IN FACE OF ADVERSITY:

AN ECOLOGICAL APPROACH TO UNDERSTANDING

THE RESILIENCY OF DISADVANTAGED KINDERGARTENERS

by

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ABSTRACT OF THE DISSERTATION

In Face of Adversity:

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Dissertation Director:

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This study examined the relationships between socio-demographic risk, ecologically based resources and kindergarten readiness skills to investigate if the presence of ecologically based resources increases the likelihood of successful kindergarten readiness skills for disadvantaged children. An ecological and resilience framework was used to conceptualize that differences in kindergarten readiness can result from differences in resources in the multiple contexts in which the child is nested. The analysis used existing data from the nationally representative Early Childhood Longitudinal Study, Kindergarten Class of 1998-99. The sample used a subset of children who were all first-time kindergarteners without a diagnosed disability (N=14,918).

The results of this study found that one or more socio-demographic risks was associated with weaker kindergarten readiness skills, one or more ecologically based

resources was associated with stronger kindergarten-readiness skills, and the presence of some ecologically based resources reduced the negative effects of socio-demographic risks on kindergarten readiness skills. The findings of this study support the notion that kindergarten readiness may be understood as a function of resiliency, rooted in access to a variety of resources at multiple ecological levels. The implications and recommendations for policy, practice, theory building and research are discussed.

DEDICATION

Poppy's excitement and pride throughout my academic pursuits filled me with motivation and satisfaction.  His stories instilled me with a sense of connectedness to ancestors of the past.  His zest for life enabled me to seize the spectacular moments in the present.  His confidence in me and dreams of my endeavors gave me inspiration for the future.  Poppy, as promised, I dedicate this dissertation to you.

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CHAPTER I

The Problem in Context

More than a decade ago, the National Educational Goals Panel (NEGP) set forth the ambitious goal that "by the year 2000, all children in America will start school ready to learn" (Emig, Moore, & Scarupa, 2001, p. 1).  Incorporated into federal legislation, the drive to produce a nation of kindergarten ready children stimulated collective efforts toward achieving that elusive goal.  The longstanding achievement gap in educational outcomes continues to be a cornerstone of this plight and generates research and controversy.  As early as kindergarten, mounting evidence demonstrates that children arrive with stark differences in school readiness and that their early school performance follows a trajectory throughout the elementary school years (Foster & Miller, 2007; Hair, Halle, Terry-Humen, Lavelle & Calkins, 2006; Rathbun, West, & Walston,  2005). Children who demonstrate positive outcomes at the start of their education tend to remain higher performers whereas those demonstrating initially poor outcomes follow that course.

Variations in readiness have been found to be associated with a number of different factors including socio-demographic risk.  Children from more disadvantaged backgrounds face negative cognitive and social outcomes and are at greater risk for school failure.  Research demonstrates that this risk extends to those who live in poverty, who have a single parent family, whose mother has not completed high school, and/or whose primary language is something other than English (Hair et al., 2006; Rathbun et

al., 2005; Zill & West, 2002). Nationally representative research estimates that 46 percent of kindergarteners have one of the aforementioned socio-demographic risk factors (Zill, Moore, Smith, Stief, & Coiro, 1995).

In spite of adversity, some disadvantaged children have been found to arrive at school with advanced skills and perform at or above average from the start of kindergarten (Judge, 2005). How do we explain why disadvantaged children demonstrate significantly different degrees of school readiness? To address this question, this study looks at germane theory, research, and contested concepts in school readiness literature. In particular, this study undertakes an empirical investigation that examines the relationships between socio-demographic risk, multidimensional resources and kindergarten readiness skills.

Examining the Problem

After four decades of school reforms, the achievement gap persists among children entering kindergarten and widens over time (Bracey, 2003; Durham & Smith, 2006). Richard Coley's (2002) book, An Uneven Start: Indicators of Inequality in School Readiness presents a straightforward analysis of the skills of children entering kindergarten broken down according to socio-demographic characteristics. On some tasks, the differences are fairly small; for example, most children across socio-demographic categories are capable of recognizing numbers and shapes. On more sophisticated aspects of numeracy, however, affluent children have a significant advantage. Lee and Burkam's (2002) book Inequality at the Starting Gate further discusses the associations between socio-demographic risk and academic performance.

Their analysis shows that low-income children score below the national average in reading and mathematics. The overall picture is that achievement increases with family income.

The recognized risk of economic disadvantage on children's development, which led to the inception of Head Start in the 1960s, remains a major impediment to children's academic achievement. Low income children are often inadequately prepared for the demands of the formal education setting and are disproportionately retained in kindergarten or referred for special education placement (Piotrkowski, 2004). Furthermore, children from homes lacking a nurturing and supportive adult are at highest risk for school failure (Casady, Luster, Bates, & Vanderbilt, 2002). The absence of intellectual stimulation at home often goes hand in hand with poverty, thus intensifying the detrimental effects (Casady, Luster, Bates, & Vanderbilt, 2002).

The achievement gap in educational outcomes as a consequence of *SE*S was a driving force in the development of Head Start (Piotrkowski, 2004). However, some argue that the resources offered by Head Start are not easily accessible (Hamm, 2006; Lamb-Parker et al., 2001) For example some statistics show that only 27% of low-income children and 14.6% of lower middle-income children participate in Head Start (Lee & Burkam, 2002). The same data show that 65% of high-income children and 52% of upper middle-class children attend a formal preschool program as opposed to only 20% of children in the lowest income category. Consistent with the notion of resilience, theorists postulate that participation in an early childhood program can act as a protective factor and outweigh the disadvantages of risks such as low socio-economic status (Judge, 2005).

Early literacy development is also a pivotal factor in children's academic success (Durham & Smith, 2006; Foster & Miller, 2007; Judge, 2005). Teachers and principals are virtually unanimous in giving precedence to literacy skills as prerequisite for academic achievement (Wright, Diener, & Kay, 2000). Children who begin school with emergent literacy skills have much greater probability of advancing in the general school curriculum than their peers who lack basic literacy skills (Foster & Miller, 2007). Over time, the learning trajectories of these two groups of children grow further apart; after fourth grade, only 13% of struggling readers benefit from remediation and intervention. The divergent paths of children who enter kindergarten with and without critical literacy skills highlight the "Matthew effect," or the "rich get richer—poor get poorer" (Foster & Miller, 2007, p. 174) effect. The metaphor is highly apt; poor children are heavily overrepresented in the group beginning kindergarten without adequate literacy skills.

Statistics show that 12.8 million children are living in poverty (U.S. Census Bureau, 2008) and the achievement gap further exposes such inequities. The historical failure to ameliorate the inequalities in education by closing the achievement gap continues to be a civil rights issue attracting considerable debate. This social injustice deserves the attention of social workers who should be called upon to intervene and ameliorate this social problem and human rights issue. It is increasingly clear that children's educational outcomes vary based upon the skills they bring at the start of school. Achievement gap research further demonstrates that those children who are at risk when they enter kindergarten are likely to fall further behind throughout their schooling (Hair et al., 2006). In spite of collaborative efforts the duty to narrow the achievement gap continues to exist and needs further examination from a social work

perspective to aid policies and practices geared toward improving kindergarten readiness skills.

<div align="center">Theoretical Rationale of the Study</div>

Why do children with the same socio-demographic disadvantages emerge with significantly different degrees of school readiness?  The concept of resilience grew out of recognition that many children flourished even despite exposure to cumulative stress (Luthar, Cicchetti, & Becker, 2000).  Early resilience research focused on internal attributes of the children, who were often portrayed as "invulnerable" (Luthar, Cicchetti, & Becker, 2000, p. 544).  Resilience research historically focused on individual differences without consideration of the context of the ecosystem (Waller, 2001).  More recently, the profession of social work has expanded the concept of resilience to be understood as a transactional product of individual attributes and the environmental context (Waller, 2001; Fraser, 1999).  Flaws in the assumption that resilience is something intrinsic and stable ultimately led to research outlining three types of factors contributing to the development of resilience: (a) child characteristics, (b) family characteristics, and (c) characteristics of the broader social environment (Luthar, Cicchetti, & Becker, 2000).

The conceptualization of resilience presented by Luthar et al. (2000) invokes Bronfenbrenner's ecological model, which is considered an applicable paradigm. Bronfenbrenner's (1979) ecological systems model has become a prominent framework for examining the impact of poverty on children's intellectual and social–emotional development (Eamon, 2001; Johnson, 1994).  Tracing the history of children identified in educational literature as "high risk students," Johnson (1994) noted that the term is often

used interchangeably with disadvantaged which first appeared in the 1960s to denote children whose ethnic and socioeconomic backgrounds predisposed them toward alienation from the greater society. Deprived was another term common to the same era. The 1970s brought more sophisticated understanding of the impact of socioeconomic status (*SE*S) on school achievement, thus, "The academic repercussions of social class and poverty were examined in relation to student physical growth and development, language, cognition, and personality" (Johnson, 1994, p. 36).

From a social work perspective, ecological frameworks examine resilience as a function of multiple contextual factors, as opposed to over-focusing on attributes of the individual. Individual characteristics are recognized as micro-level influences; however, macro-level influences of the broader environment are given notable consideration. For example, school readiness research has found that children's individual skills account for less than 25% of the variance in kindergarten outcomes (LaParo & Pianta, 2000). Ecological approaches recognize that the child is nested within a group of interacting systems. The skills a child brings to the start of kindergarten emerge as a result of influences from multiple sources including the family, community and school (Pianta & Walsh, 1996).

From their singular focus on *SE*S and child attributes, respectively, the two distinct but related concepts of academic risk and resilience have both come to emphasize an ecological perspective within the field of social work. A number of sources reviewed for this project employed ecological and resilience frameworks for examining kindergarten readiness in children (Adelman & Taylor, 2001; Bagdi & Vacca, 2005; Block & Block, 2002; Devaney & Milstein, 1998; Evans & English, 2002; Fantuzzo,

McWayne, Perry, & Childs; 2004; Johnson, 1994; Judge, 2005; Huebner, 2000; Kim-Cohen, Moffitt, & Taylor, 2004; Maggi, Kohen, Hertzman, & D'Angiulli, 2004; McWayne, Hampton, Fantuzzo, Cohen, & Sekino, 2004; Pettit, Bates, & Dodge, 1997; Pianta, 2002; Piotrkowski, 2004; Rimm- Kaufman & Pianta, 2000; Seginer, 2006; Wright & Smith, 1998). The authors span a range of disciplines including social work, education, child development, and psychology. Most are united in the belief that multidimensional resources have the capacity to buffer the negative impact of socio-demographic risk on children's academic achievement.

<div align="center">Conceptualizing School Readiness</div>

Pianta and LaParo (2003) declare that, "Definitions are important because perceptions of the ways in which children develop can shape decisions about programs and policies related to early schooling" (p. 2003). Pianta (2002) observed that there are numerous perspectives of school readiness expressed by different stakeholder groups. Various surveys of parents show different emphases on academic or social–emotional competence, possibly reflecting media attention to academic achievement or pro-social skills (Diamond, Reagan, & Bandyk, 2000; Kim, Murdock, & Choi, 2005; Plevyak & Morris, 2002). Parents' cultural heritage and neighborhood characteristics also influence their conceptions of school readiness (Harding, 2006).

*Parent and Educator Perspectives*

Parents and teachers do not necessarily agree on what constitutes school readiness (Boethel, 2004; Piotrowski, 2004; Piotrkowski, Botsko & Matthews, 2001; Plevyak &

Morris, 2002). Some authors contend that the voices of poor families are often ignored and should be awarded more weight in targeting preschool preparation and Title I services once children have entered school (McAllister, Wilson, Green, & Baldwin, 2005; Shoaf, Shoak, & Leck, 2006). Diamond et al. (2000) and Kim et al. (2005) used data from the 1993 National Household Education Survey (NHES) to examine parents' perspectives of school readiness. Findings showed that most parents espoused a holistic conception of school readiness that encompassed an array of behavioral and academic skills. Early Head Start parents express a similar perspective (McAllister et al., 2005). Parents tend to believe that social competence precedes academic skills.

Diamond et al. (2000) further explored the learning experiences parents provided their children. The majority of respondents gave their children regular opportunities to engage in learning activities at home such as reading, learning the alphabet, and watching educational television programs. An ironic pattern was that while behavioral and academic factors were intertwined in the parents' overall conceptions of school readiness, academic readiness was paramount in their perceptions of whether their own child was sufficiently prepared.

Kindergarten teachers surveyed by Pianta and LaParo (2003) stated that children who arrive at school with "teachability skills" have the capacity to gain from educational opportunities offered in class (p. 26). The teachers targeted the absence of formal preschool preparation and lack of stimulation in the home environment as factors that undermined the development of teachability. "Teachability" in the form of self-controlled behavior and active engagement with learning are associated with better attention and

social competence, and ultimately greater success, in Head Start classrooms (Fantuzzo et al., 2007).

According to Plevyak and Morris (2002), the perspectives of parents and teachers regarding school readiness appear to have diverged over time. Research findings presented at the 1996 annual meeting of the American Educational Research Association showed that parents, caregivers, and kindergarten teachers all concurred on the three major indicators of school readiness: (a) being healthy and having good nutrition and adequate sleep; (b) being capable of expressing their needs, desires, and thoughts; and (c) being curious and enthusiastic about engaging in novel activities.

*Patterns of School Readiness*

Konold and Pianta (2005) analyzed data to formulate empirically derived profiles of typically developing preschool age children. The data were drawn from 964 typically developing 4.5 year olds. The profiles concentrated on two key dimensions of school readiness: cognitive functioning and self-regulation skills. Six patterns evolved from the study, supporting the premise that cognitive and self-regulation skills develop fairly independently and inconsistently. The six patterns were attention problems (Profile 1), low cognitive ability (Profile 2), low to average social and cognitive skills (Profile 3), social and externalizing problems (Profile 4), high social competence (Profile 5), and high cognitive ability to mild externalizing problems (Profile 6).

A particularly notable finding was that despite evidence of behavior problems, children with high cognitive ability still performed better than children with other profiles, even those high in social competence (Konold & Pianta, 2005). These results

suggested that high cognitive ability might compensate for weakness in other areas. High intelligence has in fact been found to be one of the attributes associated with resilience in children (Garmezy, 1983; Luthar et al., 2000).

High social competence bestowed an academic advantage on children with average cognitive ability (Konald & Pianta, 2005). Children with Profile 4 had the lowest levels of academic achievement. Konald and Pianta associated this profile with inadequate mother and child interactions. This composite profile is associated with high risk for grade retention and academic failure among African American boys (Blair, 2001). The overall implication, according to Konald and Pianta (2005), is that there are multiple pathways to attaining school readiness. Evidence that compensatory mechanisms may buffer risk can help target strategies for building on children's strengths to advance their academic achievement.

Therefore, rather than focusing on differences, Pianta (2002) finds it more practical and productive to conceptualize school readiness as basically "multifaceted, complex, and system," which means it combines (a) children's home experiences and home resources, (b) resources and experiences found in the childcare and preschool programs children attend, (c) community resources supporting high quality childcare and parenting, (d) the scope of collaboration between the school and family and child care resources, and (e) the extent that kindergarten and first grade classroom experiences build on the competencies children bring with them to the school setting (Pianta, 2002, p. 2).

*National Educational Goals Panel*

The multidimensional nature of school readiness is intrinsic to the way school readiness is operationalized by the National Educational Goals Panel (Pianta, 2002). The

National Educational Goals Panel (NEGP) was formed in July 1990 for the purpose of evaluating and reporting the extent of state and national progress in meeting the eight designated National Education Goals (Emig et al., 2001). For the purpose of ensuring that all children are prepared for school, the NEGP outlined three fundamental elements of school readiness: (a) the child's readiness for school, (b) the schools' readiness for children, and (c) family and community services and supports that promote children's school readiness (Emig et al., 2001).

As one of their first endeavors, the NEGP Resource Group on School Readiness discoursed on the "dimensions of school readiness" (Pianta, 2002, p. 2). The discussion yielded no unanimous decision on what constitutes school readiness. Departing from traditional assumptions equating academic readiness with school readiness, the NEGP turned to child development and educational research, arguing in favor of a holistic model of school readiness that incorporates physical, social, and emotional, as well as cognitive development, as signs of children's readiness (Adelman & Taylor, 2001; Emig et al., 2001). In the report Reconsidering Children's Early Development and Learning Toward Common Views and Vocabulary, the NEGP elaborated five aspects of school readiness:

(1) Physical well-being and motor development: These concepts encompass factors such as health status, growth, disability, and gross and fine motor skills.

(2) Social and emotional development: Social development denotes children's competence in interacting with others; emotional development includes facets such as self-concepts and divergent thinking, which enable children to

comprehend their own feelings and those of others as well as express their personal feelings.

(3) Approaches to learning: This refers the child's ability to apply knowledge, skills, and talent; this dimension is influenced by characteristics of the child such as enthusiasm, curiosity, perseverance, and temperament, as well as by cultural factors.

(4) Language development: This includes verbal language capabilities and emergent literacy.

(5) Cognition and general knowledge: This encompasses knowledge about the characteristics of specific objects, along with the ability to detect differences and similarities in objects, people, and events; this dimension also covers awareness of alphabetic, numeric, and spatial concepts (Emig et al., 2001).

Background of the ECLS-K Study

Until the last decade, most evidence of children's skills on entering kindergarten was derived from parents' reports (Zill & West, 2002). The inception of Early Childhood Longitudinal Study—Kindergarten Cohort (ECLS-K) in fall 1998 marked the first large-scale, systematic evaluation of the scope of kindergarten children's skills, knowledge, health, and behavior based on a large, nationally representative sample. The ambitious project was designed to monitor the children's progress through fifth grade (National Center for Education Statistics, 2000).

ECLS-K assesses young children's academic competence in the areas of reading, mathematics, and general knowledge (Zill & West, 2002). The ECLS-K also gathers data

on children's health, social competence, behavior issues, and approaches to learning from parents' and teachers' reports (Zill & West, 2002). A hallmark of the ECLS-K is the adoption of a holistic or "whole child" approach to school readiness (Zill & West, 2002). As previously mentioned social workers strongly endorse this perspective and decry a narrow focus on academic skills in preparing children for kindergarten (Plevyak & Morris, 2002). Resilience encompasses multiple dimensions of growth and development (Kim-Cohen et al., 2004; Luthar et al., 2000) and the most effective programs for promoting children's school readiness are grounded in an ecological philosophy of child development (Adelman & Taylor, 2001; Devaney & Milstein, 1998; Emig et al., 2001).

Results of ECLS-K research reveal that overall children begin kindergarten with basic alphabetic and numeric skills (Zill & West, 2002). Most are in good health, although teachers report increasing numbers of children with improper health habits (Plevyak & Morris, 2002). The research reveals that a sizable minority of children experience behavioral or communication problems with the potential to interfere with school success (Zill & West, 2002). Based on reports from parents, approximately 18% of children have some signs of hyperactivity compared to their peers, 13% experience difficulties with attention, and 11% experience phonological or articulation problems. Smaller proportions of children have sensory or motor impairments. Although Zill and West note that parents' accounts of developmental difficulties do not inevitably imply the existence of a diagnosed disorder, early speech and language problems (Foster & Miller, 2007) and behavior and attention problems (Blair, 2001; Webster-Stratton & Hammond, 1998) may lead to poor academic outcomes without intervention. Indeed, teachers view

communication skills, behavioral self-control, and sustained attention as critical to classroom success (Zill & West, 2002).

ECLS-K assessments disclosed a wide range of variations in the knowledge and skills of kindergarten children and associated factors (Zill & West, 2002).  In each of the domains assessed, a proportion of children were remarkably proficient while others had skill levels below the average child.  The study identified four basic socio-demographic risk factors that made children vulnerable to falling behind their peers: (a) having a mother with less than a high school education, (b) residing in a household receiving welfare benefits, (c) living in a single parent family, and (d) having parents whose primary language is not English.  Close to half (46%) of kindergarten children had at least one of the four risk factors (Zill & West, 2002).  Almost one-third (31%) had a single risk factor and 16% had two or more.  The proportion of children with disadvantaged backgrounds rises substantially in urban areas, where two-thirds of new kindergarteners have at least one risk factor and 26% have more than one risk.  The ECLS-K analysis also revealed on average that one child in 20 with socio-demographic risk scored two proficiency levels ahead of the typical kindergartener in readiness skills (Zill & West, 2002).

Conceptual Framework of the Study

*Purpose of the Study*

Research has found that socio-demographic risk factors are associated with unsuccessful educational outcomes but that in spite of adversity some children perform at

advanced levels from the start of kindergarten. Researchers have also compared different analytic approaches to investigating the associations between socio-demographic risk and school readiness skills including analyzing individual risk factors as predictors and creating cumulative risk composites (Rathbun, West, & Walton, 2005). Many of these studies have been limited because they rely on small sample sizes that were not representative of the U.S. population of children or they tended to focus on sub-samples with an over-representation of risk or psychopathology (Rathbun, West, & Walton, 2005). Additionally, much of the discussion has focused largely on cognitive skills, particularly emerging literacy skills that children bring with them to school. Finally, although recent policy endorsed the conceptualization of readiness as a "whole-child" construct, other dimensions of readiness receive less attention in the literature (Hair et al., 2006; Mantzicopolos, 2003).

There remains a need to incorporate an ecological framework and a holistic definition of kindergarten readiness to analyze factors that lead to success for all kindergarteners, and especially for those categorically at risk for school failure. This study extends on existing research and further explores the relationship between socio-demographic risk factors, ecologically based resources and kindergarten readiness skills. It is distinguishable from existing literature in that it incorporates multiple dimensions (motor development, social/emotional, approaches to learning, literacy, and math skills) of kindergarten readiness, as recommended by theorists and policymakers. It adds to current discourse in that it examines factors that are hypothesized to contribute to successful kindergarten readiness skills for disadvantaged children while buffering the negative effects of risk.

Thus, this study extends on previous research in several ways:

(1) It explores the relationship among socio-demographic risk factors, ecologically based resources and kindergarten readiness skills.

(2) It takes into account a comprehensive and holistic definition of kindergarten readiness.

(3) It uses a nationally representative sample to draw conclusions and implications that apply to America's kindergarteners.

*Research Question*

Research continues to demonstrate that children begin school with vast differences in their skills and readiness to learn (Foster & Miller, 2007; Hair, Halle, Terry-Humen, Lavelle & Calkins, 2006; Rathbun, West, & Walston, 2005). As previously mentioned, much of the discussion has relied on socio-demographic differences to explain this variability. A failure of this research is the conceptualization of risk factors as static attributes of the child, without regard to the influence of contextually based resources. In spite of existing socio-demographic risk, some children have been found to arrive at school with skills that match or surpass their peers. Further research is needed to examine resources from an ecological perspective to further understand resiliency and differences in kindergarten readiness skills.

Specifically, this study investigates the following question: Does the presence of ecologically based resources increase the likelihood of successful kindergarten readiness skills for disadvantaged children?

Using existing data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, this study (a) describes variation in family background characteristics, ecologically based resources, and kindergarten readiness skills in a representative sample of this nation's kindergarteners; (b) examines the association between socio-demographic risk factors, ecologically based resource factors and kindergarten readiness skills; and (c) investigates the effect of ecologically based resources on kindergarten readiness skills for disadvantaged children.

*Definitions*

The following definitions generally describe the terms used in this study. Operational definitions for these terms and other variables in this study are provided in the measures section of Chapter III that reviews methodology in detail.

*Kindergarten readiness*. This study uses an advanced conceptualization of readiness that includes multiple dimensions of a child's development and adaptation to the classroom. Aligned with recommendations from NEGP, this study uses a definition of kindergarten readiness that incorporates motor development, social/emotional skills, approaches to learning, and reading and math skills.

*Ecologically based resources*. This refers to experiences and assets of a child that occur within the environmental context. Consistent with an ecological framework, these factors are multidimensional in nature and include family, community and school level resources. Home educational environment, early school experience and school setting are used in this study to represent ecologically based resources.

*Socio-demographic risk.* Consistent with the literature (Hair, Halle, Terry-Humen, Lavelle, & Calkins, 2006; Rathbun et al., 2005; Zill & West, 2002), this study defines socio-demographic risk as factors that are associated with the likelihood of negative educational outcomes. The factors included in this definition extend to those who receive welfare, who have a single parent family, whose mother has not completed high school, and/or whose primary home language is something other than English.

*Disadvantaged children.* In this study disadvantaged children are those who live in a household with one or more socio-demographic risk factor.

## Significance of the Study

School readiness research has the benefit of holding implications for both practice and policy. For example, parent involvement programs that enhance connections between home and school have been found to benefit both schools and children (Pianta & Walsh, 1996). Evidence-based research guides school practices and is responsible for the implementation and improvement of home-school collaboration. This study offers early childhood programs such as Head Start, pre-schools and kindergartens, a perspective on school readiness that should be integrated into best practices.

For program development initiatives to be successful, they need legislative support in policy. NEGP legislation brought the focus of school readiness to the forefront and the No Child Left Behind (NCLB) legislation maintains its accountability. Under current educational policies, state initiatives focus on ensuring all students begin school ready to learn regardless of socio-demographic background. States are also required to show that subgroups, such as those at economic disadvantage, are reaching

proficiency according to standardized tests (Jennings, 2002). Furthermore, all children

are expected to meet minimum academic standards by third grade (Jennings, 2002). With

third grade set as the point of accountability, legislation affirms the need for effective

early childhood programs. Taken together, these policy enactments rely on scholarly

research, such as this study, to both inform policy re-authorizations and support evidence

based practice.

Finally, this research also adds to social work knowledge building by contributing

to the definitions of contested concepts and the development of theoretical perspectives.

Resiliency, as a concept, has deep roots in social work. It can be used to conceptualize

social problems and build models for intervening (Fraser & Richman, 1999).

Understanding social problems and devising interventions requires that both risk and

protective factors be addressed. Social workers must consider negative influences in

accordance with a strength based perspective in order to buffer risk and achieve

successful adaptation (Fraser & Richman, 1999). Considering the growing complexity of

literature on which social work relies, as well as the demand for evidence-based practice,

theoretical building is essential in the area of resilience.

## Organization of the Study

The content of this study is organized into five distinct chapters. The first chapter

provides the problem formulation, including an orientation to the relevant theoretical and

empirical foundation. The significance of the study is explored as well as implications

for future research. Finally, the research question and the accompanying conceptual

framework are discussed. The second chapter synthesizes a critical theoretical and

empirical review as it applies to this study. The third chapter details the methodology

used to examine the research question. The research approach and design are described

in detail and all measures are described in operational terms. The fourth chapter presents

the results and findings of the statistical analysis used in this study and the fifth chapter

presents a summary and discusses the conclusions and implications.

CHAPTER II

Literature Review

In his analysis of recent research on the academic achievement gap, Bracey (2003) found it redundant that studies are consistently focusing on the role of *SE*S in educational inequities. Head Start was conceived as part of the "War on Poverty" in 1965. Johnson (1994) shares a similar perspective, arguing that over-focusing on economic disadvantage ignores the dynamic interactions of features of the child and environment that come into play in producing outcomes. This chapter reviews the theoretical and empirical research that guides the conceptual model in this study. In particular, ecological and resiliency frameworks are discussed with theoretical and empirical relevance supporting the notion that multidimensional resources can buffer the negative impact of risk.

Theoretical Perspectives

*Ecological Model*

According to an ecological perspective, children are at risk for adverse outcomes when they are confronted with "environments for which they are ill equipped" (Johnson, 1994, p. 39). Bronfenbrenner (1979) presented an ecological model of child-environment dynamics that offers a cohesive framework for understanding academic risks.

Bronfenbrenner's ecological network is comprised of four nested systems or levels, originally described as "nested structures" (Eamon, 2001, p. 257). The first level is the microsystem, consisting of a "physical milieu, a program of activities, inhabitants, and a location in time and space" (Johnson, 1994, p. 39). Next is the mesosystem, which focuses on interactions between two or more microsystems in which the developing child is involved. The third level is the exosystem, which is external to the child, but which has activities affecting microsystems that the child is part of. The community is an example of an exosystem. The fourth level is the macrosystem, which encompasses the array of social and cultural forces that affect human development.

The microsystems in which the child develops include the home, school, and peer group (Eamon, 2001). Poverty affects the microsystem because it undermines family functioning and places a burden on families to cope with limited resources. Poor families also tend to have fewer social supports. In terms of the school setting, low-income schools tend to have large classes, fewer material and human resources, and inexperienced and under-qualified teachers (Bracey, 2003). Class composition in kindergarten has been found to influence children's academic development (Maggi et al., 2004). Specifically, the proportion of children classified as highly competent affects performance in later grades. Given inequities in school readiness based on *SE*S, the impact is especially pronounced for children in economically segregated schools.

Evans and English (2002) argue that the impact of stressors in the child's immediate environment is often overlooked in research into environmental risks related to poverty. In their study of rural children, low-income children were exposed to a "broader array of cumulative, multiple stressors" compared to more affluent peers (p.

1243).  These included living in crowded, noisy, shabbily maintained homes, chaotic

family dynamics (including family violence), and higher incidence of child and family

separation.  These findings parallel the surroundings of low-income urban families.

Evans and English (2002) conducted their study from the perspective of stress and

coping.  Stress-coping models, as well as family process models, are often applied to

assess the microsystems of children growing up in poverty (Eamon, 2001).  Stress,

coping, and risk are central to the understanding of resilience (Burchinal, Roberts, Zeisel,

Hennon, & Hooper, 2006; Judge, 2005; Luthar et al., 2000).  Head Start and similar early

childhood programs intervene at the microsystem level by fostering children's physical,

cognitive, and social–emotional development, involving parents and offering parent

training, and providing families with access to a network of services and supports

(Abbott-Shim, Lambert, & McCarty, 2003; Devaney & Milstein, 1998; Duch, 2005;

Fantuzzo et al., 2005; Fontaine, Torre, & Grafwallner, 2006; Gamel-McCormick &

Amsden, 2002; Hemmeter, Ostrosky, & Fox, 2006; McWayne et al., 2004; Olsen &

DeBoise, 2007; Parker et al., 1999; Piotrkowski, 2004).

Mesosystems relate to connections between microsystems in the developing

child's world (Eamon, 2001; Johnson, 2001).  The most obvious channel for facilitating

children's kindergarten readiness and subsequent academic success is family involvement

with school, which has a documented positive impact on educational outcomes (Fantuzzo

et al., 2004; Huebner, 2000; Marcon, 1999; McWayne et al., 2004).  The establishment of

collaborative partnership between families and schools is a cornerstone of an ecological

approach to school readiness, particularly for disadvantaged children (Bagdi & Vacca,

2005; Block & Block, 2002; Boethel, 2004; Devaney & Milstein, 1998; Emig et al.,

2001; Hemmeter et al., 2006; Johnson, 1994; Wright & Smith, 1998). This perspective extends into the exosystem with the creation of collaborative partnerships between home, school, and community resources (Eamon, 2001; Johnson, 1994; Seginer, 2006). Bronfenbrenner called the macrosystem a cultural "blueprint" that affects the social structures and activities in the more proximal systems levels (Eamon, 2001, p. 261). Elements of the macrosystem include material resources, opportunities, available alternatives, lifestyles, customs, and collective knowledge and cultural beliefs.

*Resilience*

The concept of resilience grew out of recognition that many children achieved successful outcomes in spite of adversity (Luthar, Cicchetti, & Becker, 2000). Although early research conceptualized resilience as internal attributes, resilience in the field of social work is now understood as including child and family characteristics, and characteristics of the broader social environment. Luthar et al. define resilience as "a dynamic process encompassing positive adaptation within the context of significant adversity" (p. 543). Stress, coping, and risk are implicit in their definition, along with two basic conditions: (a) exposure to a serious threat or severe adversity, and (b) "the achievement of positive adaptation despite major assaults on the developmental process" (Luthar, p. 543). In their conception, resilience is a dynamic, unfolding process as opposed to a fixed characteristic of the individual. An ecological perspective is evident in this formulation of resilience that invokes the resource model of school readiness (Piotrkowski, 2004).

*Resource Model of School Readiness*

Piotrkowski (2004) applies a resource model of school readiness which combines elements of ecological and resilience frameworks. According to Piotrkowski (2004), the notion of school readiness has aroused criticism that it conceptualizes readiness as a fixed entity, placing unwarranted responsibility on children, and neglecting influences such as individual child attributes, inequities in children's early experiences, and the schools' obligation to provide all children with appropriate learning opportunities. Some experts question whether the concept of school readiness has any real utility.

Piotrkowski (2004) believes an ecological model of school readiness is compatible with the principles of Head Start and best serves the interests of developing children. Three fundamental tenets guide this conceptualization: (a) school readiness should not be treated as a static feature of children, (b) school readiness should integrate the multiple aspects of children's development that are key to school success, and (c) school readiness is based on awareness of the mutual obligations of families, schools, and communities to facilitate children's successful school learning experiences.

Simply stated, Piotrkowski believes that "School readiness can be conceptualized as the political, social, organizational, educational, financial, and individual resources that help prepare children for school" (Piotrkowski, 2004, p. 131). The use of the term resources denotes that school readiness is a dynamic construct that extends beyond the individual child to encompass the plethora of influences on children's development. Family readiness encompasses sufficient financial resources, an enriching environment for literacy development, and social supports to assist parents in care giving and teaching roles. At the school level, readiness means effective leadership, a welcoming atmosphere

for parents and children, activities to support high quality teaching and learning, and partnerships with families and community agencies (Piotrkowski, 2004). For the community level, readiness encompasses an array of resources including affordable, good quality child care and preschool programs, accessible libraries and health care, and other supports services for families and children (Piotrkowski, 2004). This multidimensional conceptualization of resources is congruent with the notion that protective factors can improve outcomes in the face of adversity.

*Social Capital*

The notion of multidimensional resources buffering the negative effects of risk incorporates elements of a social capital perspective. Drawing on the concept of human capital, Piotrkowski (2004) maintains that, "If we think of schooling as the work children do…then programs such as Head Start help create rudimentary human capital" in the form of an investment in resources intended to help children succeed in "their workplace," namely "the classroom setting" (pp. 131–132). Implicit in this formulation is the idea that investments or resources moderate children's success in the classroom.

As outlined by Coleman (1988), "human capital encompasses the acquired knowledge, intelligence, common sense, personal abilities and talents housed within a particular person" (Ferguson, 2006). In terms of children's development, human capital typically refers to parents' educational level, which has a profound impact on the type of intellectual stimulation the child receives. School readiness research supports that assumption (Fantuzzo et al., 2005; Rathbun et al., 2005). The degree of support and

assistance children receive from their families can either advance or impede their cognitive growth.

Family human capital extends to financial capital and social capital (Ferguson, 2006). Family social capital is a frequent focus of research on children's academic achievement (Durham & Smith, 2000; Parcel & Dufur, 2001). Family social capital refers to the social networks established by family members and the interactions between parents and children that influence their future development (Durham & Smith, 2000; Ferguson, 2006). School social capital and community social capital extend the concept further to incorporate the network of systems in the ecological framework (Ferguson, 2006; Parcel & Dufur, 2001). Ferguson (2006) contends that social service professionals can play a key role in devising strategies to enhance families' social capital. Social workers are envisioned as a liaison between schools and low-income families as part of intensive efforts to close the achievement gap (Shoaf, Shoaf, & Leck, 2006).

*Multidimensional Perspective*

Pianta (2002) also incorporates ecological and resilience perspectives in his view of school readiness as a complex and multifaceted phenomenon that integrates multiple domains of children's development and their transactions with the broader environment (Rimm Kaufman & Pianta, 2000). Inherent in this model of school readiness is the idea that children require a set of competencies to enable them to succeed in the formal school setting (Pianta, 2002). According to Pianta, two core competences are fundamental to children's subsequent success: (a) literacy and language competencies (narrative and discourse capabilities, phonological awareness) and (b) social and self-regulatory

competencies (sustained attention, emotional and social competence interacting with others). These individual differences in child characteristics interact with contexts through a transactional process (Rimm Kaufman & Pianta, 2000). According to this model, school outcomes should be understood as a combination of direct and indirect influences. Child competencies are acknowledged as directly contributing to school readiness, but the family, neighborhood, and school contexts in which the child is nested must also be considered (Rimm Kaufman & Pianta, 2000). Simple stated, ecology surrounds the child that considers the influence of contexts on child competencies and school outcomes (Rimm Kaufman & Pianta, 2000).

Recognition of the paramount importance of children's competencies in children's school success is virtually universal (Durham & Smith, 2006; Foster & Miller, 2007; Wright et al., 2000). Strategies to engage parents in learning development activities at home occupy a prominent position in research on fostering the cognitive development of disadvantaged children (Huebner, 2000; Judge, 2005; Raikes et al., 2006). Social and emotional competence are awarded less attention, which some early childhood educators perceive as a casualty of the emphasis on academic development (Plevyak & Morris, 2002). Nonetheless, problem behaviors interfere with children's ability to learn and are often a marker for negative outcomes such as grade retention or special education referral (Blair, 2001; Webster-Stratton & Hammond, 1998). From an ecological and resilience perspective, child competencies can act as protective factors and increase the likelihood of successful outcomes (Rimm Kaufman & Pianta, 2000).

Theoretical Framework of the Study

Taken together, these perspectives on school readiness all fit into a paradigm invoking an ecological approach to examining the resiliency of disadvantaged kindergarteners.  The contextual theories of development discussed incorporate influences from multiple systems in which the child develops (Bronfenbrenner, 1979; Luthar, Cicchetti, & Becker, 2000; Piotrkowski, 2004; Coleman, 1988; Pianta, 2002). These nested contexts include characteristics of the family, community and school, and influence the child over time as well as the contexts themselves (Rimm-Kaufman & Pianta, 2000).  Consequently, a broader theoretical framework emerges for studying kindergarten readiness in which skill acquisition is not situated exclusively within the child, but rather the result of dynamic interactions among multiple systems (see Figure 1).  Similar to the theoretical framework suggested by Rimm-Kaufman and Pianta (2000), kindergarten readiness can thus be understood as an assessment of ecology which both influences the child and is also influenced by the child.  This acknowledges that a child's kindergarten readiness skills develop within a set of contexts and can vary based upon family, community and school experiences.  Such a framework acknowledges the importance of "ready" families, schools, and communities and the contribution of resources to readiness at these levels (Piotrkowski, 2004; Rimm-Kaufman & Pianta, 2000).  The framework being advanced here, therefore conceptualizes that differences in kindergarten readiness can result from differences in resources in the multiple contexts in which the child is nested.

Figure 1

*Theoretical Framework of the Study*
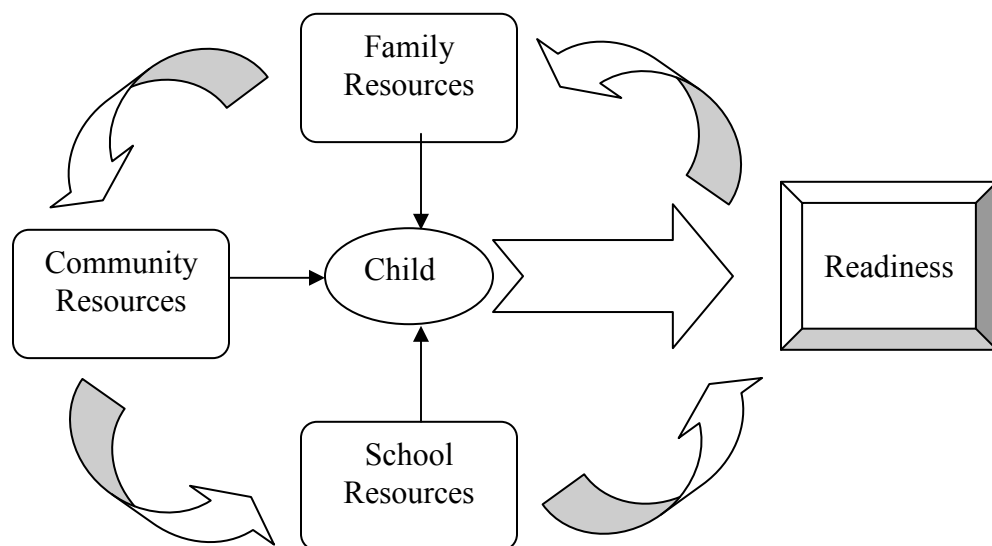
Multidimensional Factors Affecting Kindergarten Readiness

*Risk in School Readiness*

Research has demonstrated that on numerous measures, children with socio-demographic risks differed in readiness from peers with no risks (Burchinal et al., 2006; Fantuzzo et al., 2005; Hair, Halle, Terry-Humen, Lavelle, & Calkins, 2006; Rathbun et al., 2005; Zill & West, 2002). ). In particular, research has found that four socio-demographic risk factors are associated with lower reading, math and motor skills, social–emotional skills and approaches to learning for entering kindergarteners (Zill & West, 2001). For example, research using the ECLS-K dataset revealed that children with one of these factors were twice as likely to have reading scores in the lowest 25% of the distribution and half as likely as their non-risk peers to exhibit specific age-appropriate math skills. Additionally, it was found that 35% of children with one risk factor scored in the lowest third of the distribution on fine motor skills, while 73% were rated to be less socially adept by teachers, and between 30%-40% lacked positive approaches to learning such as eagerness, task persistence and attention span (Zill & West, 2001.)

Extensive school readiness research further supports these findings. Hair et al. (2006) reported on the competencies of ECLS-K children in first grade. At the onset of kindergarten, the children were clustered into four profiles: comprehensive positive development, social–emotional and health strengths, social–emotional risk, and health risk. Children with risk profiles tended to be from families with more than one aspect of socioeconomic disadvantage. These children scored lowest on all outcome measures.

Although most educators stress the importance of language and cognitive development, Hair et al. (2006) emphasized that they were not the only factors in poor outcomes. Rather, low language and cognitive skills in conjunction with serious health issues or lack of interpersonal skills at the start of kindergarten produced the lowest performance in reading and mathematics at the end of first grade. In addition, low language and cognitive skills combined with seriously low social and emotional skills when beginning kindergarten were linked with low self-control and motivation over the same time frame. Hair et al. (2006) recommend that communities devote efforts to creating quality early child care and education programs along with community based parenting programs.

Rathbun et al. (2005) traced the trajectory of reading and mathematics achievement during the primary grades. Findings were based on 10,345 children who entered kindergarten in fall 1998 and were assessed consistently through third grade. At the onset of kindergarten, more than 39% of the children had at least one family risk factor and 16% were exposed to multiple family risks (Rathbun et al., 2005). Consistent with previous research, children at higher risk began kindergarten with lower cognitive performance and progressed more slowly in both academic subjects than children with lower risks.

In terms of the unique effects of individual risks, children of single parents and those whose families spoke a language other than English had lower reading and mathematics achievement than children with no risk factors (Rathbun et al., 2005). At the same time, children whose only risks were single parent families and non-English speaking homes were academically advantaged compared to children from low income

families or those whose mothers had less than a high school education. Children whose sole risk was coming from a non-English speaking household tended to start school with lower numeracy skills but made impressive gains in mathematics over the primary grades that narrowed the gap in performance. Hair et al. (2006) found that children from non-English speaking backgrounds were high in social competence. Additionally, research suggests that in the case of children with a non-English primary home language, the practice of oral storytelling, characterized by shared verbal interaction between children and their caregivers may promote subsequent language skills (Cutspec, 2006). Such practices might explain why having a non-English primary home language, although considered a risk factor, is less impacting than other socio-demographic risks.

McGroder (2000) investigated the parenting practices of 193 low-income, African American mothers to determine their influence on the development of their preschool age children. The data were derived from interviews conducted as part of the Child Outcomes Study component of the National Evaluation of Welfare-to-Work Strategies. The author noted that in some respects, "the background characteristics of this sample defy stereotypes" (p. 754). Close to two-thirds of the women had a high school diploma or GED and more than half the participants had been receiving welfare benefits for less than five years. In the conception of Shoaf et al. (2006), most of McGroder's (2000) participants would be characterized as "situationally poor" as opposed to "generationally poor" (Shoaf et al., 2005, p. 66). Situationally poor families tend to have greater resources for coping with poverty, including education, job skills or experience, and access to material goods. As a result, their children are more advantaged socially and academically than peers from generationally impoverished families. However, other

background factors in the profiles of the single mothers indicated increased risk for their children's development. Some 16% of the women had been exposed to childhood abuse or neglect and a high proportion (47%) displayed depressive symptoms.

McGroder (2000) observed a wide range of parenting practices, compressed into four categories: Aggravated but Nurturant, Patient and Nurturant, Cognitively Stimulating, and Low Nurturance. Although Cognitively Stimulating and Patient and Nurturant mothers displayed several of the same qualities, Patient and Nurturant mothers actually scored below average on the degree of intellectual stimulation they provided their children. However, this did not compromise their children's academic development. The children of mothers with both parenting styles were equally ready academically to begin school leading McGroder to surmise that nurturing support may work to compensate for lower intellectual stimulation. In addition to higher academic development, the children of Patient and Nurturant and Cognitively Stimulating mothers were more socially adept than children whose mothers were Low Nurturing or Aggravated but Nurturant.

The four parenting patterns were influenced by three maternal characteristics: education, duration on public assistance, and adolescent motherhood (McGroder, 2000). However, one effect was paradoxical to prevailing assumptions. Specifically, while adolescent motherhood and low educational attainment translated into lower levels of cognitive stimulation, these mothers fell into the two high nurturing categories. Aggravated but Nurturant mothers accounted for the highest proportion of the sample and had psychological as well as demographic risks. However, according to McGroder, while their parenting styles might be considered authoritarian by white, middle class

standards, they fostered a sense of maturity in their children.  Casady et al. (2002) observed a similar phenomenon among young African American mothers.  Both authors acknowledge that an emphasis on control may be an adaptive mechanism for families whose children are exposed to dangerous neighborhood conditions although both concur that it may not be adaptive for preparing children for school.

McGroder's (2002) overall conclusion was that regardless of the mothers' parenting practices, "these children are generally not faring well" (p. 764).  Even the children with the highest levels of cognitive development scored below the national average for low-income African American preschool children.  McGroder noted that less than 10% of the children were enrolled in Head Start or other center-based programs that met minimum standards for staffing and group size.  Her main recommendation was that these children, and others in similar circumstances, would benefit from Head Start or other quality early childhood education programs.

One of the key components of Early Head Start is helping families to foster children's literacy development (Olsen & DeBoise, 2007).  Staff members discuss the importance of early language learning with parents, teaching them how to promote their children's linguistic development and create an enriching learning environment. Children are provided with books and parents are encouraged to engage them in reading activities.  Raikes et al. (2006) explored the efficacy of this component in a detailed analysis of the reading activities of 2,581 low-income mothers and their young children of 14 to 24 months.  Data were derived from the Early Head Start Research and Evaluation Project, which encompassed roughly 3,000 poor and low-income children and

families recruited from 1996 through 1999.  Participants were randomly assigned to either Early Head Start or a control group.

Although from the age of 14 months on, almost all the children were read to with some degree of consistency (Raikes et al., 2006), the extent of reading activities varied tremendously among families.  African American and Latino parents engaged their children in reading significantly less often than white families.  Spanish-speaking families had the fewest number of books at home, which Raikes et al. propose may be due to limited availability of books in their native language.  Also noting that English-speaking and Spanish-speaking mothers read to their children less frequently than mothers from other ethnic groups they suggest that Latin families may be more inclined toward oral storytelling than storybook reading.  The mothers' educational level and verbal skills had a strong influence on their reading practices (Raikes et al., 2006).  The powerful link led Raikes et al. to suggest that early childhood programs such as Early Head Start could be improved by strategies to support parents with limited verbal or literacy skills and lower educational levels.

*Protective Factors in School Readiness*

It has also been found that the presence of resources can buffer against risk and reduce negative outcomes in disadvantaged children.  Studies demonstrate that these factors incorporate influences from multiple systems at different levels and include characteristics of the child, family, community and school (Durham & Smith, 2000; Fantuzzo et al., 2004; Judge, 2005; McWayne et al., 2004; Parcel & Dufur, 2001).  Judge (2005) found that the presence of protective factors effectively buffered against risks,

even in children with multiple risk factors. Good motor skills and positive interactions with peers proved to be effective internal resources for resilience. The major family and environmental resources were home reading activities, participation in formal preschool programs, and parents who conveyed high educational aspirations. Children classified as resilient by virtue of having developed competence in spite of risks showed minimal differences from competent peers with no risks. Both groups of children differed substantially from those labeled vulnerable. Vulnerable children were prone to externalizing behavior, and had inadequate interpersonal competence. These children had multiple risks and few protective factors. Their profile, in terms of motor skills, preschool, and parents' educational expectations, was the antithesis of the resilient group.

Further studies support the notion that ecologically based resources can be protective and buffer against the negative effects of socio-demographic risk. Using academic achievement data from the National Longitudinal Survey of Youth (NLSY) combined with data from the NLSY Mother-Child records, Parcel and Dufur (2001) reported that family interactions played a significant role in students' mathematics and reading achievement. Highlighting the critical role of family support for children's learning, family social capital overrode school financial capital in predicting academic achievement.

Durham and Smith (2000) observed that family social capital was significantly linked with the early literacy development of rural children. Having a single parent detracted from children's literacy learning and this effect was not mediated by *SE*S or parent involvement. On the other hand, participation in a formal preschool program such as Head Start had a marked positive impact on emergent literacy. In fact, the researchers

noted that any child care other than center-based preschool predicted lower levels of early literacy.

Living in an affluent home with parents who invested heavily in intellectually enriching experiences had the strongest impact on early literacy skills (Durham & Smith, 2000). This finding is neither new nor surprising (Bracey, 2003). However, Durham and Smith (2000) and Bracey (2003), along with other sources, endorse the value of high quality preschool programs for overcoming families' lack of financial capital. The overarching conclusion is that early childhood education is advantageous for all children, particularly those most at risk due to poverty (Boethel, 2004).

Theorists support the notion that a high quality early childhood program can buffer against risk and reduce negative outcomes in disadvantaged children (Bracey, 2003; Durham & Smith, 2000; Judge, 2004; National Association for the Education of Young Children, 2008; National Head Start Association, 2008) however some argue that the effectiveness of Head Start is not conclusive (Ludwig & Phillips, 2007). Project Head Start was initiated in 1965 under President Lyndon Johnson's War on Poverty as "a federally-funded, comprehensive early intervention program for low-income families and their young children" (Parker et al., 2001, p. 35) designed to "provide poor children with the academic stimulation and physical care" required for advancement (Terezakis, 2001, p. 43). Basically, 3- and 4-year old children participating in Head Start programs would have a "'head start'" toward the type of education afforded to more privileged preschool students (Terezakis, 2001). More recently however, in 1998, policy makers pointedly identified the development of school readiness skills as the principal goal for Head Start programs (Fantuzzo, Bulitsky-Shearer, McDermott et al., 2007; Parker, Boak, Griffin, et

al., 1999).  Head Start and other preschool programs are based on the premise that a

child's first five years of life form the foundation for subsequent physical, cognitive,

social, and emotional development (Olsen & DeBoise, 2007; U.S.  Department of Health

and Human Services, 2003).

More than four-decades since its initial implementation, Head Start, "the longest-

running national school-readiness program" in the country has served more than 25

million children since 1965, with a current enrollment of nearly one million children

(Results, 2008), though the perceived effectiveness of Head Start is not conclusive and in

fact, is the subject of considerable debate (Ludwig & Phillips, 2007).  Despite such

controversy, Head Start is recognized as "one of the most successful social programs of

the last 40 years" (Abbott-Shim, Lambert & McCarty, 2003, p. 192).  According to the

National Head Start Association (June 19, 2008) for instance, research shows that Head

Start programs have contributed positively to the experiences of its participants in terms

of cognitive, language, and health measures.  However, according to a report by the

Department of Health and Human Services (2003) based on a recent comprehensive

study of Head Start, Head Start programs, "When the school readiness of the nation's

poor children is assessed, it becomes clear that Head Start is not eliminating the gap in

educational skills and knowledge needed for school" (p. 1), despite evidence of some

gains in social, emotional, and cognitive development.  Once they enter school, "Head

Start children continue to perform significantly below their more advantaged peers in

areas essential to school readiness, such as reading and mathematics" (p. 2).  In turn, the

National Head Start Association viewed these study findings more favorably, indicating

they "showcased" the program's effectiveness – suggesting that the data may be

interpreted differently such that the glass may be seen as "half empty or half full" in the words of Wade F. Horn, the assistant secretary for children and families of the Department of Health and Human Services (Davis, 2008).

Fantuzzo et al. (2004) investigated the influence of various aspects of parent involvement on the behavioral and academic competence of 144 children attending an urban Head Start program. The sample was predominately African American (96%) and representative of the income status of Head Start programs nationally. Creating a home environment conducive to learning had the most powerful impact on behavioral and intellectual outcomes (Fantuzzo et al., 2004). This encompassed endeavors such as reading, creating a space for educationally enriching activities, and engaging children in discussions about school. These activities heightened children's motivation, attention, and perseverance as well as enhancing vocabulary skills. Given the effects on motivation and attention, not surprisingly, children with a more positive home learning atmosphere also had fewer behavior problems in school. Although involvement at school and engaging in home-school conferences were significantly linked with children's end-of-year outcomes, their effects were overshadowed by the overarching effect of home-based activities.

McWayne et al. (2004) utilized a larger sample of 307 low-income minority children and their primary caregivers in a study extending the exploration of children's social and emotional development into kindergarten. The sample was recruited from seven urban elementary schools and the children ranged in age from five to seven years. The sample was predominately African American (95%), with Asian Americans comprising most of the remaining 5%.

The main purpose of the study was to test the validity of the three dimensions of the Parent Involvement in Children's Education Scale (PICES): Supportive Home Environment, Direct School Contact, and Inhibited Involvement (McWayne et al., 2004). Results showed that the PICES dimensions for kindergarten children were analogous to those observed for preschool children from similar socio-demographic backgrounds. Furthermore, the three components were significantly linked with the children's social and academic competence at home and at school. Analysis revealed two distinctive patterns of parent involvement. Parents classified as involved created an enriching home learning environment by providing their children with a range of activities, discussing with them the importance of school, and supporting the children in practicing skills they acquired at school. As a result, the children of these highly involved parents exhibited greater cooperation, self-control, and pro-social behavior in both the home and school settings. Further highlighting the benefits of parent involvement, the children were more motivated to learn and out-performed peers with less involved parents in reading and mathematics.

As interpreted by McWayne et al. (2004), the study illustrated that "positive relationships exist across the transition into kindergarten and that parent involvement may be a key protective factor for children living in urban poverty as they enter school for the first time" (p. 373). The implications of their findings outlined by McWayne et al. (2004) are directly pertinent to an ecological understanding of early childhood intervention and school readiness. According to the investigators, the marked impact of parent involvement in home learning underscores the importance of providing ways to help parents foster their children's cognitive growth via home-based activities.

Casady et al. (2002) explored the first-grade academic achievement of children whose mothers were involved with Family Ties, (Trust, Information, Encouragement, and Support) a program devised for poor, adolescent mothers. Resilience was used as the conceptual framework for understanding what influences enabled children confronting the double jeopardy of poverty and being parented by a mother who is not yet an adult to surmount these obstacles to achievement. Poverty and mothers' withdrawal from high school individually and collectively pose powerful risks to children's academic development (Rathbun et al., 2005). Heightening the environmental risk, the site of the study was Flint, Michigan, during a period of rampant unemployment (Casady et al., 2002).

Family TIES was provided by a children's health center, which enrolled pregnant adolescents who were eligible for services until the child reached the age of five (Casady et al., 2002). Upon enrollment, the prospective mothers were randomly assigned to either a Standard Program Group or a Home-Visited Group that received a more intensive package of services. The average age of participants was 16, and reflecting the demographics of the Flint area, 57% of the participants were African American and the remaining adolescents were white. A total of 138 young mothers were involved with the program and assessed bi-annually until the children reached age three and then again when the children reached 4.5 years. The first grade data were based on 96 children and derived from a standardized test administered at home combined with teachers' observations.

Maternal attributes played a prominent role in the children's achievement (Casady et al., 2002). Children of mothers who were more intelligent, and above all, more

determined, had the highest probability of academic success. High-achieving children were typically immersed in an intellectually stimulating home environment. On the other hand, all children who did not have the benefit of a nurturing and supportive caregiver were ranked in the lowest quartile of academic achievement. The overarching significance of a caring, supportive relationship is intrinsic to childhood resilience (Garmezy, 1983; Luthar et al., 2000). The most striking finding was that within a fairly homogenous socio-demographic range, the children's home environments varied tremendously, with marked impact on their consequent academic development (Casady et al., 2002). Although the study did not examine formal preschool participation, the recommendations of McGroder (2000) for early childhood education are equally applicable. The situations of some of the highest risk children suggest they might warrant more intensive intervention (Parke & Agness, 2002).

Using data from the 1993 NHES, Beasley (2002) investigated the influence of exposure to cultural activities on the cognitive development of pre-kindergarten children. According to the author, families who take children to visit cultural sites or events (libraries, plays, concerts, shows, art galleries, museums, or historical sites) are not only exposing their children to enriching materials, but in addition, such family activities can be construed as a form of social capital or parent involvement in learning. The sample consisted of 1,710 four-year old children from diverse backgrounds with varying preschool experience.

The most significant finding was that, "For children typically considered to be at risk, participation in culture-related activities was generally associated with higher levels of cognitive development regardless of whether a center-based program was attended"

(Beasley, 2002, p. 19). Parents' *SE*S, educational attainment, and primary language exerted a direct impact on cognitive school readiness. In effect, exposure to cultural activities "leveled the playing field" in the sense that the benefits were greater for children with identified risks (p. 20). Disadvantaged children who were introduced to cultural activities, or who participated in a formal preschool program, displayed superior cognitive development to low-risk children who lacked such experience.

Although preschool attendance and exposure to cultural events independently influenced cognitive development, the two types of enriching activities often occurred in conjunction thus the benefits were cumulative (Beasley, 2002). Engaging children in cultural activities seemed to serve as a marker for other forms of parent involvement. Highlighting the positive impact of culture-related experiences on young children's cognitive growth, Beasley raises the issue of whether these are neglected in preschool programs. Drawing on Bruner's "spiral curriculum," he concludes that arts education in early childhood acts as a "foundation for later learning," and is especially important for high-risk families "who may have limited access to America's cultural capital" (Beasley, 2002, p. 21).

Finally, literature also emphasizes the role that school characteristics can play in contributing to school outcomes. Piotrkowski (2004) maintains that schools that are ready for children have a strong, accountable leadership, are welcoming to parents and children and have sufficient resources to support high quality instruction and meet the needs of the individual children within the school. School neighborhoods are argued to indirectly influence school outcomes (Ainsworth, 2002) because problem conditions such as crime create a school setting that is unwelcoming to families (Lee & Burkam, 2002).

In particular, strong neighborhood levels of social control, or the monitoring and sanctioning of inappropriate behavior, can influence educational outcomes by creating a safe and welcoming school setting (Ainsworth, 2002). Rimm-Kaufmann & Pianta (2000) further maintain that crime in the school neighborhood can be accompanied by a breakdown in connectedness and influence the ecology of the child. The lack of community consensus and shared monitoring can result in greater crime and disenfranchisement (Sampson, 1992), whereas social connectedness within neighborhoods can buffer against negative outcomes. As cited by Piotrkowski (2004), literature also suggests that school resources are a characteristic of a school setting that can affect school outcomes by translating into educational inequity (Bracey, 2003) and influencing the child both directly and indirectly (Rimm-Kaufmann & Pianta, 2000). Children attending resource-deprived schools are often in classes presided over by teachers who have less experience and training, and feel less shared responsibility for the school (Bracey, 2003). This continues to limit child opportunity and also contributes to disenfranchisement by sending a message that it is satisfactory for schools that need the most resources to be taught by the least qualified teachers (Robelen, 2002).

Summary

Through an ecological framework, children's school readiness can be understood as a dynamic and interactive process (Rimm-Kaufman & Pianta, 1996). This view recognizes that contextual factors at multiple levels contribute to readiness in partnership. An ecological approach is particularly important for understanding the trajectory for disadvantaged children because it goes beyond socio-demographic risk and incorporates

characteristics of the family, community and school. A social work perspective on resilience also emphasizes a transactional process that occurs between the micro-level components of the child, and the macro-level components of the family and broader social environment (Luthar, Cicchetti, & Becker, 2000). Thus, the theoretical framework in this study is applied to support the notion that ecologically based resources contribute to readiness as well as resilience by buffering the negative effects of risk.

School readiness research has identified a variety of factors that are associated with negative as well as successful outcomes. Children with socio-demographic risks have been found to perform significantly lower on multiple measures of kindergarten readiness than their non-risk peers. These findings extend to those who live in poverty, who have a single parent family, whose mother has not completed high school, and/or whose primary language is something other than English (Zill & West, 2002). On the other hand, a number of multidimensional factors have been suggested to be associated with successful school outcomes including enriching home educational environment, participation in a formal preschool program (Judge, 2005), and a welcoming school setting (Piotrkowski, 2004).

CHAPTER III

Methodology

The purpose of this chapter is to discuss, methodologically, a variety of factors

and their relationship to kindergarten readiness. In the first section the research approach

and design including hypotheses, data, and sample are introduced. In the second section,

the instruments used in the study are described and variables selected for the study are

defined in operational terms. The final section of this chapter reviews the analytic

approach including descriptive and regression analysis, and weight applications.

Limitations associated with the methodology used in this study are also discussed.

Research Approach

*Conceptual Model*

This study conceptually investigates the relationship between socio-demographic

risk, ecologically based resources and kindergarten readiness skills. It is driven by the

postulation that ecologically based resources act as protective factors and moderate the

direct effects of socio-demographic risk on kindergarten readiness. In particular, the

primary research question in this study asks if the presence of ecologically based

resources increases the likelihood of successful kindergarten readiness skills for

disadvantaged children. Figure 2 depicts the conceptual model used in this study.

Figure 2

*Conceptual Model of the Study*
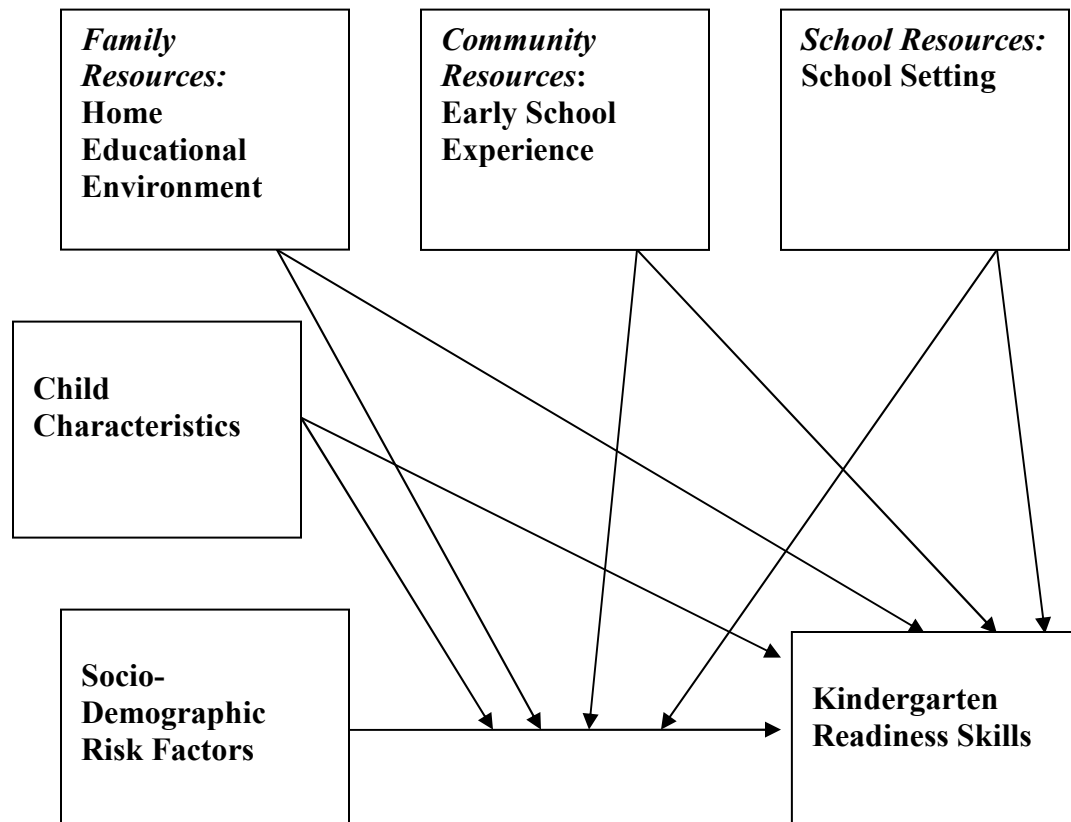
As referenced in the diagram, socio-demographic risk factors are hypothesized to have a direct relationship with kindergarten readiness skills. The ecologically based resources home educational environment, early school experience and school setting are also hypothesized to have a direct effect on kindergarten readiness skills. The child is nested within the contexts of the ecologically based resources and the characteristics of the child, specifically self control, social interaction and impulsive/overactive behavior, also directly influence kindergarten readiness skills (an effect which will be controlled for in this study). The diagram depicts a moderation model in which the ecologically based factors buffer the effects of socio-demographic risk factors on kindergarten readiness skills. Simply stated, the ecologically based resources are hypothesized to reduce the association between socio-demographic risk factors and kindergarten readiness skills.

*Hypotheses*

The specific hypotheses are as follows.

    (1) The presence of one or more socio-demographic risk factors is associated with weaker kindergarten readiness skills.

    (2) The presence of one or more ecologically based resources is associated with stronger kindergarten readiness skills.

    (3) The presence of one or more ecologically based resources reduces the negative effects of socio-demographic risk factors on kindergarten readiness skills.

Sample Design

The data used in the study is from the Base Year Public-Use Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K).  The ECLS-K is an ongoing study for the U.S.  Department of Education, National Center for Education Statistics (NCES) that focuses on school experiences beginning with kindergarten and following through elementary school (National Center for Education Statistics, 2000). The study captures information on children's status upon entering school, their transition into school, and their experiences and progression through 5$^{th}$ grade.  Data is collected from the child, the child's parents or guardians, teachers or other childcare providers and schools, beginning in the fall of 1998 when the subjects were entering kindergarten.  The children in the ECLS-K constitute a nationally representative sample; they come from public and private schools, full-day and part-day kindergarten programs, and have diverse socio-demographic backgrounds and geography across the United States (National Center for Education Statistics, 2000).

The ECLS-K is the first large, national study to follow a cohort of children from kindergarten entry through elementary school.  Its design provides comprehensive and reliable information on children's development and school experiences that can inform policymakers and researchers regarding ecological factors as they relate to child development.  Data collected from children and their families, teachers, and schools provide information on child development in cognitive, social–emotional, and physical domains.  Information is also available on children's home educational environment, classroom and school environment, and classroom curriculum and teacher qualifications. Methods of data collection include one-on-one assessments, computer-assisted telephone

interviews (CATI), and self-administered questionnaires (National Center for Education Statistics, 2000).

A nationally representative sample of 22,782 children enrolled, in 1,277 kindergarten programs during the 1998-1999 school year participated in the ECLS-K. The ECLS-K sample involved a dual-frame, multistage probability sample design. In the first stage, a selection of 100 primary sampling units (PSU) consisting of counties from across the country was derived from a national sample of PSU's. The second stage then involved a nested or stratified data structure of selecting public and private schools within the PSU's and then a fixed number of children within each school. A target sample was drawn from each school although some participants were over sampled such as Asian/Pacific Islander children, private kindergarten children and Head Start participants (National Center for Education Statistics, 2000).

The ECLS-K dataset was selected for this study based upon its nationally representative sample, the multi-method model employed and the rigorous psychometric properties it contains. The ECLS-K was also appropriate for this study because it has a design guided by an ecological model, in which the child's development is considered within multiple contexts including home, school, and community, in line with the model under investigation. An additional benefit realized by selecting the ECLS-K, is its provision of a valuable context for the interpretation of findings from an array of smaller studies of specific populations. In this study, the analysis used a subset of children who were all first-time kindergarteners without a diagnosed disability, in the fall of 1998.

Instruments Used in the Study

*Direct Child Assessment*

The direct child assessment was collected to measure a child's cognitive skills at given points in time. The direct child assessment was conducted by trained assessors and took approximately 50 to 70 minutes per child. The procedure required that the trained assessor visit the child in the school, using a computer-assisted personal interview (CAPI) in an un-timed, one-on-one session. The assessment design was based upon national and state standards and included items specifically created for the ECLS-K adapted from commercial assessments. The direct child assessment gathered data on three cognitive domains (reading, math, general knowledge) as well as psychomotor skills, and height and weight measurements (National Center for Education Statistics, 2000).

The cognitive component utilized a two-stage battery in which all children began with a routing test leading to a second-stage test with items that could precisely measure the child's skills. The reading assessment measured basic kindergarten reading skills including print familiarity, letter recognition, phonemic awareness, and sight vocabulary and decoding. The math assessment tested conceptual and procedural knowledge and problem solving skills. The general knowledge assessment included items that measure kindergarten skills in science and social studies. Psychomotor assessment included both fine and gross motor skills through activities including copying shapes, drawing figures and balancing, hopping and skipping (National Center for Education Statistics, 2000).

The ECLS-K design allowed for inclusion of as many limited-English speaking children as possible. Children from homes where English was not the primary language were given an initial screening using the Oral Language Development Scale (OLDS) to determine their participation in the direct child assessment. Children who passed the cut score for the OLDS were administered the main ECLS-K battery in English. If the OLDS indicated a child could not participate in the main ECLS-K battery, and their language was Spanish, they were administered the Spanish language version of the OLDS, and a translated version of parts of the direct child assessment (warm up booklet, math, psychomotor). Less than 1 percent of participating children were unable to participate in the direct child assessment (National Center for Education Statistics, 2000).

*Parent Interview*

Trained interviewers collected information from parents/guardians through computer-assisted telephone interviewing (CATI) lasting approximately 45 minutes. If respondents did not have a telephone or were reluctant to be interviewed by phone, computer-assisted personal interviewing (CAPI) was conducted. Computer-assisted interviewing involves a method of recording the parent's answers. Parents/guardians were asked to provide information on items including family demographics, family structure, home educational environment, childcare history, child health, parent involvement, parent education, employment status, and child's social and behavioral skills (National Center for Education Statistics, 2000).

*Teacher and Administrator Questionnaires*

Self-administered questionnaires were used to obtain information from all kindergarten teachers and school administrators with sampled children. The teacher questionnaires pertained to the teachers' own educational backgrounds, teaching practices, experiences, and current classroom settings. The teachers also completed a child-specific questionnaire collecting information on the child's social skills and approaches to learning for each of the sampled children they taught. The school administrator questionnaire was used to gather information regarding the school climate in general, as well as the student body, policies, and teachers and administrator characteristics (National Center for Education Statistics, 2000).

Measures Used in the Study

The choice of variables in the conceptual model was based upon theoretical and empirical foundations as discussed in the literature review (Chapter II). As relevant, further information is provided in this section to substantiate the selection of certain variables. In the herein study, the dependent variable was kindergarten readiness, the independent variables were socio-demographic risk factors and ecologically based resources, while child disposition characteristics were control variables. The ecologically based resources were hypothesized to be moderator variables and were represented by home, community and school characteristics. Information on socio-demographic factors, home and community characteristics, and child disposition were obtained from parent interviews. School setting characteristics were garnered through questionnaires completed by school administrators. Assessment of children's' kindergarten readiness

skills was garnered through systematic testing by an independent assessor and also via questionnaires completed by kindergarten teachers. A list of all variables and the factors they comprise can be found in Table 1.

*Dependent Variables*

Kindergarten readiness skills are comprised of multiple measures representing a holistic definition of kindergarten readiness. The first three indicators include cognitive assessment in reading and math, and physical assessment of composite psychomotor skills conducted by direct child assessment during fall of the kindergarten year. The final two indicators include teacher ratings, obtained through questionnaire, of a child's approaches to learning and social–emotional development.

*Reading and math assessment*. The reading assessment included questions in basic skills, vocabulary and comprehension. The math assessment included questions in number sense, properties and operations designed to measure conceptual and procedural knowledge as well as problem solving skills. The continuous scores on the reading and math assessments were derived from an IRT model and based on all of a child's responses to a particular area of assessment. IRT uses the pattern of right, wrong, and omitted responses and the difficulty of each item to place a child on a continuous ability scale. The items in the routing test, plus a core set of items for the second stage test, made it possible to establish a common scale. With information from both tests it is then possible to place the children on a common scale. This allows the children to be compared even though they took different items. IRT scores can also account for the possibility of a low ability student guessing difficult items. The literature recommends

using IRT scores for identifying cross-sectional differences among subgroups in achievement that correlates with status variables such as demographics, as in the proposed study. Reliability statistics for the variables examined were computed during the ECLS-K design phase and ranged from 0.88 to 0.95 for the IRT scale scores (National Center for Education Statistics, 2000).

*Psychomotor assessment.* The psychomotor assessment included two distinct scales transformed into a continuous composite scale during the ECLS-K design phase. The resulting continuous scale measured eye–hand coordination and balance and motor planning. The ECLS-K design phase included confirmatory factor analysis for the composite. This scale had an alpha reliability of 0.61 (National Center for Education Statistics, 2000).

*Approaches to Learning.* Children's approaches to learning and social–emotional development were rated on a continuous scale by kindergarten teachers as part of a self-administered questionnaire. The Approaches to Learning Scale examined behaviors that affect the child's ability to benefit from the learning environment. Six items are included that rate the child's attentiveness, task persistence, eagerness to learn, independence, flexibility and organization. For each category, the teacher rated frequency of occurrence on a four point scale with 1 indicating "never," 2 "sometimes," 3 "often," and 4 "very often." The ECLS-K dataset computes a mean value for the approaches to learning score by averaging across category ratings ($M = 3.0$, $SD = 0.7$). The split half reliability was 0.89 for the Approaches to Learning Scale (National Center for Education Statistics, 2000).

Table 1

*Measures Used in the Study*

| Variable | Description | Indicator | Name |
|---|---|---|---|
| Kindergarten Readiness Skills | Child assessment in fall of Kindergarten year | Reading IRT scale score<br>Math IRT scale score<br>Composite motor skills score<br>Approach to learning score<br>Social-emotional Score | C1RSCALE<br>C1MSCALE<br>C1CMOTOR<br>T1LEARN<br>T1INTERP |
| Socio-Demographic Risk Factors | Family background characteristics | Single or two parent family<br>Having a mother with less than high school educational level<br>Primary home language<br>Being a welfare recipient | P1HFAMIL<br>WKMOMED<br>WKLANGST<br>P1AFDC |
| Home Educational Environment | Cognitive stimulation activities in the home | Parent rated how often in a typical week they engaged child in reading, telling stories, singing songs, doing art, playing games, teaching about nature, building things, playing sports | P1READBO<br>P1TELLST<br>P1SINGSO<br>P1HELPAR<br>P1GAMES<br>P1NATURE<br>P1BUILD<br>P1SPORT |
| Early School Experience | Participation in formalized center-based early childhood program | Parent rated if child attended day care or preschool, or Head Start regularly in the year before kindergarten | P1CPREK<br>P1HSPREK |
| Welcoming School Setting | School resources including safety and facilities | School administrator rated: School location has crime problem<br>Classroom facilities meet needs | S2CRIME<br>S2CLSSOK |
| Child Disposition Characteristics | Measures of characteristics of child | Parent rated self-control, social skills and impulsive behavior | P1CONTRO<br>P1SOCIAL<br>P1IMPULS |

*Social–emotional skills*.  Social–emotional development, as a measure, was derived from teachers' ratings of aspects of each child's social skills and behavior.  The Interpersonal Skills Scale included five items rating friendship skills, social skills, ability to comfort others, positively express feelings, and showing sensitivity toward others.  The raw scores ranged from 1 indicating "never" to 4 indicating "very often," though only the mean score was provided ($M =$ 3.0, $SD =$ 0.6).  A higher score represented a more positive approach to social interaction.  The split half reliability was 0.89 for the Interpersonal Skills Scale (National Center for Education Statistics, 2000).

Independent Variables

*Socio-demographic risk factors*.  In the parent interview, respondents were asked questions regarding their family socio-demographic characteristics.  Information for each child was obtained including if they lived in a single or two parent family, the having a mother with less than high school education level, whether they received welfare in the past 12 months, and if the primary home language is English or non-English.  Based on previous empirical findings and for relevance to this study, each socio-demographic risk factor was indexed by a dummy variable.  The variables were coded into non risk versus risk categories (0 versus 1 respectively).  These are represented as single parent family, less than High School education, welfare recipient, and non-English primary home language.

*Moderator Variables*

This grouping of variables refers to ecologically based resources at the family, community and school levels examined as moderators in this study.  Family and

community resources were garnered through the parent interview in the fall of the kindergarten year. School resources were acquired through the administrator-completed questionnaire in the spring of the kindergarten year.

The variables selected to represent family, community and school resources are derived from Piotrkowski's (2004) definitions. As previously mentioned in the literature review, Piotrkowski conceptualizes school readiness as an ecological concept that is influenced by resources at multiple levels that help prepare children for school. In the author's ecological resource model of school readiness examples of family, community and school level resources are denoted. Among others, family resources include a rich home educational environment, community level resources include affordable, high-quality childcare and preschool, and school resources include a welcoming school setting (Piotrkowski, 2004). A number of other sources present similar conceptualizations of ecology and/or rely on similar indicators as measures (Ainsworth, 2002; Gershoff, Raver, Aber & Lennon, 2007; Judge, 2005; McCoach, O'Connell, Reis & Levitt, 2006; Rimm-Kaufmann & Pianta, 2000; Ungar et al., 2005) It is noteworthy that the exploration of variables in this study does not fully represent resources at the various levels as discussed by Piotrkowski, nor does it sufficiently encompass the full nature of ecologies. Still, the exploration of ecologically based resources in relation to kindergarten readiness can uniquely add to current discourse on resiliency.

*Family resources*. Resources at the family level comprised the variable Home Educational Environment and included cognitive stimulation activities provided to the child in the home. Parent interview items asked how often in a typical week parents engaged with their children in learning activities including reading to child, telling

stories, singing songs, doing art, playing games, teaching about nature, building things, and playing sports.  Parents indicated the frequency on a Likert scale ranging from 1 (*not at all*), 2 (*once or twice per week*), 3 (*3–6 times a week*), to 4 (*every day*).  The cognitive stimulation interview items in the ECLS-K were designed with the ability to be used as a composite scale (Gershoff & Raver, 2007).  Therefore, the composite Home Educational Environment was created as a variable in this study by averaging the eight indicators of cognitive stimulation activities to derive the mean score.

  *Community resources*.  Information regarding early school experience was obtained through parent interview and captured whether a child attended a formalized center-based early childhood program such as day care, pre-school or Head Start in the year before they entered kindergarten.  Although the ECLS-K dataset used multiple indicators to measure early school experience, a mutually exclusive variable was not included in the dataset measuring early school experience.  Therefore, for this study, two separate variables were used to examine the effects of early school experience allowing for the independent examination of Head Start and center-based program effects.  Specifically, the first variable measured participation in a center-based program such as day care or pre-school in the year before entering kindergarten and the second variable measured participation in Head Start in the year before entering kindergarten.  Each variable was indexed by a dummy variable that was coded such that "0" represented absence of the early school experience and "1" represented participation in a program.

  *School resources*.  Resources at the school level measure characteristics that reflect if the school setting was welcoming.  Two distinct indicators measuring safety and facilities of the school were used to represent school setting as measured via

administrator questionnaires.  Specifically, the first question asked how much of a

problem crime is in the neighborhood where the school is located.  The range for this

indicator was collapsed to include a three point scale with 0 indicating "no problem," 1

"somewhat of a problem," and 2 "big problem."  The second question asked how

adequate the school classroom facilities were for meeting the needs of the children in the

school.  The scale for this indicator was collapsed to a three point scale with 0 indicating

"always adequate," 1 "sometimes not adequate," and 2 "often not adequate or never

adequate."


*Control Variables*

In order to examine the influence of the ecologically based resources with

minimal confounding, characteristics of the child were treated in this study as controls

variables.  The selection of variables used as controls is supported with the literature

previously reviewed in chapter II.  In brief, it has been found that behavioral difficulties

in children have the potential to interfere with school success (Zill & West, 2002).  Based

upon reports from parents, approximately 18% of children in the ECLS-K sample have

some signs of hyperactivity and 13% experience difficulties with attention (Zill & West,

2002).  Furthermore, according to Judge (2005), children prone to externalizing behavior

were more vulnerable to negative educational outcomes.

Therefore, three different scales that measured externalizing behavior were

selected to represent child disposition characteristics.  Self-control, social interaction, and

impulsive behavior of the child were measured via parent interview in the fall of the

kindergarten year.  The Self-Control scale had five items reflecting a child's ability to

regulate their own behavior and was scored on a range from 1 (never) to 4 (very often) with a higher score indicating greater exhibition of self-control.  The Social Interaction Scale had three items that obtain information about a child's interactions with peers and adults and was scored on a range from 1 (never) to 4 (very often) with a higher score indicating the child exhibited more positive social skills.  The Impulsive/Overactive Scale had two items that ask about the impulsivity and activity level of children and was scored on a range from 1 (never) to 4 (very often) with a higher score representing more impulsive behavior and a higher activity level.  Split half reliabilities and mean scores are respectively as follows:  0.74 for self-control ($M$ = 2.8, $SD$ = 0.5)., 0.70 for social interaction ($M$ = 3.3, $SD$ = 0.6).,  and 0.46 for impulsive behavior ($M$ = 2.0, $SD$ = 0.7). (User's Guide: ECLS-K Base Year Public-Use Data Files and Electronic Codebook).

Analytic Approach

*Pre-Analysis Data Screening*

Data was screened prior to statistical analysis using SAS 9.1 to assure the quality of the data included and validity of the conclusions drawn.  First, the sample was filtered to only include students who were first-time kindergarteners without a diagnosed disability.  Then a total of 3163 subjects were screened out of the sample due the fact that data on these subjects was 'system missing'.  System missing represents when subjects were missing data across an entire instrument and/or assessment due to unit non-response (National Center for Education Statistics, 2000).  For example, in the ECLS-K dataset if a child's parent did not participate in the parent interview, the subject was coded as system

missing.  Due to the fact that the parent interview was the primary instrument for measuring independent variables in this study, these cases were dropped from the analysis.  The resulting sample size for this study was 14,918.

Missing data were compared on the independent and dependent variables to assure patterns were random and did not jeopardize external validity.  For missing at random data, the assumption is that the data is not systematically missing and therefore does not produce associations between the missing data and the outcomes (Shulting, Malone, & Dodge, 2005).  Listwise deletion and replacing missing values are frequently used techniques by researchers for handling missing data (Mertler & Vannata, 2002).  The rate of missing data (missing at random) ranged from less than 1% to 7%, with continuous variables missing on average between 100-200 values and dichotomous variables missing on average between 25-30 values.  For cases such as this with less than 15% of missing data, it is frequently recommended to replace missing values with the mean score of all other subjects for that variable (Mertler & Vannata, 2002).  SAS 9.1 has a procedure that allows this type of replacement.  Although replacing many missing values with this technique can sometimes bias the results, the small number of replacements required appeared to have little impact on the analysis.  Missing data were replaced rather than list-wise deletion since it is less restrictive and provides a better estimate of the parameters (Shulting, Malone, & Dodge, 2005).  Missing data on continuous variables was replaced with mean imputations, whereas for dichotomous variables (which were dummy coded), a random seed number was generated and 0 or 1 was assigned to replace the missing values.

The multivariate analysis in this study utilized regression which is particularly sensitive to outliers. Therefore, outliers were examined with boxplots in an effort to identify extreme data that might hold an undue influence. Boxplots revealed that values ascended steadily and consistently without identification of extreme scores. No values were deleted or transformed. Finally, to assess the adequacy of fit between the data and assumptions of the regression procedure, normality, linearity, and homoscedasticity were examined. In terms of normality, linearity, and homoscedasticity, moderate violations may weaken regression analysis, but do not invalidate it, and can often be ignored with large sample sizes (Mertler & Vannatta, 2002). Data was screened using scatterplots, Kolmogorov-Smirnov and Levene's test. No violations were detected that required transformations.

*Descriptive Analysis*

For the bivariate analysis, SAS 9.1 was used to provide descriptive statistics and examine associations among all kindergarten readiness skills, socio-demographic risk factors and ecologically based resources. Descriptive statistics of socio-demographic risk factors, ecologically based resources, and readiness skills of kindergarteners are presented in the results sections. Pearson correlations of all predictors and kindergarten readiness criteria are also presented in the results section. With non-experimental data multicollinearity must be a consideration. Collinearity analysis indicated that tolerance statistics were all greater that 0.1 and variance inflation factors (VIF) were all less than 10; thus multicollinearity was not a problem and all variables were retained in this study.

*Regression Analysis*

Hierarchical multiple regression analysis was conducted to examine individually and collectively which variables provided the greatest relative fit and the most explanatory model. Hierarchical Multiple Regression is a favored technique when a researcher wants to examine the influence of several predictors in a specific order (Mertler and Vannatta, 2002). Theoretical consideration is the basis for determining the hierarchical order and three basic principles should underlie the predictor variable entry (Petrocelli, 2003). Consideration needs to be given to the presumed direction of causal flow, the hierarchical relevance of each predictor to the criterion, and the hypothesized interactions among the predictor variables. The conceptual model in this study hypothesizes that ecologically based resources moderate the effect of socio-demographic risk factors on kindergarten readiness. This requires a three-step hierarchical multiple regression analysis. In moderated multiple regression, after testing the relationship of the predictors of interest on the criterion variable, the relationship of a term that carries information about the interaction of predictors is tested (Baron and Kenny, 1986; Cohen and Cohen, 1983). In this study, Step 1 examined the variation in kindergarten readiness explained by the presence of the socio-demographic risk factors. Step 2 incorporated socio-demographic risk factors, ecologically based resources, and child disposition characteristics to determine the amounts of variation explained in readiness above and beyond the initial model. In Step 3 the interaction terms between socio-demographic risk factors and ecologically based resources was added into the model to test the hypothesized moderated effect. These models were run separately for each of the five outcome measures representing kindergarten readiness skills.

It is important to address the fact that the interaction terms created in step 3 to test the moderated effect can exhibit spurious multicollinearity. This occurs when two (or more) variables are related and they measure essentially the same thing (Aiken & West, 1991.). Multicollinearity results in large standard errors and reduces the power of the statistical test of the regression coefficients, making it difficult to detect a statistically significant regression coefficient (Aiken & West, 1991). Orthogonalization is a procedure that is recommended for reducing multicollinearity in the interaction terms (Burrill, 2006). It is a process that involves finding the residual of the interaction term by subtracting the vector from its projection (Yu, 2008). This results in a new vector pointing in a different direction that is far away from the original vectors in the interaction (Yu, 2008). In this way, othogonalization reduces collinearity so that it is no longer a threat (Yu, 2008). In this study, in accordance with such recommendations, the process of orthogonalization was applied to the variables in the interaction terms and thus decreased spurious multicollinearity and sustained power. It is worth noting that power was also sustained by the large sample size in this study as well as the valid and reliable measures. However, as power increases, the chances of Type I error also increase (Mertler & Vannata, 2002). To minimize the chances of Type I error, the probability level was set at .05 for significance testing.

The following regression equation was estimated as

$\hat{Y} = a + ß_1$ socio-demographic risks $+ ß_2$ child disposition characteristics$+ ß_3$ home educational environment $+ ß_4$ early school experience $+ ß_5$ school setting $+ ß_6$ socio-demographic risks x child disposition characteristics $+ ß_7$ socio-demographic risk x

home educational environment + $\beta_8$ socio-demographic risk x early school experience + $\beta_9$ socio-demographic risk x school setting + $\varepsilon$,

where $\hat{Y}$ is the predicted value for kindergarten readiness, a is the least squares intercept, $\beta_1$ is the least squares estimate of the population regression coefficient for socio-demographic risk factors, $\beta_2 - \beta_4$ is the least squares estimate of the population regression coefficient for ecologically based resources, $\beta_5 - \beta_7$ is the least squares estimate of the population regression coefficient about the interaction between socio-demographic risk factors and ecologically based resources, and $\varepsilon$ is an error term representing the unexplained variance associated with the model.

*Weighting*

As previously noted, this study utilized a large nationally representative dataset. The advantages of a large sample size are well established. Standard error of the mean decreases as sample size increases, and as the score distribution approaches normality the value required to reject the null hypothesis becomes smaller (Mertler and Vannatta, 2002). However, even when random samples are drawn they are not likely to be exactly the same as the population, causing sampling error and threatening external validity. In the ECLS-K data, issues may cause sampling error due to the fact that the ECLS-K design over sampled certain types of schools and students. Taking this into consideration, application of a weighting variable was needed to generalize results of this study to the nation's kindergarteners. In this study, the ECLS-K child, parent, and teacher design weight (bycptw0) was employed for all analysis.

Finally, the software package SAS 9.1 was selected over SPSS for use in this study. The design of SPSS assumes that a simple random sample is used which means that standard procedures in the statistical software packages calculate incorrect standard errors. As a result, the standard errors calculated in SPSS are extremely small which makes everything tested highly significant. The ECLS-K user's guide warns that it is inappropriate to conduct significance testing in a software package such as SPSS that is not designed to handle complex samples (National Center for Education Statistics, 2000). Thus, due to its superior ability to accommodate for the complex sample design and weights, the statistical software package SAS 9.1 was used for the analysis in this study.

Limitations

All research contains limitations and this study is no exception. It is important to note these limitations to both internal and external validity and to exercise caution in the interpretation of the results and when generalizing findings. A number of limits to internal validity are apparent. Although the data source has many advantages, the major threat is that the non-experimental nature of the data makes it impossible to distinguish causal relationships between variables and outcomes. This further extends to interpreting the moderation effects investigated in this study. Unless a variable is manipulated there is no causality in moderation; only strength of association. Although interaction is expressed in terms of an independent variable and a moderator variable, both can actually function as the moderator or predictor, thus, theory is relied upon to make the distinction (Baron & Kenny, 1986). It is therefore necessary to have a strong theoretical basis in order to make suppositions about the nature of the relationships among variables. As

with many large scale datasets, ECLS-K data is broader in scope than it is in depth.

Survey questions are closed-ended, based on categorical variables that may limit

variability. Furthermore, the dichotomous variables in this study present further

limitation. Creating dichotomous variables decreases measured relationships between

variables, lowers the power for detecting true interactions, and introduces measurement

error (Cohen, Cohen, Aiken & West, 2003). Therefore, the variables examined might not

reflect the true complexity of the items being measured. A final limitation to the internal

validity is that the cross-sectional data in this study lack longitudinal information from

which to draw conclusions about the process that might occur as ecological resources are

transformed into readiness skills.

In regards to external validity, the weighted sample is designed to be nationally

representative and is sufficiently large to warrant generalizations and draw conclusions

and implications that apply to the nations first-time kindergarteners. However, the

external validity is threatened by limitations in the parent data. First, parents were not

included in the dataset if they did not have children participating in the study. Second,

parent interviews and questionnaires were completed by only one parent. Finally, the

procedures applied a broad definition of parent or guardian. Typically the respondent for

the parent interview was the mother of the child, but other guardians (related or not) were

permitted to be the respondent. Respondents were selected in a preferential order

including (a) the child's mother, (b) another parent or guardian, (c) another household

member (National Center for Education Statistics, 2000). These procedures allowed for

parents to be self-selected. Thus, the primary source of data collection was derived from

respondents who defined themselves as parent/guardian and electively participated in the

study, resulting in the risk of a self-selection sample bias.

CHAPTER IV

Results

The purpose of this study is to investigate whether the presence of ecologically based resources increase the likelihood of successful kindergarten readiness skills for disadvantaged children. In doing so, patterns have emerged which describe what types of socio-demographic risks and ecologically based resources are significant and the relationships that exist among them and kindergarten readiness skills. The findings are presented in two parts: the first part describes the sample and the relationships among variables. In particular, this part addresses the first two hypotheses; the presence of one or more socio-demographic risk factors is associated with weaker kindergarten readiness skills, and the presence of one or more ecologically based resources is associated with stronger kindergarten readiness skills. The second part describes the results of the hierarchical regression analyses for the five measures of kindergarten readiness skills. It is hypothesized that the presence of one or more ecologically based resources reduces the negative effects of socio-demographic risk factors on kindergarten readiness skills. It should be noted that the interpretation of this analysis is not intended to justify any causal inferences. The use of expressions such as "effects" or "contributions" refer to suppositions based upon previous literature studying the direction and causal nature of the relationships investigated in this study.

Descriptive Statistics

Table 2 presents the overall means, standard deviations and frequencies on all variables for the weighted sample. As can be seen, the students in the sample demonstrate a broad range of kindergarten readiness skills. Scores in reading and math have the greatest variability indicating that the scores in the distribution are spread out away from the mean ($M = 22.45$, $SD = 8.04$ and $M = 19.49$, $SD = 7.16$ respectively). Comparatively, scores on psychomotor skills have a smaller standard deviation indicating that the scores are clustered closer together around the mean ($M = 12.25$, $SD = 2.91$). Scores for the measures approaches to learning and social–emotional skills, both have standard deviations that indicate small variability among the sample in these outcomes ($M = 3.01$, $SD = .66$ and $M = 3.00$, $SD = .60$ respectively).

Table 2

Descriptive Statistics of All Variables, Weighted

| Variable | M | SD |
|---|---|---|
| Kindergarten Readiness Skills | | |
|    Reading Score (0-72) | 22.45 | 8.04 |
|    Mathematics Score (0-64) | 19.49 | 7.16 |
|    Psychomotor Score (0-17) | 12.25 | 2.91 |
|    Approaches to learning Score (1-4) | 3.01 | .66 |
|    Social-emotional Score (1-4) | 3.00 | .60 |
| Socio-Demographic Risk Factors [%] | | |
|    Single parent family | 22.90 | - |
|    Welfare recipient | 11.80 | - |
|    Non-English primary home language | 13.20 | - |
|    Mother's education less than high school | 15.80 | - |
| Home Educational Environment | | |
|    Frequency of: | | |
|      Reading to child (1-4) | 3.23 | .80 |
|      Telling stories (1-4) | 2.72 | .92 |
|      Singing songs (1-4) | 3.11 | .94 |
|      Doing art (1-4) | 2.66 | .88 |
|      Playing games (1-4) | 2.78 | .84 |
|      Teaching nature (1-4) | 2.19 | .88 |
|      Building things (1-4) | 2.33 | .92 |
|      Playing sports (1-4) | 2.66 | .92 |
|      Composite of home educational environment (1-4) | 2.71 | .51 |
| Early School Experience [%] | | |
|    Attended Head Start | 14.70 | - |
|    Attended day care or pre-school | 55.50 | - |
|    Did not attend any formalized center-based program | 29.80 | - |
| School Setting | | |
|    Level of inadequacy of school facilities (0-2) | .55 | .61 |
|    Level of crime in school neighborhood (0-2) | .49 | .54 |
| Child Disposition Characteristics | | |
|    Exhibits self control (1-4) | 2.85 | .51 |
|    Exhibits positive social interaction (1-4) | 3.33 | .55 |
|    Exhibits impulsive/overactive behavior (1-4) | 1.94 | .66 |

Unweighted $\underline{N}$=14,918

As previously mentioned the reading and math scores were derived from an IRT model and based on all of a child's responses to a particular area of assessment. These scores are not integers because they are probabilities of correct answers. They represent the number of items a student would have answered correctly if they were administered the total number of items in the assessment battery (National Center for Education Statistics, 2000). The assessment battery was designed for use with both kindergarten and first-grade children. Therefore, it is expected that the majority of first time kindergarteners could score at lower levels (U.S. Department of Education, 2001). If fact, although the mean for reading score ($M = 22.45$ on a 0-72 scale) and math score ($M = 19.49$ on a 0-64 scale) appear relatively low, they are consistent with statistics presented by the ECLS-K study and can be interpreted as defining the national average for the population represented in this study (National Center for Education Statistics, 2000). Similarly, although not derived from an IRT model, the psychomotor score represents the total number of points earned for demonstrating fine and gross motor skills measured by the assessor. The mean for psychomotor skills ($M = 12.25$ on a 0-17 scale) is not intended to be interpreted based upon face validity, but rather and can be interpreted as the average performance for children in the population represented by the sample in this study and thus defines the national average (U.S. Department of Education, 2001).

Finally, as reviewed in chapter III, the approaches to learning score and social–emotional score were derived from the Social Rating Scale completed by teachers. These scale scores are the mean rating on the items included in the scale (National Center for Education Statistics, 2000). The frequency scale ranged from 1-4 and the means derived

for the variables in this study are consistent with the statistics presented in the ECLS-K

study (National Center for Education Statistics, 2000). In particular, the mean score for

approaches to learning skills ($M$ = 3.01, $SD$ = .66) and the mean score for social–

emotional skills ($M$ = 3.00, $SD$ = .60) indicate that on average, the population represented

by the sample in this study exhibits these skills regularly, but not all the time (National

Center for Education Statistics, 2000).

     As for explanatory variables, the percentage of children that live in a home

defined as having socio-demographic risk varies with 23% living in a single parent

family, 12% receiving welfare, 13% having a non-English primary home language and

16% having a mother with less than high school education. The mean scores for the eight

different types of cognitive stimulation activities provided in the home vary slightly,

while the total average of the home educational environment ($M$ = 2.71, $SD$ = .51)

indicates that a majority of parents engaged in cognitive stimulation activities between

once and twice per week to 3-6 times per week. As for early school experience, almost

15% of the total sample attended Head Start in the year before entering kindergarten as

opposed to not attending Head Start. Just over 55% attended a day care or pre-school in

the year before entering kindergarten as opposed to not attending a day care or pre-school

in the year before entering kindergarten. As also illustrated in Table 2, the majority

indicated that school facilities ($M$ = .55, $SD$ = .61) and crime in the school neighborhood

($M$ = .49, $SD$ = .54) are either sometimes a problem or not a problem at all. Finally,

characteristics of the child range with average ratings indicating that children exhibit self

control sometimes or often ($M$ = 2.85, $SD$ = .51), exhibit positive social interaction often

or very often (*M* = 3.33, *SD* = .55) and exhibit impulsive/overactive behavior sometimes (*M* = 1.94, *SD* = .66).

<div style="text-align: center;">Bivariate Associations</div>

Intercorrelations among kindergarten readiness skills, socio-demographic risk factors, ecologically based resources, and child disposition characteristics are presented in Table 3. The correlations indicate that all four socio-demographic risk factors are significantly and inversely related to all five measures of kindergarten readiness skills, meaning that the presence of risk is related to lower scores in kindergarten readiness skills. From the perspective of the outcomes, kindergarten skills in math had the strongest relationship with the socio-demographic risk factors. Table 3 indicates that math scores are most strongly associated with having a mother with less than high school education (*r* = −0.25), followed by being a welfare recipient (*r* = −0.20), and then by equal associations with having a non-English primary home language (*r* = −0.17) and a single parent family (*r* = −0.17). Kindergarten readiness skills in reading post the second strongest associations with the socio-demographic risk factors. For reading outcomes, having a mother with less than high school education (*r* = −0.17) and being a welfare recipient (*r* = −0.17) have the strongest associations, followed by having a single parent family (*r* = −0.16) and then having a non-English primary home language (*r* = −0.04), which although significant, is considered trivial (Cohen, 1988). The outcome variable with the third strongest associations among the socio-demographic risk factors is kindergarten readiness skills in approaches to learning. As can be seen, similar to math and reading skills, approaches to learning has the strongest association with having a

mother with less than high school education ($r = -0.14$), followed by being a welfare recipient ($r = -0.13$) and having a single parent family ($r = -0.13$). Again, having a non-English primary home language is significantly related but considered trivial ($r = -0.04$).

Finally, although statistically significant, psychomotor skills and social–emotional skills show the weakest correlations among the socio-demographic risk factors. Consistent with the other findings, having a mother with less than high school education ($r = -0.13$ for psychomotor and $r = -0.08$ for social–emotional), being a welfare recipient ($r = -0.10$ for both psychomotor and social–emotional) and having a single parent family ($r = -0.08$ for psychomotor and $r = -0.11$ for social–emotional) show the strongest relationship with the outcome variables. Having a non-English primary home language ($r = -0.03$ for psychomotor and $r = -0.06$ for social–emotional) shows a relationship that is significant but insubstantial. In sum, from the perspective of the socio-demographic risk factors, having a mother with less than high school education  and being a welfare recipient have the strongest inverse associations with kindergarten readiness skills followed by having a single parent family. Having a non-English primary home language although statistically significant, is the socio-demographic risk factor with the weakest association among kindergarten readiness skills.

Table 3

Pearson Correlations of all Variables, Unweighted

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Reading Score | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 Math Score | .72** | | | | | | | | | | | | | | | | | | | | | | | |
| 3 Psychomotor Score | .31** | .41** | | | | | | | | | | | | | | | | | | | | | | |
| 4 Approaches to Learning Score | .36** | .40** | .34** | | | | | | | | | | | | | | | | | | | | | |
| 5 Social-Emotional Score | .21** | .23** | .20** | .67** | | | | | | | | | | | | | | | | | | | | |
| 6 Single Parent Family | -.16** | -.17** | -.08** | -.13** | -.11** | | | | | | | | | | | | | | | | | | | |
| 7 Welfare Recipient | -.17** | -.20** | -.10** | -.13** | -.10** | .29** | | | | | | | | | | | | | | | | | | |
| 8 Non-English Primary Home Language | -.04** | -.17** | -.03** | -.04** | -.06** | -.05** | .05** | | | | | | | | | | | | | | | | | |
| 9 Mother's education less than high school | -.17** | -.25** | -.13** | -.14** | -.08** | .08** | .21** | .31** | | | | | | | | | | | | | | | | |
| 10 Reading to child | .18** | .18** | .06** | .10** | .09** | -.10** | -.10** | -.13** | -.15** | | | | | | | | | | | | | | | |
| 11 Telling stories | .05** | .06** | .03** | .05** | .04** | -.02** | -.03** | -.03** | -.06** | .36** | | | | | | | | | | | | | | |
| 12 Singing songs | .03** | .03** | .02* | .04** | .06** | .02** | .01 | -.12** | -.09** | .18** | .23** | | | | | | | | | | | | | |
| 13 Doing art | .03** | .05** | .06** | .07** | .06** | -.02** | -.01 | -.07** | -.06** | .22** | .25** | .20** | | | | | | | | | | | | |
| 14 Playing games | .05** | .08** | .01 | .03** | .03** | -.02 | -.01 | -.10** | -.06** | .22** | .26** | .20** | .27** | | | | | | | | | | | |
| 15 Teaching nature | .09** | .10** | .06** | .05** | .04** | -.06** | -.06** | -.11** | -.11** | .23** | .26** | .22** | .23** | .25** | | | | | | | | | | |
| 16 Building things | -.02** | .01 | -.01 | -.03** | -.01 | -.02** | -.01 | -.06** | -.04** | .19** | .24** | .15** | .26** | .31** | .26** | | | | | | | | | |
| 17 Playing sports | -.03** | .01 | .01 | .00 | .01 | -.01 | .01 | -.10** | -.03** | .17** | .22** | .20** | .21** | .27** | .23** | .27** | | | | | | | | |
| 18 Composite of home educational environment | .08** | .11** | .05** | .07** | .07** | -.05** | -.05** | -.16** | -.13** | .54** | .61** | .53** | .57** | .59** | .58** | .59** | .56** | | | | | | | |
| 19 Attended head start | -.19** | -.20** | -.09** | -.12** | -.09** | .18** | .22** | .05** | .14** | -.09** | -.02** | .01 | -.01 | .01 | -.05** | .01 | .02** | -.02** | | | | | | |
| 20 Attended day care or pre-school | .25** | .28** | .14** | .11** | .05** | -.07** | -.16** | -.17** | -.25** | .12** | .02* | .04** | .02** | .01 | .05** | -.01 | -.01 | .05** | -.32** | | | | | |
| 21 Inadequacy of school facilities | -.06** | -.06** | -.02 | .00 | -.01 | .02** | .02** | .03** | .06** | -.02** | -.01 | -.02* | -.01 | -.02* | -.01 | -.01 | -.01 | -.02** | .01 | -.03** | | | | |
| 22 Crime in school neighborhood | -.12** | -.17** | -.07** | -.07** | -.06** | .13* | .16** | .12** | .14** | -.05** | -.02* | -.01 | -.03** | -.02* | -.05** | -.01 | -.02** | -.04** | .13** | -.12** | .19** | | | |
| 23 Child exhibits self-control | .12** | .12** | .10** | .13** | .14** | -.06** | -.07** | -.01 | -.10** | .12** | .11** | .04** | .06** | .05** | .08** | .04** | .04** | .12** | -.08** | .05** | .01 | -.02** | | |
| 24 Child exhibits positive social interaction | .07** | .12** | .08** | .09** | .11** | -.01 | -.03** | -.22** | -.16** | .13** | .13** | .18** | .12** | .12** | .15** | .08** | .14** | .23** | -.03** | .10** | -.02** | -.06** | .15** | |
| 25 Child exhibits impulsive/overactive behavior | -.14** | -.15** | -.11** | -.19** | -.16** | .12** | .10** | .01 | .10** | -.11** | -.06** | -.01 | -.04** | -.01 | -.02** | -.01 | .00 | -.05** | .11** | -.08** | -.01 | .06** | -.40** | .02** |

Unweighted N=14,918

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

Correlations between frequency of cognitive stimulation activities provided to the child in the home and kindergarten readiness skills are significant for most of the activities indicating that engaging in home activities is generally positively related to kindergarten readiness (r ranges from −0.03 to 0.18).  Reading to the child is the home activity that posts the strongest association across all five kindergarten readiness outcome variables (r ranges from 0.06 to 0.18).  The home activities that are least related with kindergarten readiness skills include playing sports and building things; most of the associations between these activities and the outcomes are not statistically significant and those that are can be considered trivial (r ranges from −0.03 to 0.01) (Cohen, 1988).  The composite, or average, of the home educational environment is statistically significant and strongly related to kindergarten readiness skills in math ($r = 0.11$), followed closely by readiness skills in reading ($r = 0.08$), and then by small associations with approaches to learning, social–emotional skills, and psychomotor skills respectively ($r = 0.07, 0.07, 0.05$).

The associations between early school experience and kindergarten readiness skills are all significant but vary by independent variable.  Attending Head Start is inversely related to the outcomes indicating that attendance is related to lower scores on all five measures of kindergarten readiness skills (r ranges from −0.09 to −0.20).  The absence of any type of formalized center-based program is also related to lower scores in kindergarten readiness skills (r ranges from −0.04 to −0.11).  On the contrary, attending day care or pre-school in the year before entering kindergarten is positively associated with the outcomes indicating that attendance is related to higher scores on kindergarten readiness skills (r ranges from 0.05 to 0.28).  Consistent with the other bivariate results,

the associations are strongest for kindergarten readiness skills in math, followed closely by readiness skills in reading, and then by smaller associations among the outcome variables approaches to learning, psychomotor skills and finally social–emotional skills.

Associations between kindergarten readiness skills and the inadequacy of school facilities are inversely related, and are significant with correlations for math ($r = -0.06$) and reading ($r = -0.06$) skills but not significant for approaches to learning ($r = 0.00$), psychomotor skills ($r = -0.02$) and social–emotional skills ($r = -0.01$). This indicates that while inadequate school facilities are related to lower scores on kindergarten readiness in general, this association is not consistently significant across all outcome measures of kindergarten readiness skills. Crime in the school neighborhood is significantly and inversely associated with all five outcome variables indicating that problems with crime are related to lower scores on kindergarten readiness skills (r ranges from $-0.06$ to $-0.17$). Similar to other results, the dependent variables with the strongest association with crime in the school neighborhood are kindergarten readiness skills in math ($r = -0.17$), followed by readiness skills in reading ($r = -0.12$), and then by approaches to learning ($r = -0.07$), psychomotor skills ($r = -0.07$) and social–emotional skills ($r = -0.06$) respectively.

Finally, the associations between child disposition characteristics and kindergarten readiness skills are all significant but vary by child characteristic. Exhibiting self-control and exhibiting positive social interaction are both positively associated with the outcomes (r ranges from 0.07 to 0.14), while exhibiting impulsive/overactive behavior is inversely associated with kindergarten readiness skills (ranges from $-0.11$ to $-0.19$). This indicates that, as expected, behaviors such as self

control and positive social interaction are related to higher scores whereas externalizing behavior difficulties such as impulsive/overactive behavior are related to lower scores on kindergarten readiness skills. From the perspective of the outcome variables, impulsive/overactive behavior has the strongest associations, followed by self-control and then by positive social interaction which posts the smallest associations with the five measures of kindergarten readiness skills. As can be seen in Table 3, the associations are not consistently stronger for any particular dependent variable, but rather vary in strength across the five measures of kindergarten readiness skills (r ranges from −0.19 to 0.14).

Hierarchical Regression Analysis

Hierarchical regression analysis was run separately for each of the five outcome measures representing kindergarten readiness skills. Three-step models were conducted; step 1 included the socio-demographic risk factors, step 2 incorporated the ecologically based resources and control variables (child disposition characteristics), and step 3 added the interaction terms between socio-demographic risk factors and ecologically based resources. In order to achieve a parsimonious solution, the total number of interaction terms was initially entered in step 3 for each of the outcome measures, and then repeated for each dependent variable with only the significant interactions. The results of the hierarchical regression analyses are described separately for each of the five dependent variables in this study.

*Kindergarten Readiness Skills in Reading*

The results for the hierarchical regression analysis summary for variables predicting kindergarten readiness skills in reading are presented in Table 4. The socio-demographic risk factors entered in model 1 significantly predicted kindergarten readiness skills in reading for three of the four risk factors, accounting for 6% of the variance. Having a single parent family ($B = -1.93$, $SE = .16$, $p < .001$), being a welfare recipient ($B = -2.78$, $SE = .21$, $p < .001$), and having a mother with less than high school education ($B = -3.00$, $SE = .19$, $p < .001$) were significant while having a non-English primary home language ($B = -.23$, $SE = .20$, $p > .05$) was not a significant contributor to the model. Consistent with the first hypothesis, the results show that all of the socio-demographic risk factors have negative associations with reading skills, indicating that being at risk is particularly associated with lower kindergarten readiness skills in reading. In particular, the findings reveal that living in home with a single parent family result in a score that is 1.93 points lower in reading than for those with a two parent family. Additionally, being in the welfare recipient category results in a score that is 2.78 points lower than for welfare non-recipients. Finally, having a mother with less than high school education results in a score that is 3.00 points lower, compared to those whose mother has an education that includes high school or more.

Table 4

Hierarchical Regression Analysis Summary for Variables Predicting
Kindergarten Readiness Skills in Reading, Weighted

| Variable | Model 1 | | | Model 2 | | | Model 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | S. E. | P | B | S. E. | P | B | S. E. | P |
| Single parent family | -1.93 | .16 | *** | -1.39 | .16 | *** | -1.24 | .16 | *** |
| Welfare recipient | -2.78 | .21 | *** | -1.66 | .21 | *** | -1.65 | .21 | *** |
| Non-English primary home language | -.23 | .20 | | .55 | .20 | ** | .62 | .20 | ** |
| Mother's education less than high school | -3.00 | .19 | *** | -1.67 | .19 | *** | -1.79 | .19 | *** |
| Home Educational Environment | - | - | | .62 | .13 | *** | .60 | .13 | *** |
| Head Start Attendance | - | - | | -1.74 | .19 | *** | -1.76 | .19 | *** |
| Day Care or Pre-School Attendance | - | - | | 2.84 | .14 | *** | 2.76 | .14 | *** |
| Inadequacy of School Facilities | - | - | | -.47 | .10 | *** | -.47 | .10 | *** |
| School Neighborhood Crime | - | - | | -.61 | .12 | *** | -.57 | .12 | *** |
| Child Self-Control | - | - | | .91 | .14 | *** | .91 | .14 | *** |
| Child Social Interaction | - | - | | .26 | .12 | * | .28 | .12 | * |
| Child Impulsive/Overactive behavior | - | - | | -.78 | .10 | *** | -.75 | .10 | *** |
| Welfare recipient x Head Start Attendance | - | - | | - | - | | 1.78 | .43 | *** |
| Welfare recipient x School Neighborhood Crime | - | - | | - | - | | .89 | .33 | ** |
| Non-English primary home language x Home Educational Environment | - | - | | - | - | | -1.29 | .33 | *** |
| Non-English primary home language x Day Care or Pre-School | - | - | | - | - | | -.94 | .40 | * |
| Non-English primary home language x School Neighborhood Crime | - | - | | - | - | | .93 | .32 | ** |
| Mother's education x Head Start Attendance | - | - | | - | - | | 1.70 | .43 | *** |
| Mother's education x Day Care or Pre-School Attendance | - | - | | - | - | | -1.35 | .40 | *** |
| Mother's education x Inadequacy of School Facilities | - | - | | - | - | | 0.63 | 0.27 | * |
| Constant | 23.73 | .08 | *** | 18.77 | .66 | *** | 18.71 | 0.66 | *** |
| Adjusted R-square | .06 | | | .12 | | | 0.13 | | |

Unweighted $\underline{N}$=14,918
 * p < .05, ** p <.01, *** p < .001

With the addition of the ecologically based resources and child disposition characteristics, model 2 accounts for 6% more variance in reading skills with a total adjusted $R^2$ of 12 percent. The three initially significant socio-demographic risk factors retain their significance however the strength of the magnitudes decreases. Compared to the coefficients in model 1, the coefficients of the socio-demographic risk factors in Model 2 each decreased in magnitude. Having a single parent family ($B = -1.39$, $SE = .16$, $p < .001$) decreases in magnitude by 28%, being a welfare recipient ($B = -1.66$, $SE = .21$, $p < .001$) decreases in magnitude by 41%, and having a mother with less than high school education ($B = -1.67$, $SE = .19$, $p < .001$) decreases in magnitude by 45 percent. The diminished magnitudes of the coefficients for the socio-demographic risk factors suggest that the resources added to the model share variance in predicting kindergarten readiness skills in reading. Simply stated, the risk factors are less impacting with the presence of the ecologically based resources added in the second model.

Having a non-English primary home language additionally shows significance in model 2 ($B = .55$, $SE = .20$, $p < .01$). However, unlike the other socio-demographic risk factors, non-English primary home language is positively associated with kindergarten readiness skills in reading. The coefficient shows that having a non-English primary home language improves the score on kindergarten readiness skills in reading by .55 points. Where as in model 1 it was not a significant predictor, with the addition of the resource variables in model 2, non-English primary home language shows a significant and positive association. This indicates that the resource variables added in model 2 share variance with non-English primary home language in contributing to kindergarten readiness skills. Consistent with the literature finding that some children from non-

English speaking backgrounds demonstrate high levels of resources (Hair et al., 2006), results of this study suggest that the presence of resources contribute to the positive association between non-English primary home language and readiness skills in reading.

As for the ecologically based resources in model 2, all variables significantly account for variance in kindergarten skills in reading. Consistent with the second hypothesis, most of the ecologically based resources have a positive relationship with the outcome indicating that the presence of one or more ecologically based resources is associated with stronger kindergarten readiness skills. Home educational environment ($B$ = .62, $SE$ = .13, $p$ < .001) has a coefficient indicating that a more cognitively stimulating home environment is related to stronger readiness skills in reading such that with each increasing unit of cognitive stimulation, the score on kindergarten readiness skills in reading increases by .62 points above the mean. Attending day care or pre-school ($B$ = 2.84, $SE$ = .14, $p$ < .001) has positively related effects indicating participation in day care or preschool in the year before kindergarten raises scores 2.84 points higher in readiness skills in reading than scores for those who do not attend day care or pre-school. However, contrary to what was hypothesized, the results show that attending Head Start ($B$ = −1.74, $SE$ = .19, $p$ < .001) as opposed to not attending Head Start in the year before kindergarten, has an inverse relationship with the outcome. That is, attending Head Start is related to lower scores on kindergarten readiness skills in reading; it decreases the score on kindergarten readiness skills in reading by 1.74 points compared to not attending Head Start in the year before Kindergarten.

Further results demonstrate that as expected, inadequate school facilities and crime in the school neighborhood were both inversely related to kindergarten readiness

skills in reading; inadequate facilities and crime predicted lower scores in readiness skills in reading ($B = -.47$, $SE = .10$, $p < .001$ and $B = -.61$, $SE = .12$, $p < .001$ respectively). In particular, the findings reveal that with each increase in level of inadequacy of facilities the score on kindergarten readiness skills in reading decreases by .47 points. Additionally, with each increase in level of crime in the school neighborhood the score on kindergarten readiness skills in reading decreases by .61 points. Simply stated, the school setting impacts outcomes; the more adequate the school facilities and the lower the crime in the school neighborhood, the higher the scores are for kindergarten readiness skills in reading.

Finally, as for the covariates in model 2, the child disposition characteristics self-control and positive social interaction both have slightly positive associations with readiness skills in reading ($B = .91$, $SE = .14$, $p < .001$ and $B = .26$, $SE = .12$, $p < .05$, respectively), while impulsive/overactive behavior was associated with lower scores on the outcome measure ($B = -.78$, $SE = .10$, $p < .001$). For each unit increase in exhibiting self-control kindergarten readiness scores in reading increase by .91 points, while for each unit increase in exhibiting positive social interaction kindergarten readiness scores in reading increase by .26 points. For each unit increase in exhibiting impulsive/overactive behavior, kindergarten readiness scores in reading decrease by .78 points.

In Model 3, the risk factors, ecologically based resources and child disposition characteristics remained in the model and interaction terms were added to test the moderation hypothesis. That is, to examine if the presence of one or more ecologically based resources reduces the negative effects of socio-demographic risk factors on

kindergarten readiness skills. To orient the reader to terms and definitions used in presenting the results of Model 3, a brief discussion follows on interpreting interaction in regression. Subsequently, the results of model 3 in this study are presented.

Interaction terms in regression can be understood as interplay among predictors that affect the outcome variable in a way that is different from the sum of the effects resulting from the individual predictors (Cohen, Cohen, Aiken & West, 2003). When an interaction term is entered into the model, results are interpreted for first order and higher order effects. First order effects refer to the contribution of individual predictors on the outcome while higher order effects refer to effects that result from multiplicative functions among the individual predictors (Cohen, Cohen, Aiken & West, 2003). When the two predictors are combined into a term and significantly interact, the regression of the outcome on one of the predictors depends on the value of the other predictor (Cohen, Cohen, Aiken & West, 2003). In a regression analysis containing significant interactions, the first order effects are moderated by the values of the other predictors with which they are interacting, which are represented as higher order effects (Cohen, Cohen, Aiken & West, 2003). Therefore, in order to test moderation, individual predictors need to be included with the interaction terms in the model. If otherwise omitted, the higher order effect would include any first order effects of the predictors that were correlated with the interaction term (Cohen, Cohen, Aiken & West, 2003).

In social science research, interactions are often investigated for the presence of a buffering effect where one variable represents a risk factor while the other variable is hypothesized to be a protective factor which moderates the risk. In fact, there are three different types of interactions which can be determined by the pattern of signs and

magnitudes of the coefficients in the model (Cohen, Cohen, Aiken & West, 2003). First, a synergistic interaction occurs when both first order (main) effects and interaction effects are the same sign indicating that they affect the outcome in the same direction (Cohen, Cohen, Aiken & West, 2003). In comparison, a buffering interaction contains two individual predictors that have regression coefficients with opposite signs (Cohen, Cohen, Aiken & West, 2003). In this case, a significant interaction represents the fact that one predictor weakens the impact of the other. Finally, an antagonistic interaction, both individual predictors affect the outcome in the same direction, but the higher order interaction term contains a different sign (Cohen, Cohen, Aiken & West, 2003; Neter, Kutner, Nachtsheim & Wasserman, 1996). Essentially, the whole is less than the sum of its parts resulting in an "either-or" pattern of influence (Cohen, Cohen, Aiken & West, 2003), that is, one predictor compensates for the other predictor (Cohen, Cohen, Aiken & West, 2003). Simple stated, the importance of one predictor is lessened by the importance of the existence and/or level of another predictor.

When an interaction has been found to be significant, the issue then becomes one of interpretation (Cohen, Cohen, Aiken & West, 2003). A significant interaction indicates that the association between a predictor and an outcome variable is different across measures on a third variable (Baron & Kenny, 1986). As previously mentioned, as far as interpretation is concerned, as Baron & Kenny explain (1986), unless a variable is manipulated there is no causality in moderation; only strength of association. Although interaction is expressed in terms of an independent variable and a moderator variable, both can actually function as the moderator or predictor, thus, theory is relied upon to make the distinction (Baron & Kenny, 1986). One way to assist with the interpretation is

to plot the relationship between one independent variable and the outcome variable at different levels of the other independent variable (Aiken & West, 1991). This allows for a visual indication of the direction and nature of the relationships that can be interpreted on the basis of face validity (Aiken & West, 1991).

In this study, model 3 for kindergarten readiness skills in reading accounted for a total of 13% of the variance with all first order and higher order effects showing significance. As can be seen in Table 4, a total of eight interaction terms were included in the model. Six of these terms showed significance as antagonistic interactions while two can be interpreted as buffering interactions. In the first significant interaction, being a welfare recipient and Head Start participation both individually show inverse relationships with the outcome in first order effects ($B = -1.65$, $SE = .21$, $p < .001$ and $B = -1.76$, $SE = .19$, $p < .001$ respectively) and a coefficient change in their interaction term ($B = 1.78$, $SE = .43$, $p < .001$) demonstrating the presence of antagonistic interaction. The antagonistic interaction suggests a compensation effect; the importance of one variable is lessened by the importance of another variable. The plot for the first interaction is depicted in Figure 3.

Figure 3

*Effects of Head Start and Receipt of Welfare on Reading Score*
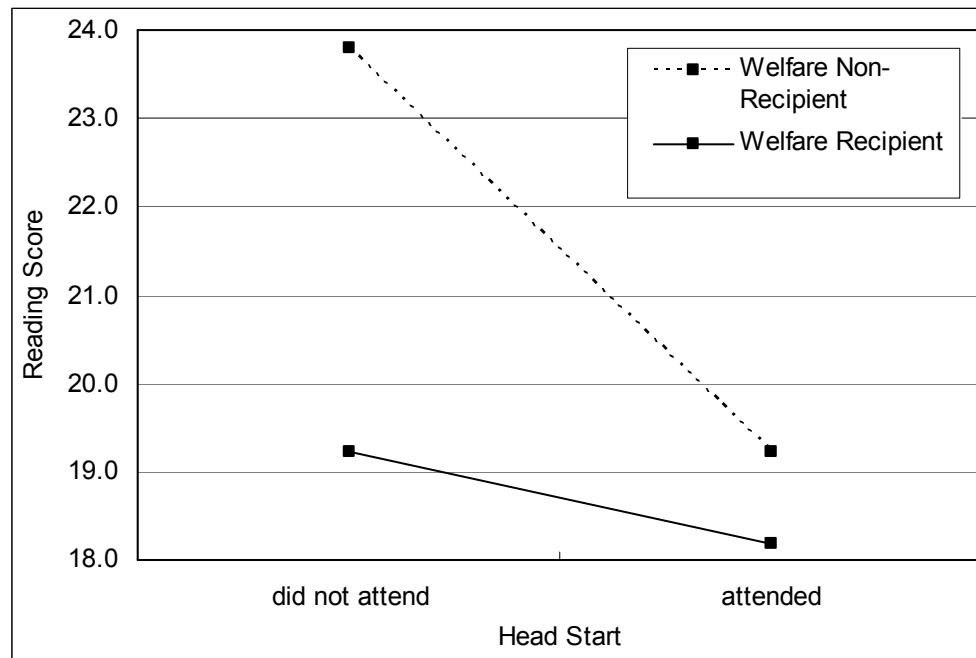
In this case, contrary to what was hypothesized, Head Start attendance does not act as a resource but rather lowers reading scores for both welfare recipients and non-recipients. As can be seen in the plot, Head start has more of an impact on scores for welfare non-recipients compared to welfare recipients. In terms of not attending Head Start, the difference in outcomes for welfare recipients and non-recipients is notably large, demonstrating the differential effect of receipt of welfare. However, for Head Start attendance, the gap in outcomes between welfare recipient and non-recipient becomes much smaller, demonstrating the diminished impact of receipt of welfare. Thus, the significant antagonistic interaction term reflects the fact that the impact of receipt of welfare on reading score is lessened by the role that attending Head Start plays in contributing to outcomes. Essentially, moderation was detected, but in a different form than hypothesized. It was hypothesized that moderation would take form as an increase in reading scores for welfare recipients, but instead Head Start attendance predicted a decrease in reading scores which was greater for welfare non-recipients than recipients.(Implications of these results are further addressed in Chapter V).

The results for the second interaction show that being a welfare recipient and having crime in the school neighborhood both individually have inverse relationships with the outcome in first order effects ($B = -1.65$, $SE = .21$, $p < .001$ and $B = -.57$, $SE = .12$, $p < .001$ respectively) and a coefficient change in their significant interaction term ($B = .89$, $SE = .33$, $p < .01$). This is interpreted as an antagonistic interaction and suggests another compensation effect. Figure 4 shows this interaction in a plot.

Figure 4

*Effects of Level of Crime in School Neighborhood and Receipt of Welfare on Reading Score*
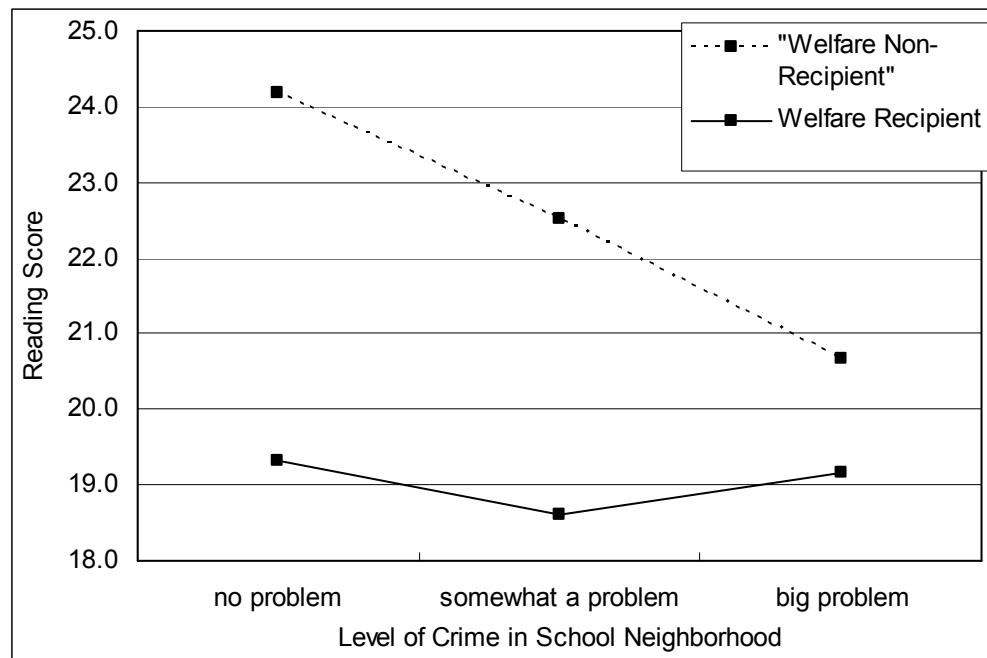
In this case, problems with crime lower reading scores for welfare non-recipients, but scores for welfare recipients are not notably altered by the level of crime. As can be seen in the plot, when there is no problem with the level of crime in the school neighborhood the difference in reading scores for welfare recipients and non-recipients is notably large, demonstrating the differential effect of receipt of welfare. However, when there is a big problem with crime in the school neighborhood, the gap in outcomes between welfare recipient and non-recipient becomes much smaller, demonstrating the diminished impact of receipt of welfare. Thus, the antagonistic interaction indicates that the importance of being a welfare recipient is lessened by the importance of the level of crime in the school neighborhood on outcomes. Although moderation was detected, the fact that reading scores increase for welfare recipients when crime is a big problem, indicates moderation takes a different form than hypothesized. As the level of crime decreases, implying that the school setting generates a perception of greater safety, reading scores steadily increase for welfare non-recipients but not for recipients. It is also important to note that even when there is no problem with crime, welfare recipients have a mean score for reading that is notably lower than the mean score for welfare non-recipients.

The third significant interaction, non-English primary home language and home educational environment both individually show positive relationships with the outcome in first order effects ($B = .62$, $SE = .20$, $p < .01$ and $B = .60$, $SE = .13$, $p < .001$ respectively) and a coefficient change in their significant interaction term ($B = -1.29$, $SE = .33$, $p < .001$) indicating another antagonistic interaction. This plot is depicted in Figure 5.

Figure 5

*The Effects of Home Educational Environment and Non-English Primary Home Language on Reading Score*
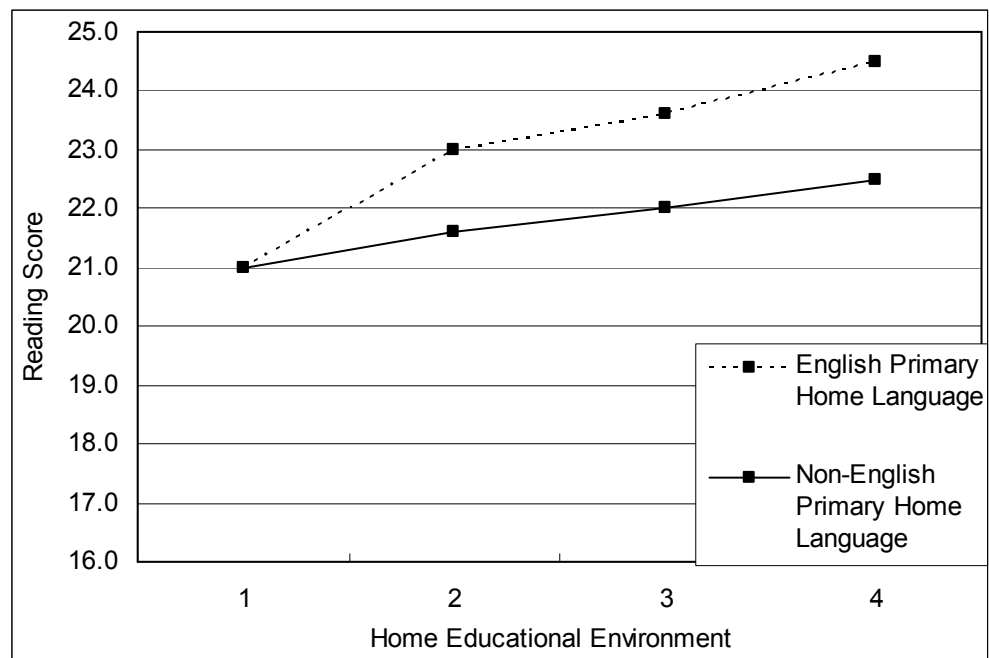
As can be seen, a more cognitively stimulating home environment improves reading scores for both those with non-English and English primary home languages. However, these variables interact such that the impact of the home educational environment is greater for those who have an English primary home language. Yet, when the home educational environment is at the lowest level, there is no differential effect of English versus non-English primary home language on reading scores. Thus, although the home educational environment does moderate the relationship between non-English primary home language and reading score, the moderation effect is stronger for those with an English primary home language. Furthermore, the antagonistic interaction implies that that importance of having an English or non-English home language is lessened by the importance of home educational environment in contributing to outcomes.

In the fourth interaction, non-English primary home language and attending a center based program in the year before kindergarten both individually show positive relationships with the outcome in first order effects ($B = .62$, $SE = .20$, $p < .01$ and $B = 2.76$, $SE = .14$, $p < .001$, respectively) and a coefficient change in their antagonistic interaction term ($B = -.94$, $SE = .40$, $p < .05$). Figure 6 shows the plot of this interaction.

Figure 6

*The Effects of Daycare or Pre-School and Non-English Primary Home Language on Reading Scores*
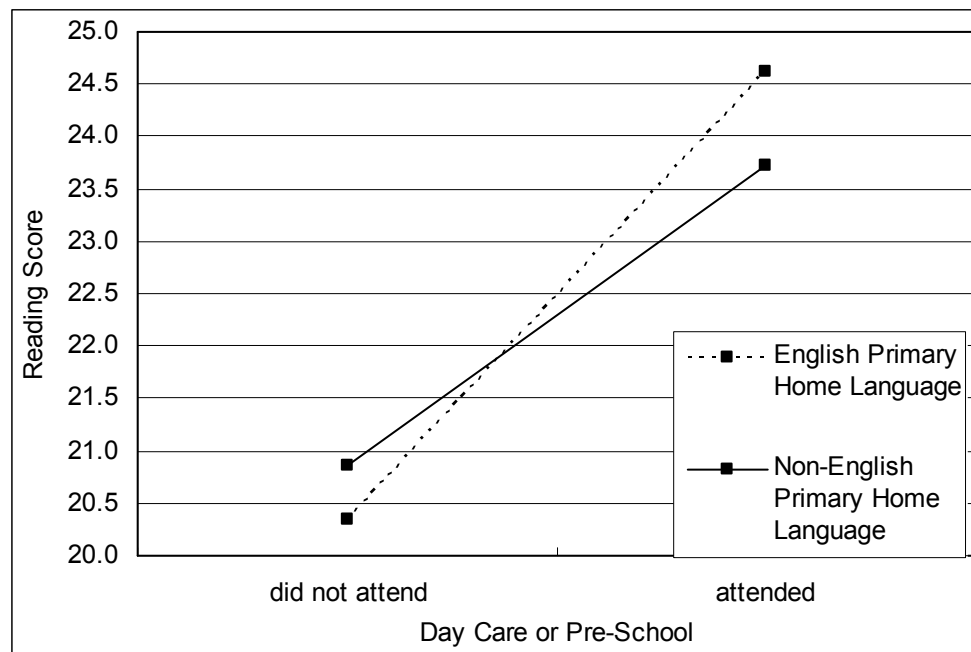
As hypothesized, the plot indicates that attending day care or pre-school does moderate the impact of non-English primary home language on reading score. Although the positive effects of day care or pre-school are more pronounced for those with an English primary home language, the difference in gain scores between non-English and English primary home language is small. Essentially, reading scores are lower for those who did not attend day care or pre-school, and high for those who did attend day care or pre-school, for both those with an English and non-English primary home language. As an antagonistic interaction, this can be interpreted as meaning that the importance of non-English primary home language is lessened by the importance of day care or pre-school attendance as a factor in contributing to outcomes. It is interesting to note that the mean score for non-English primary home language was higher than English primary home language for those who did not attend day care or pre-school, whereas it was lower for those who did attend day care or pre-school.

The fifth interaction is interpreted as a buffering interaction; non-English primary home language shows a positive relationships with the outcome in first order effects ($B = .62$, $SE = .20$, $p < .01$) while crime in the school neighborhood shows an inverse relationship with the outcome in first order effects ($B = -.57$, $SE = .12$, $p < .001$) and a significant interaction term ($B = -.93$, $SE = .32$, $p < .01$). This plot is presented in Figure 7.

Figure 7

*The Effects of Level of Crime in School Neighborhood and Non-English Primary Home Language on Reading Score*
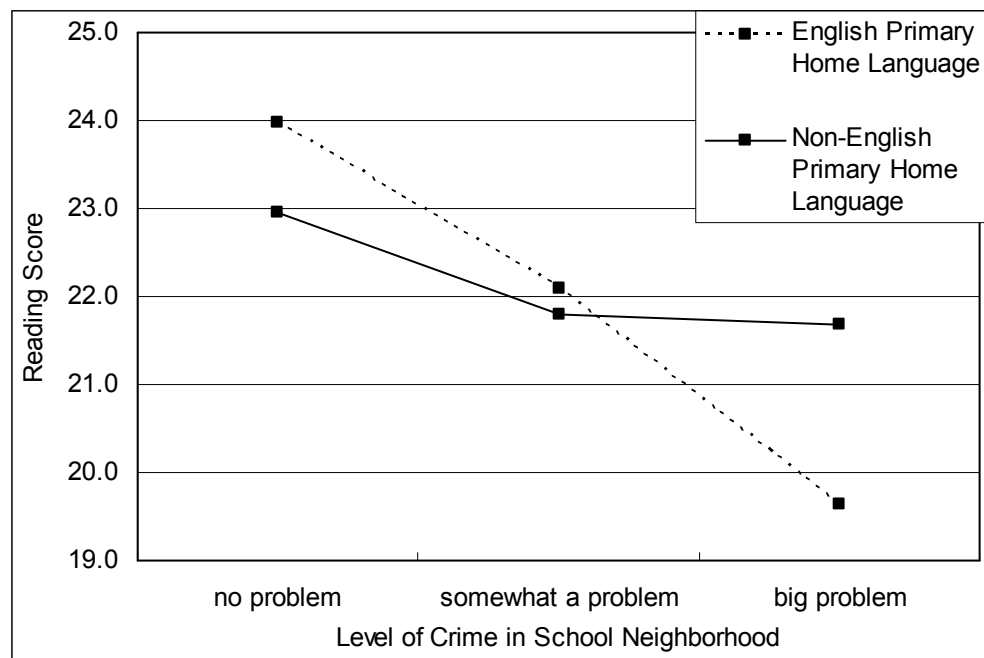
In a buffering interaction, the existence and/or level of one predictor weakens the effect of another predictor. In this case, crime in the school neighborhood does generally have a negative impact on outcomes, but for those with an English primary home language, the impact is greater. The plot indicates that while crime in the school neighborhood contributes to lower scores in reading skills for those with an English primary home language, it does not contribute as significantly for those with a non-English primary home language. In particular, for those with a non-English primary home language, reading scores are similar whether there is somewhat of a problem or a big problem with crime. Yet when there is no problem with crime, reading scores are notably higher. For those with an English primary home language, reading scores steadily decrease as the level of crime increases. This buffering interaction supports the hypothesis; the level of crime in the school neighborhood weakens the negative effect that non-English primary home language has on reading scores. Specifically, when there is no problem with crime implying that the school setting is safer, reading scores are higher. However, it is also worth noting that main effects are depicted in the plot; even when there is no crime the reading scores for those with a non-English primary home language are lower than for those with an English primary home language.

The results for the sixth interaction indicate that having a mother with less than high school education and Head Start attendance both individually show inverse relationships with the outcome in first order effects ($B = -1.79$, $SE = .19$, $p < .001$ and $B = -1.76$, $SE = .19$, $p < .001$ respectively) and a coefficient change in their interaction term ($B = 1.70$, $SE = .43$, $p < .001$). This is interpreted as an antagonistic interaction and suggests a compensation effect. Figure 8 shows this interaction in a plot.

Figure 8

*The Effects of Head Start and Mother's Education Less than High School on Reading Score*
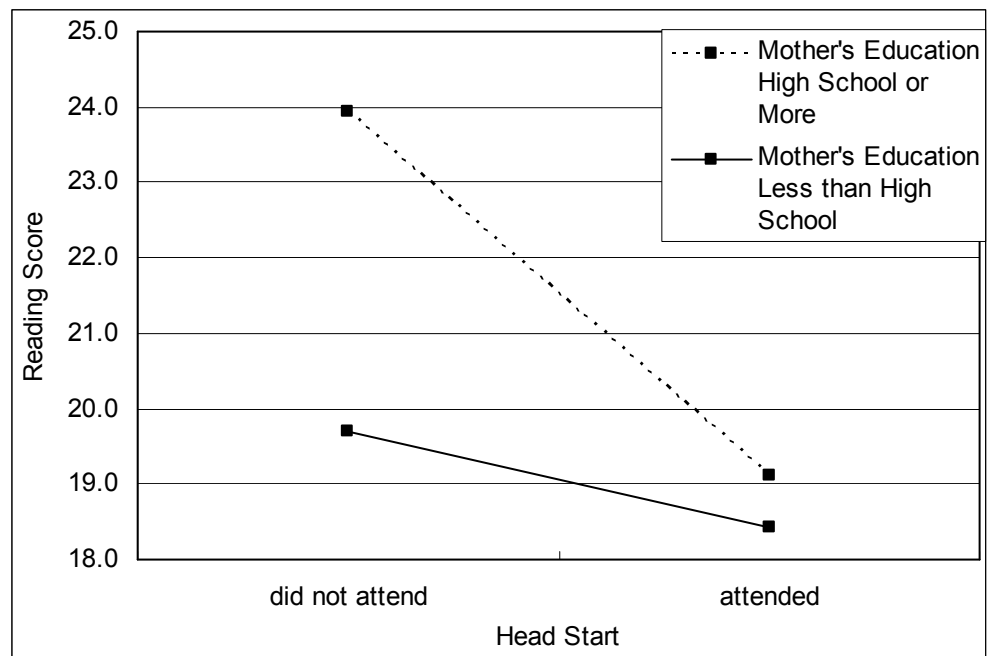
As can be seen, contrary to what was hypothesized, Head Start attendance is associated with lower scores in reading skills. This effect was more prominent for those having a mother with a high school or more education. For those having a mother with a less than high school education, Head Start attendance did lower reading scores, but to a slighter degree. In terms of not attending Head Start, the difference in outcomes for having a mother with a high school or more education versus having a mother with a less than high school education is notably large, demonstrating the differential effect of level of mother's education. However, for Head Start attendance, the gap in outcomes between having a mother with a high school or more education versus having a mother with a less than high school education becomes much smaller, demonstrating the diminished impact of level of mother's education. Thus, the significant antagonistic interaction term reflects the fact that the impact of level of mother's education on reading score is lessened by the role that attending Head Start plays in contributing to outcomes. As previously mentioned, it was hypothesized that Head Start would show a moderation effect in the form of an increase in reading scores, not as a decrease in reading scores as the results indicate.

In the seventh interaction, having a mother with less than a high school education shows an inverse relationship with the outcome in first order effects ($B = -1.79$, $SE = .19$, $p < .001$) while attending a center based program in the year before kindergarten shows a positive relationship with the outcome in first order effects ($B = 2.76$, $SE = .14$, $p < .001$) and a significant buffering interaction term ($B = -1.35$, $SE = .40$, $p < .001$). The plot for this interaction is presented in Figure 9.

Figure 9

*The Effects of Daycare or Pre-School and Mother's education Less than High School on Reading Score*
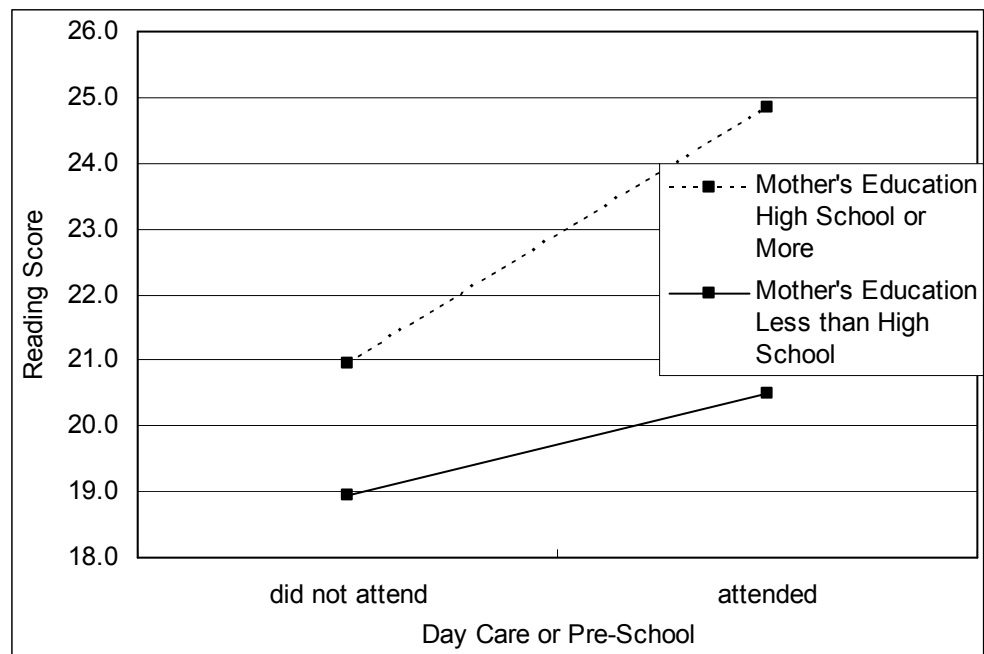
The plot indicates that attending day care or pre-school improves reading scores for both those with a mother's education of less than high school and those with a high school or more education. Thus, the buffering interaction implies that attending day care or pre-school weakens the impact of having a mother's education of less than high school on reading scores. However, the differential impact of the level of mother's education is greater for those who attended day care or pre-school than for those who didn't attend day care or pre-school. Specifically, the plot shows that the level of mother's education has a strong effect in contributing to different trajectories in outcomes for having a mother with a high school or more education versus having a mother with a less than high school education, even with day care or pre-school attendance.

In the eighth and final interaction for predicting kindergarten readiness skills in reading, having a mother with less than high school education and inadequate school facilities both individually show inverse relationships with the outcome in first order effects ($B = -1.79$, $SE = .19$, $p < .001$ and $B = -.47$, $SE = .10$, $p < .001$ respectively) and a coefficient change in their significant interaction term ($B = .63$, $SE = .27$, $p < .05$). This represents another antagonistic interaction. The plot is presented in Figure 10.

Figure 10

*The Effect of Level of Inadequacy of School Facilities and Mother's education Less than High School on Reading Score*
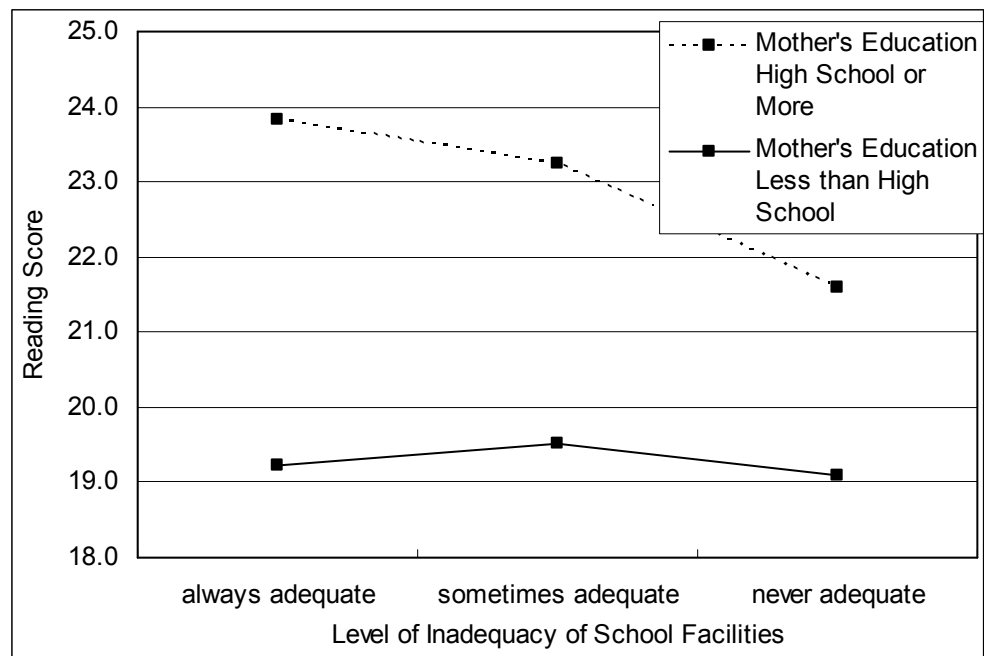
In this case, inadequate school facilities lower reading scores for those with a mother's education of high school or more, but scores for those with a mother's education of less than high school are not notably altered by the adequacy of facilities. Additionally, the gap between reading scores for those with a mother's education of less than high school versus high school or more is large demonstrating the main effects of mother's level of education on outcomes. Thus, the antagonistic interaction indicates that the importance of the adequacy of facilities on outcomes is lessened by the importance of level of mother's education. Finally, the significant moderation detected in this interaction exists in a form that is different than what was hypothesized. Adequate school facilities improve reading scores for those having a mother with a high school or more education but not for those categorically at risk due to having a mother with less than a high school education.

*Kindergarten Readiness Skills in Math*

The results for the hierarchical regression analysis summary for variables predicting kindergarten readiness skills in math are presented in Table 5. The socio-demographic risk factors entered in Model 1 significantly predicted math skills for all of the four risk factors, accounting for 12% of the variance. Having a single parent family ($B = -1.93$, $SE = .14$, $p < .001$), being a welfare recipient ($B = -2.76$, $SE = .18$, $p < .001$), having a non-English primary home language ($B = -3.06$, $SE = .17$, $p > .001$) and having a mother with less than high school education ($B = -3.45$, $SE = .16$, $p < .001$) were all significant contributors to the model. Consistent with the first hypothesis, the results show that all of the socio-demographic risk factors have negative associations with math

skills, indicating that being at risk is particularly associated with lower kindergarten readiness skills in math. In particular, the findings reveal that living in home with a single parent family result in a score that is 1.93 points lower in math than for those with a two parent family. Additionally, being in the welfare recipient category results in a score that is 2.76 points lower than for welfare non-recipients and having a mother with less than high school education results in a score that is 3.45 points lower, compared to those whose mother has an education that includes high school or more. Finally, for those having a non-English primary home language the result is a score that is 3.06 points lower in math than for those having an English primary home language.

Model 2, with the addition of the ecologically based resources and child disposition characteristics, accounted for 6% more variance in math skills with a total adjusted $R^2$ of 18 percent. The initially significant socio-demographic risk factors retained their significance and the ecologically based resources added to the model significantly accounted for variance in kindergarten skills in math. Compared to the coefficients in model 1, the coefficients of the socio-demographic risk factors in Model 2 each decreased in magnitude. In Model 2 having a single parent family ($B = -1.42$, $SE = .14$, $p < .001$) decreased in magnitude by 26%, being a welfare recipient ($B = -1.72$, $SE = .18$, $p < .001$) decreased in magnitude by 38%, having a non-English primary home language ($B = -2.23$, $SE = .17$, $p > .001$) decreased in magnitude by 27%, and having a mother with less than high school education ($B = -2.22$, $SE = .16$, $p < .001$) decreased in magnitude by 35 percent. The diminished magnitudes of the coefficients for the socio-demographic risk factors suggest that the resources added to the model share variance in predicting

kindergarten readiness skills in math. Simply stated, the risk factors are less impacting with the presence of the ecologically based resources added in the second model.

As for the ecologically based resources in model 2, all variables significantly account for variance in kindergarten skills in math. Consistent with the second hypothesis, most of the ecologically based resources have a positive relationship with the outcome indicating that the presence of one or more ecologically based resources is associated with stronger kindergarten readiness skills. Home educational environment ($B$ = .61, $SE$ = .11, $p < .001$) has a coefficient indicating that a more cognitively stimulating home environment is related to stronger readiness skills in math such that with each increasing unit of cognitive stimulation, the score on kindergarten readiness skills in math increases by .61 points. Attending day care or pre-school ($B = 2.48$, $SE = .12$, $p < .001$) has positively related effects indicating participation in day care or preschool in the year before kindergarten raises scores 2.48 points higher in readiness skills in math than scores for those who do not attend day care or pre-school. However, contrary to what was hypothesized, the results show that attending Head Start ($B = -1.32$, $SE = .16$, $p < .001$) as opposed to not attending Head Start in the year before kindergarten, has an inverse relationship with the outcome. That is, attending Head Start is related to lower scores on kindergarten readiness skills in math; it decreases the score on kindergarten readiness skills in math by 1.32 points compared to not attending Head Start in the year before Kindergarten.

Table 5

Hierarchical Regression Analysis Summary for Variables Predicting
Kindergarten Readiness Skills in Math, Weighted

| Variable | Model 1 | | | Model 2 | | | Model 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | S. E. | P | B | S. E. | P | B | S. E. | P |
| Single parent family | -1.93 | .14 | *** | -1.42 | .14 | *** | -1.29 | .14 | *** |
| Welfare recipient | -2.76 | .18 | *** | -1.72 | .18 | *** | -1.77 | .18 | *** |
| Non-English primary home language | -3.06 | .17 | *** | -2.23 | .17 | *** | -2.12 | .17 | *** |
| Mother's education less than high school | -3.45 | .16 | *** | -2.22 | .16 | *** | -2.23 | .16 | *** |
| Home Educational Environment | - | - | | .61 | .11 | *** | .61 | .11 | *** |
| Head Start Attendance | - | - | | -1.32 | .16 | *** | -1.39 | .16 | *** |
| Day Care or Pre-School Attendance | - | - | | 2.48 | .12 | *** | 2.37 | .12 | *** |
| Inadequacy of School Facilities | - | - | | -.29 | .09 | ** | -.28 | .09 | ** |
| School Neighborhood Crime | - | - | | -.92 | .10 | *** | -.86 | .10 | *** |
| Child Self-Control | - | - | | .55 | .12 | *** | .54 | .12 | *** |
| Child Social Interaction | - | - | | .50 | .10 | *** | .50 | .10 | *** |
| Child Impulsive/Overactive behavior | - | - | | -.84 | .09 | *** | -.82 | .09 | *** |
| Single Parent Family x Head Start Attendance | - | - | | - | - | | .90 | .33 | ** |
| Welfare recipient x Home Educational Environment | - | - | | - | - | | -.77 | .30 | ** |
| Welfare recipient x Head Start Attendance | - | - | | - | - | | 1.27 | .40 | ** |
| Welfare recipient x Day Care or Pre-School Attendance | - | - | | - | - | | -1.02 | .36 | ** |
| Welfare recipient x School Neighborhood Crime | - | - | | - | - | | .65 | .30 | * |
| Non-English primary home language x Head Start Attendance | - | - | | - | - | | 1.42 | .42 | *** |
| Mother's education x Head Start Attendance | - | - | | - | - | | 2.00 | .36 | *** |
| | - | - | | - | - | | | | |
| Constant | 21.20 | .07 | | 16.84 | .57 | *** | 16.82 | 0.56 | *** |
| Adjusted R-square | .12 | | | .18 | | | 0.19 | | |

Unweighted <u>N</u>=14,918
* p < .05, ** p <.01, *** p < .001

Further results demonstrate that as expected, inadequate school facilities and crime in the school neighborhood were both inversely related to kindergarten readiness skills in math; inadequate facilities and crime predicted lower scores in readiness skills in math ($B = -.29$, $SE = .09$, $p < .01$ and $B = -.92$, $SE = .10$, $p < .001$ respectively). In particular, the findings reveal that with each increase in level of inadequacy of facilities the score on kindergarten readiness skills in math decreases by .29 points. Additionally, with each increase in level of crime in the school neighborhood the score on kindergarten readiness skills in math decreases by .92 points. Simply stated, the school setting impacts outcomes; the more adequate the school facilities and the lower the crime in the school neighborhood, the higher the scores are for kindergarten readiness skills in math.

Finally, as for the covariates in model 2, the child disposition characteristics self-control and positive social interaction both have slightly positive associations with readiness skills in math ($B = .55$, $SE = .12$, $p < .001$ and $B = .50$, $SE = .10$, $p < .001$ respectively), while impulsive/overactive behavior was associated with lower scores on the outcome measure ($B = -.84$, $SE = .09$, $p < .001$). For each unit increase in exhibiting self-control kindergarten readiness scores in math increase by .55 points, while for each unit increase in exhibiting positive social interaction kindergarten readiness scores in math increase by .50 points. For each unit increase in exhibiting impulsive/overactive behavior, kindergarten readiness scores in math decrease by .84 points.

Model 3 accounted for a total of 19% of the variance in kindergarten readiness skills in math with all first order and higher order effects showing significance. As can be seen in Table 4, a total of seven interaction terms were included in the model. Five of these terms showed significance as antagonistic interactions while two can be interpreted

as buffering interactions. In terms of the first interaction, having a single parent family and Head Start participation both individually show inverse relationships with the outcome in first order effects ($B = -1.29$, $SE = .14$, $p < .001$ and $B = -1.39$, $SE = .16$, $p < .001$ respectively) and a coefficient change in their antagonistic interaction term ($B = .90$, $SE = .33$, $p < .01$). The antagonistic interaction suggests a compensation effect meaning that the importance of one variable is lessened by the importance of another variable. The plot for the first interaction predicting kindergarten readiness skills in math is depicted in Figure 11.

Figure 11

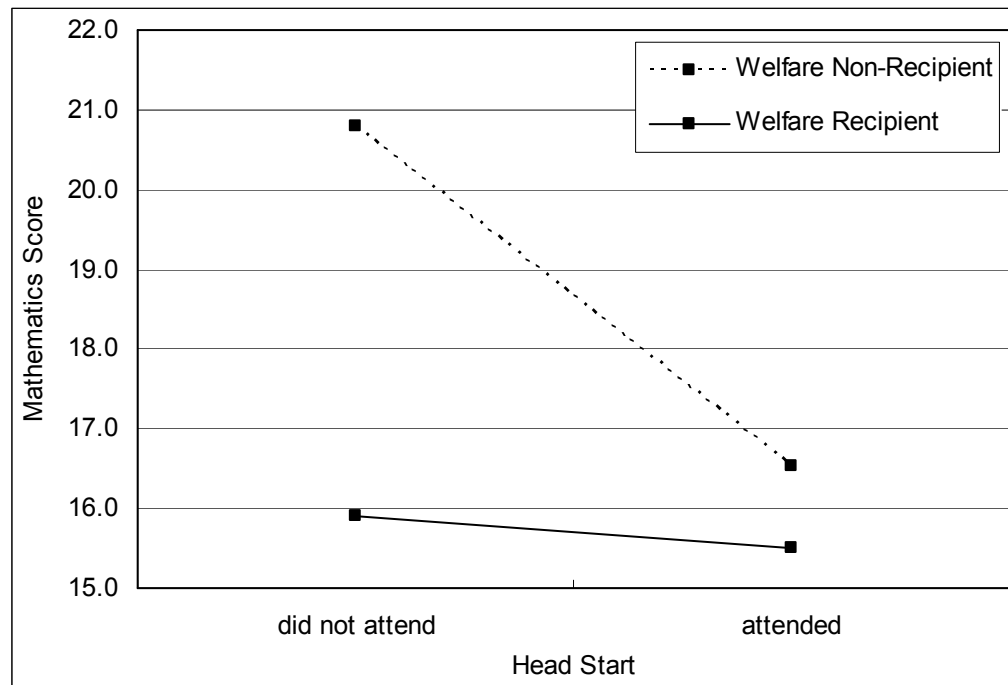*The Effects of Head Start and Single Parent Family on Math Score*
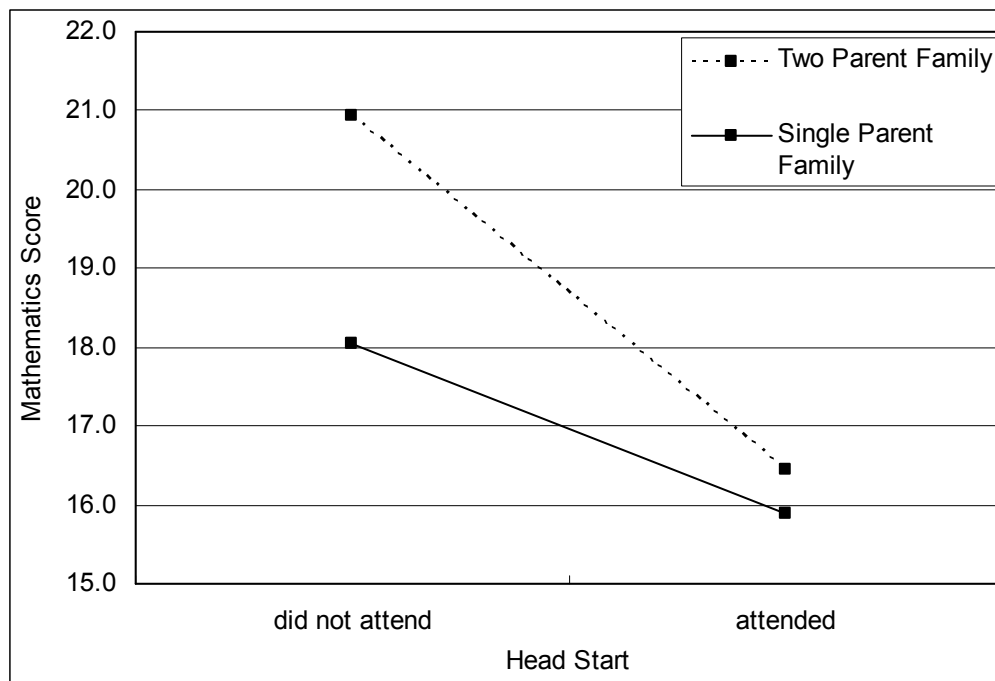
Contrary to what was hypothesized, Head Start attendance does not act as a resource but rather lowers math scores for both single parent and two parent families. As can be seen in the plot, Head start has more of an impact on scores for two parent families compared to single parent families. In terms of not attending Head Start, the difference in outcomes for single parent and two parent families is notably large, demonstrating the differential effect of the number of parents in the family. However, for Head Start attendance, the gap in outcomes between single parent and two parent families becomes much smaller, demonstrating the diminished impact of the number of parents in the family. Thus, the significant antagonistic interaction term reflects the fact that the impact of the number of parents in the family on math score is lessened by the role that attending Head Start plays in contributing to outcomes. As previously mentioned, it was hypothesized that this moderation would take form as an increase in scores, not as a decrease in scores as the results indicate.

In terms of the next interaction, being a welfare recipient and Head Start participation both individually show inverse relationships with the outcome in first order effects ($B = -1.77$, $SE = .18$, $p < .001$ and $B = -1.39$, $SE = .16$, $p < .001$ respectively) and a coefficient change in their antagonistic interaction term ($B = 1.27$, $SE = .40$, $p < .01$). The plot for this interaction is presented in Figure 12.

Figure 12

*The Effects of Head Start and Receipt of Welfare on Math Score*

Similar to the previous interaction, contrary to what was hypothesized, Head Start attendance does not act as a resource but rather lowers math scores for welfare non-recipients and has minimal effect on scores for welfare recipients. In terms of not attending Head Start, the difference in outcomes for welfare recipients and non-recipients is notably large, demonstrating the differential effect of receipt of welfare. However, for Head Start attendance, the gap in outcomes between welfare recipient and non-recipient becomes much smaller, demonstrating the diminished impact of receipt of welfare. Thus, the significant antagonistic interaction term reflects the fact that the impact of receipt of welfare on math score is lessened by the role that attending Head Start plays in contributing to outcomes. Again, although it was hypothesized that moderation would take form as an increase in math scores, the plot depicts a moderation effect that decreases math scores.

The interaction term for welfare recipient and crime in the school neighborhood also takes form as an antagonistic interaction. Being a welfare recipient and crime in the school neighborhood both individually show inverse relationships with the outcome in first order effects ($B = -1.77$, *SE* $= .18$, *p* $< .001$ and $B = -.86$, *SE* $= .10$, *p* $< .001$ respectively) and a coefficient change in their significant antagonistic interaction term ($B = .65$, *SE* $= .30$, *p* $< .05$. Figure 13 depicts the plot for this interaction.

Figure 13

*The Effects of Level of Crime in School Neighborhood and Receipt of Welfare on Math Score*
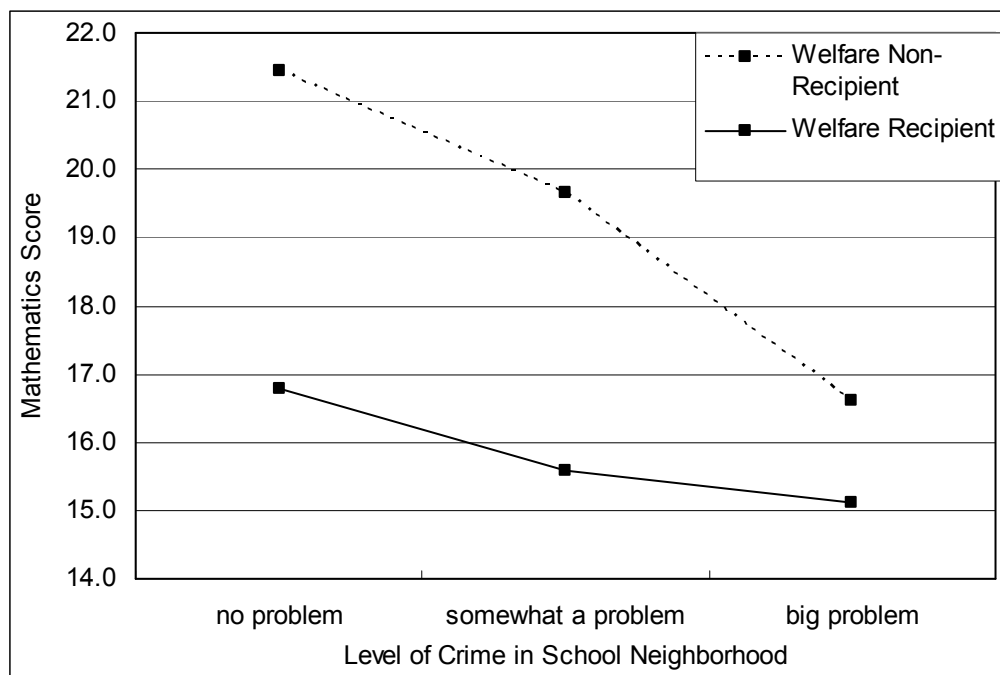
In this interaction, problems with crime lower math scores for welfare non-recipients, but scores for welfare recipients are not notably altered by the level of crime. As can be seen in the plot, when there is no problem with the level of crime in the school neighborhood the difference in reading scores for welfare recipients and non-recipients is notably large, demonstrating the differential effect of receipt of welfare. However, when there is a big problem with crime in the school neighborhood, the gap in outcomes between welfare recipient and non-recipient becomes much smaller, demonstrating the diminished impact of receipt of welfare. Thus, the antagonistic interaction indicates that the importance of being a welfare recipient is lessened by the importance of the level of crime in the school neighborhood on outcomes.

Another significant antagonistic interaction term predicting kindergarten readiness skills in math is comprised of non-English primary home language and Head Start attendance. non-English primary home language and attending Head Start in the year before kindergarten both individually show inverse relationships with the outcome in first order effects ($B = -2.12$, $SE = .17$, $p < .01$ and $B = -1.39$, $SE = .16$, $p < .001$ respectively) and a coefficient change in their antagonistic interaction term ($B = -1.42$, $SE = .42$, $p < .001$). The plot for this interaction is presented in Figure 14.

Figure 14

*The Effect of Head Start and Non-English Primary Home Language on Math Score*
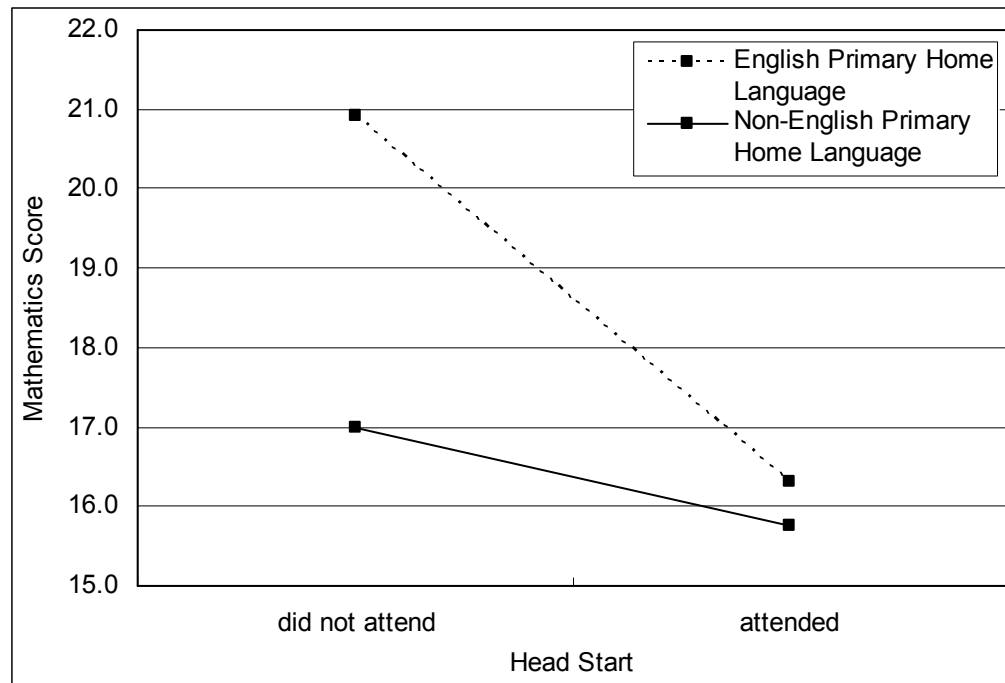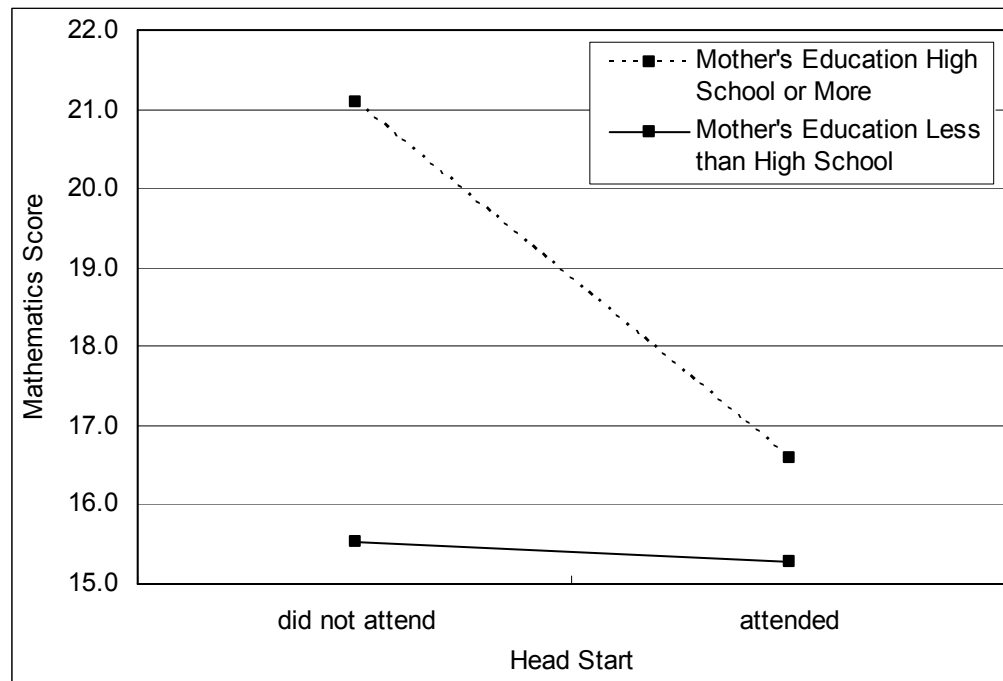
As the plot depicts, contrary to what was hypothesized, Head Start attendance does not act as a resource but rather lowers math scores for both those with an English and non-English primary home language. As can be seen in the plot, Head start has more of an impact on scores for those with an English versus non-English primary home language. In terms of not attending Head Start, the difference in outcomes for English versus non-English primary home language is notably large, demonstrating the differential effect of primary home language. However, for Head Start attendance, the gap in outcomes between English versus non-English primary home language becomes much smaller, demonstrating the diminished impact of primary home language. Thus, the significant antagonistic interaction term reflects the fact that the impact of primary home language on math score is lessened by the role that attending Head Start plays in contributing to outcomes. Again, although the interaction term is significant, it was hypothesized that this moderation effect would take form as an increase in math scores, not as a decrease in math scores as the results indicate.

In another antagonistic interaction, having a mother with less than high school education and Head Start both individually show inverse relationships with the outcome in first order effects ($B = -2.23$, $SE = .16$, $p < .001$ and $B = -1.39$, $SE = .16$, $p < .001$ respectively) and a coefficient change in their antagonistic interaction term ($B = 2.00$, $SE = .36$, $p < .001$). The plot for this interaction is presented in Figure 15.

Figure 15

*The Effects of Head Start and Mother's Education Less than High School on Math Score*

Consistent with the other plots depicting the moderation effect of Head Start and contrary to what was hypothesized, Head Start attendance is associated with lower scores in math skills. This effect was more prominent for those having a mother with high school or more education. For those having a mother with less than high school education, Head Start attendance had a minimal effect on math score. In terms of not attending Head Start, the difference in outcomes for having a mother with high school or more education versus having a mother with less than high school education is notably large, demonstrating the differential effect of level of mother's education. However, for Head Start attendance, the gap in outcomes between having a mother with high school or more education versus having a mother with less than high school education becomes much smaller, demonstrating the diminished impact of level of mother's education. Thus, the significant antagonistic interaction term reflects the fact that the impact of level of mother's education on math score is lessened by the role that attending Head Start plays in contributing to outcomes.

In the form of a buffering interaction, being a welfare recipient shows a negative relationship with the outcome in first order effects ($B = -1.77$, $SE = .18$, $p < .01$) while home educational environment shows a positive relationship with the outcome in first order effects ($B = .61$, $SE = .11$, $p < .001$) and a significant buffering interaction term ($B = -.77$, $SE = .30$, $p < .01$). Figure 16 depicts the plot for this interaction.

Figure 16

*The Effects of Home educational Environment and Receipt of Welfare on Math Score*
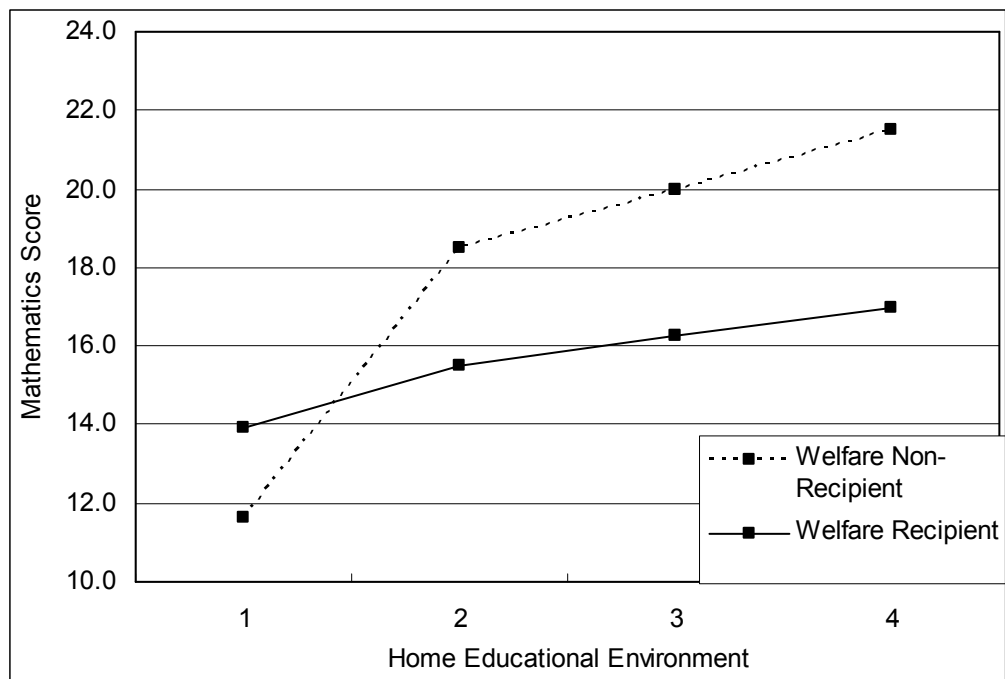
As can be seen, a more cognitively stimulating home environment improves math scores for both welfare recipients and non-recipients. However, these variables interact such that the impact of the home educational environment is greater for those who are welfare non-recipients. Yet, when the home educational environment is at the lowest level, there is no differential effect of receipt of welfare on math scores. In fact, at the lowest level of a home educational environment welfare recipients post a higher mean math score than welfare non-recipients. Thus, although the home educational environment does moderate the negative effects of receipt of welfare, the moderation effect is stronger for welfare non-recipients.

In the final interaction term in Model 3 for predicting kindergarten readiness skills in math, being a welfare recipient shows a negative relationship with the outcome in first order effects ($B = -1.77$, $SE = .18$, $p < .01$) while attending day care or pre-school shows a positive relationship with the outcome in first order effects ($B = 2.37$, $SE = .12$, $p < .001$) and a significant buffering interaction term ($B = 1.02$, $SE = .36$, $p < .01$). The plot for this interaction is presented in Figure 17.

Figure 17

*The Effects of Daycare or Pre-School and Receipt of Welfare on Math Score*
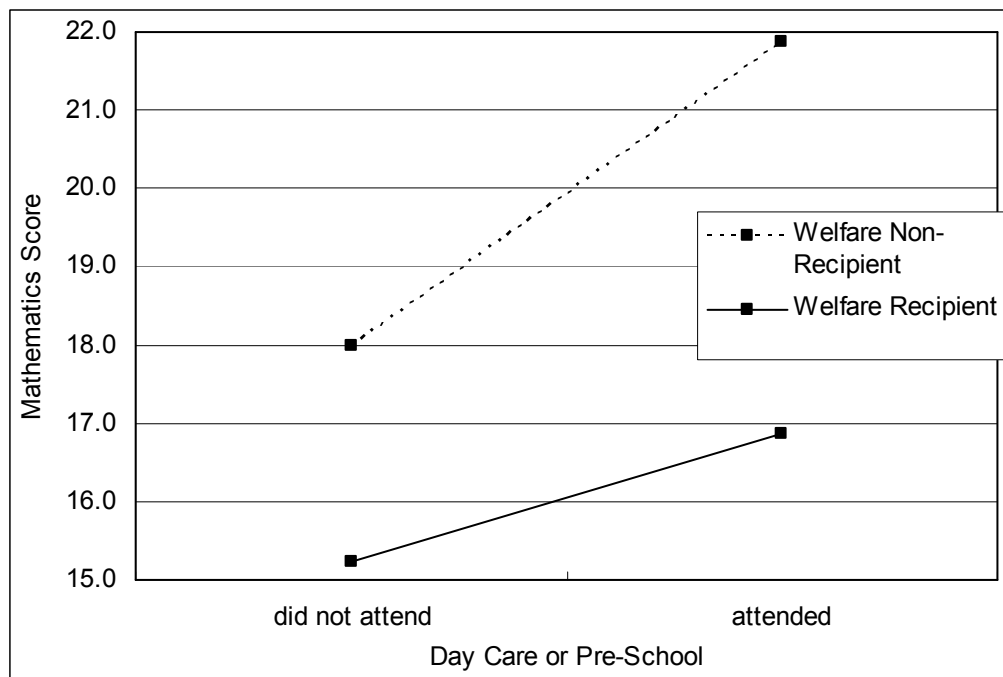
The plot indicates that attending day care or pre-school improves math scores for both welfare recipients and non-recipients. However, attendance improves outcomes more for welfare non-recipients than for recipients demonstrating that the differential impact receipt of welfare is greater for those who attended day care or pre-school than for those who didn't attend day care or pre-school. Specifically, the plot shows that the main effects of receipt of welfare has a strong impact in contributing to different trajectories in outcomes for welfare recipients non-recipients, even with day care or pre-school attendance.

*Kindergarten Readiness Skills in Psychomotor Skills*

The results for the hierarchical regression analysis summary for variables predicting kindergarten readiness in psychomotor skills are presented in Table 6. The socio-demographic risk factors entered in Model 1 significantly predicted psychomotor skills for three of the four risk factors, accounting for 3% of the variance. Having a single parent family ($B = -.31$, $SE = .06$, $p < .001$), being a welfare recipient ($B = -.54$, $SE = .08$, $p < .001$), and having a mother with less than high school education ($B = -.95$, $SE = .07$, $p < .001$) were significant while home language ($B = -.02$, $SE = .07$, $p > .05$) was not a significant contributor to the model. Consistent with the first hypothesis, the results show that all of the socio-demographic risk factors have negative associations with psychomotor skills, indicating that being at risk is particularly associated with lower kindergarten readiness in psychomotor skills.

Table 6

Hierarchical Regression Analysis Summary for Variables Predicting
Kindergarten Readiness Skills in Motor, Weighted

| Variable | Model 1 | | | Model 2 | | | Model 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | S. E. | P | B | S. E. | P | B | S. E. | P |
| Single parent family | -.31 | .06 | *** | -.20 | .06 | *** | -.17 | .06 | ** |
| Welfare recipient | -.54 | .08 | *** | -.33 | .08 | *** | -.33 | .08 | *** |
| Non-English primary home language | -.02 | .07 | | .19 | .07 | * | .18 | .07 | * |
| Mother's education less than high school | -.95 | .07 | *** | -.63 | .07 | *** | -.63 | .07 | *** |
| Home Educational Environment | - | - | | .09 | .05 | | .08 | .05 | |
| Head Start Attendance | - | - | | -.03 | .07 | | -.03 | .07 | |
| Day Care or Pre-School Attendance | - | - | | .60 | .05 | *** | .59 | .05 | *** |
| Inadequacy of School Facilities | - | - | | -.01 | .04 | | -.01 | .04 | |
| School Neighborhood Crime | - | - | | -.16 | .05 | *** | -.16 | .05 | *** |
| Child Self-Control | - | - | | .26 | .05 | *** | .26 | .05 | *** |
| Child Social Interaction | - | - | | .29 | .04 | *** | .29 | .04 | *** |
| Child Impulsive/Overactive behavior | - | - | | -.32 | .04 | *** | -.32 | .04 | *** |
| Single Parent Family x Home Educational Environment | - | - | | - | - | | .30 | .10 | ** |
| Welfare recipient x Head Start Attendance | - | - | | - | - | | .45 | .16 | ** |
| Non-English primary home language x Home Educational Environment | - | - | | - | - | | -.29 | .13 | * |
| Non-English primary home language x Head Start Attendance | - | - | | - | - | | .74 | .18 | *** |
| Non-English primary home language x School Classroom Facilities | - | - | | - | - | | -.24 | .11 | * |
| Constant | 12.54 | .03 | *** | 10.84 | .25 | *** | 10.84 | 0.25 | *** |
| Adjusted R-square | .03 | | | .05 | | | 0.05 | | |

Unweighted N=14,918
* p < .05, ** p <.01, *** p < .001

In particular, the findings reveal that living in home with a single parent family result in a score that is .31 points lower in motor skills than for those with a two parent family. Additionally, being in the welfare recipient category results in a score that is .54 points lower than for welfare non-recipients. Finally, having a mother with less than high school education results in a score that is .95 points lower, compared to those whose mother has an education that includes high school or more.

Model 2, with the addition of the ecologically based resources and child disposition characteristics, accounted for 2% more variance in psychomotor skills with a total adjusted $R^2$ of 5 percent. The three initially significant socio-demographic risk factors retained their significance and home language additionally showed significance in this model ($B = .19$, $SE = .07$, $p < .05$). However, as in the regression for reading, unlike the other risk factors non-English primary home language shows a positive association with kindergarten readiness in this model. The coefficient shows that having a non-English primary home language improves the mean score on kindergarten readiness skills in motor skills by .19 points. Where as in model 1 it was inversely related to the outcome but not a significant predictor, with the addition of the resource variables in model 2, home language shows a significant and positive association. This indicates the presence of the added variables both contribute to the model as well as the effect of home language on the model.

In Model 2, the three initially significant socio-demographic risk factors retain their significance however the strength of the magnitudes decreases. As compared to the coefficients in model 1, the coefficients of the socio-demographic risk factors in Model 2 each decrease in magnitude. Having a single parent family ($B = -.20$, $SE = .06$, $p < .001$)

decreases in magnitude by 35%, being a welfare recipient ($B = -.33$, $SE = .08$, $p < .001$) decreases in magnitude by 39%, and having a mother with less than high school education ($B = -.63$, $SE = .07$, $p < .001$) decreases in magnitude by 34 percent. The diminished magnitudes of the coefficients for the socio-demographic risk factors suggest that the resources added to the model share variance in predicting kindergarten readiness skills in reading. Simply stated, the risk factors are less impacting with the presence of the ecologically based resources added in the second model.

As for the ecologically based resources in model 2, almost all variables significantly account for variance in kindergarten readiness in psychomotor skills. Consistent with the second hypothesis, most of the ecologically based resources have a positive relationship with the outcome indicating that the presence of one or more ecologically based resources is associated with stronger kindergarten readiness skills. Home educational environment ($B = .09$, $SE = .05$, $p > .05$) is not a significant contributor to the model; meaning that each level increase in cognitive stimulation activities in the home is not significantly associated with scores in motor skills. Attending Head Start ($B = -.03$, $SE = .07$, $p > .05$) as compared to not attending Head Start in the year before kindergarten is also not a significant contributor in this model. Attending a formalized center-based program such as day care or pre-school ($B = .60$, $SE = .05$, $p < .001$) is positively related to the outcome indicating that participation in a day care or pre-school program in the year before kindergarten is related to stronger readiness in psychomotor skills; attendance is associated with motor scores being .60 points higher than scores for those who did not attend day care or pre-school in the year before kindergarten. Inadequate school facilities and crime in the school neighborhood are both inversely

related to scores in motor skills. However, while adequacy of school facilities is not a significant contributor ($B = -.01$, $SE = .04$, $p > .05$), level of crime in the school neighborhood is associated with the outcome ($B = -.16$, $SE = .05$, $p < .001$). Higher levels of crime in the school neighborhood predict lower scores in readiness in psychomotor skills; with each unit increase in crime kindergarten readiness skills in motor decrease by .16 points.

Finally, as for the child disposition characteristics in model 2, they are all significant with self-control and positive social interaction both having slightly positive associations with readiness in psychomotor skills ($B = .26$, $SE = .05$, $p < .001$ and $B = .29$, $SE = .04$, $p < .001$ respectively), while impulsive/overactive behavior is associated with lower scores on the outcome measure ($B = -.32$, $SE = .04$, $p < .001$). In other words, with each unit increase in exhibiting self-control kindergarten readiness scores in motor skills increase by .26 points, while for each unit increase in exhibiting positive social interaction kindergarten readiness scores in motor skills increase by .29 points. For each unit increase in exhibiting impulsive/overactive behavior, kindergarten readiness scores in motor skills decrease by .32 points.

Model 3 accounted for a total of 5% of the variance in kindergarten readiness in psychomotor skills with most first order and higher order effects showing significance. As can be seen in Table 6, a total of five interaction terms were included in the model. Two of these terms show significance as antagonistic interactions while three can be interpreted as buffering interactions. In terms of the first interaction term, having a single parent family shows an inverse relationship with the outcome in first order effects ($B = -.17$, $SE = .06$, $p < .01$) while home educational environment shows a positive relationship

with the outcome in first order effects ($B = .08$, $SE = .05$, $p > .05$).  The significant

interaction term ($B = .30$, $SE = .10$, $p < .01$) can be interpreted as a buffering interaction

and is plotted in Figure 18.

Figure 18

*The Effects of Home Educational Environment and Single Parent Family on Motor Score*
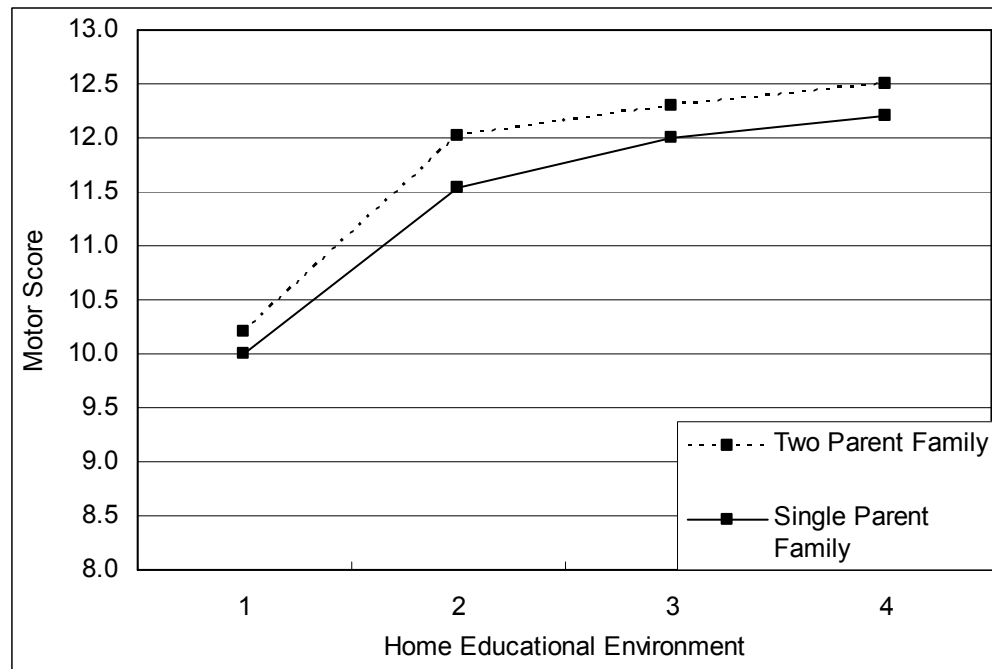
The plot depicts that Home Educational Environment has a moderation effect on the relationship between single parent family and motor score. As the level of home educational environment increases, indicating that the cognitive stimulation in the home increases, motor scores increase for both single parent and two parent families. The plot also indicates that the mean motor score is lower for single parent family versus two parent family demonstrating the differential impact of each family category. When the level of home educational environment is at the lowest, the difference in motor scores is minimal. Taken together, this suggests that in this buffering interaction, home educational environment weakens the negative impact of single parent family, but the moderation effects varies at different levels of home educational environment.

In the second interaction, being a welfare recipient and Head Start participation both individually show inverse relationships with the outcome in first order effects ($B = -.33$, $SE = .08$, $p < .001$ and $B = -.03$, $SE = .07$, $p > .05$ respectively) and a coefficient change in their interaction term ($B = .45$, $SE = .16$, $p < .01$), signifying an antagonistic interaction. This plot is presented in Figure 19.

Figure 19

*The Effects of Head Start and Receipt of Welfare on Motor Score*
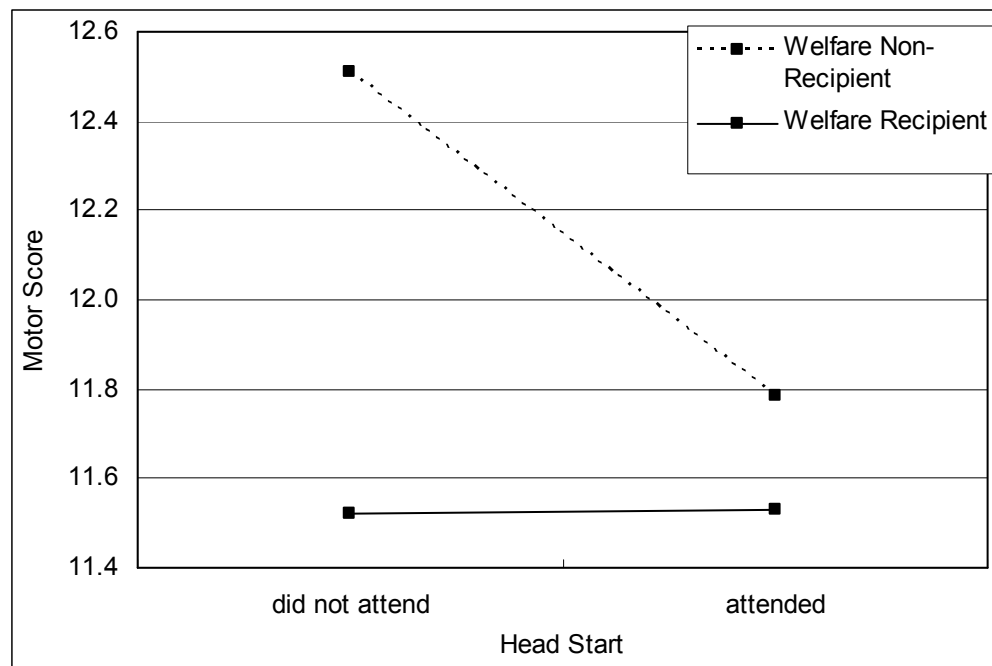
As can be seen in the plot, outcomes are lower for those who attended Head Start versus those who did not attend Head Start in the year before entering kindergarten for welfare non-recipients but remain stagnant for welfare recipients. Thus, the moderation effect detected took a different form than was hypothesized; the interaction of Head Start resulted in lower scores for welfare non-recipients. Additionally, the difference in motor score for welfare recipients versus welfare non-recipients is notably larger for not attending Head Start as compared to attending Head Start. This indicates the differential main effect that receipt of welfare has on the outcomes. Yet, the smaller gap in scores for Head Start attendance reflects the fact that the impact of Head Start lessens the differential effect of welfare recipient versus welfare non-recipient.

In another antagonistic interaction term, non-English primary home language and home educational environment both individually show positive relationships with the outcome in first order effects ($B= .18$, $SE = .07$, $p < .05$ and $B = .08$, $SE = .05$, $p > .05$, respectively) and a coefficient change in their significant interaction term ($B = -.29$, $SE = .13$, $p < .05$). Figure 20 depicts this interaction in a plot.

Figure 20

*The Effects of Home Educational Environment and Non-English Primary Home Language on Motor Score*
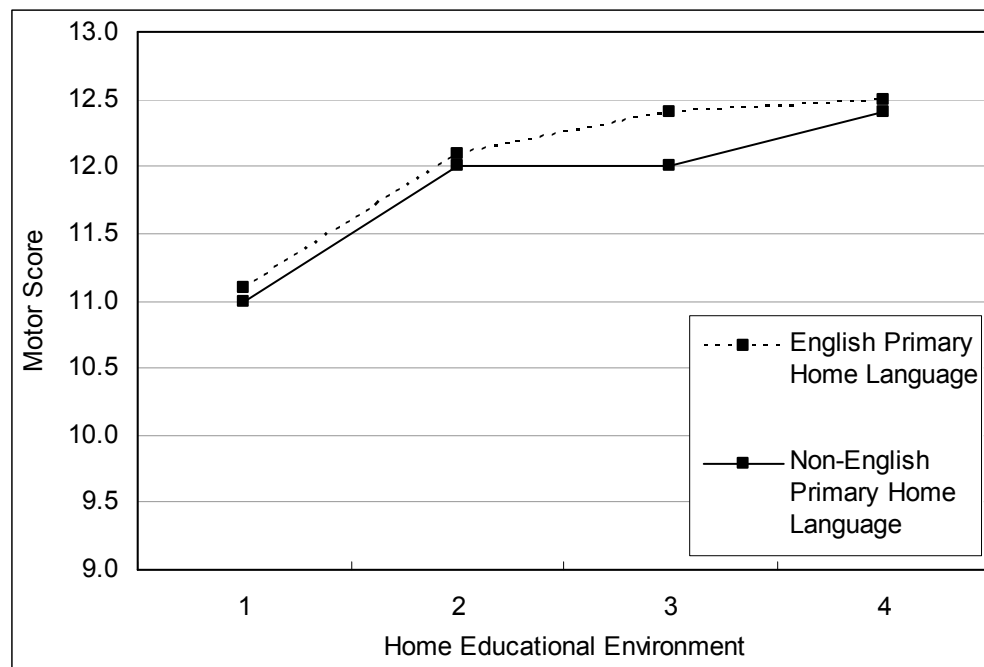
The results of this interaction are similar to the previously reviewed interaction of home educational environment and single parent family on motor score which was depicted in Figure 18. Again, the plot depicts that Home Educational Environment has a moderation effect on the relationship between non-English primary home language and motor score. As the level of home educational environment increases, indicating that the cognitive stimulation in the home increases, motor scores increase for those having a non-English and English primary home language. The plot also indicates that the mean motor score is lower for non-English primary home language versus English primary home language demonstrating their differential impact. Finally, when the level of home educational environment is at the lowest, the difference in motor scores is minimal. Taken together, the results of this antagonistic interaction suggest that the impact of home educational environment lessens the differential effect of non-English versus English primary home language.

In a buffering interaction, non-English primary home language shows a positive relationships with the outcome in first order effects ($B = .18$, $SE = .07$, $p < .05$) while Head Start attendance shows an inverse relationship with the outcome in first order effects ($B = -.03$, $SE = .107$ $p > .05$) and a significant interaction term ($B = .74$, $SE = .18$, $p < .001$). The plot for this interaction is presented in Figure 21.

Figure 21

*The Effects of Head Start and Non-English Primary Home Language on Motor Score*
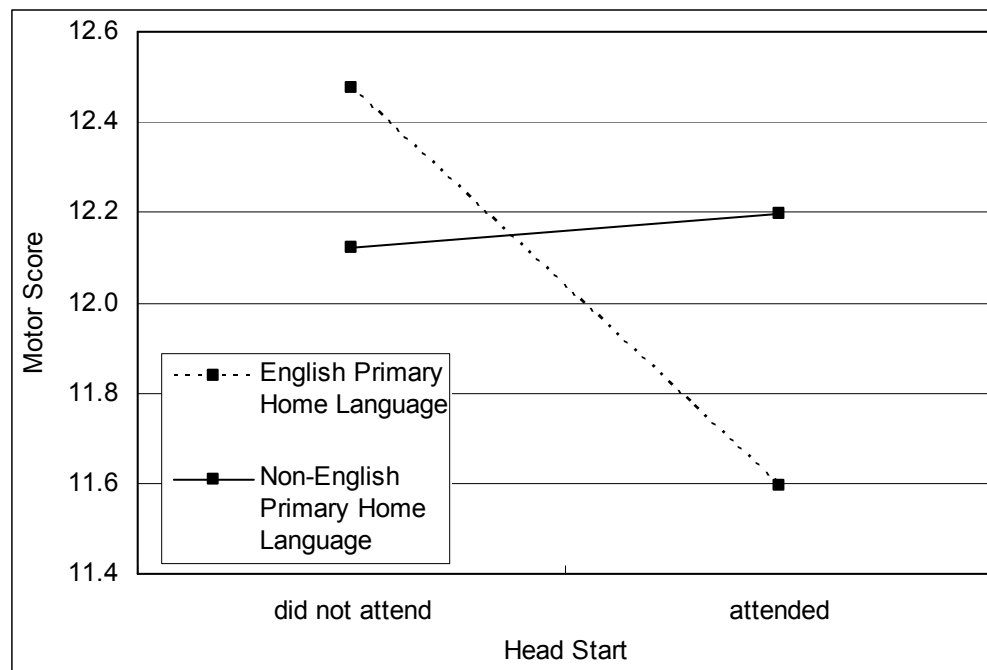
As can be seen in the plot, for those with an English primary home language, scores are significantly lower for attending Head Start as compared to not attending Head Start in the year before entering kindergarten. On the contrary, for those with a non-English primary home language, attending Head Start as opposed to not attending Head Start is associated with a slight increase in motor score. Thus the moderation effect takes different form for English versus non-English primary home language. The interaction between Head Start attendance and English primary home language results in notably lower motor scores whereas the interaction between Head Start attendance and non-English primary home language results in slightly higher motor scores. The plot of this buffering interaction indicates that the impact of Head Start weakens the impact that English and non-English primary home language have on outcomes.

The last interaction term for variables predicting kindergarten readiness skills in motor is comprised of level of inadequacy of school facilities and non-English primary home language. Adequacy of school facilities shows an inverse relationship with the outcome in first order effects ($B = -.01$, $SE = .04$, $p > .05$) while Non-English primary home language shows a positive relationship with the outcome in first order effects ($B = .18$, $SE = .07$, $p < .05$) and a significant buffering interaction term ($B = -.24$, $SE = .11$, $p < .05$). Figure 22 depicts the plot for this significant interaction.

Figure 22

*The Effects of Level of Inadequacy of School Facilities and Non-English Primary Home Language on Motor Score*
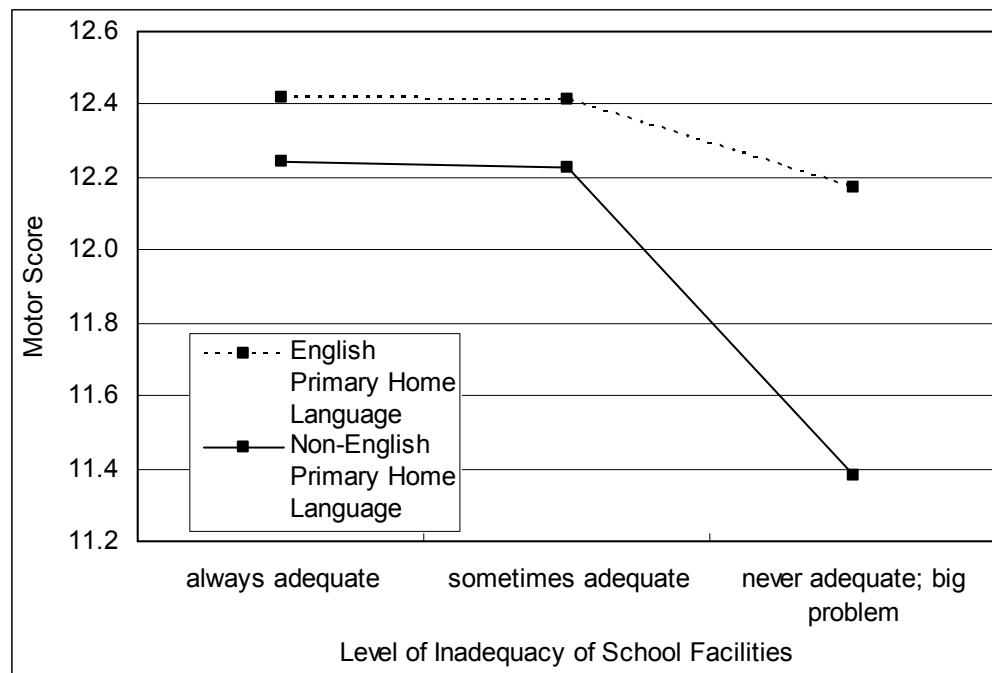
As presented in the plot, when the level of school facilities is sometimes or always adequate, there is similar impact on motor scores for both English and non-English primary home language.  When the level of school facilities is never adequate, scores are lower for both those with English and non-English primary language, however, the drop in scores is greater for those with a non-English primary home language.  Thus, consistent with the hypothesis, adequacy of school facilities acts a resource and buffers the negative effects of the risk of non-English primary home language, resulting in an increase in motor score.  However, it is important to note that the plot also indicates that mean scores for those with a non-English primary home language are consistently lower than those with an English primary home language, demonstrating the impact of the main effects.

*Kindergarten Readiness in Approaches to Learning Skills*

The results for the hierarchical regression analysis summary for variables predicting kindergarten readiness in approaches to learning are presented in Table 7.  The socio-demographic risk factors entered in Model 1 significantly predicted approaches to learning skills for three of the four risk factors, accounting for 4% of the variance. Having a single parent family ($B$ = -.15, $SE$ = .01, $p < .001$), being a welfare recipient ($B$ = -.17, $SE$ = .02, $p < .001$), and having a mother with less than high school education ($B$ = -.19, $SE$ = .02, $p < .001$) were significant while home language ($B$ = -.03, $SE$ = .02, $p > .05$) was not a significant contributor to the model.  Consistent with the first hypothesis, the results show that the socio-demographic risk factors have negative associations with approaches to learning, indicating that being at risk is particularly associated with lower

kindergarten readiness in approaches to learning skills. In particular, the findings reveal that living in home with a single parent family result in a score that is .15 points lower in approaches to learning skills than for those with a two parent family. Additionally, being in the welfare recipient category results in a score that is .17 points lower than for welfare non-recipients. Finally, having a mother with less than a high-school education results in a score that is .19 points lower, compared to those whose mother has an education that includes high school or more.

Model 2, with the addition of the ecologically based resources and child disposition characteristics, accounted for 4% more variance in approaches to learning with a total adjusted $R^2$ of 8 percent. The three initially significant socio-demographic risk factors retained their significance while home language remained insignificant in this model ($B = .00$, $SE = .02$, $p < .05$). Although the three initially significant socio-demographic risk factors retain their significance in Model 2, the strength of the magnitudes decreases. Having a single parent family ($B = -.12$, $SE = .01$, $p < .001$) decreases in magnitude by 20%, being a welfare recipient ($B = -.12$, $SE = .02$, p $<.001$) decreases in magnitude by 30%, and having a mother with less than high school education ($B = -.12$, $SE = .02$, $p < .001$) decreases in magnitude by 37 percent. The diminished magnitudes of the coefficients for the socio-demographic risk factors suggest that the resources added to the model share variance in predicting kindergarten readiness skills in approaches to learning. Simply stated, the risk factors are less impacting with the presence of the ecologically based resources added in the second model.

Table 7

Hierarchical Regression Analysis Summary for Variables Predicting
Kindergarten Readiness Skills in Approaches to Learning Skills, Weighted

| Variable | Model 1 | | | Model 2 | | | Model 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | S. E. | P | B | S. E. | P | B | S. E. | P |
| Single parent family | -.15 | .01 | *** | -.12 | .01 | *** | -.11 | .01 | *** |
| Welfare recipient | -.17 | .02 | *** | -.12 | .02 | *** | -.12 | .02 | *** |
| Non-English primary home language | -.03 | .02 | | .00 | .02 | | .00 | .02 | |
| Mother's education less than high school | -.19 | .02 | *** | -.12 | .02 | *** | -.12 | .02 | *** |
| Home Educational Environment | - | - | | .03 | .01 | ** | .03 | .01 | ** |
| Head Start Attendance | - | - | | -.10 | .02 | *** | -.10 | .02 | *** |
| Day Care or Pre-School Attendance | - | - | | .04 | .01 | *** | .04 | .01 | *** |
| Inadequacy of School Facilities | - | - | | .01 | .01 | | .01 | .01 | |
| School Neighborhood Crime | - | - | | -.02 | .01 | * | -.02 | .01 | * |
| Child Self-Control | - | - | | .06 | .01 | *** | .06 | .01 | *** |
| Child Social Interaction | - | - | | .06 | .01 | *** | .06 | .01 | *** |
| Child Impulsive/Overactive behavior | - | - | | -.14 | .01 | *** | -.14 | .01 | *** |
| Welfare recipient x Head Start Attendance | - | - | | - | - | | .08 | .04 | * |
| Welfare recipient x School Neighborhood Crime | - | - | | - | - | | .06 | .03 | * |
| Constant | 3.10 | .01 | *** | 2.84 | .05 | *** | 2.84 | 0.05 | *** |
| Adjusted R-square | .04 | | | .08 | | | 0.08 | | |

Unweighted N=14,918
 * p < .05, ** p <.01, *** p < .001

As for the ecologically based resources in model 2, almost all variables significantly accounted for variance in kindergarten readiness in approaches to learning. Consistent with the second hypothesis, most of the ecologically based resources have a positive relationship with the outcome indicating that the presence of one or more ecologically based resources is associated with stronger kindergarten readiness skills. Home educational environment ($B = .03$, $SE = .01$, $p < .01$) is a significant contributor to the model; meaning that each level increase in cognitive stimulation activities in the home is associated with an increase of .03 points in scores in approaches to learning skills.  Attending Head Start ($B = -.10$, $SE = .02$, $p < .001$)  as compared to not attending Head Start in the year before kindergarten is also a significant contributor in this model such that a decrease in approaches to learning score of .10 points is associated with attending Head Start..  Attending a formalized center-based program such as day care or pre-school is also significant ($B = .04$, $SE = .01$, $p < .001$) and is positively related to the outcome indicating that participation in a day care or pre-school program in the year before kindergarten is related to stronger readiness in approaches to learning skills; attendance is associated with approaches to learning scores being .04 points higher than scores for those who did not attend day care or pre-school in the year before kindergarten. Inadequate school facilities and crime in the school neighborhood are both inversely related to the outcome, however, while level of school facilities is not a significant contributor, level of crime in the school neighborhood  predicts lower scores in readiness in approaches to learning skills ($B = -.01$, $SE = .01$, $p > .05$ and $B = -.02$, $SE = .01$, $p < .05$ respectively).  Specifically, with each unit increase in crime, kindergarten readiness skills in approaches to learning decreases by .02 points.

Finally, as for the covariates in model 2, the child disposition characteristics are significant with self-control and positive social interaction both having slightly positive associations with readiness in approaches to learning ($B = .06$, $SE = .01$, $p < .001$ and $B = .06$, $SE = .01$, $p < .001$ respectively), while impulsive/overactive behavior is associated with lower scores on the outcome measure ($B = -.14$, $SE = .01$, $p < .001$). In other words, with each unit increase in exhibiting self-control kindergarten readiness scores in approaches to learning skills increase by .06 points, while for each unit increase in exhibiting positive social interaction kindergarten readiness scores increase by .06 points. For each unit increase in exhibiting impulsive/overactive behavior, kindergarten readiness scores in approaches to learning skills decrease by .14 points.

Model 3 accounted for a total of 8% of the variance in kindergarten readiness in approaches to learning with most first order and higher order effects showing significance. As can be seen in Table 7, a total of two interaction terms were included in the model. Both of these terms show significance as antagonistic interactions. Being a welfare recipient and Head Start attendance both individually show inverse relationships with the outcome in first order effects ($B = -.12$, $SE = .02$, $p < .001$ and $B = -.10$, $SE = .02$, $p < .001$ respectively) and a coefficient change in their antagonistic interaction term ($B = .08$, $SE = .04$, $p < .05$). The plot for this interaction is presented in Figure 23.

Figure 23

*The Effects of Head Start and Receipt of Welfare on Approaches to Learning Score*
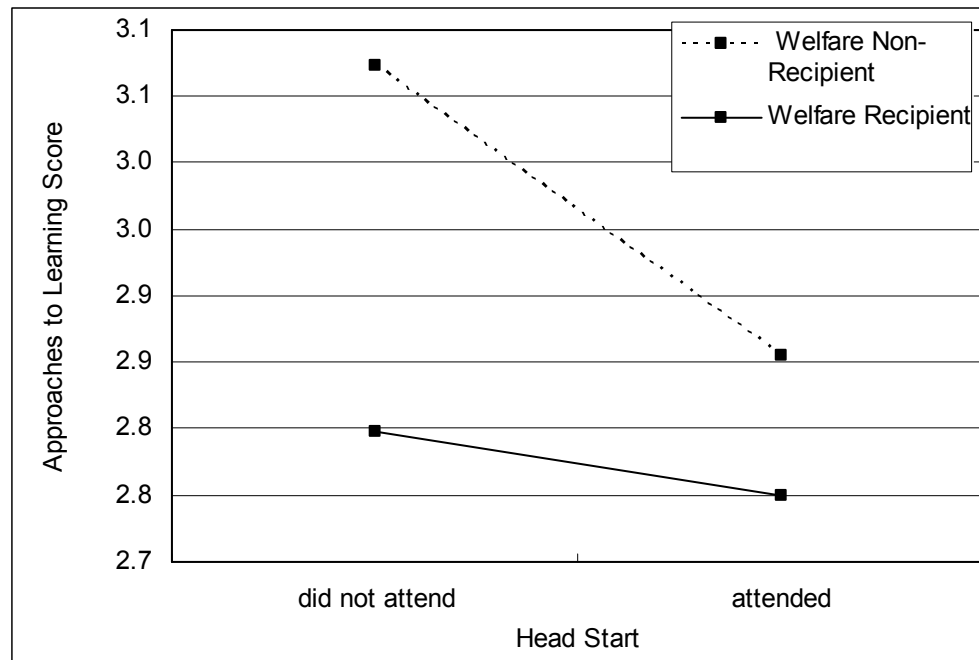
The plot indicates that approaches to learning scores are lower for attending Head Start for both welfare recipients and non-recipients. Additionally, the gap in approaches to learning score between welfare recipients and non-recipients is smaller for attending Head Start as compared to not attending. Thus, moderation took a different form than what was hypothesized; Head Start lowered scores and interacted more with welfare recipients than non-recipients. The results of this antagonistic interaction suggest that the importance of the main effects of receipt of welfare is lessened by the impact of Head Start on approaches to learning scores.

In the second interaction, being a welfare recipient and level of crime in the school neighborhood both individually show inverse relationships with the outcome in first order effects ($B = -.12$, $SE = .02$, $p < .001$ and $B = -.02$, $SE = .01$, $p < .05$ respectively) and a coefficient change in their antagonistic interaction term ($B = .06$, $SE = .03$, $p < .05$). Figure 24 depicts the plot for this interaction.

Figure 24

*The Effects of Level of Crime in the School Neighborhood and Receipt of Welfare on Approaches to Learning Score*
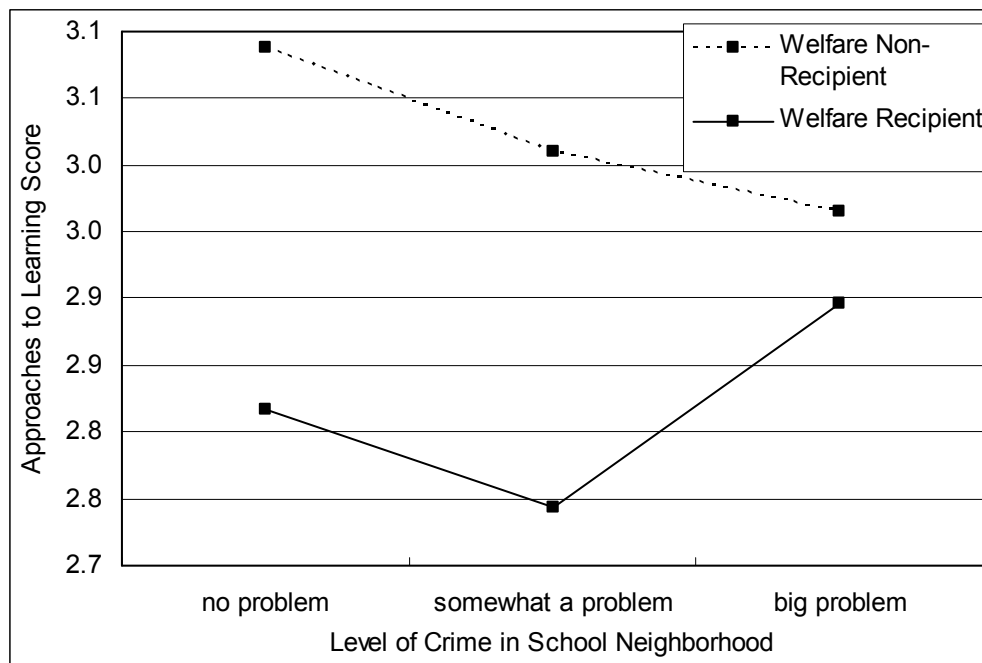
As depicted in the plot, increasing levels of crime are associated with decreasing scores for welfare non-recipients. For welfare recipients, somewhat of a problem with crime predicts lower outcomes than no problem with crime, however, a big problem with crime predicts a higher mean score for approaches to learning. When there is a big problem with crime, the differential impact of welfare versus non-welfare recipient is smaller than at the other levels of crime. When there is no problem or somewhat of a problem with crime in the school neighborhood, the gap in approaches to learning score for welfare versus non-welfare recipients is consistently larger demonstrating the impact of the main effects. Essentially, the moderation effect detected indicates that level of crime in the school neighborhood and receipt of welfare interacts differently at different levels of crime. Specifically, this antagonistic interaction implies that when there is a big problem with crime in the school neighborhood, the impact of crime lessens the impact of receipt of welfare on approaches to learning score. On the contrary, when there is somewhat of a problem or no problem with crime, the impact receipt of welfare lessens the impact of crime in the school neighborhood on outcomes. Finally, although the interaction is significant, the fact that the mean score for welfare recipients is highest when there is a big problem with crime indicates that level of crime did not moderate in the direction hypothesized; decreasing problems with crime did not predicts increasing scores for welfare recipients.

*Kindergarten Readiness in Social–Emotional Skills*

The results for the hierarchical regression analysis summary for variables predicting kindergarten readiness in social–emotional skills are presented in Table 8. The

socio-demographic risk factors entered in Model 1 significantly predicted social–

emotional skills for all of the four risk factors, accounting for 2% of the variance. Having

a single parent family ($B$ = -.12, $SE$ = .01, $p$ < .001), being a welfare recipient ($B$ = -.13,

$SE$ = .02, $p$ < .001), non-English primary home language ($B$ = -.08, $SE$ = .02, $p$ > .001)

and having a mother with less than high school education ($B$ = -.08, $SE$ = .01, $p$ < .001)

were all significant contributors to the model. Although the magnitudes are slight,

consistent with the first hypothesis, the results show that all of the socio-demographic

risk factors have negative associations with social–emotional skills, indicating that being

at risk is particularly associated with lower kindergarten readiness in social–emotional

skills. In particular, the findings reveal that living in home with a single parent family

result in a score that is .12 points lower in social–emotional skills than for those with a

two parent family. Additionally, being in the welfare recipient category results in a score

that is .13 points lower than for welfare non-recipients and having a mother with less than

high school education results in a score that is .08 points lower, compared to those whose

mother has an education that includes high school or more. Finally, for those having a

non-English primary home language, the result is a score that is .08 points lower in

reading than for those having an English primary home language.

Table 8

Hierarchical Regression Analysis Summary for Variables Predicting
Kindergarten Readiness Skills in Social-Emotional Skills, Weighted

| Variable | Model 1 | | | Model 2 | | | Model 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | S. E. | P | B | S. E. | P | B | S. E. | P |
| Single parent family | -.12 | .01 | *** | -.08 | .01 | *** | -.08 | .01 | *** |
| Welfare recipient | -.13 | .02 | *** | -.10 | .02 | *** | -.10 | .02 | *** |
| Non-English primary home language | -.08 | .02 | *** | -.05 | .02 | *** | -.05 | .02 | ** |
| Mother's education less than high school | -.08 | .01 | *** | -.04 | .01 | * | -.03 | .01 | * |
| Home Educational Environment | - | - | | .03 | .01 | *** | .03 | .01 | * |
| Head Start Attendance | - | - | | -.07 | .01 | *** | -.07 | .01 | *** |
| Day Care or Pre-School Attendance | - | - | | -.01 | .01 | | -.01 | .01 | |
| Inadequacy of School Facilities | - | - | | -.01 | .01 | | .00 | .01 | |
| School Neighborhood Crime | - | - | | -.02 | .01 | * | -.02 | .01 | * |
| Child Self-Control | - | - | | .08 | .01 | *** | .07 | .01 | *** |
| Child Social Interaction | - | - | | .09 | .01 | *** | .09 | .01 | *** |
| Child Impulsive/Overactive behavior | - | - | | -.11 | .01 | *** | -.11 | .01 | *** |
| Welfare recipient x Head Start Attendance | - | - | | - | - | | .10 | .03 | ** |
| Welfare recipient x Day Care or Pre-School Attendance | - | - | | - | - | | .10 | .03 | ** |
| Welfare recipient x School Neighborhood Crime | - | - | | - | - | | .07 | .03 | ** |
| Non-English primary home language x Head Start Attendance | - | - | | - | - | | .11 | .04 | ** |
| Constant | 3.07 | .01 | *** | 2.70 | .05 | *** | 2.69 | 0.05 | *** |
| Adjusted R-square | .02 | | | .06 | | | .06 | | |

Unweighted N=14,918
 * p < .05, ** p <.01, *** p < .001

Model 2, with the addition of the ecologically based resources and child disposition characteristics, accounted for 4% more variance in social–emotional skills with a total adjusted $R^2$ of 6 percent. The initially significant socio-demographic risk factors retained their significance and the ecologically based resources added to the model did significantly account for variance in kindergarten in social–emotional skills. Compared to the coefficients in model 1, the coefficients of the socio-demographic risk factors in Model 2 each decrease in magnitude. In Model 2 having a single parent family ($B$ = -.08, $SE$ = .01, $p$ < .001) decreases in magnitude by 34%, being a welfare recipient ($B$ = -.10, $SE$ = .02, $p$ < .001) decreases in magnitude by 23%, having a non-English primary home language ($B$ = -.05, $SE$ = .02, $p$ < .001) decreases in magnitude by 38%, and having a mother with less than high school education ($B$ = -.04, $SE$ = .01, $p$ < .05) decreases in magnitude by 50 percent. The diminished magnitudes of the coefficients for the socio-demographic risk factors suggest that the resources added to the model share variance in predicting kindergarten readiness in social–emotional skills. Simply stated, the risk factors are less impacting with the presence of the ecologically based resources added in the second model.

Consistent with the second hypothesis, most of the ecologically based resources have a positive relationship with the outcome indicating that the presence of one or more ecologically based resources is associated with stronger kindergarten readiness skills. Home educational environment ($B$ = .03, $SE$ = .01, $p$ < .001) has a coefficient indicating that a more cognitively stimulating home environment is related to stronger social–emotional readiness skills such that with each increasing unit of cognitive stimulation, the score on kindergarten readiness skills increases by .03 points. However, contrary to what

was hypothesized, the results show that attending Head Start ($B$ = -.07, $SE$ = .01, $p$ < .001) as opposed to not attending Head Start in the year before kindergarten, has an inverse relationship with the outcome. That is, attending Head Start is related to lower scores on social–emotional skills; it decreases the score on kindergarten readiness skills by .07 points compared to not attending Head Start in the year before Kindergarten. Further results demonstrate that as expected, that level of crime in the school neighborhood is inversely related to social–emotional skills; level of crime ($B$ = -.02, $SE$ = .01, $p$ < .05) predicted lower scores in readiness; with each increase in level of crime in the school neighborhood the score on kindergarten readiness skills decreases by .02 points.

Finally, as for the child disposition characteristics in model 2, self-control and positive social interaction both have slightly positive associations with social–emotional readiness skills ($B$ = .08, $SE$ = .01, $p$ < .001 and $B$ = .09, $SE$ = .01, $p$ < .001) while impulsive/overactive behavior is associated with lower scores on the outcome measure ($B$ = -.11, $SE$ = .01, $p$ < .001). For each unit increase in exhibiting self-control kindergarten readiness scores increased by .08 points, while for each unit increase in exhibiting positive social interaction kindergarten readiness scores in reading increase by .09 points. For each unit increase in exhibiting impulsive/overactive behavior, kindergarten readiness scores in reading decrease by .11 points.

Model 3 accounted for a total of 6% of the variance in kindergarten readiness in social–emotional skills with most first order and higher order effects showing significance. As can be seen in Table 8, a total of four interaction terms were included in the model. All of these terms show significance as antagonistic interactions. In the first

interaction,  being a welfare recipient and Head Start participation both individually show

inverse relationships with the outcome in first order effects ($B$ = -.10, $SE$ = .02, $p$ < .001

and $B$ = -.07, $SE$ = .01, $p$ < .001 respectively) and a coefficient change in their

antagonistic interaction term ($B$ = .10, $SE$ = .03, $p$ < .01).  The plot is presented in Figure

25.

Figure 25

*The Effects of Head Start and Receipt of Welfare on Social–Emotional Score*
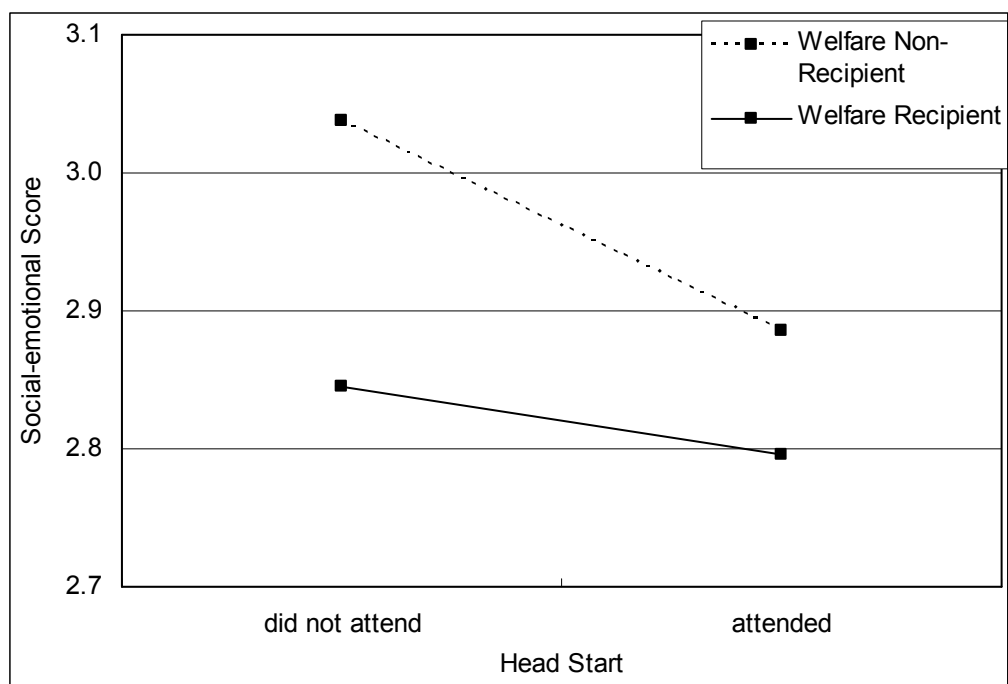
Similar to the other results examining the moderation effect of Head Start and contrary to

what was hypothesized Head Start attendance does not act as a resource but rather lowers

social–emotional scores for both welfare recipients and non-recipients.  As can be seen in

the plot, Head start has more of an impact on scores for welfare non-recipients compared

to welfare recipients.  In terms of not attending Head Start, the difference in outcomes for

welfare recipients and non-recipients is notably large, demonstrating the differential

effect of receipt of welfare.  However, for Head Start attendance, the gap in outcomes

between welfare recipient and non-recipient becomes much smaller, demonstrating the

diminished impact of receipt of welfare.  Thus, the significant antagonistic interaction

term reflects the fact that the impact of receipt of welfare on social–emotional score is

lessened by the role that attending Head Start plays in contributing to outcomes.

In the next interaction, being a welfare recipient and participation in a center-

based program both individually show inverse relationships with the outcome in first

order effects ($B$ = -.10, $SE$ = .02, $p$ < .001 and $B$ = -.01, $SE$ = .01, $p$ > .05 respectively)

and a coefficient change in their antagonistic interaction term ($B$ = .10, $SE$ = .03, $p$ < .01).

Figure 26 depicts the plot for this interaction.

Figure 26

*The Effects of Daycare or Pre-School and Receipt of Welfare on Social–Emotional Score*
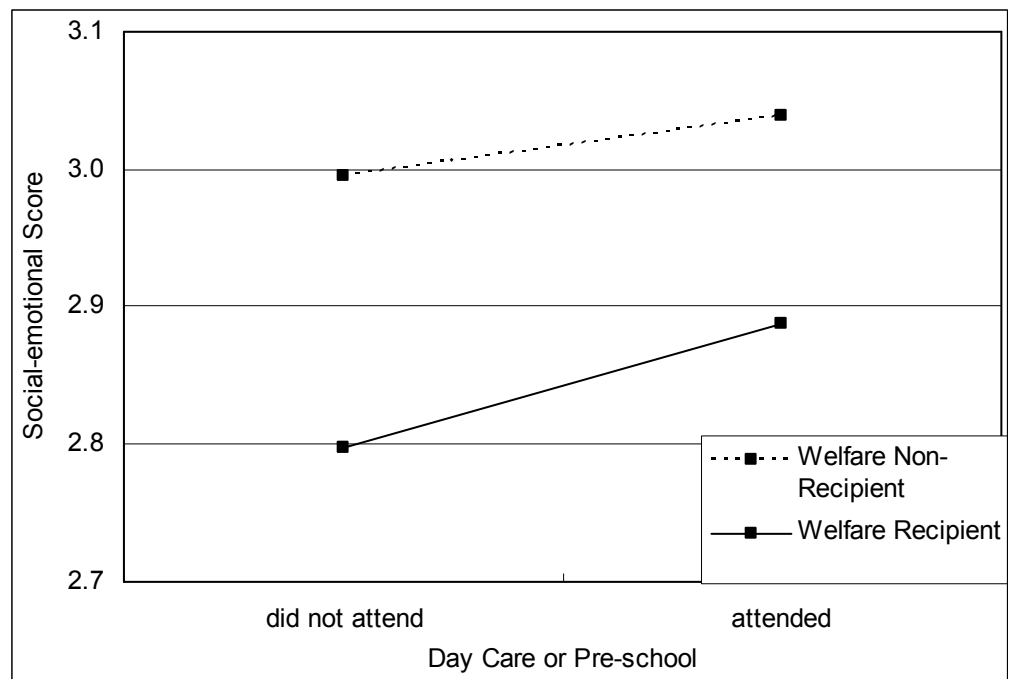
The plot indicates that attending day care or pre-school improves social–emotional scores for both welfare recipients and non-recipients. The gap in scores between welfare recipients and non-recipients is slightly greater for not attending as compared to attending day care or preschool. Thus, the antagonistic interaction implies that attending day care or pre-school lessens the impact of receipt of welfare on social–emotional scores and moderates the negative effects of being a welfare recipient on outcomes. However, the plot depicts that the even with the positive impact of day care or pre-school the gap in outcomes for welfare versus non-welfare recipients remains large.

In another antagonistic interaction, being a welfare recipient and crime in the school neighborhood both individually show inverse relationships with the outcome in first order effects ($B = -.10$, $SE = .02$, $p < .001$ and $B = -.02$, $SE = .01$, $p < .05$ respectively) and a coefficient change in their antagonistic interaction term ($B = .07$, $SE = .03$, $p < .01$). The plot for this interaction is presented in Figure 27.

Figure 27

*The Effects of Level of Crime in School Neighborhood and Receipt of Welfare on Social–Emotional Score*
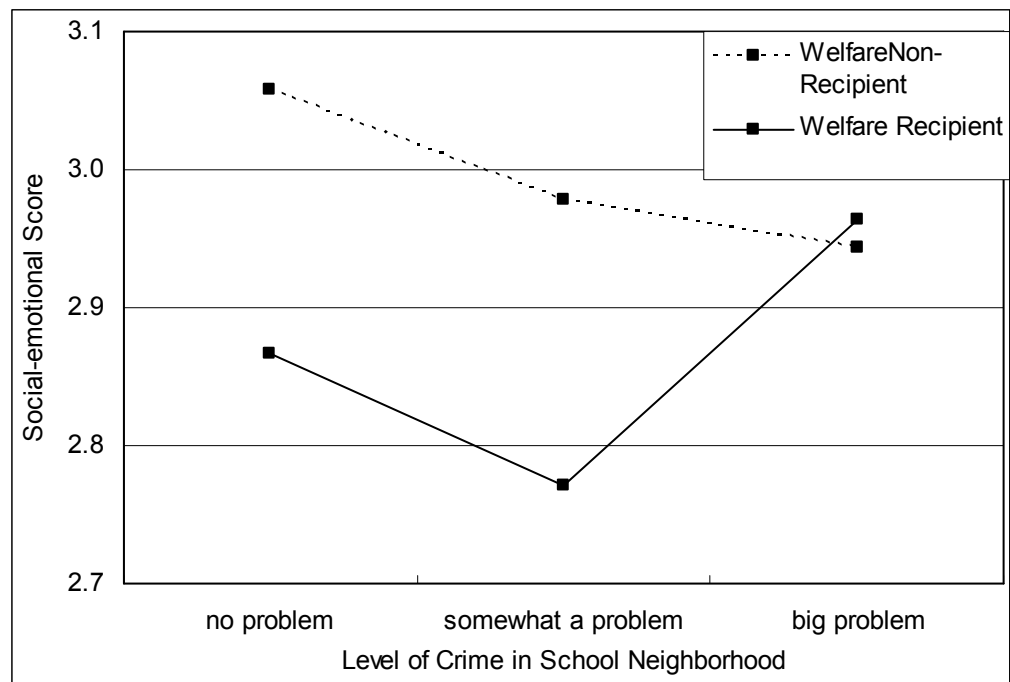
The plot depicts that level of crime and receipt of welfare interact such that when there is no crime or some crime in the school neighborhood, the effect of being a welfare recipient or non-recipient is largely impacting. However, when crime in the school neighborhood is a big problem the gap in social–emotional scores is minimal for welfare recipients versus non-recipients. This indicates that when crime is a big problem, the impact of crime is greater than the impact of receipt of welfare on outcomes. Essentially, the moderation effect detected indicates that level of crime in the school neighborhood and receipt of welfare interacts differently at different levels of crime. Specifically, this antagonistic interaction implies that when there is a big problem with crime in the school neighborhood, the impact of crime lessens the impact of receipt of welfare on approaches to learning score. On the contrary, when there is somewhat of a problem or no problem with crime, the impact receipt of welfare lessens the impact of crime in the school neighborhood on outcomes. Finally, although the interaction is significant, the fact that the mean score for welfare recipients is highest when there is a big problem with crime indicates that level of crime did not moderate in the direction hypothesized; decreasing problems with crime did not predicts increasing scores for welfare recipients.

In the final interaction for variables predicting kindergarten readiness in social–emotional skills, non-English primary home language and Head Start participation both individually show inverse relationships with the outcome in first order effects ($B = -.05$, $SE = .02$, $p < .01$ and $B = -.07$, $SE = .01$, $p < .001$ respectively) and a coefficient change in their antagonistic interaction term ($B = .11$, $SE = .04$, $p < .01$). The plot for this interaction is presented in Figure 28.

Figure 28

*The Effects of Head Start and Non-English Primary Home Language on Social–Emotional Score*
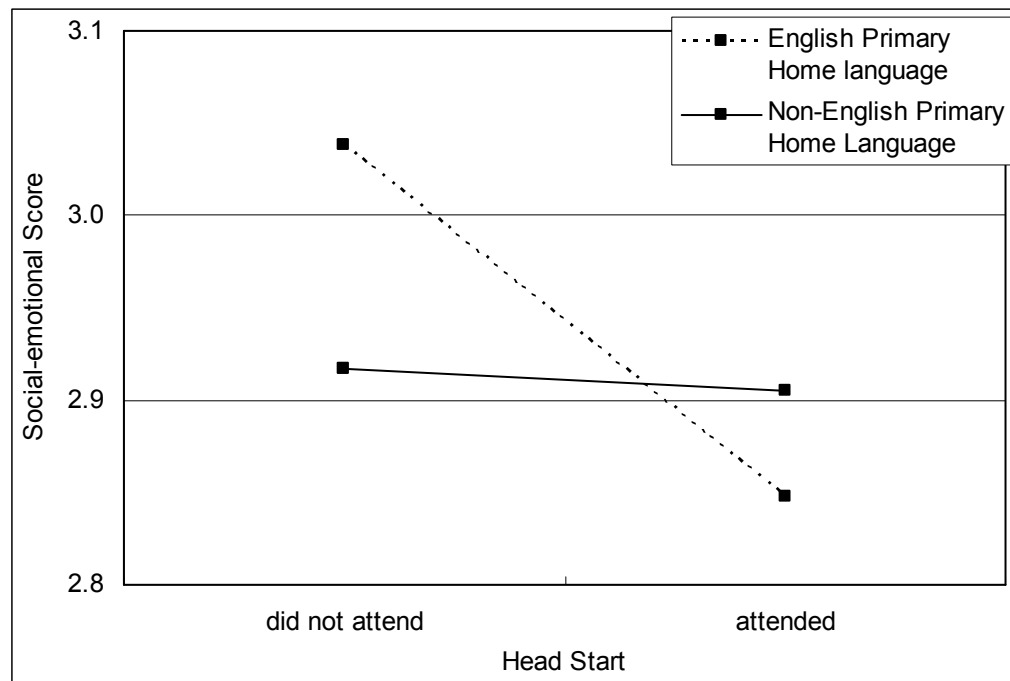
As can be seen in the plot, for those with an English primary home language, scores are significantly lower for attending Head Start as compared to not attending Head Start in the year before entering kindergarten. On the contrary, for those with a non-English primary home language, attending Head Start as opposed to not attending Head Start is associated with no increase or decrease in social–emotional score. Thus the moderation effect takes different form for English versus non-English primary home language. The plot of this antagonistic interaction indicates that the impact of Head Start lessens the impact that English and non-English primary home language have on outcomes. As previously noted in other interactions, the moderation effect of Head Start did not take the form that was hypothesized; the results indicate that Head Start attendance is associated with lower rather than higher scores in social–emotional outcomes.

## Summary

The purpose of the results section was to describe the analysis and findings regarding the relationships between socio-demographic risk, ecologically based resources and kindergarten readiness skills. Generally speaking, the strength of most of the relationships was found to be small or even insubstantial (Cohen, 1988) and the standard errors were large, limiting the inferences that can be drawn from the results. Additionally, as previously mentioned, interpreting significant interactions only extends to strength of association; unless a variable is manipulated there is no causality and thus theory drives the interpretation of moderation effects (Baron & Kenny, 1986; Cohen, Cohen, Aiken & West, 2003). Yet, patterns emerged in the data that lends support to the hypotheses under investigation.

First, the presence of one or more socio-demographic risk factors was found to be associated with weaker kindergarten readiness skills. Among the socio-demographic risk factors, all four of the factors were found to be inversely related to kindergarten readiness skills. As a group, the socio-demographic risk factors explained between 2 % and 12 % of variance in kindergarten readiness skills in the five different outcome measures. From the perspective of the outcomes, the associations for the socio-demographic risk factors were strongest for kindergarten readiness skills in math, followed closely by readiness skills in reading, and then by smaller associations among the outcome variables approaches to learning, psychomotor skills and finally social–emotional skills. Notably, home language varied in its significance and association with kindergarten readiness skills. Consistent with the literature (Hair et al., 2006; Rathbun, West, & Walton, 2005), non-English primary home language was generally the least impacting risk factor and some of the variance that was contributed by non-English primary home language could be explained away with the addition of the resources entered in Model 2.

Second, the presence of one or more ecologically based resources was found to be associated with stronger kindergarten readiness skills. Across the five measures of kindergarten readiness skills, the ecologically based resources accounted for between 2% and 6 % more variance above and beyond what was explained by the socio-demographic risk factors. From the perspective of the outcomes, the associations for the resource variables were strongest for kindergarten readiness skills in math, followed closely by readiness skills in reading, and then by smaller associations among the outcome variables approaches to learning, psychomotor skills and finally social–emotional skills. Home educational environment and kindergarten readiness skills were found to be related

indicating that engaging in home activities is generally positively related to kindergarten readiness.  Reading to the child was the home activity with the strongest association across all five kindergarten readiness outcomes.  Attending a formalized center-based program such as day care or pre-school was generally positively associated with outcomes indicating that attendance was related to higher scores on kindergarten readiness skills.  Inadequacy of school facilities and problems with crime in the school neighborhood were both generally found to be related to lower scores on kindergarten readiness skills.  Finally, exhibiting self-control and exhibiting positive social interaction were both positively associated with kindergarten readiness skills while exhibiting impulsive/overactive behavior was inversely associated indicating that externalizing behavior difficulties are related to lower scores on kindergarten readiness skills.  On the other hand, inconsistent with the hypothesis, results indicate that attending Head Start as opposed to not attending Head Start in the year before entering kindergarten was inversely related to the outcomes indicating that attendance was related to lower scores on all five measures of kindergarten readiness skills.

Third, the presence some of the ecologically based resources was found to partially reduce the negative effects of socio-demographic risk factors on kindergarten readiness skills.  Across the five measures of kindergarten readiness skills, the final regression models accounted for a total of between 5% and 19% variance.  The best fitting model was for kindergarten readiness skills in math which accounted for a total of 19% of the variance.  Kindergarten readiness skills in reading followed with a final model that accounted for 13% of the variance.  The hierarchical regression analysis for

approaches to learning, social–emotional and psychomotor skills posted weaker final

models accounting for 8%, 6%, and 5% of the variance respectively.

The effects of the interactions in Model 3 presented a variety of results. First, the

moderation effect for Head Start did not take form as an increase in scores for

disadvantaged children as hypothesized, but rather Head Start attendance was found to be

associated with lower scores on all measures. Furthermore, Head Start attendance

predicted a larger decline in scores for those without socio-demographic risk as compared

to those with one or more socio-demographic risk factors. These results suggest that

variables might be contributing to the impact of Head Start attendance on kindergarten

readiness skills that were beyond the scope of what was included in this study. The

implications of these results are discussed in detail in Chapter V. Second, as

hypothesized, the moderation effect for day care or pre-school attendance suggests that

attending day care or pre-school reduces the negative effects of socio-demographic risk

on outcomes. However, the results indicate that even with the positive impact of day care

or pre-school on kindergarten readiness skills, the gap in outcomes remains large between

disadvantaged children and those without any socio-demographic risk. Third, the

moderation effect for home educational environment suggests that the negative effect of

socio-demographic risk on outcomes diminishes with an increase in home educational

environment, meaning an increase in cognitive stimulation in the home. The results of

the interactions indicate that the moderation effect varies at different levels of home

educational environment and is more impacting for those without any socio-demographic

risk, than for those with one or more socio-demographic risk factor. Fourth, the

moderation effect for level of crime in the school neighborhood did not consistently

support the hypothesis. It was hypothesized that as the level of crime decreased, implying that the school setting generated a perception of greater safety, scores in kindergarten readiness skills would increase for disadvantaged children. In fact, this was the case for those without any socio-demographic risk but not the case for disadvantaged children. In particular, the results indicated that for disadvantaged children, having no problem with crime did predict an increase in kindergarten readiness scores on some outcomes (reading and math). However, on other outcomes, having somewhat of a problem with crime predicted lower outcomes than no problem with crime, while having a big problem with crime predicted the highest mean score on outcomes (approaches to learning and social–emotional). Essentially, the moderation effect detected indicates that level of crime in the school neighborhood interacts differently for various outcomes and also at various levels of crime. Fifth, the moderation effect for the level of inadequacy of school facilities additionally did not consistently support the hypothesis. For those without any socio-demographic risk, an increase in adequacy of school facilities predicted an increase in kindergarten readiness skills. However, for those with one or more socio-demographic risk factors, the results were less consistent. For some outcomes an increase in adequacy of school facilities predicted an increase in kindergarten readiness skills, but for other outcomes it demonstrated minimal effect.

Finally, from the perspective of the ecologically based resources, the greatest number of significant interactions was with the level of crime in the school neighborhood, followed by the variables home educational environment, participation in a center-based day care or pre-school program, and lastly the level of inadequate school facilities. From the perspective of the outcomes, the greatest number of significant

interactions were found for kindergarten readiness skills in reading, followed closely by

readiness skills in math, and then by readiness skills in psychomotor, social–emotional

and finally approaches to learning skills.  Although a number of moderation effects were

detected, overall, the plots indicated the gap in kindergarten readiness skills for

disadvantaged children as compared to those without any socio-demographic risk was

still notably large.

CHAPTER V

Discussion

This research study was designed to examine the factors associated with varying

degrees of school readiness among kindergarteners, furthering empirical knowledge in

this area and contributing to social work theory, policy and practice.  The study examines

the relationship between socio-demographic risk, ecologically based resources, and

kindergarten readiness skills.  Simply stated, this research is provoked by the following

questions; how do we explain why disadvantaged children demonstrate significantly

different degrees of school readiness?  And, do ecologically based resources contribute to

resilience by buffering the negative impact of socio-demographic risk?  Specifically, this

study investigates the following research question: Does the presence of ecologically

based resources increase the likelihood of successful kindergarten readiness skills for

disadvantaged children?

To address these issues, a theoretical perspective was utilized invoking an

ecological approach to understanding the resiliency of disadvantaged kindergarteners.

(See Figure 1 for the diagram of the theoretical framework of the study). The conceptual

framework was based on the premise that the concept of readiness to learn is dynamic

and a function of multi-faceted and inter-related characteristics, including those intrinsic

to the child at the micro-level and to the schools, family, community, and society at the

macro-level, as proposed by the National Educational Goals Panel (Boethel, 2004;

Brofenbrenner, 1979; Coleman, 1988; Emig et al., 2001; Luther, Cicchetti & Becker, 2000; Pianta, 2002; Piotrkowski, 2004).  This framework acknowledges that a child's kindergarten readiness skills develop within a set of contexts and can vary based upon family, community and school experiences.  Such a framework acknowledges the importance of "ready" families, schools, and communities and the contribution of resources to readiness at these levels (Piotrkowski, 2004; Rimm-Kaufman & Pianta, 2000).  The framework being advanced therefore conceptualizes that differences in kindergarten readiness can result from differences in resources in the multiple contexts in which the child is nested. (See Figure 2 for the diagram of the conceptual model of the study).

The findings are based on a secondary analysis of data provided by the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K) implemented in 1998 by the U.S. Department of Education, National Center for Education Statistics (NCES) and are recognized as the first large-scale, systematic evaluation of kindergartners' readiness to learn.  The ECLS-K follows the school experiences of a nationally representative cohort of students ($n = 22,782$) from kindergarten through grade 5 of elementary school. The data used in this study includes a subset of students derived from the Base Year Public Use Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) who were first-time kindergartners without a diagnosed disability ($n = 14,918$).  A hallmark of the ECLS-K, noted earlier but worthy of reiteration, is its adoption of a holistic approach to school readiness.  More specifically, consistent with the conceptual framework used in this study, the ECLS-K conceptualization of school readiness includes multiple dimensions of a child's development and adaptation to the classroom, namely,

psychomotor development, social/emotional skills, approaches to learning, and literacy and math skills.

## Overview

To address the research question, three hypotheses were postulated:

(1) The presence of one or more socio-demographic risk factors is associated with weaker kindergarten readiness skills;

(2) The presence of one or more ecologically based resources is associated with stronger kindergarten readiness skills; and,

(3) The presence of one or more ecologically based resources reduces the negative effects of socio-demographic risk factors on kindergarten readiness skills.

This study identifies three categories of variables for analysis: dependent variable (kindergarten readiness); independent variables (socio-demographic risk factors and ecologically based resources); and, control variables (child disposition characteristics). (See Table 1 for a detailed description of the operational measures of these variables.) The findings are based on descriptive statistics, bivariate analysis (Pearson correlations), and multivariate analysis (three-step hierarchical multiple regression), as highlighted below.

*Descriptive Statistics*

In terms of outcome measures, the kindergarteners show a relatively low score on readiness skills, particularly in terms of reading and math, as evidenced by mean scores

of 22.45 (with a range of 0–72) and 19.49 (with a range of 0–64), respectively, and a

broad range of readiness skills, as evidenced by standard deviations (*SD*) with the

greatest variability among reading (8.04) and math (7.16) scores.  The mean scores for

psychomotor skills (12.25, with a range of 0–17), approaches to learning (3.01, with a

range of 1–4), and social–emotional skills (3.01, with a range of 1–4) are relatively

higher than for the more cognitively based areas of reading and math, and the variability

in terms of *SD* is lower as well, 2.91, .66, and .60, respectively.  As previously

mentioned, the ECLS-K assessment battery was designed for use with both kindergarten

and first-grade children.  Therefore, it is expected that the majority of first time

kindergarteners could score at lower levels (U.S. Department of Education, 2001).

Although the mean scores appear relatively low, they are consistent with statistics

presented by the ECLS-K study and can be interpreted as defining the national average

for the population represented in this study (National Center for Education Statistics,

2000).

In terms of independent variables, a moderate percentage of students can be

identified as at risk based upon socio-demographic factors.  Those who live in single

parent household account for just under one-fourth (23%) of study participants, with a

smaller proportion living in households characterized as welfare recipient (12%), having

a non-English primary home language (13%), and having a mother's education of less

than high school (16%).  As for ecologically based resources, the students' home

educational environment may be described as supportive in terms of the mean scores

(with a range of 1-4) for the following activities: reading to child (3.23); singing songs

(3.11); telling stories (2.72); playing games (2.78); doing art (2.66); playing sports (2.66);

and, to a lesser extent, building things (2.33); and, teaching nature (2.19). Overall, the mean score for home educational environment based on a composite of the above activities is 2.71.

In terms of early school experience, the typical kindergartener participated in an early childhood school experience, including daycare or pre-school (55%) or Head Start programs (15%) in the year before entering kindergarten. For the most part, school-setting was not identified as limiting, as evidenced by a mean score for level of inadequacy of school facilities of .55 (with a range of 0-2) and a mean score of level of neighborhood crime of .49 (with a range of 0-2), suggesting that such school level factors are sometimes a problem or not a problem at all. Finally, in terms of child disposition characteristics, the typical kindergartener shows self-control and positive social interaction as evidenced by mean scores of 3.33 and 2.85, respectively (with a range of 1-4), indicating they exhibit such behaviors sometimes or often. The manifestation of impulsive or overactive behavior is less apparent, with a mean score of 1.94. (See Table 2 for a presentation of descriptive statistics.)

*Bivariate Associations*

The data analysis also examines the interrelationships among readiness skills, socio-demographic risk factors, ecologically based resources, and child disposition characteristics. The findings show that all four socio-demographic risk factors (i.e., single-parent family, welfare recipient, non-English primary home language, and mother's education less than high school) are significantly and inversely related to each of the five outcome measures of kindergarten readiness skills (i.e., reading, math,

psychomotor, approaches to learning, and social–emotional skills). That is, socio-demographic risk is related to lower kindergarten readiness, with math skills showing the strongest associations and psychomotor and social–emotional skills, the weakest associations. (See Table 3 for a presentation of Pearson Correlations for all variables.)

When home educational environment is examined, cognitive stimulation activities (i.e., reading, telling stories, singing, doing art, playing games, teaching nature, building things, and/or playing sports) are positively correlated with kindergarten readiness skills for most of these activities, with reading to the child showing the strongest association across all five readiness outcome measures and playing sports and building things showing the weakest associations. Overall, the composite score for home educational environment shows a strong and statistically significant association with kindergarten readiness in terms of math and reading scores, and to a lesser extent, approaches to learning, social–emotional skills, and psychomotor skills.

Early school experience is also correlated with kindergarten readiness, though the direction of the association varies by type of program. For example, having attended Head Start is inversely related to kindergarten readiness skills, with evidence of lower measures on each of the five domains of readiness skills, a revealing and critical finding that will be discussed later in this chapter. In contrast, study participants who attended day care or preschool in the year prior to kindergarten show higher scores on kindergarten readiness skills, with stronger associations in math and reading and relatively smaller associations for approaches to learning, psychomotor skills, and social–emotional skills.

When school setting is considered, inadequate school facilities and neighborhood crime are both found to be associated with lower kindergarten readiness scores overall, though to different degrees for each of the five dimensions of kindergarten readiness. Finally, child disposition characteristics are also associated with kindergarten readiness skills such that exhibiting self-control and exhibiting positive social interaction show a positive association while exhibiting impulsive/overactive behavior shows an inverse association with kindergarten readiness skills.

*Hierarchical Regression Analysis*

To provide a more complete and comprehensive understanding of the data, the secondary analysis conducted hierarchical regression analysis, using three-step models to predict kindergarten readiness, for each of the five outcome measures of kindergarten readiness skills (i.e., reading, math, psychomotor, approaches to learning, and social–emotional skills). Specifically, Step 1 included the socio-demographic risk factors; Step 2 incorporated the ecologically based resources and child disposition characteristics; and, Step 3 added the significant interaction terms between socio-demographic risk factors and ecologically based resources. (See Tables 4–8 for a presentation of the hierarchical regression analysis.)

As a group, the socio-demographic risk factors entered in Step 1 explained between 2 % and 12 % of variance in kindergarten readiness skills in the five different outcome measures. In Step 2, the ecologically based resources and child disposition characteristics accounted for between 2% and 6 % more variance above and beyond what was explained by the socio-demographic risk factors. The final regression models in Step

3 accounted for a total of between 5% and 19% variance. The best fitting model was for kindergarten readiness skills in math which accounted for a total of 19% of the variance. Kindergarten readiness skills in reading followed with a final model that accounted for 13% of the variance. The hierarchical regression analysis for approaches to learning, social–emotional and psychomotor skills posted weaker final models accounting for 8%, 6%, and 5% of the variance respectively.

The hierarchical regression analysis revealed that the presence of some ecologically based resources was found to reduce the negative effects of socio-demographic risk factors on kindergarten readiness skills. Some additionally particular findings of the regression analysis are deserving of mention (and will be further addressed in the discussion section). First, non-English primary home language varied in its significance and association with kindergarten readiness skills. Non-English primary home language was generally the least impacting risk factor and some of the variance that was contributed by non-English primary home language could be explained away with the addition of the resources entered in Model 2. Second, inconsistent with the hypothesis, results indicate that attending Head Start as opposed to not attending Head Start in the year before entering kindergarten was inversely related to the outcomes indicating that attendance was related to lower scores on all five measures of kindergarten readiness skills.

In general, although the final models revealed a number of significant moderation effects, the interaction plots indicated the gap in kindergarten readiness skills for disadvantaged children as compared to those without any socio-demographic risk was still notably large. (See Figures 3-28 for a presentation of interaction plots.) Furthermore,

the hierarchical regression analysis showed that the predictive strength of most of the relationships was found to be small (Cohen, 1988) and the standard errors large, limiting the ability to make inferences from the data. However, the results did unveil a number of patterns that support the hypotheses, as highlighted below:

(1) The presence of one or more socio-demographic risk factors was associated with weaker kindergarten readiness skills.

(2) The presence of one or more ecologically based resources was associated with stronger kindergarten readiness skills.

(3) The presence of some, but not all, of the ecologically based resources partially reduced the negative effects of socio-demographic risk factors on kindergarten readiness skills.

## Discussion

*Impact of Head Start on Kindergarten Readiness*

A key finding of this research, albeit unexpected, was the failure of Head Start participation to positively contribute to kindergarten readiness with regard to each of the five measures of readiness (i.e., reading, math, psychomotor, approaches to learning, and social–emotional skills). This finding was based on data that included 15% of study participants who reportedly attended Head Start programs in the year prior to entering kindergarten. Specifically, the moderation effect for Head Start did not take form as an increase in scores for disadvantaged children as hypothesized, but rather Head Start attendance was found to be associated with lower scores on all measures. Furthermore,

Head Start attendance predicted a larger decline in scores for those without socio-demographic risk as compared to those with one or more socio-demographic risk factors.

As discussed in the literature review (See Chapter II for in-depth review), Head Start was initiated as an early intervention program for low-income families (Parker, Piotrkowski, Baker et al., 2001, p. 35) designed to provide 3- and 4-year old children with a "'head start'" toward the type of education afforded to more privileged preschool students (Terezakis, 2001). In 1998, policy makers pointedly identified the development of school readiness skills as the principal goal for Head Start programs (Fantuzzo, Bulitsky-Shearer, McDermott et al., 2007; Parker, Boak, Griffin, et al., 1999). Head Start programs are based on the premise that a child's first five years of life form the foundation for subsequent physical, cognitive, social, and emotional development (Olsen & DeBoise, 2007; U.S. Department of Health and Human Services, 2003).

Head Start remains "the longest-running national school-readiness program" in the country, though the perceived effectiveness of Head Start is not conclusive and in fact, is the subject of considerable debate (Ludwig & Phillips, 2007). According to the National Head Start Association (June 19, 2008) for instance, research shows that Head Start programs have contributed positively to the experiences of its participants in terms of cognitive, language, and health measures. However, according to a report by the Department of Health and Human Services (2003) based on a recent comprehensive study of Head Start, "when the school readiness of the nation's poor children is assessed, it becomes clear that Head Start is not eliminating the gap in educational skills and knowledge needed for school" (p. 1). Still others argue that the controversy surrounding the impact of Head Start on school readiness and subsequent school performance may be

a function of the variable research methods used and more pointedly, the relative scarcity

of experimental design (Abbott-Shim, Lambert & McCarty, 2003).

Clearly, the Head Start findings based on the ECLS-K data reported in this study

must be viewed within a situational as well as an historical context; that is, Head Start

programs as they were implemented in 1998 as compared with today.  For example, one

explanation of the unanticipated findings in this study is that the ECLS-K data used do

not address the organizational characteristics of each of the Head Start program attended

by study participants in terms of size of facility, number of students enrolled,

composition of staff, credentials of staff, quality of instruction, student attendance, level

of parental involvement, and, full- or part-time attendance, among other variables.  That

is, the impact of Head Start attendance on kindergarten readiness may be influenced by

the type and quality of Head Start program attended (McGroder, 2002).

For example, it was only in 1994, nearly 30 years after the implementation of

Head Start, that Head Start legislation included quality assurance requirements making

funding contingent on the ability to meet minimum quality requirements and rectify

program deficiencies.  This same legislation also revised Head Start Performance

Standards to promote better collaboration between Head Start and the broader community

(National Association for the Education of Young Children, 2008).  Still more recently,

in 1998, a congressional mandate finally required that all center-based Head Start

teachers obtain at least an Associate-level degree by September 2003.  In 2002, nearly

half of all Head Start teachers did not have an Associate degree (Hamm, 2006).

Moreover, the data used in this study did not allow a comparison between Head

Start programs and other daycare or pre-school programs in terms of organizational

characteristics, posing the possibility that greater kindergarten readiness among children attending non-Head Start daycare/pre-school programs may be a function of the type and quality of program attended. Dr. Edward Zigler, often referred to as "'the father of Head Start,'" believes that the benefits of a Head Start program are a function of the quality of services provided by that program, noting that overall, the quality of Head Start programs has shown constant albeit gradual improvement through the initiative's history (National Head Start Association, January 28, 2008, p. 1). Thus, variations in type and quality of Head Start programs attended by the sample in this study might have contributed to the unanticipated findings.

A second explanation to consider is the level of parental involvement in Head Start; a key component of the Head Start model (Duch, 2005; Lamb-Parker, Piotrkowski, Baker et al., 2001). Head Start has been recognized as "the earliest two-generation model of service delivery in the early childhood and family support fields (Lamb-Parker, Piotrkowski, Baker et al., p. 36). The ECLS-K, however, does not provide data on parental participation in the day-to-day activities of the Head Start programs included in the study sample. The benefit of parental involvement in Head Start is related to the effectiveness of the program itself (Lamb-Parker, Piotrkowski, Baker et al., 2001). What is known about parental involvement in Head Start programs suggests that it has declined appreciably since 1990 (Duch, 2005) likely because of the same "situational and personal" barriers (Lamb-Parker, Piotrkowski, Baker et al., 2001) that historically plagued poor and welfare-recipient parents, namely, difficult life circumstances such as family/child care responsibilities, lack of energy or interest, and scheduling conflicts due to employment or school. The scope of this study did not include examining the role that

parental involvement in Head Start programs might contribute to improving kindergarten readiness skills for disadvantaged children; a factor which might additionally contribute to the Head Start findings in this study.

As a third consideration, continuity in childcare has been identified as an important factor in the development of young children. Yet, Head Start programs often provide only half-day programs and for no more than two years (Duch, 2005). To address this gap, Head Start programs have established extended care networks, for example, through certified day care providers or other community-based public preschool programs (Duch, 2005). This study is limited in that it examined Head Start categorically, as a moderator that was hypothesized to act as a resource. Thus, variations in length and duration of Head Start programming were not included as a variable and the potential differentiating effects were not investigated. As a result, it is reasonable to consider that the impact of Head Start in this study may have been influenced by the duration of the program (i.e., full-day versus half-day), a possibility that should be investigated in future research.

Finally, the Head Start findings should also be interpreted with caution due to limitations in terms of the study design. Some argue that the controversy surrounding the impact of Head Start on school readiness may be a function of the research methods used (Abbott-Shim, Lambert & McCarty, 2003). The data in this study did not include a comparison of children with each type of early school experience, that is, those enrolled in Head Start programs as compared to other daycare/pre-school programs, or no center-based program. Rather the categories used in this study compared those attending Head Start versus those not attending Head Start. Furthermore, the variable measuring Head

Start attendance extended to the year before entering kindergarten, but did not include earlier Head Start participation. Finally, a comparison of Head Start participants with other "Head Start-eligible, but not enrolled" children might have contributed to our understanding of the impact of Head Start on kindergarten readiness skills and should be a consideration for future research.

*Impact of Non-English Primary Home Language on Kindergarten Readiness*

A second notable finding was that non-English primary home language varied in its significance and association with kindergarten readiness skills. Non-English primary home language was generally the least impacting risk factor and some of the variance that was contributed by non-English primary home language could be explained away with the addition of the resources entered in Model 2. Additionally, non-English primary home language was sometimes positively associated with kindergarten readiness skills, such as in the case of reading skills.

Although this finding was not specifically predicted, it is consistent with the literature (Hair et al., 2006; Rathbun, West, & Walton, 2005). Research has found that children whose families speak a language other than English were found to have lower reading and mathematics scores than children with no risk factors (Rathbun et al., 2005). However, children whose only risks were non-English primary home language were found to be academically advantaged compared to children who are from a welfare recipient family or who have a mother with less than a high school education. Children whose sole risk was coming from a non-English speaking household tended to start school with lower numeracy skills but made impressive gains in mathematics over the

primary grades that narrowed the gap in performance.  Furthermore, Hair et al. (2006) found that children from non-English speaking backgrounds were high in social competence.  Finally, research suggests that in the case of children living in a home with a non-English primary home language, the practice of oral storytelling, characterized by shared verbal interaction between children and their caregivers may in promote subsequent language skills (Cutspec, 2006).  Such practices might buffer the negative effect that living in a home with a non-English primary language might have on kindergarten readiness skills.

Specifically, current understanding of literacy development, based on empirical evidence, suggests that formalized book reading (print-based literacy) in the home may not be the only means of fostering reading skills.  Rather, it may be that in the case of children living in homes with non-English primary home languages, the practice of oral storytelling, characterized by shared verbal interaction between children and their caregivers may in fact promote subsequent language skills (Cutspec, 2006).  According to Cutspec, oral storytelling is accepted by some as a precursor to reading, contributing substantially to early literacy development.  The ECLS-K data includes storytelling as among the Home Educational Environment indicators, however, the data analysis does not differentiate between the specific cognitive stimulation activities used by parents in primarily English-speaking and non-English speaking homes.

Taken together, the results imply that multiple factors, such as the ecologically based resources incorporated in Step 2 of the hierarchical regression analysis contribute to kindergarten readiness skills among children with a non-English primary home language.  The ecologically based resources investigated in this study are empirically and

theoretically based and offer some examples of contributing factors. However, the review of literature and the findings in this study support the need for further research on factors that contribute to successful kindergarten readiness skills specifically for children who live in a home with a non-English primary home language.

## Implications and Recommendations

In the past 20 years or so, social workers have shown increased interest in school readiness. Research demonstrates that children arrive at kindergarten with significant differences in school readiness and that their early school performance follows a trajectory throughout the elementary school years (Foster & Miller, 2007; Hair et al., 2006; Rathbun et al., 2005). The historical failure to ameliorate these inequalities in education by closing the achievement gap continues to be a civil rights issue attracting considerable debate. This social injustice deserves the attention of social workers who should be called upon to intervene and ameliorate this social problem and human rights issue. Social work interventions can have positive outcomes for program development and implementation and support the emergence of policy initiatives that focus attention on improving the plight of those with disadvantages (Adelman & Taylor, 2001). The results of this study therefore contribute to theory building in social work and also hold implications for social work policy, practice and areas of future research.

This study is useful to social workers because it furthers our understanding of differences in school readiness and informs social workers about relationships that help conceptualize social problems such as the achievement gap. The profession of social work endorses the concept of resilience to be understood as a transactional product of

individual attributes and environmental context (Waller, 2001; Fraser, 1999), and this study embraces an ecological and resilience framework that accounts for not only children's individual differences, but their environment, as well, including family, community, and school.

This research adds to social work knowledge building by contributing to the definitions of contested concepts and the development of theoretical perspectives. First, school readiness, arguably an "ambiguous" concept (as cited by Mantzicopolos, 2004, p. 268), is limited by variability in how school readiness is perceived by key stakeholders, including parents and teachers (Piotrkowski, Botsko & Mathews, 2001). By conducting a secondary analysis of data in which school readiness is operationally defined using a multivariate approach, this research recognizes that school readiness is a multifaceted concept and contributes to our understanding of school readiness as an empirical construct. In particular, an advantage of the ECLS-K design utilized in this study is that data are based on direct child assessment as well as surveys of parents, teachers, and school administrators, allowing for multiple and varied indicators of school readiness.

Second, resilience theory in social work can be used to conceptualize social problems and build models for intervening (Fraser & Richman, 1999). As a concept, resilience is based on individual and environmental interactions such that "personal qualities and social influence" are believed to promote well-being (National Association of Social Workers, 2004, p. 1). Resilience theory has been applied to the area of child development based on the question, "'Why do children from the same high-risk factor or low supportive environment emerge so differently?'" While early research typically

focused on personal qualities, more recent efforts have expanded to also include ecological factors, as evidenced in this study.

This study reveals how multidisciplinary resources may serve as a buffer against the negative impact of socio-demographic risk factors, in particular, in promoting school readiness. And, indeed, the study findings presented here based on a subset of the ECLS-K national database of children followed from kindergarten through grade 5, namely, first-time kindergartners (without a diagnosed disability), show that although the presence of one or more socio-demographic risk factors was associated with weaker kindergarten readiness skills, the presence of one or more ecologically based resources promoted resilience among disadvantaged children. That is not to ignore the impact of socio-demographic risk on the developmental gains and obstacles of entering kindergarteners, in light of statistics showing that in 2006 an estimated 12.8 million children were living in poverty (U.S. Census Bureau, 2008). As examined in this study, four family factors are generally associated with socio-demographic risk: mother's highest level of education as less than high school; family's economic status as below the poverty line; primary home language as non-English; and the presence of only one parent in the household (Zill et al., 1995). The findings of this study suggest that kindergarten readiness may be a function of resiliency, that is, the ability of environmental factors such as family, community, and school to serve as a buffer against socio-demographic risk factors. This understanding of an individual's ability to survive or thrive in the face of environmental obstacles can ultimately contribute to the development and implementation of social work programs and practices (National Association of Social Workers, 2004).

As previously mentioned (See Chapter I for more detail), under current educational policies, state initiatives focus on ensuring all students begin school ready to learn regardless of socio-demographic background. According to NCLB, states are also required to show that subgroups, such as those at economic disadvantage, are reaching proficiency according to standardized tests (Jennings, 2002). More specifically, as a landmark initiative in 1965, Project Head Start underscored the importance of improving social competence and later, school readiness skills in young children (Fantuzzo, Bulotsky-Shearer, McDermott et al., 2007). While the importance of early childhood intervention continues to be a key focus in school readiness, in more recent years, the implication of school readiness interventions for children, parents, and communities has broadened especially given the growing demand for school accountability and student performance on a national level (Weigel & Martine, 2006). Toward this end, the 2002 No Child Left Behind Act was implemented to ensure high quality education to every child regardless of income, background, or ability thereby setting accountability standards.

The results of this study reveal that resources such as day care/pre-school and home-based educational activities can improve school performance for those with socio-demographic risk. Though majority of the sample in this study had some experience with center-based programs, such as day care or preschool, the experience varied across groups based on background and risk factors, with disadvantaged children less likely to participate in such programs. Other research reveals similar finding with Head Start centers serving only about half of eligible pre-school children and only 2.5% of eligible Early Head Start children (calculations are based on data from the U.S. Head Start

Bureau and the Census Bureau in 2004; Hamm, 2006). The fact that programs are available does not necessarily suggest they are accessible and social workers can support policy initiatives that improve the accessibility of early childhood education. Furthermore, the impact of home educational environment on readiness supports the notion that early school initiatives, such as Head Start and universal pre-school, would benefit from a home involvement component. Taken together, social workers can inform and support policy that structures services to develop and capitalize on ecologically based resources so that those with disadvantages are not marginalized.

In terms of practice, parent involvement programs that enhance connections between home and school have been found to benefit both schools and children (Pianta & Walsh, 1996). The results of this research inform social workers of resources that can differentiate outcomes for those with socio-demographic risk. Evidence- based research guides school practices and is responsible for the implementation and improvement of home-school collaboration. This study offers early childhood programs such as Head Start, pre-schools and kindergartens, a perspective on school readiness that should be integrated into best practices. Additionally, social workers are in a unique role to build a link between parents and the school that can capitalize on resources, including parent education and support such that resources are sustained. Furthermore, the findings that ecologically based resources contribute variance above and beyond the socio-demographic risk factors underscores the importance of integrating strength based assessment in addition to risk assessments with vulnerable populations. Strength based assessments will improve early detection of existing resources and afford social workers

the opportunity to sustain and improve those resources while also improving access to others.

In terms of future directions, social workers should also recognize that the concept of school readiness must embrace a population of children that are perceived to be "at-risk" for reasons beyond socio-demographic background characteristics. According to Bagdi and Vacca (2005), "The make-up of today's generation of children coming into programs is dramatically different from the last. At some time or another, a majority of children are considered to be 'at-risk.'" Factors contributing to increased risk for school readiness and performance include the growth in divorce rates, single-parent households, dual career families, and complexities of modern life. As a result, even children from middle-class families are coming to school "unprepared" because of stressful life circumstances (p. 146). To address the needs of young children Bagdi and Vacca propose a number of other recommendations. For example, they emphasize the importance of services that are "child and family-centered, collaborative, and culturally competent" among a continuum that includes promotion, prevention, and intervention (p. 148). Key to enhancing school readiness is early identification and intervention, according to the authors, such that the unique needs of all children and families can be met. Though the strategies Bagdi and Vacca identify focus on fostering early childhood social–emotional well-being, the implications for improved cognitive skills are apparent, as well, namely: developmentally appropriate curriculum; individualized assessment; professional development/staff training; parent training; parent-teacher relationships; parent-pediatrician relationships; interagency collaboration; and, home visitation.

Finally, the findings of this study have implications for future research, as well, in terms of research questions and study design. In particular, the unanticipated finding that participation by children/families in Head Start failed to positively contribute to kindergarten readiness warrants further investigation. To the extent possible, the subsample of study participants who attended center-based preschool programs can be identified within the ECLS-K database and stratified into two groups, Head Start and Other Center-Based enrollees (matched on selected background characteristics), allowing for further secondary analysis of the ECLS-K data variables (e.g., sex, race, health status) to determine what are the characteristics of these children that may promote or impede school readiness. Or, a "deviant case analysis" might be conducted within the Head Start study population alone to identify those characteristics of Head Start enrollees that may or may not influence school readiness. For example, what are the characteristics of Head Start participants that show kindergarten readiness skills as compared with Head Start participants that do not? More rigorous research on this issue might be accomplished using an experimental or quasi-experimental study design.

Limitations

This study contained limitations which require caution in the interpretation of the results and when generalizing findings. One threat is that the non-experimental nature of the data makes it impossible to distinguish causal relationships between variables and outcomes. This further extends to interpreting the moderation effects investigated in this study. Unless a variable is manipulated there is no causality in moderation; only strength of association. As with many large scale datasets, ECLS-K data is broader in scope than it is deep. Survey questions are closed-ended, based on categorical variables that may limit variability. Furthermore, the dichotomous variables in this study present further limitation. Additionally, the cross-sectional data in this study lack longitudinal information from which to draw conclusions about the process that might occur as ecological resources are transformed into readiness skills.

In the parent interview, respondents were asked questions regarding their family socio-demographic characteristics. Based on previous empirical findings, each socio-demographic risk factor was indexed by a dummy variable and coded into non risk versus risk categories (living in a single parent family, having a mother with less than high school education, receiving welfare in the past 12 months, and having a Non-English primary home language.) Creating dichotomous variables in this way decreases variation and its differential effects; it decreases measured relationships between variables, lowers the power for detecting true interactions, and introduces measurement error (Cohen, Cohen, Aiken & West, 2003). Therefore, the variables examined might not reflect the true complexity of the items being measured.

Another limitation is that parents were not included in the dataset if they did not have children participating in the study, parent interviews and questionnaires were completed by only one parent, and the procedures applied a broad definition of parent or guardian. These procedures allowed for parents to be self-selected which can pose a threat to external validity. Thus, the primary source of data collection was derived from respondents who defined themselves as parent/guardian and electively participated in the study, resulting in the risk of a self-selection sample bias.

As suggested by Abbott-Shim, Lambert & McCarty (2003), the results regarding the impact of Head Start on school readiness in this study should be interpreted with caution due to limitations in research methods. First, the data used in this study did not allow a comparison between Head Start programs and other daycare or pre-school programs in general or in terms of organizational characteristics. Specifically, the data in this study did not include a comparison of children with each type of early school experience, that is, those enrolled in Head Start programs as compared to other daycare/pre-school programs, or no center-based program. Additionally, variations in type and quality of Head Start programs attended by the sample in this study might have contributed to the unanticipated findings. Second, this study did not provide data on parental participation in the day-to-day activities of the Head Start programs included in the study sample; a factor which might additionally contribute to the Head Start findings in this study. Third, variations in length and duration of Head Start programming were not included as a variable and the potential differentiating effects were not investigated. As a result, it is reasonable to consider that the impact of Head Start in this study may have been influenced by the duration of the program (i.e., full-day versus half-day), a

possibility that should be investigated in future research. Fourth, the variable measuring Head Start attendance extended to the year before entering kindergarten, but did not include earlier Head Start participation. Finally, a comparison of Head Start participants with other "Head Start-eligible, but not enrolled" children might have contributed to our understanding of the impact of Head Start on kindergarten readiness skills.

In terms of limitations, consideration should also be given to variables that were not included in this study and might have contributed variance to the significant relationships detected. The analysis included a variety of ecologically based resources to examine moderation effects, but many other potential moderators were not included in the scope of this study. For example, the variance contributed by differences in gender, number of children in household, age of mother at first birth, parent or child depression, and relationship quality between the parent and child were not included in this study.

Taken together, the findings of this study support the notion that kindergarten readiness may be understood as a function of resiliency, rooted in access to a variety of resources at multiple ecological levels. That is, resources exist within the child, family, community, and school contexts and serve as a buffer against the negative impact of socio-demographic risk. This understanding of an individual's resiliency in face of adversity can ultimately contribute to improvement in the development and implementation of social work programs and practices.

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