ABSTRACT

CAMPBELL, BERNICE VIRGINIA. Parental Involvement as an Explanation of Mathematics and Reading Achievement in Kindergartners. (Under the direction of Paul F. Bitting.)

The purpose of this study was to determine how well parent involvement, as a form of social capital, made up for familial differences in human (educational) and financial (income) capital thereby influencing reading and mathematics achievement scores. The sample consisted of 14952 kindergarten students from the Early Childhood Longitudinal Study Kindergarten Cohort of 1998. The research examined the effect of parent involvement on overall gains in mathematics and reading achievement scores. Using multiple regression analysis, level of parent involvement was found to have an influence on overall reading and mathematics gains, however the effect was weak. Predictor variables found to have an influence on overall reading gain were poverty level, gender, level of parent involvement, and SES. These variables explain 1.2% of the overall variance in reading gain scores. Predictor variables found to have an influence on overall mathematics gain were poverty level, child changed schools between rounds, level of parent involvement, and SES. These variables explain 1.3 % of the overall variance in mathematics gain scores.

PARENTAL INVOLVEMENT AS AN EXPLANATION OF MATHEMATICS AND READING ACHIEVEMENT IN KINDERGARTENERS

by

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DEDICATION

This work is dedicated to the memory of:

My father, William Manning Campbell, Jr. (1925-1993),

My sister, Laura Ann Campbell (1971-1989), and

My grandmothers, Evangeline Edgehill (1905-1998) and Emma Hill (1914-1998).

"Your love for me in life has allowed me to spread my wings and fly high and soar."

Also, a special dedication is extended to my number one fan, supporter, guide, and "Mommy", Georgianna Hill Campbell.

BIOGRAPHY

Bernice V. Campbell was born in Richmond, Virginia on October 26, 1972. She grew up in both Richmond and Rocky Mount, North Carolina where she graduated from Northern Nash High School. She earned Bachelor of Science and Master of Arts in Education degrees in Mathematics Education from North Carolina State University and Wake Forest University respectively.

After holding teaching positions in North Carolina and Georgia, in 2001, Ms. Campbell was employed by Family and Youth Inc. as a Mental Health Case Manager. Later, Ms. Campbell served as an Evaluation Specialist with the National Early Childhood Technical Assistance Center. She is currently employed as a Project Lead at EDSTAR, a private program evaluation firm in Raleigh, NC.

Ms. Campbell is the daughter of Georgianna H. Campbell and the late William M. Campbell, Jr. She has one faithful companion, Harley Davidson Campbell.

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To all of my family and friends, thank you for supporting my dream and making it your dream as well. Surely, a large, wonderful village raised and nurtured me.

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CHAPTER ONE

INTRODUCTION

The *No Child Left Behind Act* of 2001, federal legislation requiring American schools to meet yearly goals ensuring accountability and academic progress, has spurred the debate over school readiness and preparation for our youngest students as it measures the success of older children. Children are entering elementary school where they immediately begin preparations and training for standardized tests in hopes that when they reach third grade, the school year in which annual testing begins, they will be able to show academic progress. While teachers and schools adjust curriculums, schedules, and teacher requirements, parents are encouraged to volunteer at their child's school, attend school meetings with teachers and staff, and learn more about the *No Child Left Behind Act* (U. S. Department of Education, 2005). However, these suggestions made by the U. S. Department of Education may not be enough when past research has shown that parental education (especially that of the mother), maternal language, poverty status, single parent household, preschool experience, race-ethnicity, month of birth age, family annual income, and sex-gender are all factors that influence child development and can be used to forecast academic achievement (Zill, Collins, West, & Germino-Hausken, 1995). The academic achievement gap is the difference in knowledge and skills between groups and the term is most often used to highlight differences among racial groups.

BACKGROUND OF THE PROBLEM

Compelling research has been performed with regards to academic achievement gaps. The Rand Corporation sponsored one such study examining data from 1972-1992 in

mathematics among racial and ethnic groups (Berends, Lucas, Sullivan, & Briggs, 2005). The researchers reviewed test score trends between the 1970s and 1990s using National Assessment of Education Progress data (NAEP: 1972 and1992), the National Longitudinal Study Class of 1972 (NLS: 72), High School and Beyond of 1982 (HSB: 82), and the National Education Longitudinal Study of 1988 (NELS: 88). Test score trends showed African Americans and Hispanics are scoring higher in mathematics than they were decades ago. When examining relationships between test scores and racial group differences, research found African Americans and Hispanics were more likely to have lower standardized test scores, but progress has been made since 1992. Overall gaps have narrowed (African American-White and Hispanic-White) but "the average achievement gap between blacks and whites in national data often ranges between about 0.75 and 0.90 of a standard deviation on nationally representative tests" (Berends, Lucas, Sullivan, & Briggs, 2005, p. 24). Likewise, the gap for Hispanics and Whites is "0.60 of a standard deviation" (Berends, Lucas, Sullivan, & Briggs, 2005, p. 24). With regards to mathematics achievement, Rand Corporation researchers found differences for African American-White (standard deviation unit difference from 1.09 to.87 which translates to a reduction of 20%) and Hispanic-White differences (standard deviation unit difference from .88 to .60 which translates to a reduction of 32%) based on mathematics test score gaps between 1972 and 1992 (Berends, Lucas, Sullivan, & Briggs, 2005, p. xv).

Improvements in parent education levels and higher occupational status over the decades has improved economic status but in 1992 41% African American students lived in poverty compared to 19% of Whites (Berends, Lucas, Sullivan, & Briggs, 2005). Even though family conditions have improved for Hispanics students and their families, it has not

closed the gap between Hispanics and Whites with regards to achievement (Berends, Lucas, Sullivan & Briggs, 2005).

Similar research regarding the academic achievement gap in kindergarten and first grade students was performed using the Early Childhood Longitudinal Study of 1998 for kindergarten and first grade students (Chatterji, 2005). The ECLS-K data used multilevel regression coefficient parameter estimates to show achievement gaps of –1.55 between African Americans and Whites and -0.90 between Hispanics and Whites at kindergarten entry at significant levels of p of .001 and .05 respectively (Chatterji, 2005). However, by the time the students entered first grade, the gap was only significant for African Americas at –2.01 with a significance level of $p < .01$ (Chatterji, 2005). There was no evidence of a gender gap in academic achievement at the first grade level (Chatterji, 2005). With regards to school-level data, class size was found to negatively affect school achievement and was strongly influenced by time spent by parents reading to their children (Chatterji, 2005).

Studies have shown significant gaps in vocabulary knowledge as children enter school (American Educational Research Association, AERA, 2004), especially in African American and Hispanic children whose skills lag far behind Asian and White counterparts (Duncan & Magnuson, 2005). These gaps could be the result of social and ethnic inequalities (Duncan & Magnuson, 2005) and household incomes (Noguera, 2004). Families with higher incomes are able to access good health care, good schools, and safer living conditions (Duncan & Magnuson, 2005; Teachman, Pasch, & Carver, 1997). Children from poorer families are less prepared for school and have experienced far less rigorous learning opportunities (AERA, 2004; Noguera, 2004). In 2001, the U. S. Government responded by approving the *No Child Left Behind Act,* " designed to radically reform public schools across

the U. S. by raising academic standards and imposing new systems of accountability" (Noguera, 2004, p.1). Schools are now required to demonstrate that students are learning based on annual testing and completion of goals but this only holds the schools accountable. Where is the accountability for parents? What can parents do to help their children be successful? Parent income, parent education, race and socioeconomic status have been found by research to be predictors of academic success (Campbell, 1996; Gregory & Weinstein, 2004; Noguera, 2004;). Studies have shown that students with highly educated parents score higher on tests and perform better in school because their parents are more likely to intervene when there is a problem and have a greater knowledge about how to succeed in school (Duncan & Magnuson, 2005; Schmid, 2001; Teachman, et al, 1997; Useem, 1992). One purpose of education is to ensure children will graduate from high school, and that they will be healthy and productive citizens. Research supports this notion as well because "schooling leads to better employment and earnings, and indirectly increase household incomes" (Duncan & Magnuson, 2005, p.41). Parental involvement was found to be an important contributor to the success of African American children (Yan, 1999). Overall, "if parents involve themselves actively in their children's development and learning, then evidence shows that children achieve more" (Wade & Moore, 1998, p.2).

STATEMENT OF THE PROBLEM

Current research has shown that children are beginning kindergarten at varying academic levels (AERA, 2004; Zill & West, 2001) and at kindergarten entry African American and Hispanic children are already behind White students (Duncan & Magnuson, 2005; Haskins & Rouse, 2005). Naturally, parents are concerned and search for methods to enhance their child's educational outcomes. Families with higher incomes are able to

purchase the latest education materials and computer technology, to hire tutors or tutorial agencies, and to purchase homes in high-performing school districts (Duncan & Magnuson, 2005; Teachman, et al, 1997). Middle-class families have been shown to manage their children's academic careers more often that lower-class families (Epstein, in press; Kelly, 2004). Educated parents have been shown to become involved in the child's education as well as influence academic achievement (Duncan & Magnuson, 2005; Kelly, 2004; Schmid, 2001; Useem, 1992;Wang & Wildman, 1996). Likewise, involved parents have also been shown to influence the academic achievement of their children (Drummond & Stipek, 2004; Muller, 1998; Reynolds, 1992; Signer & Saldana, 2001; Useem, 1992, Wade & Moore, 1998). "Low-income families face particular problems in schooling that often make parent involvement less likely including their home resources and social support," which may decrease chances for those children to perform at their full potential in school (Reynolds, 1992, p.444). What remains for low-income families who do not have the financial or educational capital to influence academic performance? Obviously, children from low-income families achieve academically, but how did their parent's involvement with the school influence success? Could parental involvement in the school make up for lack on financial incomes and lower education and improve the child's chances at academic success?

DEFINITION OF TERMS

Terms used in the study are defined below:

Financial capital: Monetary resources that can be used to purchase goods and services (Klein, Starky & Wakely, 1999).

Human capital: The skills and capabilities that individuals have to learn and adapt to their environment (indicated by level of education) (Hofferth, Boisjoly & Duncan, 1998).

Item Response Theory scores: Scale scores that are criterion-referenced measures of status at a point in time (West, Harbin, Rathbun, & Park, 2005).

Parental involvement: Any interactions between a parent and child that many contribute to the child's development or to direct parent participation with a child's school in the interest of the child (Reynolds, 1992). An interaction between social capital and either human or financial capital (Muller, 1995).

Parent education: The highest level of schooling attained by the parents (Signer & Saldana, 2001).

Reciprocity: The process of exchange within a social relationship whereby 'goods and services' given by one party are repaid to that party by the party who received the original "goods and services', governed by norms (Stone, 2001).

Social capital: Relationships between: 1) parents and children and 2) parents and other individuals and institutions that affect children's development and are needed for the development of human capital (Hofferth, Boisjoly & Duncan, 1998).

Trust: The level of confidence that people have that others will act as they say or are expected to act, or that what they say is reliable (Productivity Commission, 2003).

OBJECTIVES OF THE STUDY

The main objective of this study is to determine the extent to which parent social interactions with the school, or parent involvement activities, influence mathematics and reading achievement in kindergarten.

Specific Objectives:

1. To discover the extent to which parent involvement influences mathematics and reading achievement.

2. To explore the extent to which social capital (in the form of parental involvement) can make up for deficiencies in financial and human capital in the family.
3. To compare level of parental involvement in regards to racial/ethnic groups based on fall and spring mathematics and reading assessments.

PURPOSE OF THE STUDY

The purpose of this study is to determine if familial differences in financial and human capital can be made up with social capital in the form of parent involvement with the child's school, thereby influencing the child's academic achievement in mathematics and reading over the kindergarten year.

THEORETICAL FRAMEWORK

In "Social Capital in the Creation of Human Capital," James Coleman (1988) defines three types of capital. Financial capital or physical capital is "created by changes in materials to form tools that facilitate production" and is tangible (Coleman, 1988, p. S100). For example, we work and earn an income in order to purchase goods and services for our survival. Human capital is "created by changes in persons that bring about skills and capabilities that make them able to act in new ways," such as the education one garners from attending college or learns while on the job (Coleman, 1988, p. S100). Social capital "comes about through changes in the relations among persons that facilitate action" (Coleman, 1988). Based on Coleman's assertions, one cannot attempt to explain outcomes merely by financial (income) and human (education, skills) capital, but that we must include social (resources gained through relationships) capital (Teachman, et al, 1997). Social capital allows one to examine the benefits and gains obtained through relationship exchanges in order to meet a goal or outcome. Coleman argues, "if the human capital possessed by parents is not

complemented by social capital embodied in family relations, it is irrelevant to the child's educational growth that the parent has a great deal, or a small amount, of human capital" (1988, p. S100). If parents are well-educated but expend this knowledge is other arenas, for example at work or with hobbies, instead of with their child; it makes no difference because the child suffers from lack of a relationship with the parent and does not benefit from his/her parent's knowledge. So one might raise the question that if a parent has a 4-year degree but lives outside of the home and does not have a relationship with the child, will the child benefit from the human capital of his/her parent?

Teachman, Pasch, and Carver (1997) described Coleman's assertion of intergenerational closure as a form of social capital in which relations between parents, children, and participants outside of the family form networks in which resources are exchanged through interactions and relationships. For example, one parent may have a daughter who is interested in space exploration and the parent's college friend currently works on experiments with NASA. The parent has used a relationship network to enable the child to experience space exploration. These relationships can be with the child's friends, other parents, community members, and the school. Coleman used intergenerational closure to explain the benefits of attending private Catholic school over public school. He found that students attending Catholic schools often were Catholic, also attended the Catholic church, and lived in neighborhoods close to the church, which presented many opportunities to expand relationships and resources available to the students; thus, in turn, influencing their academic performance (Coleman, 1988). Public school children could not benefit because students were scattered throughout neighborhoods and attended various religious activities. The basic theory is "that children who are embedded in richer, more consistent school-related

relationships will obtain more schooling," therefore providing a greater opportunity for success in academics and later in life (Teachman, et al, 1997, p.1344). Finally, Coleman (1988) suggests, "the person who invests the time and resources in building up this capital reaps its benefits in the form of a higher-paying job, more satisfying or higher work status" (p. S116). The current study aims to examine the role of social capital in the form of parent involvement during the Kindergarten year along with financial and human capital influences mathematics academic achievement.

RESEARCH QUESTIONS AND HYPOTHESES

This study will address the general question: "To what extent does parent involvement influence mathematics and reading academic achievement?" More specifically, the following questions will be used to define the problem:

1. Is there a correlation between parent involvement at school and mathematics and reading achievement in kindergarten?

H_{a1}: There is a significant relationship between parent involvement with the school and mathematics achievement in kindergarten.

H_{a2}: There is a significant relationship between parent involvement with the school and reading achievement in kindergarten

2. To what degree does level of parent involvement explain changes/gains in mathematics and reading achievement between the fall and spring semester?

H_{a3}: There is a significant difference in mathematics gain scores between fall and spring semester for varying levels of parent involvement.

H_{a4}: There is a significant difference in reading gain scores between fall and spring semester for varying levels of parent involvement.

SIGNIFICANCE OF THE STUDY

The current study is significant for use in policy and practice. An alternative method of examining the achievement gap in schools between racial groups can be used to provide policy makers additional information on how to address this issue. Schools will be able to inform parents on the advantages and disadvantages of parent involvement and to create programs to influence parent involvement. The literature regarding parent involvement as social capital and its influence on academic outcomes in the past, has researched students in middle school (Carbonaro, 1998; Hofferth, Boisjoly, & Duncan, 1998) and high school- level (Cleveland & Crosnoe, 2004; Coleman, 1988; Kelly, 2004; McNeal, 1999; Morgan & Sorenson, 1999) or both (Fan, 2001; Parcel & Dufur, 2001) but seldom elementary students (Lareau, 1987). Several studies used data from the 1988 National Education Longitudinal Study (Desimone, 1999; Fan, 2001; Kelly, 2004; McNeal, 1999; Morgan & Sorenson, 1999; Muller, 1995; Signer & Saldana, 2001; Teachman, Pasch, & Carver, 1997; Yan, 1999), which is decades old when new data is available from the National Center for Educational Statistics. The current study would provide an up-date on changes since the NELS: 88 research studies were completed. Alternative measures of social capital such as intergenerational closure (Cleveland & Crosnoe, 2004; Hofferth, Boisjoly, & Duncan, 1998) were often used. Persistent gaps in the literature include studies regarding elementary students and investigations of academic gains over time and parent involvement at school level and influence achievement. Few studies apply the concept of parent involvement as social capital.

SUMMARY AND ORGANIZATION OF THE STUDY

Chapter One described the basis and foundation of the study. It provided information

regarding social capital and one of its forms, parent involvement. Parent involvement, as social capital, is thought to influence academic outcomes for children. Chapter Two will provide a review of literature related to social capital and educational outcomes with regards to parent involvement, mathematics, and reading achievement. Chapter Three will describe the design of the study and methodology used. Chapter Four will present the findings of the statistical analysis. Chapter Five will provide discussion of the findings, implications, and suggestions for future research.

CHAPTER TWO

LITERATURE REVIEW

OVERVIEW

In this chapter, research on social capital, human capital, and parental involvement will be reviewed. First, social capital will be defined, explained, and followed by applications of the theory in education. Next, human capital will be defined, explained and its relationship to social capital will be assessed. Then, social capital, in the form of parental involvement, and coupled with human capital will be defined, explained, and followed by applications in past research. Finally, a discussion of kindergarten programs in the United States is presented.

SOCIAL CAPITAL

The theory of social capital originated in sociology and has made its way into education, economics, and political science (Portes, 1998). Recognition and usage of the term spread in the 1980s, as researchers began to use social capital as a supplementary term to financial and human capital (Harper, 2001). Financial capital refers to monetary capital or income. Human capital, which will be discussed in-depth later, refers to the skills, knowledge, and abilities gained through education, training, and experience.

Three researchers have been identified as experts on social capital theory. Pierre Bourdieu, a French sociologist, defined social capital with respect to the resources gained from memberships within an organization or group, social or formal networks and relationships one could rely on in accordance to their social class (Edwards, 2005;

Wikipedia, 2005). In *The Forms of Capital,* Bourdieu (2005) defined capital as "accumulated labor (in its materialized form or its incorporated, embodied form) which, when appropriated on a private, i.e., exclusive, basis by agents or groups of agents, enables them to appropriate social energy in the form of reified or living labor" (p.1). He acknowledged that capital "takes time to accumulate and which, as a potential capacity to produce profits and to reproduce itself in identical or expanded form" (Bourdieu, 2005, p. 1). How that capital is distributed has become the "structure of the social world" and he argued that one cannot explain the functioning and structure of the social world without a firm discussion of capital (Bourdieu, 2005, p.1). He described three forms of capital: economic, cultural and social capital. Economic capital was defined as "immediately and directly convertible into money and may be institutionalized in the forms of property rights" (Bourdieu, 2005, p.2). Cultural capital in its three states: embodied, objectified and institutionalized, were then illustrated. The embodied state of cultural capital was explained to be "long-lasting dispositions of the mind and body" such as culture and "can be acquired, to a varying extent, depending on the period, the society, and the social class, in the absence of any deliberate inculcation, and therefore quite unconsciously" (Bourdieu, 2005, p.3). In the objectified state, cultural capital took on "the form of cultural goods (pictures, books, dictionaries, instruments, machines, etc.), which are the trace or realization of theories or critiques of these theories, problematics, etc." (Bourdieu, 2005, p.5). In the institutionalized state, cultural capital presumed "the form of academic qualifications is one way of neutralizing some of the properties it derives from the fact that, being embodied, it has the same biological limits as its bearer" (Bourdieu, 2005, p.6).

Bourdieu (2005) defined social capital as "the aggregate of the actual or potential

resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition -- or in other words, to membership in a group which provides each of its members with the backing of the collectivity-owned capital, a credential which entitles them to credit, in the various senses of the word" (p.7). The amount of social capital one possesses is determined by the size of the social network one belongs to and that membership enables individuals to obtain profits and benefits (Bourdieu, 2005). Bourdieu further determined that social networks and relationships are a given in society in which investments are made to yield returns (Bourdieu, 2005).

Similar to Bourdieu, Robert Putnam described social capital in terms of group membership relying on "collective action in terms of economic and political development" not just form social class and familial relationships alone leading to various outcomes (Edwards, 2005; Stone, 2001). He believed "the core of the theory of social capital is extremely simple: social networks matter" (Putnam & Goss, 2002, p.6). Putnam and Goss argues the dense networks fostered in social interaction provide a give and take mentality in which people are willing to exchange ideas and resources without expecting immediate return because the deed will be reciprocated from the person who has been helped previously or from another person (Putnam & Goss, 2002). This level of trust ensures the cycle will not be broken. Putnam states that social capital has two forms, formal and informal. Formal capital exists in organized institutions with numerous resources such as school PTAs, labor unions, and the like which stipulate rules of membership, attendance, dues, ability to hold office and the like. Informal social capital can be as simple as those random individuals how come together for a pickup game of basketball in the park (Putnam & Goss, 2002).

Putnam argues that America is suffering economically due to the desertion of group pastimes, such as bowling, which brought people together creating social networks relying on trust which could later be used to exchange resources (Plagens, 2003; Pope, 2003). Two major components in Putnam's interpretation of social capital are bonding of homogenous groups who are similar and have restricted membership (ex. Mafia and gangs) and bridging of heterogeneous groups with differences that allow members to advance, for example, bowling leagues, church choirs and PTAs (Edwards, 2005; Wikipedia2, 2005,).

Putnam and Goss (2002) provide a brief history of the evolution of social capital and defines the theory as "social networks and the norms of reciprocity associated with them"(p.3). Social capital was termed as "that life which tends to make these tangible substances count for most in the daily lives of people: good will, fellowship, sympathy, and social intercourse among the individuals and families who make up a social unit" (Putnam & Goss, 2002, p.4). In the 1950s, a Canadian sociologist, John Seely, used the idea of social capital to explain upward mobility in society. By the 1960s, social capital began to be used in discussing informal social ties between neighbors and whom they unite for collective action. Glenn Loury, in the 1970s, used social capital to "highlight the inaccessibility of wider social ties to African Americans as one of the most insidious legacies of slavery and segregation" (Putnam & Goss, 2002, p.5). In 1984, German economist Ekkehart Schlicht applied social capital theory when he began "to underline the economic value of organizations and moral order" (Putnam & Goss, 2002, p.5). Not until James Coleman, in the late 1980s, was social capital drawn on "to highlight the social context of education" (Putnam & Goss, 2002, p.5).

In *Social Capital in the Creation of Human Capital*, James Coleman (1988) defined social capital as the acquisition of resources available to satisfy one's interest by networking.

In this article, he became the first to use empirical data to represent the relationship between social capital and drop out rates (World Bank, 2005). Coleman argued that social capital relied on trust and social environment where reciprocity was necessary and one was bound by obligation (Coleman, 1988). Here social capital emanates from relationships between families, friends, and community members who used the social capital gained from these relationships to increase their own economic situation (Edwards, 2005; Lin, 2000). In education, Coleman believed social capital could be used, along with financial and human capital, to explain enhanced educational outcomes (Coleman, 1988; Edwards, 2005; Noguera, 2004). Intergenerational closure, a form of social capital, pertains "to the dense networks that may arise among adults and children in some social settings" (Cleveland & Crosnoe, 2004, p.176). Robert Cosnoe (2004) conducted a study using the concept of intergenerational closure existing when parents are familiar with the parents of their child's friends with regards to how genetic traits influence the degree of intergenerational closure in adolescents. Similarly, William Carbonaro (1998) examined the effect intergenerational closure had on educational outcomes.

Social capital, as defined by the author, refers to the resources gained through relationships between family, friends and the community, which enables an exchange of resources with the expectation those resources will be reciprocated at a later time. The author recognizes there are several definitions of social capital, however, the term's use in this study is focused on its use in the field of education based on Coleman's interpretation of social capital.

The World Bank Group (2005) lists seven sources of social capital: family, community, firms, civil society, public sector, ethnicity, and gender. Family social capital,

the main source, stems from the relationships between parents and their children (Parcel & Dufur, 2001; World Bank, 2005). In a research study conducted using the National Longitudinal Survey of Youth, family social capital was found to be important in mathematics achievement (Parcel & Dufur, 2001). The next four sources of social capital could be grouped together as sources from outside of the family. Communities, firms, civic society, and the public sector include relationships among friends, neighbors, organization members, and institutions. The last two sources, ethnicity and gender, would exist within homogeneous groups such as the social networks between Native Americans in the United States and women with breast cancer. Research has shown social capital to have positive impacts.

Effective use of social capital theory results in positive implications for group members. Collective action enables members to benefit from knowledge dispersed throughout the group along with perks such as discounts due to membership (Productivity Commission, 2003). Association with the group also promotes social networks and social behavior, which promotes cooperation (Productivity Commission, 2003).

Although social capital has made its way into discussions in various fields, opponents caution against the negative implications of the theory. Group solidarity, such as elitist groups which bar members based on social class or income level, creates discriminatory associations blocking benefits for the poor and other disenfranchised groups (Edwards, 2005; Lin, 2000; Pope, 2003; Portes, 1998; Productivity Commission, 2003). Because group membership requires acceptance of group norms, individual growth is hampered when one must support the goals of the group, thus the level of the norms shift downward (Pope, 2003; Portes, 1998; Productivity Commission, 2003). In other words, when one must accept the

norms or rules of others, it stifles creativity and growth, thus shifting creativity and growth downward.

Social capital lacks the tangibility of financial capital and the measurable level of education and experience of human capital, therefore levels of social capital become difficult to measure (Pope, 2003; Portes, 1998). Also, due to the ever-changing definition of social capital, based on which discipline studied and which function is selected, measures of social capital fluctuate as well (Grootaert, 1998). Research suggests that current research on social capital examine and clearly define the possessors of social capital, the sources of social capital and the resources themselves to effectively consider the topic (Portes, 1998).

In education, social capital has been used to examine the relationships between parents, children, and school officials to determine its effect on achievement. Coleman (1988) examined social capital and its role in creating human capital. He argued one could not fully understand or interpret educational outcomes without considering social capital along with human and financial capital. Each must be in place to aid educational attainment for youth because social relationships within and outside of the family aid in creating human capital for the child. Social capital is seen as “a filter through which [the] financial and human capital of parents is transmitted to and used by children” (Teachman, Pasch, & Carver, 1997, p.1345). Coleman investigated a form of social capital, intergenerational closure, and its effect on dropping out of school. Within a dataset that included public, Catholic, and other private schools, dropout rates were lower for Catholic schools at 3.4% followed by 14.4% for public schools and 11.9% for other private schools. He determined Catholic school students had the benefits of the social networks of attending a school within their neighborhood, a part of their religious background, and serving students like

themselves. Hence, social capital had benefited these students in that they were least likely to drop out of school (Coleman, 1988).

Studies following from Coleman's interpretation of social capital examined the relationship between financial and human capital and social capital's effect, by level, on graduation rates (Teachman, et al, 1997), amount of schooling completed (Hofferth, Boisjoly, & Duncan, 1998), fourth grade reading and mathematics achievement (Goddard, 2003), and high school mathematics achievement (Carbonaro, 1998, Morgan & Sorenson, 1999). Studies found higher levels of social capital reduced the likelihood of dropping out of school (Teachman, et al, 1997). Family income was found to be highly associated with children completing more years of schooling (Hofferth, et al, 1998). The effect of social capital on reading and mathematics achievement was found to be modest and limited to these two subjects for fourth grade students (Goddard, 2003). However, social capital, in the form of intergenerational closure, was found to have positive effects on mathematics but not reading achievement for high school students (Carbonaro, 1998). Later, intergenerational closure was found capable of explaining mathematics achievement but not Catholic school differences in dropout rates, as Coleman had suggested earlier (Morgan & Sorenson, 1999). How community levels of social capital could predict individual student achievement was studied and results indicated that community social capital has little effect on student achievement (Israel, Beaulieu, & Hartless, 2001). Few studies have been conducted on the subject of social capital and its influence on achievement providing a gap in the literature on studies pertaining to kindergarten students, mathematics and reading achievement, and social capital use in the school.

In the current study, social capital will be analyzed to determine its effect on the

creation of human capital and mathematics and reading achievement in kindergarten children. As has been noted above, previous studies have focused on specific forms of social capital, such as intergenerational closure, older students, or outcomes like dropout rates and graduation. This study will use each form of capital to determine its effect on achievement as well as determine if social capital makes up for lower levels of financial and human capital. Human capital is directly linked to social capital as parents use their social relationships with their children to pass on knowledge gained from education and experience to help build favorable educational outcomes for their children. Therefore, a discussion of human capital follows.

HUMAN CAPITAL

Human capital theory was developed in the 1950s by economists Theodore Schultz and Gary Becker (Kaufman, 1986). Human capital theory emanates from the analysis of education and training as used to further acquisition of resources such as income and earnings. In *Human Capital*, Becker (1993) discussed how the human capital revolution began. Pioneers of human capital, Ted Schultz, Jacob Mincer, Milton Friedman, and Sherwin Roen, were researchers with the University of Chicago (Becker, 1993). Some examples of human capital are education (formal schooling), training (on-the-job), migration, and searches for jobs and health care. Expenditures in one area yield specific earnings in the long run. In other words, early investments will yield favorable outcomes later such as a college education that cannot be later separated from the individual (Becker, 1993). Becker observed that investments in education and training lead to higher income levels over time (Becker, 1993).

Human capital within the family, an informal form of capital, has been shown to

influence investment opportunities. Families effect knowledge, skills, values, and the habits of children. These effects are positive or negative (Becker, 1993). When families pass on the love of reading from parent to child, especially when the parent reads a book to the child from birth and later encourages the child to read on their own, is an example of the positive impact of human capital within the family. Becker provided an example of the negative impact of human capital in the family. He explained that when a parent abuses a child by physically abusing them it could cause lasting effects and damage to the child's emotional development (Becker, 1993).

When considering parent income, Becker (1993) noted that the earnings of parents and eventual earnings of children are strongly related when parents are poorer. In evidence, richer parents are able to pay for training to help further the economic pursuits of their children while the poorer parents would like to lend the money but do not have it to lend or would require it be returned later for their own use. This leads to children from poorer families being unable to afford or unwilling to pay for training, thus making it hard for them to increase their earnings. However, some families are hindered in the amount of money they can give their children for training due to the number of children in the home. The more children, the lower the amount of money available to be lent; this decreases the number of children who become educated. This was particularly true in African American, Mexican, and Puerto Rican families (Becker, 1993).

Coleman discussed how parental human capital, parental education, can be used along with social capital to create human capital in children (Coleman, 1988). In other words, the education and social networks of parents can be used to generate education and learning in their offspring. For example, consider a father has been working with an international firm

that has encouraged him to learn Spanish to facilitate communication with Mexican clients. His daughter is also studying Spanish in fifth grade but has experienced difficulty with the subject. The father sets aside time each afternoon to practice naming items in the home in Spanish and English. Hence, he supports a social relationship with his daughter as well as helps her with her studying, using his human capital from work to create human capital for the child through their social relationship, i.e. social capital.

However benefits are only enjoyed when parents share their human capital with their children (Coleman, 1988; Muller, 1995; World Bank, 2005). If parents are absent, do not interact with their children, or expend their human capital at work, children suffer. Coleman reasoned, "if the human capital possessed by parents is not complemented by social capital embodied in family relations, it is irrelevant to the child's educational growth that the parent has a great deal, or a small amount, of human capital" (Coleman, 1988, p. S110). In the current study, it will be examined whether social capital can indeed make up for differences in levels of human and financial capital. Early analysis of the Early Childhood Longitudinal Study- Kindergarten Cohort (ECLS-K) of 1998 indicates income matters in achievement (Duncan & Magnuson, 2005)). Level of income is influenced by level of parent education (Signer & Saldana, 2001), meaning the more education the higher the income. However, as we have seen above, Coleman suggests it doesn't matter how much education parents possess if it's not used to enhance the learning of the child (Coleman, 1988). Research found that lower achieving students with more educated parents have higher academic aspirations (Signer & Saldana, 2001) and the social capital lessen the impact of family economic status and parental education (World Bank, 2005).

The community of "education fosters social capital-rich networks" (World Bank,

2005, p.1). In education, social capital is produced as students interact with each other and the school staff, discover information about community activities, and learn to be productive citizens (World Bank, 2005).

We have discussed how parents should use both social and human capital simultaneously to foster achievement in their children. Now we will further define how parental influence is accomplished.

PARENTAL INVOLVEMENT

Joyce Epstein (2001), a leading researcher in parent involvement and family-school partnerships, defines parent involvement as "twelve techniques that teachers used to organize parental assistance at home, including reading, discussions, informal learning games, formal contracts, drill and practice of basic skills, and other monitoring or tutoring activities" (p. 181). Other definitions of parental involvement consider interactions at home and school that contribute to the educational development of the child (Reynolds, 1992). Thus, parent involvement can be summarized as the activities parents participate in at home, at school and in the community to enhance educational opportunities for their children. Involvement may include but is not limited to attendance at school events, teacher conferences, and volunteering and participating in parent-teacher association functions (Nord & West, 2001). At home, it can involve helping with homework, purchasing educational materials or tutorial services, or just being aware of the child's progress in school (Epstein, Simon & Salinas, 1997; Kelly, 2004).

Over the years, Epstein has continued her work regarding parent involvement in the schools, specifically the ways in which parent involvement programs can aid in parent participation and partnership with schools. She contends that if teachers and schools do not

form partnerships with parents and families, they run the risk of not developing the whole child (Epstein, 2001). Epstein further asserts that a gap exists in teacher knowledge and preparation when it comes to parent involvement and working productively with parents (Epstein, 2001). Additionally, she offers three perspectives on family-school relations based on level of responsibility between the family and school that currently guide research and thinking regarding relationships between families and schools. Separate responsibility between the school and family "assumes that school bureaucracies and family organizations are directed, respectively, by educators and parents whose different goals, roles, and responsibilities are best fulfilled independently" (Epstein, 2001, p.22). Shared responsibility between the school and family "emphasize the coordination, cooperation, and complementarily of the school and family and encourage communication and collaboration between institutions" (Epstein, 2001, p.22). Finally, sequential responsibilities of families and schools "emphasize the critical stages of parents' and teachers' contributions to child development" (Epstein, 2001, p.22).

Parent involvement has become such an issue in American education that the National Parent Teacher Association (NPTA), a national association of parents concerned with the education of students, has created *National Standards for Parent/Family Involvement Programs* a booklet "to promote meaningful and parent and family participation, to raise awareness regarding the components of effective programs, and to provide guidelines for schools that wish to evaluate and improve their programs" (NPTA, 2005, p.1). The NPTA suggests the following activities to address parent involvement in student education: communicating, parenting, student learning, volunteering, school decision-making and advocacy, and collaborating with the community (NPTA, 2005).

In 1987, Epstein (Sanders & Epstein, 2004) created a framework of the five types of parent involvement and added a sixth in 1995. The six types of parent or family involvement are: parenting, communicating, volunteering, learning at home, decision making and collaborating with the community (Epstein & Salinas, 2004; Lockwood, 1998; Sanders & Epstein, 2004). Epstein believes "children whose needs are extraordinary, strong community and family partnerships ensure that youth will be linked appropriately to services that will help them grow, learn, and develop" (Lockwood, 1998, p.2). Parent involvement may start at home but ends up being a task for the school as well as the community at-large.

Kathy Christie (2005) ordered parent involvement types by level of importance noting that all types were not equal. She believed that when schools and parents work together as partners, accountability is met at all levels in the effort to improve academic achievement for students. Level one, volunteering, described as giving of time and/or money, is on the bottom rung. Christie (2005) notes the helpfulness of volunteering but believed other activities are more significant. She also notes that the lower levels are those that are easiest to measure. The rest in order from least significant to most significant are as follows: level 2- attending conferences and activities, level 3- serving as a parent representative, level 4- at home monitoring, making sure that homework is completed, the child has a quiet place to study with the appropriate materials and that they arrive at school on time, and level 5- parents maintaining high expectations for the child (Christie, 2005). She also notes that the lower levels are those that are easiest to measure.

In *Parents and Schooling in the 1990s*, Erwin Flaxman (1992) stated there are three basic forms of parent participation. Direct parent involvement comes about when parents make a concerted effort to choose the child's school, participate in school activities,

participate in educational decision-making, and use educational information to monitor education. Parent training programs are a second form of participation; however, Flaxman contends they these programs do not always reach the parents who need it the most. Some parents may not be interested in improving their parenting skills.

Parent involvement has faced parent-related obstacles and school-related obstacles. Some parent-related obstacles include time available to participate, cultural differences, SES, and changing family structures (Constantino, 2003). Some families may not have the time to participate due to work schedules, lack of baby sitter for younger children while they attend school programs, and the lack of available income to contribute to school fundraising. Cultural differences inhibit some families from parent involvement activities because they may see the school as intimidating and interaction with the school does not fit into those cultural norms (Constantino, 2003).

Research regarding parent involvement and various outcomes has been performed in the field of education. Parent involvement has been shown to influence track placement (Kelly, 2004), high school grades (Fehrmann, Keith & Reimers, 1987; Fan, 2001), later school competence (Miedel & Reynolds, 1999), reading and math achievement (Reynolds, 1992), mathematics achievement separately (Desimone, 1999; Muller, 1998; Wang & Wildman, 1996). Lareau (1987) found "the level of parental involvement is linked to the class position of the parents and to the social cultural resources that social class yields in American society" (p.81). In regards to race and ethnicity, parent involvement was shown to explain less of the achievement of Asian students than of White, Hispanic, Black and low- or middle-income students (Drummond & Stipek, 2004). Overall, parent involvement has been shown to increase attendance, increase test scores, grades and graduation rates, decrease the

drop-out rate, create positive attitudes and high levels of self-esteem in students and in communication between students and their parents, decrease suspension rates, decrease use of alcohol and drugs, increase enrollment in post-secondary education programs, and increase parent and community support for the school (Constantino, 2003; NPTA, 2005). Parents benefit from creation of a positive attitude regarding the school, higher self-esteem, improved decision-making skills, and improved communication with child and teachers (NPTA, 2005). Teachers benefit from greater morale, improved teaching effectiveness, increased job satisfaction, and improved communication with parents, students and the community (NPTA, 2005).

However, not all research suggests parent involvement has a positive impact on achievement. EdSource, an educational research firm in California, found involvement and support from parents had a lower standard deviation when compared with other academic performance indices (API) of the study (Williams, et. al, 2005). Results from the study indicate, "that schools that report more strongly that they have implemented more of the practices included in each of the four domains have, on average, higher API scores than schools that report fewer of the practices" (Williams, et. al, 2005, p.17). Of the API's, implementing a coherent, standards-based instructional program, 17.6; ensuring availability of instructional resources, 16.9; using assessment data to improve student achievement and instruction, 16.7; prioritizing student achievement, 16.3; enforcing high expectations for student behavior, 12.3, encouraging teacher collaboration and professional development, 11.0; involving and supporting parents, 9.9, had the smallest standard deviation and least influence on achievement (Williams, et. al, 2005).

This study will examine parent involvement during the kindergarten year; therefore a

discussion of parent involvement in kindergarten is warranted. Nicolas Zill (1999) examined the issue of parent involvement in kindergarten by using data from the National Household Education Survey follow-up of 1996. In 1996, 80% of parents reported having attended a school meeting, open house, back-to-school night or PTA meeting. Parents also participated in class-level and school events (63%) or volunteered and served on a committee (50%) (Zill, 1999). Overall, the level of parent involvement in kindergarten is lower than parent involvement for grades first through fifth (Zill, 1999). Parents with lower incomes were least likely to participate in parent involvement activities than parent with higher income levels, 17% from low-income families as opposed to 38% for middle and high-income families (Zill, 1999). Of those families whose children attended private schools, parent involvement was 85% compared with all public school parents at 64%.

In studies where social capital in the form of parental involvement was considered, research demonstrated similar results. Parental involvement was shown to influence achievement for African American students (Yan, 1999), students from high socioeconomic situations (McNeal, 1999), students with strong emotional ties to parents (Crosnoe, 2004), number of school years completed (Hofferth, et al, 1998), and mathematics achievement (Muller, 1995).

Similar studies have been performed noting the effects of parental involvement on achievement. However, these studies were performed using the National Education Longitudinal Study of 1988 (NELS: 88), which survey children in eighth grade on up. The current study uses data gathered using the 1998 Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K), beginning with children who attended Kindergarten in 1998. The most recent wave of data collection for ECLS-K was completed on fifth-graders in 2004.

The current study aims to fills gaps in the literature of changes that have occurred since the early studies using NELS: 88 data.

KINDERGARTEN

Nearly all children in the U.S. participate in either half-day of full-day kindergarten. In 1998, 98% of all first and second graders had attended kindergarten (Zill, 1999). However, these programs are not uniform in the length of class day or concepts and topics learned. Differences exist from private to public school programs. Differences also are found in the level of preparation for kindergarten as some students attend early childhood programs such as Head Start, Pre-kindergarten, and other preschool programs, therefore varying the level of skill as the child enters kindergarten (Zill, 1999).

Elizabeth Garue (1999) discussed who is taught in kindergarten, how they are taught and what they are taught. In order for children to enter school, they must be deemed ready by some entity, the school, parent, etc. The most common determinant of school readiness is age at entry. Policy makers have decided what is the appropriate age, which varies from 4-6 years old in the U.S., for children to enter school and in the past the assumption has been the student is at kindergarten entry, the better able they will be able to participate in schooling (Garue, 1999). Other interventions are used to determine readiness. Some parents have delayed kindergarten entry when they believe the child is not ready, and they would like to prevent failure so early on in the education of the student (Garue, 1999). Schools have sanctioned students they believe are not prepared for school by mandating transitional programs or retaining the student (Garue, 1999).

Once students are selected they are grouped and distributed into classrooms. Students have been grouped according to likeness and difference. Homogeneous groups, with similar

characteristics, and heterogeneous groups, with different characteristics, are grouped by what the school believes is the best method for instructing the students. Grouping students by age has been supported because it is “most likely related to developmental approaches to teaching that assume that children’s growth and learning are patterned and highly correlated to age” (Garue, 1999, p.113). With-in class groupings are indicated by ability grouping of students at the classroom level (Garue, 1999). Along with classroom placement, class size has been a huge issue in the education of elementary school students. Garue (1999) stated that small groups of students were able to advance further than students from larger classrooms and classrooms in which there were 15 students or fewer yielded “impressive increases in academic achievement as well as improvement in students’ and teachers’ attitudes, regardless of the level of schooling examined” (p.116).

Most students in the United States attend kindergarten programs that are full- or half-day programs within private or public schools. Initially, kindergarten was a half-day program developed to introduce students to school, its rules and structure, and it focused on play and socialization instead of on learning (Garue, 1999). Today, kindergarten has evolved to include much more. Programs are varied in that they differ by number of children, type of curriculum, and goals. Research has suggested that a good quality, full-day kindergarten program has positive effects for students (Garue, 1999).

The type of curriculum content used in kindergarten classrooms has been the focus of much debate. Early on, schools focused on supporting the social development of students but this has become the job of most preschool programs (Garue, 1999). Thus, kindergarten programs have changed their focus to academics and subject matter councils such as the National Council of Teachers of Mathematics have established standards to which students

should be held accountable (Garue, 1999, NCTM, 2005). Garue discussed three knowledge bases for a strong curriculum for teaching kindergarten students. The first dimension, knowledge of development, specified, “knowledge of the generally expected patterns of development in content domain provides a concrete way to orient decision making when constructing curriculum” (Garue, 1999, p.132). The second domain, standards of learning, required goals for students or “standards of learning developed by communities that represent aspirations for child learning” (Garue, 1999, p.133). The third dimension, assessment as ways of knowing, mandated “the bridge between the expectations for child development and the goals for child learning using assessment (Garue, 1999, p.134). As with older students, the need for assessments and testing is highly debated for younger students. Tests have begun to be used “to make decisions about enrollment, retention, promotion, incentives for children or teachers, or other tangible rewards or punishments” (Meisels, 1999, p.60). Research has shown the negative impact of the school readiness assessments. In one such study, “retention and special education placements increased in the primary grades in step with a increase in accountability pressures” for 12 elementary schools in New York (Meisels, 1999, p.60). Another study noted the lack of instructional time, limited curricular offerings, and decreased ability of teachers to teach content for elementary schools in Arizona (Meisels, 1999). Parents have attempted to avoid failure for their children by “holding them out of school until they are older than the state’s kindergarten entrance grade” (p.61), therefore bypassing entrance assessments (Meisels, 1999). However, this is not the best plan because research has shown “that chronological age is not nearly as powerful an influence on the developmental progress of children as schooling” (Meisels, 1999, p.61). Nevertheless, the appropriateness of assessments and testing for K-12 students has remained a hot topic in American education. In

the past, psychologists and educators have urged “states that use large-scale testing to make high-stakes educational decisions should ensure the tests are aligned with state curricula and provide a fair measure of students' learning” (Carpenter, 2001, p.1). Testing has been used to diagnose educational difficulties and provide interventions; psychologists advocated for the use of “scientifically valid tools in designing and implementing trustworthy tests” (Carpenter, 2001, p.1) and to determine whether they require placement in special education programs or even to determine eligibility for graduation (Carpenter, 2001; Smith 2001). Carpenter further states should be assured that “tests be used only for the purpose for which they were scientifically validated, high-stakes decisions not be made using the results of only one test, tests are aligned with states' curriculum standards, so that teachers can prepare students to succeed, tests measure only the academic domain of interest, without unwittingly emphasizing extraneous factors, tests are sensitive to school quality differences” (Carpenter, 2001, p.2). Psychologists recommend states consult the *Standards for Educational and Psychological Testing* written by the American Psychological Association, the American Educational Research Association, and the National Council on Measurement in Education and the effects of testing and assessments be evaluated regularly (Carpenter, 2001). Nonetheless, critics continue to debate testing concerns. Opponents are concerned that tests “if designed or implemented inappropriately, may draw an inaccurate picture of student achievement and unfairly jeopardize students or schools that are making genuine efforts to improve” (Carpenter, 2001, p.3). Other critics worried “that overreliance on testing might paradoxically compromise educational quality by leading teachers to teach to the test, focusing their classes on narrow test-taking strategies rather on than on broader, conceptual material” (Carpenter, 2001, p.3). Still others worried that tests would not treat all students

fairly and equally (Carpenter, 2001; Smith, 2001).

Research regarding testing has focused on middle and high school level students even as professionals in the field support the notion that testing has advantages and disadvantages for all students. In one such study, Amrein and Berliner (2002) analyzed the impact of testing on high school students with data from the National Assessment of Educational Progress, NAEP, for states with various tests of achievement. The study found of the states with high-stakes testing (28 states), only 5 showed gains in improvement after implementation of the tests and graduation exams (Amrein & Berliner, 2002). Also, six out of the 28 states showed decreased academic achievement when compared with the rest of the United States (Amrein & Berliner, 2002). Further, results from the NAEP indicated mathematics achievement scores decreased for 67% of the states with regards to fourth grade mathematics after the implementation of high-stakes tests (Amrein & Berliner, 2002). Sixty-three percent of the states showed an increase in 8th grade mathematics and 50% showed an increase in fourth grade reading scores (Amrein & Berliner, 2002). Results from the ACT, SAT, and AP exams were not as positive. Decreases in the ACT, SAT, and AP exam performance were noted after implementation of high-stakes testing at 67%, 67%, and 57% respectively (Amrein & Berliner, 2002). Criticisms regarding the Amrein and Berliner study began with their selection of the “high-stakes” testing states, which were states that used tests to make decision regarding students, and is diluted “by a too-zealous use of changes in exclusion rates as a basis for eliminating states from consideration” (Braun, 2004, p.32). After the Amrein and Berliner study, Henry Braun conducted a similar study using 4th and 8th grade NAEP date to analyze state performance using all states (Braun, 2004). Braun found support for high-stakes testing based on relative gains the states made over time (2004). Slight support for

high-stakes testing was shown within particular cohorts (4th grade 1992- 8th grade 1996, and 4th grade 1996 – 8th grade 2000) (Braun, 2004).

In summary, the literature review examined the role of social capital theory and human capital theory when applied to educational achievement. Here parents and their actions, specifically parental involvement with the child's school, were reviewed. Past research has been used to show the connection between social capital and achievement and increases in the human capital of family. However, parent involvement has several layers and further analysis must be done to attempt to explain their influence on academic achievement.

CHAPTER THREE

METHODOLOGY

RESEARCH DESIGN

Data from the Early Childhood Longitudinal Study- Kindergarten Cohort (ECLS-K) will be used to analyze the extent to which parent involvement influences achievement. During the Fall and Spring semesters of the 1998-1999 school year, the kindergartners were given mathematics and reading direct assessments.

An ex post facto research design will be used to determine the extent to which parental involvement influences achievement. The “after the fact” notion of examining how parent involvement explains achievement is termed ex post facto research design, a non-experimental research design. The current study will compare overall gains in Mathematics and Reading IRT scores between the Fall and Spring semesters “after the fact”, for children whose parents became involved with their child’s school over the course of the Kindergarten year. Ex post facto is often used when the researcher would like to discover causes for the behavior being exhibited by the research participants (Watson, 2005).

Several conditions must exist for use of ex post facto research design. The independent variables “must be variables that cannot be manipulated” such as categorical variables; gender, race, and parenting style; or such as continuous variables, GPA, age, and intelligence (Johnson & Christensen, 2005). The variables X and Y must be related, time must have elapsed for the variable Y to occur, and the relationship between X and Y must not be due to a confounding extraneous, or spurious variable (Johnson & Christensen, 2005).

Use of a non-experimental design, such as ex post facto, creates risks. As stated above, ex post fact design prohibits the use of variables that can be manipulated. Ethical issues also inhibit the manipulation of variables, such as race, gender, etc. Some studies are better served when experimental data is collected, so one must always determine the best research design when one attempts to determine differences/relationships between variables (Burns, 2005). Some advantages of the non-experimental ex post facto research design are that it is similar to correlational analysis, establishes a differential effect, and allows the researcher more control (Burns, 2005) Some disadvantages of ex post facto research design are "the lack of control on variables, unable to draw causal linkage, and the problem with alternative hypotheses" (Burns, 2005, p.18). Ex post facto design was selected due to the nature of the study. Because the author is "starting from the cause to establish the effects" (p.100) or in other words starting from the level of parent interaction with the school and using that interaction to determine possible effect on mathematics and reading achievement, an ex post facto design is appropriate for this study (Kumar, 2005).

In the current study, the ECLS-K students will be compared based on level of parent involvement regarding mathematics and reading direct assessment scores. Responses from the parent questionnaire will be used to determine level of parent involvement. Eight variables measured parent involvement: contacted school, attended open house, attended PTA, attended other school event, attended parent advisory group meeting, attend parent-teacher conference, volunteered and participated in fundraising events. These variables will be used to create a composite variable for level of parent involvement. Overall gains made, between the Fall and Spring semesters, will be measured using the Mathematics IRT scores from the Mathematics Assessment. The difference in Mathematics IRT scores for Fall and

Spring semester will be the dependent variable. Similarly, Reading IRT scores from the Reading Assessment will be used to determine gains made during the Fall and Spring semesters as a dependent variable. The analysis for reading and mathematics will be performed separately, creating a model for each individually. From the cognitive assessments, overall performance scores routing scale scores (raw score-number correct) and standardized T scores were collected. Targeted scores were able to assess the child's ability to acquire knowledge and skills specific to the test (West, et al, 2005). There were two types of target scores proficiency level scores that indicated pass/fail and proficiency probability level scores, which were also IRT based scores.

Item response theory (IRT) scores are scale scores, ranging from 0-1, and are used to measure overall performance. IRT scores are interpreted as the number of test items the student would get correct if given the entire test battery (West, Harbin, Rathbun, & Park, 2005). Assessment administration was completed on a two-stage design. First, the students were given a set of items and depending on their performance a second set of items were administered based on their stage-one performance. IRT scores can be used to "estimate the score the child would have achieved if all of the items in all of the test forms had been administered" and because IRT scores are criterion-referenced, they measure status at a point in time (West, et al, 2005). IRT scores are also "useful in identifying cross-sectional differences among subgroups in overall achievement and provide a summary measure of achievement and as a longitudinal measure of growth" (West, et al, 2005, Section 4 p.14). The Independent or predictor variables are made up of variables measuring human capital, financial capital, and social capital and will be discussed below.

Weights were used in the ECLS-K to "indicate the relative strength of an observation,

where each observation is counted equally" (West, et al, 2005, Section 6 p.1). The weights were created to "compensate for not collecting data from the entire population and for using a complex research design" as the one used in ECLS-K (West, et al, 2005). The weights were created to produce national estimates as they "adjust[s] for unequal selection probabilities at the school and child levels and adjust for school, child, teacher, and parent non-response" (West, Denton & Reaney, 2001, p.29). Those populations that were oversampled will have smaller weight values (Hahs-Vaughn, 2005). In the first stage of the study design, weights were assigned to the primary sampling units (PSUs). At the second stage or the study design, schools within the PSUs were assigned weights (West, Denton & Reaney, 2001). Without use of the weights, the researcher would not be able to make accurate estimates to the representative population from the sample population nor would one be able to present accurate standard errors and parameter estimates (Hahs-Vaughn, 2005). In her 2005 work, Debbie Hahs-Vaughn suggests using a design-based approach when the researcher treats the sample as one group (Hahs-Vaughn, 2005). The design-based approach will be used in the current study because the students will be reviewed overall and not partitioned into subgroups based on similar characteristics. The design-based approach, an aggregated approach, uses one level of analysis to determine the best fit of the overall model can be used with regression or ANOVA, and allows the researcher to correct for bias created from use of homogeneous clusters (Hahs-Vaughn, 2005).

To appropriately approximate the estimates, two steps must be performed. First, the weights must be normalized "so standard error is based on actual sample size rather than population size" (West, et al, 2005, Section 6 p.10). The second step is to use design effect (DEFF) to account for complex sampling design (West, et al, 2005). There are three types of

weights in the ECLS-K data set, raw weights, relative or normalized weights, and design effect adjusted weights. When the raw weights add up they are equal to the population size "N" (Hahs-Vaughn, 2005). The relative or normalized weights are the raw weights divided by the mean of the raw weights and are equal to the sample size "n" (Hahs-Vaughn, 2005). If this design of the ECLS-K was a simple random sample design, we would be fine with regards to finding the standard error estimates. The ECLS-K is a complex sampling design and requires design effects to create accurate standard error estimates (Hahs-Vaughn, 2005). Design effect adjusted weights are used to adjust for degree of dependence among the observations because of the multistage or clustered sampling design (Hahs-Vaughn, 2005).

PARTICIPANTS

In 1998, approximately 22,625 students were surveyed for the ECLS-K. These students were beginning Kindergarten in about 1000 kindergarten programs in the United States. The children were enrolled in full-day and half-day kindergarten programs from public and private schools. All ethnic groups and socioeconomic backgrounds were represented. Oversampling "of Asian children, private kindergartens and private school kindergartners" and Pacific Islander children was performed to intentionally include students from these populations (West, et al, 2000, p.5).

There were two phases of sampling for the ECLS-K. In the first phase, primary sampling units, PSUs, were created. Each PSU represents counties or groups of counties within the United States. One hundred PSUs were selected from over 1000 kindergarten programs and within each PSU, individual schools were selected at the second phase. From each school approximately 23 students were selected for the study (West, et al, 2000).

Data collection began in September 1998. Separate rounds of data were collected for

the Fall semester, September – December 1998, and Spring semester, March – July 2000. Although data have been collected through fifth grade for these students, only kindergarten, the base year, data will be used for the current study. Throughout the study, "data [were] collected from children, their families, their early care and education providers, teachers and schools" (West, et al, 2005, Section 1 p.2).

INSTRUMENTATION

Five types of data collection methods were used for the ECLS-K: direct and indirect assessments of the children, parent interviews, teacher questionnaires, school administrator questionnaires, and school records. The school administrator questionnaire was only collected during the Spring semester (West, et al, 2005). For the current study, the student Math Direct Assessment, Reading Direct Assessment and Parent Questionnaire instruments will be used and are described below.

The ECLS-K assessments were designed to measure children's status in cognitive and non-cognitive domains at different points in time, growth in critical cognitive domains, overall knowledge and skills, proficiency in particular skills and skill sets, physical characteristics, and aspects of development that are influenced by school (West, et al, 2005). Three areas are addressed by the direct assessments: cognitive knowledge and skills, socio-emotional, and physical/motor. The cognitive knowledge and skills portion gathered information in the subject areas of reading, mathematics, and general knowledge. The socio-emotional and physical and motor sections will not be used in this study (West, et al, 2005). The National Center for Education Statistics has not released the mathematics and reading assessments for public review; however items descriptions are available. The mathematics assessment contained items in the following categories: number sense and properties;

measurement; geometry and spatial relations; data analysis, statistics, and probability; and patterns, algebra, and functions (West, et al, 2005). Specific test items required students to be familiar with number and shape, relative size, ordinality and sequence, addition and subtraction, multiplication and division, place value, and rate/measurement (West, et al, 2005). These items correspond to Pre-kindergarten (Pre-K) through Grade 2 standards that were developed by the National Council of Teachers of Mathematics (NCTM) in their Principles and Standards for School Mathematics. Standards were created for all grades Pre-K – 12. The mathematics direct assessment contains items from three of the Pre-K- 2 mathematics standards. They are listed below:

1. Understand numbers, ways of representing numbers, relationships among numbers, and number systems;

• count with understanding and recognize "how many" in sets of objects;

• use multiple models to develop initial understandings of place value and the base-ten number system;

• develop understanding of the relative position and magnitude of whole numbers and of ordinal and cardinal numbers and their connections;

• develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers;

• connect number words and numerals to the quantities they represent, using various physical models and representations;

• understand and represent commonly used fractions, such as 1/4, 1/3, and ½;

2. Understand meanings of operations and how they relate to one another; understand various meanings of addition and subtraction of whole numbers and the relationship

between the two operations;

• understand the effects of adding and subtracting whole numbers;

• understand situations that entail multiplication and division, such as equal groupings of objects and sharing equally;

3. Understand patterns, relations, and functions; sort, classify, and order objects by size, number, and other properties;

• recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns and translate from one representation to another;

• analyze how both repeating and growing patterns are generated (NCTM, 2005).

The reading assessment contained items from these categories: basic skills, vocabulary, and comprehension which required students be familiar with letter recognition, beginning sounds, ending sounds, sight words, words in context, literal inference, extrapolation, and evaluation (West, et al, 2005). The National Council of Teachers of English have also created twelve standards for English and Language Arts. These standards are broad in comparison to the standards created by NCTM. The standard, which corresponds with the reading direct assessment, is listed below:

1. Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes (NCTE, 2005).

The ECLS-K was made-up of a two-stage design where students were given an initial set of questions and based on their performance a second set of questions were then given. In this manner, their ability level was assessed quickly For the current study, IRT scores will be used in the analysis because they assess the student's overall performance, are

useful in correlational analysis, and are beneficial when measuring gains made over time as explained above in the research design (West, et al, 2005).

Procedures were very specific when administering the assessments. Each student was questioned individually between 50-70 minutes. With the aid of a computer-assisted personal interview (CAPI), students were able to quickly respond to assessments regarding reading, mathematics, and general knowledge (West, et al, 2000). When school records indicated the student's primary language was not English, the Oral Language Development Scale (OLDS) screened those students and allowed administrators determine if an alternative assessment be distributed (West, et al, 2000)

Parent questionnaires were completed using both CAPI and computer-assisted telephone interviewing (CATI). Most interviews were accomplished by CATI. Parents responded to questions regarding "demographics, family structure, parent involvement, home educational activities, child care experience, child health, parental education and employment status and child's social skills and behaviors" (West, et al, 2000, p.66)

Various methods were used to provide evidence of the validity of ECLS-K assessments. "A review of national and state performance standards, comparison with state and commercial assessments, the judgments of curriculum experts and teachers all provided input to test specifications" (West, et al, 2005, p.3-36). Scores from the standard instrument were compared with the reading and mathematics scores to create the resulting item pool (West, et al, 2005). Kindergarten teachers reviewed the test items and recommended changes.

Reliability for each instrument was computed for each subject area test. "For the IRT-based scores, the reliability of the overall ability estimate, theta, is based on the variance of repeated estimates of theta. The reliabilities for the instruments ranged from .88 to .96.

Reliability of the IRT-based scores from mathematics was .92, for Fall kindergarten, and .93, for Spring kindergarten. Reliability of the IRT-based scores from reading was .93, for Fall kindergarten, and .95, for Spring kindergarten" (West, et al, 2005, p. 3-23).

SELECTION OF VARIABLES

During the Fall and Spring semesters of their Kindergarten year, participants of the ECLS-K were given a mathematics assessment. The difference in the Fall and Spring mathematics assessment IRT scores will be the dependent variable. A variable will be created representing the difference between the Fall and Spring mathematics IRT scores. From the ECLS-K data file, the variables for these terms are C1MSCALE and C2MSCALE. A second dependent variable will be created representing the difference between Fall and Spring and reading IRT scores. From the ECLS-K data file, the variables for these terms are C1RSCALE and C2RSCALE. DV1 represents the difference between the Fall and Spring semester (C2MSCALE- C1MSCALE), or gains made over the kindergarten year in mathematics. DV2 represents the difference between the Fall and Spring semester (C2RSCALE- C1RSACLE), or gains made over the kindergarten year in reading. Since gains in knowledge are expected throughout the school year, Spring assessment scores are expected to be higher than in the Fall.

Statistical analysts von Eye and Schuster (1998) suggested that one use statistical arguments to justify variable selection when predictions are the aim of the research study and to use theoretical arguments to direct variable selection when explanation is the aim of the research study. The research aim of the current study is to explain the influence of parent involvement on mathematics and reading achievement for kindergartners. Therefore, references in the past research have been used in the selection of variables. Past research has

shown that parental education, especially that of the mother, maternal language, poverty status, single mother, single parent household, preschool experience, race-ethnicity, month of birth age, family annual income, and sex-gender are all factors that influence child development and can be used to forecast academic achievement (Zill, Collins, West & Germino-Hausken, 1995). Research studies in the area of parent involvement and achievement consistently used race/ethnicity, gender, parent education (composite of both or maternal education), public/private school, and SES (Carbonaro, 1998; Crosnoe, 2004; Desimone, 1999; Fehrmann, et al, 1987; Morgan & Sorenson, 1999; Muller, 1995; Reynolds, 1992). These variables will be used as control variables since they are expected to predict achievement. Parent involvement is also a variable, however not a control, because the researcher desires to determine its influence on mathematics and reading achievement, even though research has shown parent involvement to influence achievement (Wade & Moore, 1998).

There are eight parent involvement items from the Spring Parent Questionnaire that related specifically to parent involvement activities with the school. Reliability was computed to assess whether the eight parent involvement items were reliable measures of parent involvement. Cronbach's alpha was computed and the alpha for the eight items was .693. Correlation coefficients were computed among the five parent involvement items. A p – value of less than .01, two-tailed, was required for significance. The results of the correlational analyses presented in Table 1 show that all of the correlations were statistically significant and were less than or equal to .361.

Table 1 **Correlations for Parent Involvement Items**

	Contact School	Attend Open House	Attend PTA	Attend Advisory Group	Attend Parent/Teacher Conference	Attend School Event	Volunteered	Fundraising
Contact School	1	.087**	.080**	.100**	.105**	.114**	.119**	.065**
Attend Open House	.087**	1	.263**	.190**	.242**	.297**	.281**	.204**
Attend PTA	.080**	.263**	1	.288**	.191**	.248**	.290**	.247**
Attend Advisory Group	.100**	.190**	.288**	1	.267**	.266**	.284**	.219**
Attend Parent/Teacher Conference	.105**	.242**	.191**	.267**	1	.306**	.304**	.241**
Attend School Event	.114**	.297**	.248**	.266**	.306**	1	.361**	.260**
Volunteered	.119**	.281**	.290**	.284**	.304**	.361**	1	.314**
Fundraising	.065**	.204**	.247**	.219**	.241**	.260**	.314**	1

**Correlation is significant at the 0.01 level (2-tailed).

Principal Component Analysis, factor analysis, was conducted to assess the underlying structure for the eight parent involvement items from the Spring parent questionnaire. Factor analysis is most often used to “simple complex sets of data” (Kline, 2004, p.3). The Kaiser rule and scree plot were used to determine the number of factors to rotate. Kasier’s rule suggested components with an eigenvalue greater than one be dropped (Garson, 2004). Based on the rule, one component would be dropped. The scree plot, figure 1, supported the results of Kaiser’s rule as well. The scree plot’s slope changes at component two, therefore component one would be dropped. The first component was extracted and the factor accounted for 33% of the variance. Since only one component was extracted, the solution could not be rotated. The component extracted from the analysis was parent contacted the school. Table 2 displays the items and the factor loadings for the unrotated component matrix. Kline (1994) states that if “the aim of factor analysis is to explain and account for the observed correlations … this means that the factors must be interpreted and

identified" (p.56). For this reason, an unrotated matrix is not useful, therefore the eight parent involvement activity items were kept in the analysis.

"Factor loadings are the correlations of a variable with a factor" where loadings with a value of 0.6 or greater are considered high (Kline, 1994, p.5). Factor loadings with values greater than 0.3 are considered to be moderately high. In table 2, attended a school event and volunteered have high factor loadings while attended open house, attended PTA, attended advisory group, attended parent/teacher conference, and fundraising have moderately high factor loadings. A general rule of thumb for determining if a factor loading is significant, is if the value of the loading is 0.3 or greater (Kline, 1994). Therefore, all of the factor loadings in the analysis are significant except for parent contacted the school but is not rejected because it is close to 0.3.

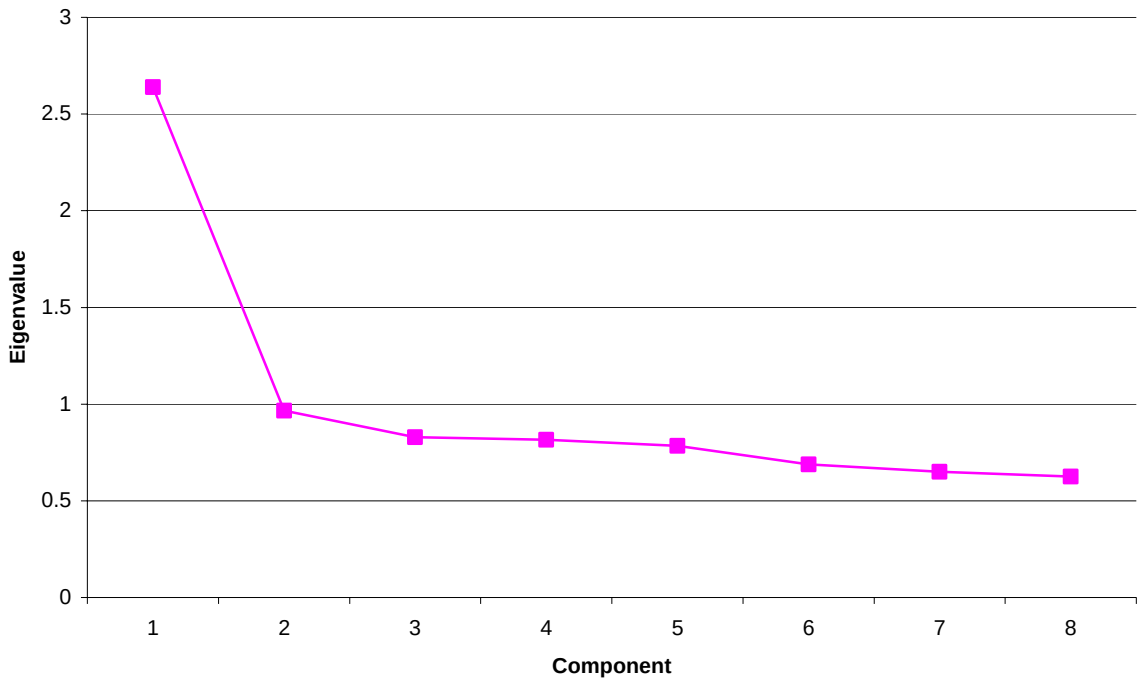

Figure 1 **Scree Plot**

Table 2 **Component Matrix**

	Component
Contact School	.250
Attend Open House	.569
Attend PTA	.582
Attend Advisory Group	.582
Attend Parent/Teacher Conference	.596
Attend School Event	.655
Volunteered	.684
Fundraising	.569

The validity of the eight parent involvement items was determined from the results of the factor analysis. Component 1, parent contacted school, explained 33% of the total variance, while the remaining components had explained variances between 7.8-12.1%. Construct validity "is determined by ascertaining the contribution of each construct to the total variance observed in a phenomenon" (Kumar, 2005, p. 155). Kumar (2005) suggested "the greater variance attributable to the constructs, the higher the validity of the instrument" because "total variance is an indication of the degree of validity of the instrument" (p.156).

The non-interpretable results of the factor analysis may have resulted from the nature of the data. Factor analysis is best used with interval or ratio data, whereas the parent involvement items were all dichotomous and nominal. Andrew Comfrey and Howard Lee (1992) suggest avoiding categorical data because the "correlations in these cases are less reliable and subject to distortions" (p.214) and "such variables will tend to show up with small loadings in any factor analysis of common factor variance because they do not contribute much common factor variance in most cases" (p.225). Another concern is the inability of the component matrix to be rotated. Garson notes that "rotation serves to make the output more understandable and is usually necessary to facilitate the interpretation of

factors" (2004, p. 7), however only one component was extracted and the matrix could not be rotated. Comfrey and Lee (1992) also noted concern when the component matrix fails to rotate as a common error in the use of factor analysis. Also, the initial correlation matrix for the eight parent involvement items had very low correlations, which suggests they would not load on the same factor.

Because these variables have already been determined to predict achievement, they may possibly correlate highly with each other. When variables correlate perfectly, with a value of 1, then the variables are said to be have prefect multicollinearity, an issue in multiple regression analysis (Kahane, 2001). High multicollinearity exists when a variable is perfectly correlated with another variable; their relationship is said to be linear and their coefficient of determination, "R", is +1.00, which indicates the independent variables have a similar influence or power over the dependent variable (Kahane, 2001). In this case, it is difficult to determine which variable has a stronger influence over the dependent variable. Statistical research suggests dropping one of the independent variables and noting the adjusted R^2; however, this strategy prohibits accurate parameter estimates of the contribution of the dropped variable (Kahane, 2001; von Eye & Schuster, 1998). The best solution is to use the largest possible sample size, to ensure you have more observations (cases) than independent variables, and to ensure that by dropping an independent variable only subtle changes in the results will occur (Kahane, 2001).

Categories of the independent variables are listed below (C* indicates a control variable):

Table 3 **Measures of Social Capital (parent involvement)**

Variable name	Description	Scale of measurement	Rationale for use
P2PARINT	Parent contacted school this year	Nominal (yes/no)	Measures parent involvement
P2ATTENB	Attended open house at school	Nominal (yes/no)	Measures parent involvement
P2ATTENP	Attended PTA meeting	Nominal (yes/no)	Measures parent involvement
P2ATTENS	Attended School Event	Nominal (yes/no)	Measures parent involvement
P2PARADV	Attended parent advisory group meeting	Nominal (yes/no)	Measures parent involvement
P2ARAGRP	Attended parent teacher conference	Nominal (yes/no)	Measures parent involvement
P2VOLUNT	Acted as a school volunteer	Nominal (yes/no)	Measures parent involvement
P2FUNDRS	Participated in School Fundraising activity	Nominal (yes/no)	Measures parent involvement

Table 4 **Other Independent Variables**

Variable Name	Description	Scale of measurement	Rationale for use
Measures of Human Capital			
WKSESQ5 (C*)	Composite SES measure, categorical data 1 = First quintile (lowest SES) 2 = Second quintile 3 = Third quintile 4 = Fourth quintile 5 = Fifth quintile (highest SES)	Ordinal	Comparison
WKMOMED (C*)	Mother's highest level of education 1 = 8th grade or below 2 = 9th to 12th grade 3 = High school diploma/equivalent 4 = Voc/Tech program 5 = Some college 6 = Bachelor's degree 7 = Graduate/professional school/no degree 8 = Master's degree 9 = Doctorate or professional degree	Nominal	
WKPOVERTY	Composite poverty level 1 = Below poverty threshold 2 = At or above poverty threshold	Nominal	Comparison
Measures of Financial Capital			
P2INCOME (C*)	Total household income	Continuous	Comparison
Other Controls			
GENDER (C*)	Child composite gender, Male =1, Female=2	Nominal	Comparison
RACE (C*)	Child composite race, 1 = White, non-Hispanic 2 = Black or African American, non-Hispanic 3 = Hispanic, race specified 4 = Hispanic, no race specified 5 = Asian 6 = Native Hawaiian or other Pacific Islander 7 = American Indian or Alaskan Native 8 = More than 1 race, non-Hispanic	Nominal	Comparison
S2KPUPRI (C*)	Public or Private School 1 = Public 2 = Private	Nominal	Comparison
Limiting Variables			
P1FIRKDG	First time Kindergartner, Yes=1, No=2	Nominal	Comparison
FKCHGSCH	Child changed schools between round 1 and round 2, 0 = No change 1 = Changed schools	Nominal	Comparison
Weight			
BYCOMWO	Base Year Child-level weight for the full sample (Fall and Spring semesters)	Continuous	Create Estimates

The final model will represent all independent variables with parameter estimates indicating influence on the dependent variables (mathematics and reading achievement) while controlling for race, gender, school type, maternal education, total family income, and SES.

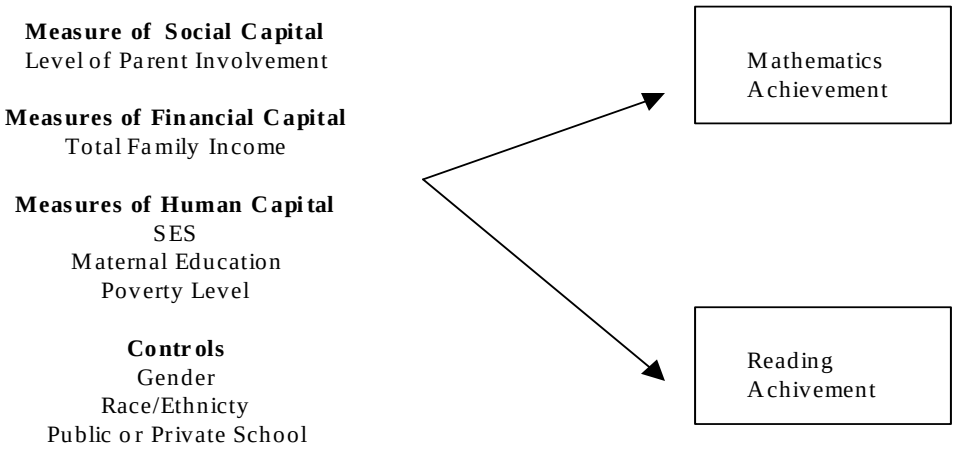

Figure 2 **Conceptual Model of Mathematics and Reading Achievement**

DATA ANALYSIS

Data regarding the ECLS-K base year were obtained from the National Center for Education Statistics by way of a compact disc. The disc contains data files on each study participant as well as an electronic codebook, which defines each variable and item. From this disc, the researcher has selected the participants for this study. The nationally representative sample of Kindergarten students is approximately 22,000, which includes students who were retained. Therefore, only first time Kindergartners, who did not change schools during the 1998-1999 school year, will be included in the current study. Due to the

setup of the data files, several variables are requisite components of the variable list. Those variables are child's identification number, gender, race, assessment age, first-time kindergartner, socioeconomic status, public or private school, and kindergarten program type (whether morning, afternoon, or all day). After the researcher has selected all variable names, the information will be transferred from the ECLS-K disc into SPSS for data analysis.

Multiple regression analysis will be used to determine 1) how the variables are related to each other, 2) the strength of the relationship, 3) how much predictive power the variables have over the dependent variables, and 4) what individual contribution one or more of the variables has after controlling for one or more covariates (Urdan, 2005). Two models will be created using mathematics and readings as the dependent variables. Separate analyses will be done using multiple regression, the best statistical analysis for this study. The dependent variables, difference in mathematics and reading assessment IRT scores, are continuous, one criterion for use of multiple regression analysis. The independent variables are continuous and categorical. The continuous variables can be entered into the model as they are. However, the categorical or nominal variables must first be recoded as dummy variables since we are using multiple regression.

Stepwise regression, a form of multiple regression, will be used to analyze the variables. In stepwise regression, the variables are entered into the model based on their correlation with the dependent variable. The independent variable with the highest correlation with the dependent variable is entered into the model first. It repeats this procedure again until it finds the variable with the second highest correlation, followed by the third and the fourth and so on. As more variables are added to the model R^2 increases and the hope is to be able to explain all of the variance in the model. Only those variables that are

statistically significant will remain in the model. Statistical significance is based on the predetermined p-value (Hopkins, 2000)

Descriptive statistics, as well as correlation, will examine relationships between the dependent and all independent variables. Ultimately, the regression equation will be used to predict gains over time in mathematics and reading using human, financial, and social capital variables. The regression equation will establish how varying levels of human, financial, and social capital describe individual mathematics achievement, in hopes of showing whether social capital can make up for lower levels of financial and human capital. Social capital variables will determine level of parental involvement with the school and its effect on mathematics achievement. Finally, an inquiry into the relationship between overall achievement gains, parental involvement, and ethnic/racial group will be explained.

RESEARCH QUESTIONS AND HYPOTHESES

The current study aims to determine the effect parent involvement has on the child's mathematics achievement. This study will address the general question: "To what extent does parent involvement influence academic achievement?" The following questions will further define the problem:

1. Is there a correlation between parent involvement at school (social capital) and mathematics and reading achievement in kindergarten?

2 To what degree does level of parent involvement explain changes/gains in mathematics and reading achievement between the fall and spring semester?

From these questions, hypotheses were formed.

H_{a1}: There is a significant relationship between parent involvement with the school and mathematics achievement in kindergarten.

H_{a2}: There is a significant relationship between parent involvement with the school and reading achievement in kindergarten

H_{a3}: There is a significant difference in mathematics gain scores between fall and spring semester for varying levels of parent involvement.

H_{a4}: There is a significant difference in reading gain scores between fall and spring semester for varying levels of parent involvement.

LIMITATIONS OF THE STUDY

The limitations of this study design are as follows:

1. Data for this study was drawn from pre-existing data from the 1998 ECLS-K. Analysis was limited to actual data only. Based on response type, missing data values may be recoded.

2. Multiple regression requires all relevant variables be included in the model, specifically those found to be significantly significant for accurate depiction of the model (Garson, 2004).

3. Multiple regression assumes an absence of multicollinearity (strong correlation between variables) and the presence of homoscedasticity (even dispersion of residuals around the estimated dependent variable) (Garson, 2004). Therefore, all outliers will be removed from the data before analysis and correlation of variables will be tested before analysis is performed.

4. Multiple regression assumes a linear relationship between variables; thus linearity must be examined before analysis.

5. Students with missing data will be dealt with based on suggestions from the ECLS-K codebook.

6. Students migrate in and out schools throughout the year causing a problem in attrition. The study population has been adjusted to include only students who remained in the same school

for the base year. Only 3% of the sample and 7% of the population of ECLS-K students changed schools after Fall Kindergarten (West, Harbin, Rathbun, & Park, 2005). The author will deal with attrition by including only students who remained in the same school for their Kindergarten year.

7. Data was collected from very young children and their parents, which may cause a maturation effect due to the length of time between the pretest and posttest.

8. The same mathematics and reading assessments were used during the Fall and Spring with the students. Parent interviews were completed at the same time. However, not all students were assessed at the same time. Fall data collections were made between September and December of 1998 and Spring data collections were made between March and July of 1999. ECLS-K Database Training Seminar instructors indicated that, "children assessed earlier tend to have lower achievement status at a given time point than those assessed later in the data collection period," and that "children with more elapsed time between assessments tend to have greater achievement gains than those with shorter elapsed" (West, et al, 2005, Section 2 p.8). Considerations will be made with regards to elapsed time between assessments when discussing the results of this study.

The author acknowledges there are several different types of parent involvement and operational definitions of social capital. In the current research, parent involvement in the form of interactions with the child's school will be examined. Parent involvement as a form of social capital will be based on James Coleman's (1988) analysis of social capital.

The following are limitations of using the ECLS-K dataset:

1. Due to the specific types and amount of data collected, the ECLS-K is limited to and appropriate for certain research questions.

2. ECLS-K only represents the population and cannot be generalized to the overall population of US kindergartners.

3. The information collected by parent interviews reflects actual information but has not been verified (parent involvement variables, income, education, etc.).

4. The data are released in a CD-Rom format and can be transferred into the following statistical software packages, SPSS, SAS, and STATA quite easily.

5. Only certain measures of parent involvement can be made based in the information collected regarding parent involvement since few items referred to parent involvement.

CHAPTER FOUR

RESULTS

The purpose of this study is to determine if familial differences in financial and human capital can be made up with social capital in the form of parent involvement with the child's school, thereby influencing the child's academic achievement in mathematics and reading over the kindergarten year. This chapter presents the results of the analysis described in the methods section (Chapter Three) of this study. In this chapter findings from the analyses are reported and explained based on the research questions prescribed in chapter one of this study.

DESCRIPTIVE STATISTICS

The study sample consisted of 14,952 kindergarten participants, where 50.2% (N= 7502) were male and 49.8% (N= 7450) were female. Figure 3 shows the frequencies and percentages for race. Approximately 61.8% of the participants were White, 15.2% were African American, 6.6% were Hispanic-Race Specified, 6.1% were Hispanic- Race Not Specified, 4.5% were Asian, 1.1% were Native Hawaiian or Other Pacific Islander, 1.8% were American Indian or Alaska Native, and 2.8% were more than one race. A small percentage (.1%) did not report a racial affiliation.

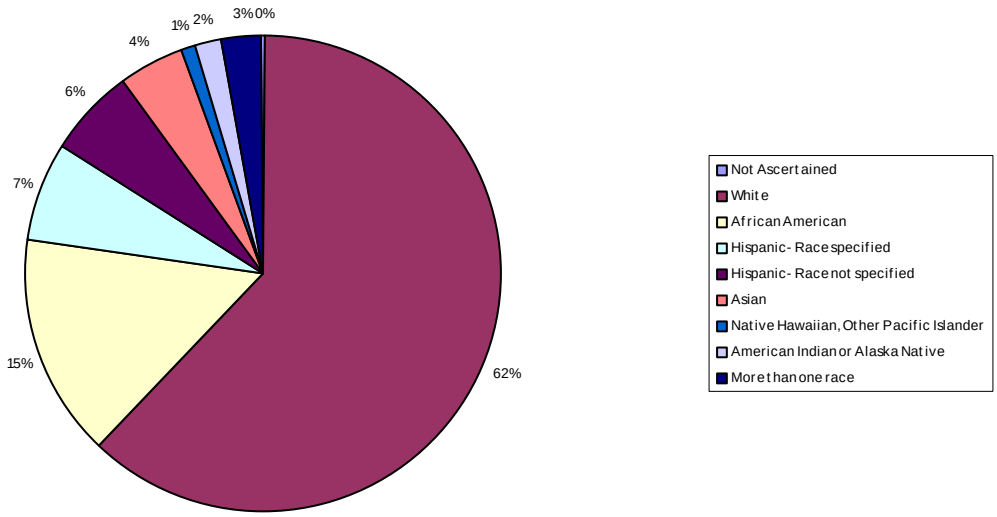

Figure 3 Percentage of Kindergarten Participants in each Ethnic Group

Table 5 reports the frequencies and percentages associated with mother's education level. The most frequently occurring education level was high school diploma, and the least occurring education level was not applicable (not listed). The next lowest occurring education levels were doctorate or professional degree and 8th grade or below.

Table 5 **Frequency Table for Mother's Education Level.**

	Frequency	Percent
8th Grade or Below	279	1.9
9th –12th Grade	1188	7.9
High School Diploma/Equivalent	4449	29.8
Voc/Tech Program	806	5.4
Some College	4194	28.0
Bachelor's Degree	2518	16.8
Graduate/Professional School- No degree	303	2.0
Master's Degree	730	4.9
Doctorate or Professional Degree	258	1.7
Not Applicable	227	1.5

Figure 4 displays the frequency and percentage of the categorical SES measure where the quintiles represent lowest SES (first quintile) up to the highest SES (fifth quintile).

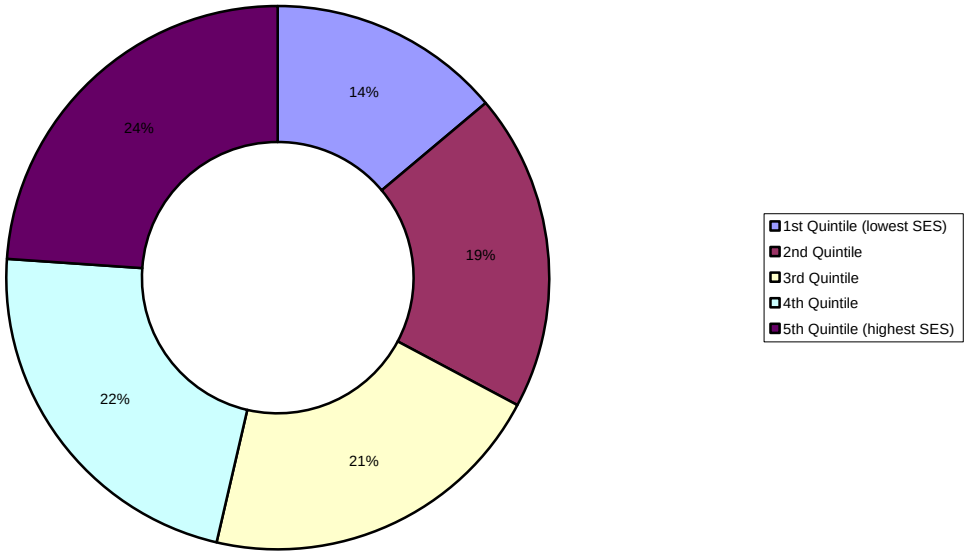

Figure 4 Frequency of the Categorical SES Measure

Approximately 83% of the participants lived at or above the poverty threshold, while 17% lived below the poverty threshold. Poverty thresholds are based on household size. A family was classified a below the poverty threshold if they fell below the household income for their family size. The following thresholds per household size were used for the families in 1998: $10,973 for family of 2, $13,001 for a family of 3, $16,655 for a family of 4, $19682 for a family of 5, $22,227 for a family of 6, $25,188 for a family of 7, $28,023 for a family of 8, and $33,073 for family of 9 or more (U. S. Department of Education, 2001, pp.7-12). Table 6 shows poverty level frequency and percentage data. Likewise, 77.3% of the

participants attended public school and 22.7% attended private school. Table 7 shows the frequency and percentages for public or private school attendance.

Table 6 **Frequency Table for Poverty Level.**

	Frequency	Percent
Below Poverty Threshold	2548	17.0
At or Above Poverty Threshold	12404	83.0

Table 7 **Frequency Table for Public or Private School Attendance**

	Frequency	Percent
Public	11558	77.3
Private	3394	22.7

Level of parent involvement represents the sum of parent involvement activities each participant's parents participated in during the kindergarten year. The most frequently occurring level of parent involvement activities was 5 activities for 3,175 participants. The least frequently occurring level of parent involvement activities was 8 activities for 312 participants. The highest percentage of parent involvement activities was 21.2% for 5 activities and 2.1% for 8 activities, the lowest percentage of parent involvement activities. Figure 5 represents the frequency for level of parent involvement.

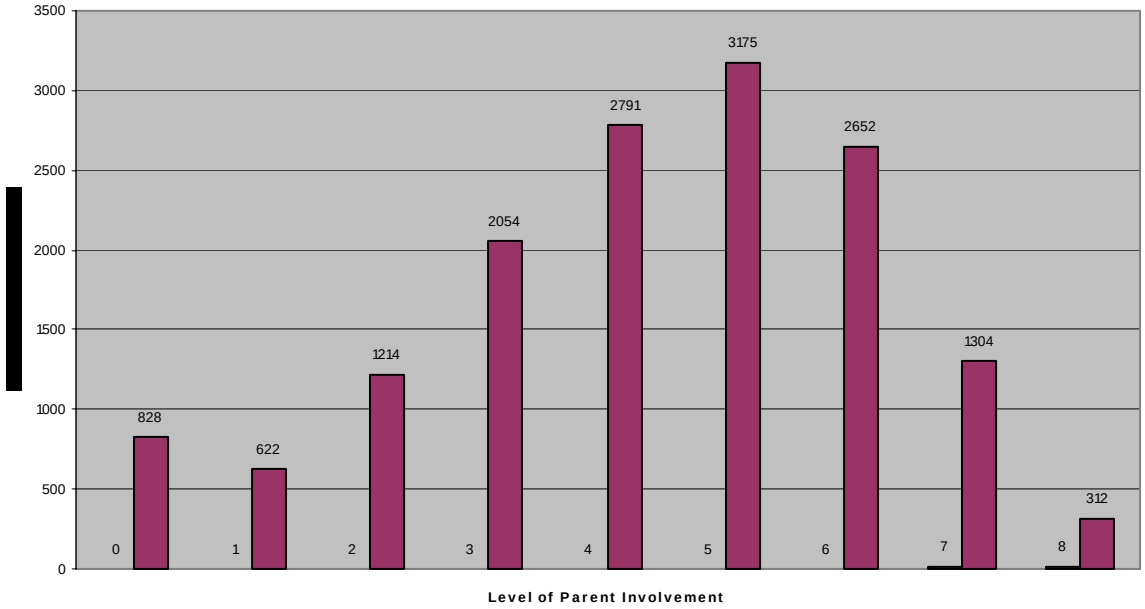

Figure 5 Frequency of Level of Parent Involvement

Finally, Table 8 presents descriptive statistics, including measures of central tendency, measures of dispersion, value counts, and skewness, for the independent and dependent variables of the study. Household income had 597 missing values, however those cases were not dropped from the sample as the researcher planned to determine whether the variable should be included in the final model based on the results of the statistical analysis.

Table 8 **Descriptive Statistics**

	Gender	Race	Mom's Ed Level	SES	Poverty Level	Public/Private School	Income	Math Gain	Reading Gain	Level of PI
Valid N	14952	14952	14952	14952	14952	14952	14952	14952	14952	14952
Missing N	0	0	0	0	0	0	597	0	0	0
Mean	1.5	1.99	4.37	3.23	1.83	1.23	42737.5546	8.2929	10.0835	4.2661
Std. Error of Mean	0.004	0.014	0.015	0.011	0.003	0.003	329.92918	0.014135	0.0504	0.01572
Std. Dev.	1	1.767	1.837	1.369	0.376	0.419	39529.5917	5.05562	6.16247	1.92161
Variance	0.25	3.122	3.374	1.874	0.141	0.175	1562588619	25.559	37.976	3.693
Min	1	-9	-1	1	1	1	-9	-26.76	-21.44	0
Max	2	8	9	5	2	2	150000	38.07	43.63	8

FINDINGS

Multiple regression analysis, cross-tabulation, and correlation were conducted. To test for the effect of several independent variables' influence on the two dependent variables, overall mathematics and reading achievement gain scores during the fall and spring semester of the kindergarten year, a multiple regression analysis was conducted. Cross-tabulation or

crosstabs procedure was executed to show “the number of cases falling into each combination of the categories of two or more variables” (Muijs, 2004, p. 114) and Chi-square test of independence and Cramer’s V measured significance and effect size respectively. Correlation coefficients were computed to determine the relationships between all of the variables. The results of these analyses are presented by research question.

RESEARCH QUESTION 1

Is there a correlation between parent involvement at school (social capital) and mathematics and reading achievement in kindergarten?

Correlation coefficients were computed among the variables level of parent involvement, fall and spring mathematics IRT scores, and fall and spring reading IRT scores. The results of the nonparametric correlational analyses revealed that all of the variables were significant at the 0.01 level (2-tailed). Particularly, as level of parent involvement increases IRT scores for fall and spring reading and mathematics increases. Spearman’s rho is used here because of the comparison of an ordinal variable, level of parent involvement, with several continuous variables, IRT scores. These results are shown in Table 9. These results suggest rejection of the null hypotheses that there is no relationship between parent involvement with the school and mathematics and reading achievement in kindergarten.

Table 9 **Nonparametric Correlations Between Level of Parent Involvement, Mathematics, and Reading Achievement.**

	Level of PI	Fall Reading IRT Score	Spring Reading IRT Score	Fall Math IRT Score	Spring Math IRT Score
Level of PI	1	.249**	.225**	.257**	.246**
Fall Reading IRT Score	.249**	1	.766**	.772**	.678**
Spring Reading IRT Score	.225**	.766**	1	.709**	.734**
Fall Math IRT Score	.257**	.772**	.709**	1	.809**
Spring Math IRT Score	.246**	.678**	.734**	.809**	1

** Correlation is significant at the 0.01 level (2-tailed).

RESEARCH QUESTION 2

To what degree does level of parent involvement explain changes/gains in mathematics and reading achievement between the fall and spring semester?

Two separate multiple regression analyses were conduced to predict overall mathematics and reading gain scores between the fall and spring semesters from several predictor variables. Stepwise regression analysis was used to enter the predictor variables into the analysis one at a time to create the best model, while also removing variables from the model as they become insignificant. The results regarding overall reading gain scores will be presented first and then the results regarding overall mathematics gain scores are presented.

In the first model for overall reading gain scores, the regression equation with the variable poverty level was significant, R^2 = .007, adjusted R^2 = .006, F = (1, 14628) = 96.379, p < .0001. R square is defined as “the amount of variance in the dependent variable explained by all the predictors together” (Muijs, 2004, p. 162). In the second model, the

regression equation includes the variables poverty level and gender. Model two was significant, R^2 = .009, adjusted R^2 = .009, F = (2, 14627) = 68.198, p < .0001. The third model includes the variables poverty level, gender, and level of parent involvement and is significant, R^2 = .011, adjusted R^2 = .011, F = (3, 14626) = 55.867, p < .0001. The final model included the variables poverty level, gender, level of parent involvement, and SES. The regression equation for overall reading gain was significant, R^2 = .012, adjusted R^2 = .012, F (4, 14625) = 45.613, p < .0001. The results of the regression analyses are presented in Tables 10 and 11. With such a large sample size, deviation from the population mean and statistical significance are expected, therefore an examination of the effect size of each variable with respect to the dependent variable was completed (StatSoft Inc., 2006, Muijs, 2004, & Urdan, 2005). Effect sizes describe the strength of the relationship and increases as the size of the sample increases thereby increasing the power of the statistical test. The following beta coefficients or standardized coefficients were found: poverty level .050, gender .051, level of parent involvement .038, and SES .039. Beta values range from 0 to 1, where values closer to 1 have a stronger effect on the dependent variable. From the results, gender has the strongest effect on overall reading gain scores, followed by poverty level, SES, and level of parent involvement. The beta values can be found in Table 12.

The statistics for the final model suggest that 1.2% of the overall variance in the model is explained by poverty level, gender, level of parent involvement, and SES and 98.8% of the variance is not explained which suggests there may be other predictor variables that better explain the model.

Table 10 **Model Summary for Multiple Regression Analysis Predicting Reading Gain**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig. F Change
1	.081	.007	.006	3.26373	.007	96.379	.000
2	.096	.009	.009	3.25941	.003	39.762	.000
3	.106	.011	.011	3.25609	.002	30.924	.000
4	.111	.012	.012	3.25456	.001	14.695	.000

Table 11 **Analysis of Variance for Reading Gain**

Model	df	F	Sig.
1	1	96.379	.000
2	2	68.198	.000
3	3	55.867	.000
4	4	45.613	.000

Level of parent involvement, when added to the model (Model 3), increases adjusted R^2 by .002 and is significant. Gender, when added in Model 2, increases adjusted R^2 by .003. Level of parent involvement has a regression coefficient of .119. This value indicates that as level of parent involvement increases by 1 unit, overall reading gain scores increase by .119. As poverty level increases by 1 unit, overall reading gain scores increase by .783. Poverty level had two categories above the poverty threshold and at or above the poverty threshold. Therefore, when a family moves from below the poverty level to above, the overall reading gain scores increase by .783. As SES increases by 1 unit, overall reading gain scores increase by .172. The regression coefficient for gender, .625, is positive and indicates that females have higher overall reading gain scores than males.

Table 12 **Coefficients of the Final Reading Model**

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
Constant	6.660	.288		23.140	.000
Poverty Level	.783	.152	.050	5.136	.000
Gender	.625	.100	.051	6.230	.000
Level of pi	.119	.029	.038	4.175	.000
SES	.172	.045	.039	3.833	.000

The final model contains the predictor variables poverty level (X1), gender (X2), level of parent involvement (X3), and SES (X4) to predict overall gain in reading scores over the kindergarten year (Y'). Given the variables in the model, the regression equation, Y' = (.783) X1 + (.625) X2 + (.119) X3 + (.172) X4 + 6.660, indicated:

- a positive and significant relationship between poverty level and overall gain in reading scores,
- a positive and significant relationship between gender and overall gain in reading scores,
- a positive and significant relationship between level of parent involvement and overall gain in reading scores, and
- a positive and significant relationship between SES and overall gain in reading scores.

The results of the multiple regression analysis suggest rejection of the null hypothesis that there is no difference in reading gain scores between fall and spring semester for varying levels of parent involvement (social capital).

In the first model for overall mathematics gain scores, the regression equation with the variable poverty level was significant, R^2 = .007, adjusted R^2 = .007, F = (1, 14628) =

100.44, $p < .0001$. In the second model, the regression equation includes the variables poverty level and level of parent involvement. Model two was significant, $R^2 = .009$, adjusted $R^2 = .009$, $F = (2, 14627) = 66.082$, $p < .0001$. The third model includes the variables poverty level, level of parent involvement, and child changed schools between fall and spring and is significant, $R^2 = .012$, adjusted $R^2 = .011$, $F = (3, 14626) = 57.018$, $p < .0001$. The final model included the variables poverty level, level of parent involvement, child changed schools between fall and spring, and SES. The regression equation for overall mathematics gain was significant, $R^2 = .013$, adjusted $R^2 = .012$, F (4, 14625) = 340.780, $p < .0001$. The following beta coefficients or standardized coefficients were found and used to determine the effect size for each variable: poverty level .053, changed schools between rounds .053, level of parent involvement .043, and SES .035. From the results, poverty level and changing schools between rounds have the strongest effect on overall mathematics gain scores, followed by level of parent involvement and SES. The beta values can be found in Table 15.

The statistics for the final model suggest that 1.3% of the overall variance in the model is explained by poverty level, child changed schools between fall and spring, level of parent involvement, and SES and 98.7% of the variance is not explained which suggests there may be other predictor variables that better explain the model. The results of the regression analyses are presented in Tables 13 and 14.

Table 13 **Model Summaries for Multiple Regression Analysis Predicting Mathematics Gain.**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig. F Change
1	.083	.007	.007	2.70965	.007	100.449	.000
2	.095	.009	.009	2.70683	.002	31.507	.000
3	.108	.012	.011	2.70336	.003	38.552	.000
4	.112	.013	.012	2.70202	.001	15.480	.000

Table 14 **Analysis of Variance for Mathematics Gain.**

Model	df	F	Sig.
1	1	100.449	.000
2	2	66.082	.000
3	3	57.018	.000
4	4	46.676	.000

When level of parent involvement is added to the model (Model 2), adjusted R^2 increases by .002 the same as when child changed schools between fall and spring is added in Model 3. However, the incremental R^2 is statistically significant in Model 2. The regression coefficient for poverty level is .701. This value indicates that as poverty level increases by 1 unit, overall mathematics gain scores increase by .701. Poverty level had two categories above the poverty threshold and at or above the poverty threshold. Therefore, when a family moves from below the poverty level to above, the overall mathematics gain scores increase by .701. As level of parent involvement increases by 1 unit, overall mathematics gain scores increase by .115. As SES increases by 1 unit, overall mathematics gain scores increase by .147. The regression coefficient for child changed schools between fall and spring is 1.093 and indicates that kindergartners who changed schools have higher overall mathematics gain scores than those kindergartners who did not change schools.

Table 15 **Coefficients of the Final Mathematics Model**

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
Constant	5.980	.205		29.233	.000
Poverty Level	.701	.127	.054	5.537	.000
Level of pi	.115	.024	.044	4.829	.000
Changed Schools	1.093	.174	.052	6.292	.000
SES	.147	.037	.040	3.934	.000

The final model contains the predictor variables poverty level (X1), level of parent involvement (X2), child changed schools between fall and spring (X3), and SES (X4) to predict overall gain in mathematics scores over the kindergarten year (Y'). Given the variables in the model, the regression equation, Y' = (.701) X1 + (.115) X2 + (1.093) X3 + (.147) X4 + 5.980, indicated:

- a positive and significant relationship between poverty level and overall gain in mathematics scores,
- a positive and significant relationship between child changed school between fall and spring and overall gain in mathematics scores,
- a positive and significant relationship between level of parent involvement and overall gain in mathematics scores, and
- a positive and significant relationship between SES and overall gain in mathematics scores.

The results of the multiple regression analysis suggest rejection of the null hypothesis that there is no difference in mathematics gain scores between fall and spring semester for varying levels of parent involvement (social capital).

SUMMARY

This chapter reported the findings of the influence of parent involvement on mathematics and reading achievement. Each of the research questions and the statistical analysis used were addressed. Chapter five will discuss those findings, as well as describe implications in education and suggest recommendations for further research and practice.

CHAPTER FIVE

DISCUSSION

Research has shown that parent involvement influences academic achievement. This study examined the effect of parent involvement on overall gains in mathematics and reading achievement scores. This chapter provides a study summary, discussion of the findings, implications, limitations of the study, and suggestions for future research and practice.

SUMMARY OF THE STUDY

This non-experimental study was conducted with existing data from the Early Childhood Longitudinal Study Kindergarten Cohort (ECLS-K) of 1998. The study reflects data collected from mathematics and reading assessments and parent interviews containing demographic information as well as parent involvement activities. The total sample size was 14,952 first time kindergarten students. The data used in this study covers the 1998-1999 fall and spring semesters of the kindergarten year. The variables used were assigned and defined by the National Center for Education Statistics.

SUMMARY OF FINDINGS

The first research question examined the relationship between parent involvement and mathematics and reading achievement in kindergarten. The research question was "Is there a correlation between parent involvement at school (social capital) and mathematics and reading achievement in kindergarten?" Reynolds (1992) asserted parent involvement shared a positive influence on mathematics and reading achievement, therefore one would expect the positive correlations between parent involvement and mathematics and reading achievement.

The present study rejects the null hypotheses and supports the alternative hypotheses, there is a significant relationship between parent involvement with the school and mathematics achievement, and likewise, reading achievement in kindergarten. Correlations of all five variables, level of parent involvement, fall and spring reading IRT scores, and fall and spring mathematics IRT scores, were positively correlated and significant. Values for Spearman's rho for level of parent involvement and the four IRT scores ranged in value from .225 to .257, indicating the strength of the relationships are modest based on scales used by Muijs (2004). Muijs used the following scale to indicate the strength of the relationship or effect size of a relationship: "< 0. +/- 1 weak, < 0. +/- 3 modest, < 0. +/- 5 moderate, < 0. +/- 8 strong, and μ +/- 0.8," (2004, p. 145).

The relationship between level of parent involvement and fall and spring mathematics IRT scores suggests that as the level of parent involvement increases mathematics IRT scores tend to increase. The relationship between level of parent involvement and fall and spring IRT reading scores suggests that as the level of parent involvement increases reading IRT scores tend to increase as well.

The second research question investigated the differences in mathematics and reading gain scores between fall and spring semester for varying levels of parent involvement. "To what degree does level of parent involvement explain changes/gains in mathematics and reading achievement between the fall and spring semester?", was the research question. The results for reading achievement gains will be discussed first followed by a discussion of mathematics achievement gains.

The regression analysis suggests the best predictors for reading achievement gains were poverty level, composite gender, SES, and level of parent involvement. The value of $\underline{R^2}$

for the final model indicates that .012 or 1.2% of the variance in reading achievement gain scores can be explained by the four variables in the model. This further suggests there could be other variables that could better explain the variance in reading achievement gain scores. The findings from the analysis further suggest that higher levels of parent involvement, being at or above the poverty threshold, having a higher SES, and being female increases the likelihood of having higher overall reading gain scores.

The regression analysis suggests the best predictors for mathematics achievement gains were poverty level, change in school during school year, SES, and level of parent involvement. The value of R^2 for the final model indicates that .013 or 1.3% of the variance in mathematics achievement scores can be explained by the four variables in the model. This further suggests there could be other variables that could better explain the variance in mathematics achievement gain scores. The findings from the analysis further suggest that higher levels of parent involvement, being at or above the poverty threshold, having a higher SES, and changing schools between fall and spring semesters increases the likelihood of having higher overall mathematics gain scores.

DISCUSSION AND IMPLICATIONS

In the present research study, social capital is defined as the resources gained through relationships between family, friends, and the community, which enables an exchange of resources with the expectations those resources will be reciprocated at a later time. This definition of social capital follows from James Coleman's (1988) claim that social capital derived from relationships should be considered in conjunction with human and financial capital when explaining educational outcomes (Coleman, 1988; Edwards, 2005; Noguera, 2004).

Pierre Bourdieu, another social capital theorist, (2005) concluded the size of one's social networks determined the amount of social capital one possesses. When families participate in parent involvement activities at school they are expanding their social network, creating relationships with school staff and other parents in the hopes that participation will reap benefits for their children. These benefits could include access to information about new curriculums, tutoring programs, or decisions affecting the entire school population.

Eight parent involvement activities were used in the study: parent contacted school this year, attended open house at school, attended PTA meeting, attending school event, attended parent advisory group meeting, attended parent teacher conference, acted as a school volunteer, and participated in school fundraising activity. Group activities such as PTA and advisory group meetings promote social networks and social behavior, which promotes cooperation (Productivity Commission, 2003). Coleman (1988) argued that social capital, used by parents to enhance educational outcomes in children, generates human capital for the children. Thus any examination of educational achievement is incomplete without review of financial, human, and social capital variables. Therefore the current study included all three forms of capital. Level of parent involvement served as the social capital variable. Human capital variables were socioeconomic status, mother's education, and poverty level. Total household income was the sole financial capital variable. Gender, race, public or private school, and child changed schools were the remaining variables.

The purpose of this study was to determine how well parent involvement, as a form of social capital, made up for familial differences in human (educational) and financial (income) capital thereby influencing reading and mathematics achievement scores. Parent involvement has been shown to influence achievement and lay some of the accountability concerns of

education on parents. Parent involvement also has educators excited for the following reasons: “1) school personnel see parent involvement as a resource to help supplement restricted budgets, and 2) educational research findings indicate that children may experience advantages when their parents are involved in their education” (Stein & Thorkildsen, 1999, p.3). With all of the advantages attributed to parent involvement, one might assume that the variable alone would have a huge effect on achievement. More specifically, when parents participate in parent involvement activities at the child’s school, are there variations in the reading and mathematics overall achievement gain scores while controlling for mother’s highest level of education, family household income, gender, and race? Research has shown parent involvement to influence reading and mathematics achievement (Reynolds, 1992). Results of the study suggest that level of parent involvement has some influence on overall achievement gains in reading and mathematics supporting research findings, however the effect is weak in respect to the other variables that show up in the final models.

Research studies in the area of parent involvement and achievement consistently used race/ethnicity, gender, parent education (composite of both or maternal education), public/private school, and SES (Carbonaro, 1998; Crosnoe, 2004; Desimone, 1999; Fehrmann, et al, 1987; Morgan & Sorenson, 1999; Muller, 1995; Reynolds, 1992). These variables were used as control variables since they are expected to predict achievement. Poverty level, composite gender, SES, and level of parent involvement influence overall reading gains, which support variables found in past research studies regarding parent involvement and achievement. Poverty level is the only variable in the model not previously used in research on parent involvement and achievement. These results also support Coleman’s (1988) assertion that financial, human, social capital variables should be

examined when discussing educational outcomes because all of the variables in the model represent at least one form of capital. However, the effect the variables had on the dependent variable, overall reaching achievement gains were moderate at best. Gender had the highest effect followed by poverty level and SES. Level of parent involvement was found to have the least effect on overall achievement gains in the model compared with the other variables.

Poverty level, child changed schools rounds, level of parent involvement and SES were found to have influence on overall mathematics achievement gains. All of the variables represent some form of capital except the child changing schools between rounds. The effect the variables had on the dependent variable are modest at best for overall mathematics achievement gains as well. Poverty level and child changed schools between rounds had the highest effect followed by parent involvement and SES. Again, parent involvements effect on the dependent variable is low compared with the effect of the other variables.

LIMITATIONS OF THE STUDY

This study was conducted using data from the ECLS-K. The data set had 597 values missing for participant's household income. The researcher decided to retain the variable until after conducting the stepwise regression. After completing the analysis, the variable was dropped from the analysis. This study acknowledges that there are several forms of social capital and that parent involvement activities can be performed at home, at school, and in the community; however, this study was limited to the parent involvement activities obtained in the ECLS-K.

RECOMMENDATIONS FOR FUTURE RESEARCH

Additional research regarding overall gains in achievement scores should be considered to further determine the effect parent involvement has on achievement. These

studies should include parent involvement activities at home and school. Current literature addresses the influence parent involvement has on achievement, however, little is known about how individual parent involvement activities transform achievement scores. The models for overall reading and mathematics gain scores indicated gender and child changing schools has some effect. Future research should further examine the influence of these two variables. Alternative methods should be considered to address the achievement gap as well as ensure accountability throughout U.S. schools.

RECOMMENDATIONS FOR EDUCATIONAL PRACTICE

Parent involvement and its influence on education continue to be an issue in American education. The National Parent Teacher Association suggests these parent involvement activities to parents: communicating with school staff, parenting at home, focusing on student learning, volunteering in the school, getting involved in school decision-making, becoming an advocate, and collaborating with the community (NPTA, 2005). School administrators and teachers should maintain current efforts to attract parents into the school building. However obstacles to parent involvement on behalf of the parents and the school often hinder participation (Constantino, 2003). Parents may lack the time to participate (Constantino, 2003). Other reasons parent fail to participate consist of cultural differences, SES, and changing family structures. Schools may lack an inviting atmosphere in which parents feel welcome and not intimidated by the school and/or school personnel. However, the benefits of parent involvement far out-weigh the negatives for both parents and teachers. Parents benefit from creation of a positive attitude regarding the school, higher self-esteem, improved decision-making skills, and improved communication with child and teachers (NPTA, 2005). Teachers benefit from greater morale, improved teacher

effectiveness, increased job satisfaction, and improved communication with parents, students and the community (NPTA, 2005).

SUMMARY

The purpose of this study was to determine how well parent involvement, as a form of social capital, made up for familial differences in human (educational) and financial (income) capital thereby influencing reading and mathematics achievement scores. Continued efforts towards encouraging parents to participate in parent involvement activities are recommended. Educators should focus on implementing programs and methods that will stimulate minority parents to take an active part in their child's education. Programs that highlight the advantages and benefits of parent involvement to the child's academic achievement should be implemented. A review of overall gain scores is recommended along with regular analysis of achievement scores to note improvements over time as parent involvement activities are implemented.

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APPENDICES

OUTPUT FOR READING MODEL

Descriptive Statistics

	Mean	Standatd Dev.	N
Reading gain	10.0499	3.27435	14630
Level of PI	4.1758	1.03655	14630
Public/Private	1.16	.195	14630
Poverty Level	1.81	.209	14630
SES	3.14	.737	14630
Mother's Ed	4.27	.972	14630
Changed Schools	.06	.130	14630
Race	1.88	.884	14630
Gender	1.49	.268	14630

Weighted Least Squares Regression- Weighted by adjweight

Correlations

	Reading Gain	Level of PI	Public/ Private	Poverty Level	SES	Mother's Ed	Changed Schools	Race	Gender
Reading gain	1.000	.068*	.018*	.081*	.080*	.058*	.000	-.008	.050*
Level of PI	.068*	1.000	.140*	.304*	.401*	.336*	-.135*	-.135*	-.003
Public/Private	.018*	.140*	1.000	.165*	.274*	.228*	-.049*	-.043*	.021*
Poverty Level	.081*	.304*	.165*	1.000	.526*	.314*	-.109*	-.150*	-.020*
SES	.080*	.401*	.274*	.526*	1.000	.740*	-.101*	-.150*	.005
Mother's Ed	.058*	.336*	.228*	.314*	.740*	1.000	-.073*	-.109*	.006
Changed Schools	.000	-.135*	-.049*	-.109*	-.101*	-.073*	1.000	.026*	-.017*
Race	-.008*	-.135*	-.043*	-.150*	-.150*	-.109*	.026*	1.000	.001
Gender	.050*	-.003	.021*	-.020*	.005	.006	-.017*	.001	1.000

* Correlation is significant at the 0.01 level (2-tailed).

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	Poverty Level	-	Stepwise (Criteria:Probability-of-F-to-enter <= .050,Probability-of-F-to-remove >= 100)
2	Gender	-	Stepwise (Criteria:Probability-of-F-to-enter <= .050,Probability-of-F-to-remove >= 100)
3	Level of PI	-	Stepwise (Criteria:Probability-of-F-to-enter <= .050,Probability-of-F-to-remove >= 100)
4	SES	-	Stepwise (Criteria:Probability-of-F-to-enter <= .050,Probability-of-F-to-remove >= 100)

Dependent variable: readinggain, Weighted Least Squares Regression- Weighted by adjweight

Model Summary for Multiple Regression Analysis Predicting Reading Gain

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig. F Change
1	.081	.007	.006	3.26373	.007	96.379	.000
2	.096	.009	.009	3.25941	.003	39.762	.000
3	.106	.011	.011	3.25609	.002	30.924	.000
4	.111	.012	.012	3.25456	.001	14.695	.000

Analysis of Variance for Reading Gain

Model	df	F	Sig.
1	1	96.379	.000
2	2	68.198	.000
3	3	55.867	.000
4	4	45.613	.000

Predictors, (Constant), poverty level
Predictors, (Constant), poverty level, gender
Predictors, (Constant), poverty level, gender, level of pi
Predictors, (Constant), poverty level, gender, level of pi, SES
Dependent variable: readinggain
Weighted Least Squares Regression- Weighted by adjweight

Coefficients- Final Model

	Unstandardized Coefficients		Standardized Coefficients						
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
Constant	6.660	.288		23.140	.000	6.096	7.224		
Poverty Level	.783	.152	.050	5.136	.000	.484	1.081	.712	1.404
Gender	.625	.100	.051	6.230	.000	.428	.822	.999	1.001
Level of pi	.119	.029	.038	4.175	.000	.063	.174	.827	1.209
SES	.172	.045	.039	3.833	.000	.084	.260	.659	1.517

Dependent variable: readinggain, Weighted Least Squares Regression- Weighted by adjweight

Collinearity Diagnostics- Final Model

	Eigenvalue	Condition Index	Constant	Poverty Level	Gender	Level of PI	SES
1	4.664	1.000	.00	.00	.00	.01	.00
2	.158	5.426	.01	.00	.28	.30	.11
3	.103	6.715	.00	.01	.03	.66	.47
4	.056	9.095	.12	.17	.55	.03	.30
5	.018	16.302	.86	.82	.13	.00	.12

Dependent variable: readinggain, Weighted Least Squares Regression- Weighted by adjweight

Residual Statistics

	Minimum	Maximum	Mean	Standard Deviation	N
Predicted Value	8.2398	11.2898	10.0945	.66381	14630
Residual	-30.80291	33.57978	.00162	6.13219	14630
Std. Predicted Value	-	-	-	-	0
Std. Residual	-	-	-	-	0

Not computed for weighted least squares regression.
Dependent variable: readinggain, Weighted Least Squares Regression- Weighted by adjweight

OUTPUT FOR MATHEMATICS MODEL

Descriptive Statistics

	Mean	Standatd Dev.	N
Reading gain	8.2599	2.71884	14630
Level of PI	4.1758	1.03655	14630
Public/Private	1.16	.195	14630
Poverty Level	1.81	.209	14630
SES	3.14	.737	14630
Mother's Ed	4.27	.972	14630
Changed Schools	.06	.130	14630
Race	1.88	.884	14630
Gender	1.49	.268	14630

Weighted Least Squares Regression- Weighted by adjweight

Correlations

	Math Gain	Level of PI	Public/ Private	Poverty Level	SES	Mother's Ed	Changed Schools	Race	Gender
Math gain	1.000	.069*	.011	.083*	.081*	.062*	.037*	-.032*	-.008
Level of PI	.069*	1.000	.140*	.304*	.401*	.336*	-.135*	-.135*	-.003
Public/Private	.011	.140*	1.000	.165*	.274*	.228*	-.049*	-.043*	.021*
Poverty Level	.083*	.304*	.165*	1.000	.526*	.314*	-.109*	-.150*	-.020*
SES	.081*	.401*	.274*	.526*	1.000	.740*	-.101*	-.150*	.005
Mother's Ed	.062*	.336*	.228*	.314*	.740*	1.000	-.073*	-.109*	.006
Changed Schools	.037*	-.135*	-.049*	-.109*	-.101*	-.073*	1.000	.026*	-.017*
Race	-.032*	-.135*	-.043*	-.150*	-.150*	-.109*	.026*	1.000	.001
Gender	-.008	-.003	.021*	-.020*	.005	.006	-.017*	.001	1.000

* Correlation is significant at the 0.01 level (2-tailed).

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	Poverty Level	-	Stepwise (Criteria:Probability-of-F-to-enter <= .050,Probability-of-F-to-remove >= 100)
2	Level of PI	-	Stepwise (Criteria:Probability-of-F-to-enter <= .050,Probability-of-F-to-remove >= 100)
3	Changed Schools	-	Stepwise (Criteria:Probability-of-F-to-enter <= .050,Probability-of-F-to-remove >= 100)
4	SES	-	Stepwise (Criteria:Probability-of-F-to-enter <= .050,Probability-of-F-to-remove >= 100)

Dependent variable: mathgain, Weighted Least Squares Regression- Weighted by adjweight

Model Summaries for Multiple Regression Analysis Predicting Mathematics Gain.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig. F Change
1	.083	.007	.007	2.70965	.007	100.449	.000
2	.095	.009	.009	2.70683	.002	31.507	.000
3	.108	.012	.011	2.70336	.003	38.552	.000
4	.112	.013	.012	2.70202	.001	15.480	.000

Analysis of Variance for Mathematics Gain.

Model	df	F	Sig.
1	1	100.449	.000
2	2	66.082	.000
3	3	57.018	.000
4	4	46.676	.000

Predictors, (Constant), poverty level
Predictors, (Constant), poverty level, level of pi
Predictors, (Constant), poverty level, level of pi, changed schools
Predictors, (Constant), poverty level, level of pi, changed schools, SES
Dependent variable: mathgain
Weighted Least Squares Regression- Weighted by adjweight

Coefficients of the Final Mathematics Model

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
Constant	5.980	.205		29.233	.000
Poverty Level	.701	.127	.054	5.537	.000
Level of pi	.115	.024	.044	4.829	.000
Changed Schools	1.093	.174	.052	6.292	.000
SES	.147	.037	.040	3.934	.000

Dependent variable: mathgain, Weighted Least Squares Regression- Weighted by adjweight

Collinearity Diagnostics- Final Model

	Eigenvalue	Condition Index	Constant	Poverty Level	Level Of PI	Changed Schools	SES
1	3.839	1.000	.00	.00	.01	.01	.01
2	.942	2.019	.00	.00	.00	.95	.00
3	.110	5.908	.03	.03	.98	.02	.06
4	.090	6.549	.12	.02	.00	.02	.79
5	.019	14.105	.84	.95	.00	.01	.15

Dependent variable: mathgain, Weighted Least Squares Regression- Weighted by adjweight

Residual Statistics

	Minimum	Maximum	Mean	Standard Deviation	N
Predicted Value	6.8276	10.1288	8.2515	.54010	14630
Residual	-35.79070	28.54685	.03346	5.02142	14630
Std. Predicted Value	-	-	-	-	0
Std. Residual	-	-	-	-	0

Not computed for weighted least squares regression.

Dependent variable: mathgain, Weighted Least Squares Regression- Weighted by adjweight