 months) using OLS Regression

Model 1	Bayley Mental Test Scores at T1 (DV)		
	β	SE ²	Estimate
Grandparent co-residency at T1 (IV)	0.91	0.64	1.41
Household Characteristics			
<i>Race (excluded- White)</i>			
Black	0.06	0.71	0.09
Hispanic	0.61	0.60	1.01
Asian	-0.46	0.90	-0.52
Other	-0.06	0.66	-0.10
<i>Nativity Status</i>			
Immigrant (at least 1 parent immigrant)	-1.53	0.66	-2.32*
<i>Home language</i>			
Home Language is English	-0.27	0.56	-0.48
<i>Economic well-being</i>			
Household Income	0.13	0.07	1.91
Federal benefits	0.23	0.42	0.54
Urban Residency	-1.34	0.61	-2.18
Number of Children in Household at 9 months	-0.36	0.20	-1.78
Constant	49.10	1.31	37.61

Note.. Statistically significant differences ($p < .05$) are noted in italics. SE²- Standard errors computed using Jackknife Method. All analyses are weighted
[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4 (continued)

Model 1	Bayley Mental Test Scores at T1 (DV)		
	β	SE ²	Estimate
Grandparent co-residency at T1 (IV)	0.91	0.64	1.41
Child Characteristics			
<i>Child Gender</i>			
Female	1.29	0.33	3.88***
<i>Birth status</i>			
Multiple Birth-twin or triplets	-4.60	0.50	-9.17***
Child is first born	1.18	0.44	2.67**
Very low birth weight	-7.03	0.77	-9.13**
Parent Characteristics			
<i>Education Level (excluded- less than high school)</i>			
Overall parent education	0.29	0.20	1.44
Age of Mother on Birth Certificate	-0.01	0.03	-0.25
Mother employed in year prior to child's birth	0.38	0.46	0.83
<i>Marital status</i>			
Married at T1 (9 months)	0.71	0.57	1.25
Constant	49.10	1.31	37.61

Note. Statistically significant differences ($p < .05$) are noted in italics. SE²- Standard errors computed using Jackknife Method. All analyses are weighted
[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4a

Testing Association Between Grandparent Co-residency and Children's Bayley Test Scores (At 2 years) using OLS Regression

Model 2	Bayley Mental Test Scores at T2 (DV)		
	β	SE ²	Estimate
Grandparent co-residency at T2 (IV)	0.08	0.90	0.08
Household Characteristics			
<i>Race (excluded- White)</i>			
Black	-2.87	1.41	-2.03*
Hispanic	-1.64	0.96	-1.72
Asian	-0.85	0.96	-0.88
Other	-2.00	1.07	-1.87
<i>Nativity Status</i>			
Immigrant (at least 1 parent immigrant)	-1.58	1.03	-1.54**
<i>Home language</i>			
Home Language is English	2.20	1.37	1.61
<i>Economic well-being</i>			
Household Income	0.26	0.11	2.31
Federal benefits	-0.84	0.83	-1.01
Urban Residency	-0.96	0.73	-1.31**
Number of Children in Household at 9 months	-0.33	0.24	-1.38
Constant	43.19	3.01	14.35

Note.. Statistically significant differences ($p < .05$) are noted in italics. SE²- Standard errors computed using Jackknife Method. All analyses are weighted
[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 4a (continued)

Model 2	Bayley Mental Test Scores at T2 (DV)		
	β	SE ²	Estimate
Grandparent co-residency at T2 (IV)	0.08	0.90	0.08
Child Characteristics			
<i>Child Gender</i>			
Female	3.77	0.45	8.31***
<i>Birth status</i>			
Multiple Birth-twin or triplets	-3.22	1.10	-2.93*
Child is first born	0.92	0.87	1.06
Very low birth weight	-3.58	0.99	-3.60***
Parent Characteristics			
<i>Education Level (excluded- less than high school)</i>			
Overall parent education	0.99	0.40	2.48*
Age of Mother on Birth Certificate	0.01	0.06	0.13
Mother employed in year prior to child's birth	0.31	0.80	0.39
<i>Marital status</i>			
Married at T1 (9 months)	1.17	0.71	1.65
Constant	43.19	3.01	14.35

Note. Statistically significant differences ($p < .05$) are noted in italics. SE²- Standard errors computed using Jackknife Method. All analyses are weighted
[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 4b

Testing Association Between Grandparent Co-residency and Children's Bayley Test Scores (At 2 years) Across Ethnoracial Groups using OLS Regression

Models	Model 1 (White) Bayley, T2			Model 2 (Black) Bayley, T2			Model 3 (Hispanic) Bayley, T2			Model 4 (Asian) Bayley, T2			Model 5 (Other) Bayley T2		
	β	SE ²	Estimate	β	SE ²	Estimate	β	SE ²	Estimate	β	SE ²	Estimate	β	SE ²	Estimate
Grandparent co-residency at T1/T2 (IV)	-0.79	1.43	-0.56	-0.15	3.30	-0.05	1.36	1.48	0.92	-0.02	1.38	-0.01	2.85	3.36	0.85
Household Characteristics															
<i>Nativity Status</i>															
Immigrant (at least parent I immigrant)	-2.05	1.57	-1.31	-2.81	2.92	-0.96	-1.26	1.93	-0.66	-0.77	2.79	-0.28	-1.60	1.82	-0.87
Home Language is English	2.14	2.58	0.83	1.49	7.82	0.19	3.01	2.92	1.03	2.28	1.50	1.52	3.07	2.90	1.06
<i>Economic well-being</i>															
Household Income (1-13)	0.29	0.21	1.37	0.15	0.41	0.36	0.04	0.20	0.21	0.24	0.31	0.76	0.03	0.46	0.06
Federal benefits	-1.72	1.30	-1.33	-1.07	2.60	-0.41	-1.87	1.23	-1.52	0.02	1.97	0.01	0.22	1.92	0.11
Urban Residency	-1.55	0.83	-1.87	-0.27	3.94	-0.07	0.50	2.08	0.24	-1.84	3.28	-0.56	1.06	1.76	0.60
Number of Children in Household at 9 months	-0.82	0.41	-2.00*	-0.38	1.77	-0.21	0.27	0.50	0.53	0.60	0.62	0.97	-0.85	0.84	-1.01
Constant	46.40	3.59	12.94	41.40	11.45	3.62	40.92	3.47	11.79	31.47	6.85	4.59	32.39	7.30	4.44

Note. Statistically significant differences ($p < .05$) are noted in italics. SE²- Standard errors computed using Jackknife Method. All analyses are weighted

+ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 4b (continued)

Models	Model 1 (White)			Model 2 (Black)			Model 3 (Hispanic)			Model (4 Asian)			Model 5 (Other)		
	β	SE ²	Estimate	β	SE ²	Estimate	β	SE ²	Estimate	β	SE ²	Estimate	β	SE ²	Estimate
Grandparent co-residency at T2 (IV)	-0.79	1.43	-0.56	-0.15	3.30	-0.05	1.36	1.48	0.92	-0.02	1.38	-0.01	2.85	3.36	0.85
Child Characteristics															
<i>Child Gender</i>															
Female	3.97	0.63	6.26***	3.19	2.05	1.55	3.23	1.01	3.2**	3.34	1.24	2.68**	6.38	1.78	3.6***
<i>Birth status</i>															
Multiple Birth-twin or triplets	-2.34	0.93	-2.52*	-5.82	5.45	-1.07	-4.05	2.25	-1.81	-6.39	3.44	-1.86	-2.84	3.23	-0.88
Child is first born	0.19	0.77	0.25	2.61	4.60	0.57	1.25	0.88	1.42	3.41	1.93	1.77	-0.79	1.94	-0.41
Very low birth weight	-3.65	1.78	-2.06*	-2.48	1.61	-1.55	-3.38	3.21	-1.05	-2.97	7.55	-0.39	-3.65	3.19	-1.14
Parent Characteristics															
Overall parent education (1-5)	1.27	0.40	3.15**	0.54	1.38	0.39	0.39	0.67	0.58	1.22	0.71	1.73	1.67	0.90	1.86
Age of Mother on Birth Certificate	-0.07	0.08	-0.90	0.06	0.20	0.31	0.05	0.09	0.53	0.23	0.18	1.26	0.09	0.19	0.50
Mother employed in year prior to child's birth	0.24	0.77	0.31	1.79	2.39	0.75	-0.02	1.47	-0.01	0.73	2.46	0.30	3.33	2.38	1.40
<i>Marital status</i>															
Married at T1 (9 months)	1.27	1.35	0.94	-0.08	2.13	-0.04	1.44	1.13	1.27	1.86	4.81	0.39	2.19	2.86	0.77
Constant	46.40	3.59	12.94	41.40	11.45	3.62	40.92	3.47	11.79	31.47	6.85	4.59	32.39	7.30	4.44

Note.. Statistically significant differences ($p < .05$) are noted in italics. SE²- Standard errors computed using Jackknife Method . All analyses are weighted
[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 5

Testing Grandparent Primary Careprovider as Moderator in Association Between Grandparent Co-residency and Children’s Test Scores

	β	SE ²	T-Test
Model 1 (Bayley Mental Test Score at T1)			
Constant	48.97	1.35	36.19***
Grandparent Co-residency T1 (A)	0.73	0.80	0.91
Co-resident Grandparent Primary Care Provider T1 (B)	0.50	0.43	1.14
Interaction Term (A*B)	0.19	1.35	0.14
Model 2 (Bayley Mental Test Score at T2)			
	β	SE ²	T-Test
Constant	44.95	2.99	15.02 ***
Grandparent Co-residency T1/T2 (A)	-0.28	1.50	-0.18
Co-resident Grandparent Primary Care Provider T1/T2 yrs (B)	0.86	0.72	0.12
Interaction Term (A*B)	1.14	2.29	0.5

Note. Dependent Variable – Bayley Mental Test Scores, all others are Independent variables.

SE²- Standard errors computed using Jackknife Method. All analyses are weighted.

Covariates are not included in this table.

Statistically significant differences ($p < .05$) are noted in italics.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5a

Testing Grandparent Primary Careprovider as Moderator in Association Between Grandparent Co-residency and Children’s Test Scores by Race Over 2 years

	β	SE ²	T-Test
Model 1 (Bayley Mental Test Score at T1, White)			
Constant	46.36	3.58	12.96***
Grandparent Co-residency T1/T2 (A)	-2.37	2.00	-1.18
Co-resident Grandparent Primary Care Provider T1/T2 (B)	-0.09	0.88	-0.10
Interaction Term (A*B)	5.07	3.82	1.33
Model 2 (Bayley Mental Test Score at T1, Black)			
Constant	41.76	11.31	3.69***
Grandparent Co-residency T1/T2 (A)	0.64	3.97	0.16
Co-resident Grandparent Primary Care Provider T1/T2 (B)	-0.99	2.11	0.47
Interaction Term (A*B)	-1.22	4.38	-0.28

Note. Dependent Variable – Bayley Mental Test Scores at 2yrs, all others are Independent variables.

SE²- Standard errors computed using Jackknife Method. All analyses are weighted using the 2 yr weight (W2C0). Covariates are not included in this table.

Statistically significant differences ($p < .05$) are noted in italics.

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5a (continued)

Model 3 (Bayley Mental Test Score at T1, Hispanic)	β	SE ²	T-Test
Constant	40.61	3.59	11.30***
Grandparent Co-residency T1/T2 (A)	2.60	1.83	1.42
Co-resident Grandparent Primary Care Provider T1/T2 (B)	0.96	1.47	0.65
Interaction Term (A*B)	-3.43	2.50	-1.37
Model 4 (Bayley Mental Test Score at T1, Asian)	β	SE ²	T-Test
Constant	31.23	6.79	4.60***
Grandparent Co-residency T1/T2 (A)	1.41	2.23	0.63
Co-resident Grandparent Primary Care Provider T1/T2 (B)	1.13	2.02	0.56
Interaction Term (A*B)	-2.56	2.94	-1.01
Model 5 (Bayley Mental Test Score at T1, Other)	β	SE ²	T-Test
Constant	32.3	7.44	4.34***
Grandparent Co-residency T1/T2 (A)	0.04	2.82	0.01
Co-resident Grandparent Primary Care Provider T1/T2 (B)	1.03	1.63	0.63
Interaction Term (A*B)	4.97	5.32	0.93

Note. Dependent Variable – Bayley Mental Test Scores at 2yrs, all others are Independent variables.

SE²- Standard errors computed using Jackknife Method. All analyses are weighted using the 2 yr weight (W2C0) .Covariates are not included in this table.

Statistically significant differences ($p < .05$) are noted in italics.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.