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# The Influence of Neighborhood, Family, School, and Student Dimensions of Social Capital on Academic Achievement: An Integrated Theoretical Framework

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THE INFLUENCE OF NEIGHBORHOOD, FAMILY, SCHOOL, AND STUDENT
DIMENSIONS OF SOCIAL CAPITAL ON ACADEMIC ACHIEVEMENT: AN
INTEGRATED THEORETICAL FRAMEWORK


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**The Influence of Neighborhood, Family, School, and Student Dimensions of Social Capital on Academic Achievement: An Integrated Theoretical Framework**

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Current federal education law places the responsibility of the academic achievement of students with schools while ignoring other social factors that might influence the educational outcomes of students. Students are part of a complex social system that both enable and constrain their development and behavior. If we are to look at ways to improve academic programs, it is imperative we examine the different social systems to which students are exposed, including neighborhood, family, peer groups, and educational systems, in order to understand their role in assessing school accountability efforts.

This study uses an integrated framework of social disorganization theory and social capital theory as the theoretical basis for examining the influence of a broader social system, such as neighborhoods, on the academic development and success of students, while accounting for how the interrelationships between schools, families, and peer groups contribute to that success.

The data for this analysis is taken from the Education Longitudinal Study of 2002/2004 (ELS:2002), a national longitudinal study conducted by the National Center for Education Statistics (NCES) of the U.S. Department of Education's Institute of Education Sciences (IES). The ELS:2002 dataset is comprised of tenth graders first surveyed in 2002 with a follow-up survey of those same students in the twelfth grade conducted in 2004. It also contains information gathered from parents, teachers, and principals. Ordinary least squares regression is used to evaluate the ability of the measures of neighborhood, family, school, and student social capital in predicting the variations in scores on academic achievement as measured by standardized math tests.

The results of this study indicate that without the consideration of both structural and individual-level factors and their relationship to one another, our understanding of the educational process is incomplete. In assessing school accountability efforts, it is important to adopt a holistic approach in examining all factors that influence the educational outcomes for students. Limitations of the current study and recommendations for future studies are discussed.

**Dedication**

In memory of my son, Timothy Edward Scott
and my mother, Phyllis Saxbury

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1 INTRODUCTION

Citizens and policymakers recognize the importance of a good educational system to the success of our nation's future as a world leader (Hirschland and Steinmo 2003). Education provides our youth with the skills, knowledge, values, and behavior necessary to become productive citizens and to achieve success in the material, social, and civic aspects of American life. The passage of the *No Child Left Behind Act* (NCLB) in 2001 (U.S. Congress 2002) holds schools accountable for the academic success of our children. The new law creates a high-stakes accountability system for all schools mandating high academic and teacher quality standards and assessment of student achievement through annual standardized tests. However, Dworkin (2005:173) argues that the NCLB is "piecemeal social engineering" that does not address external factors that may affect student achievement. He suggests that there may be serious unintended consequences for schools attempting to meet the requirements of NCLB if models measuring academic achievement do not consider these external factors.

NCLB posits that schools are accountable for the academic success of our children. Underlying this view are the assumptions that the academic success of children is the sole responsibility of schools who have failed to provide students with opportunities to be successful. These assumptions seem to reflect a belief that the education of our youth is conducted in hermetically-sealed school buildings free from the pollution of external social forces that might influence a child's ability to learn. Further, NCLB assumes that students are empty vessels, passively waiting for teachers to "fill" them with the appropriate knowledge necessary to succeed. In reality, students are part of a much larger social system that both enable and constrain their development. If we

are to look at ways to improve education programs for our youth, then it is important to consider additional factors that influence the ability of students to achieve academic success.

This study uses an integrated framework of social disorganization theory and social capital theory as the theoretical basis for examining the influence of interpersonal relationships between neighborhood, family, school, and students and their effects on academic achievement in order to understand their role in assessing school accountability efforts. The following research questions are addressed: Are current school accountability efforts sufficient to improve the academic achievement of students or does it "take a village" to ensure the academic success of our youth (Ainsworth 2002)? What are the individual contributions of neighborhood, family, school, and student interpersonal relationships to the academic achievement of students? What are the combined effects of neighborhood, family, school, and student interpersonal relationships in the academic achievement of students? These questions will be addressed by way of the following hypotheses:

> $H_1$ Neighborhood social capital measures have independent effects on academic achievement, net the effects of the control variables.
>
> $H_2$: Family social capital measures have independent effects on academic achievement, net the effects of the control variables.
>
> $H_3$: School social capital measures have independent effects on academic achievement, net the effects of the control variables.
>
> $H_4$: Student social capital measures have independent effects on academic achievement, net the effects of the control variables.
>
> $H_5$: Neighborhood, family, school, and student social capital measures have combined effects on academic achievement, net the effects of the control variables.

## 1.1. Significance of Study

The NCLB links the performance of schools, as measured by student performance on standardized tests, to not only the receipt of federal funds, but also to a school's ability to meet their adequate yearly progress (AYP) student achievement targets. The goal of setting student achievement targets, according to the requirements of NCLB, is to have all students performing at a "proficient" level on standardized tests by the year 2014. This includes the performance of subgroups of students based on racial/ethnic, special education, limited English proficiency (LEP), and low-income categories.

NCLB applies multi-layered sanctions for schools that do not meet AYP targets. Initially, schools receive a warning and the state provides professional development opportunities, and allows students to transfer to higher performing schools. Continued failure in meeting AYP could result in a state takeover of the school, firing teaching and administrative staff, and contracting with a private company to provide all administrative and teaching functions.

Schools typically use standardized tests as one measure of the student's comprehension of the curriculum content presented. However, NCLB uses student performance on standardized tests as a measure of the school's ability to present the curriculum content effectively. Thus, NCLB has changed the original meaning of standardized tests. Testing is no longer an evaluation tool to measure the student's ability to learn, but becomes an evaluation tool to measure the school's ability to teach. By focusing only on schools, NCLB provides a rather narrow view of factors that contribute to the academic success of students, by dismissing other social factors that might influence the education of our youth.

If neighborhood, family, and student factors also influence the academic performance of students, then the goal should be to design school accountability models that include "home, school, and community covariates in value-added models to assess AYP" (Dworkin 2005, p. 172). Failure to do so will certainly set the stage for all schools and students to fail by 2014.

The following section offers a review of the theoretical framework used in this study and a review of existing literature examining the influence of neighborhood, family, school, and student factors on student educational outcomes.

## 2 LITERATURE REVIEW

### 2.1 Ecological-Development Theory

This study employs an ecological-development perspective to examine the many factors that influence a student's educational outcomes. Human ecology is similar, in principle, to both plant and animal ecology, in that all living organisms are bound together in a complex system of interlinked and interdependent relationships (Park [1936] 2004). Students are part of this complex social system that both enable and constrain their development and behavior. In order to identify factors that influence positive educational outcomes for a student, it is important to examine the different social systems to which students are exposed, including neighborhood, family, and educational systems.

An ecological approach examines the multi-layered patterns of interaction of personal relationships, social settings and institutions that influence a student's development and behavior (Crosnoe 2004; Kowaleski-Jones, Dunifon and Ream 2006; Nash 2002). Specifically, an ecological-developmental approach examines the influence of a broader social system, such as neighborhoods, on the academic development and success of students, while accounting for how the interrelationships between schools, families, and peer groups contribute to that success (Anguiano 2004; Crowder and South 2003; Nash 2002). Both social disorganization theory and social capital theory trace their origins back to the human ecology perspective. The two theoretical perspectives used in this study provide an integrated theoretical framework in which to examine the complex web of interactions between students, families, schools, and neighborhoods.

<center>2.2 Social Disorganization Theory</center>

Social disorganization theory examines the broader social context in which families, students, and schools operate.  The theory highlights neighborhood structural characteristics (exogenous components) that have detrimental effects on the social organization of residents and has been primarily used to evaluate variations in crime and juvenile delinquency rates (Crowder and South 2003; Kubrin and Weitzer 2003; Nash 2002).   Since its inception, the theory has undergone three distinct stages of development outlined below.

2.2.1 Traditional Model of Social Disorganization.

Shaw and McKay ([1942] 1969) advanced the traditional model of social disorganization in their studies of Chicago neighborhoods in the 1930s and 1940s. The traditional model states that economic deprivation, racial or ethnic heterogeneity, and residential mobility lead to a decrease in informal social control that in turn increases the probability of crime, over and above the characteristics of individual residents (Kubrin and Weitzer 2003; Warner and Rountree 1997).  Although innovative, the traditional model was not without criticisms.  While the concept of social disorganization was useful in examining the effect of neighborhood structural characteristics on crime rates, it failed to identify the connection between macro-structural influences and key intervening variables that connect these to the micro influences (i.e., social ties, transmission of norms, and informal social control) that mediate the effects of these structural constraints, leading to limited use of the theory (Kubrin and Weitzer 2003; Warner and Rountree 1997).

2.2.2 Systemic Model of Social Disorganization. After falling out of favor for a number of years, the traditional model was revitalized into a "systemic model" by including intervening variables that help explain the relationship between the exogenous characteristics of neighborhoods (e.g., economic deprivation, racial or ethnic heterogeneity, and residential mobility) and informal social control (Kubrin and Weitzer 2003). The systemic model incorporates elements of social capital in that it posits the importance of social networks in mediating the effects of neighborhood structural constraints that lead to crime and juvenile delinquency (Cancino 2005; Kubrin and Weitzer 2003). Specifically, it is through neighborhood social networks that common values and expectations for behavior are articulated and informal social control is carried out, thus reducing crime-related behaviors (Cancino 2005; Kubrin and Weitzer; Warner and Rountree 1997). Even though the systemic model was an enhancement over the traditional model, it was not without its limitations. For example, the systemic model does not address how social ties differentially affect neighborhood crime rates (Kubrin and Weitzer 2003; Warner and Rountree 1997). Nor, does it address the mechanisms by which social networks achieve informal social control (Kubrin and Weitzer 2003; Warner and Rountree 1997).

2.2.3 Contemporary Model of Social Disorganization. The contemporary model of social disorganization expands its use of social capital theory in its efforts to identify the key mechanisms in which social networks facilitate informal social control (Cancino 2005; Kubrin and Weitzer 2003), thereby mediating the detrimental effects of neighborhood structural constraints. Kubrin and Weitzer (2003) state, "It is the resources transmitted through social ties, not the ties per se, that are key to facilitating

social control" (p. 377).  The resource potential of neighborhood social networks is captured by the concept of social capital theory (Cancino 2005; Kubrin and Weitzer 2003).

The contemporary model of social disorganization theory is further enhanced with the addition of the concept of collective efficacy (Cancino 2005; Kubrin and Weitzer 2003).  Based on the work of Sampson (1997) and Sampson, Morenoff, and Earls (1999), collective efficacy refers to the willingness of residents to take action and intervene for the common good.  In order for this to occur, mutual trust and solidarity among neighbors must be present (Cancino 2005; Kubrin and Weitzer 2003).

An overview of social capital theory is provided in the following section.

## 2.3 Social Capital Theory

There are three different perspectives related to the concept of social capital (Adam and Roncevic 2003).  The first derived from the work of Bourdieu (1985) in the context of developing a critical theory of society.  The second comes from Coleman (1988; see Putnam (2000) for an extension of Coleman's idea) that provides a normative theory of society.  The third is from the work of Burt (2001) and Lin (2001) and offers a network-based theory of society.  Although the perspectives tend to view the social organization of relationships in different ways, all three perspectives have a common definition for the concept of social capital.  Social capital refers to the resources that are accessible through relationship ties, whether they are social and personal relationships, social networks, or social institutions.  Accessible resources may include information channels, norms and effective sanctions, and mutual trust and obligations (Bourdieu 1985; Burt 2001; Coleman 1988; Crosnoe 2004; Lin 2001; Portes 2000; Sampson, Morenoff, and Earls 1999).

The distinctive feature of social capital is its intangible characteristic relative to other forms of capital (e.g., financial, human).  Social capital is inherent in social relations and governed by social cohesion and trust (Bourdieu 1985; Cancino 2005; Coleman 1988; Portes 2000). ). In other words, strong social ties create a dense set of relationships, through the development of trust and social cohesion, which promote cooperative behavior that is beneficial for group members (Bankston and Zhou 2002). Further, Bourdieu (1985) and Coleman (1988) emphasized the exchangeable nature of social capital in that the social capital acquired in one type of relationship can be converted for use in others.

There are three basic functions of social capital, applicable in a variety of contexts, described in the literature. Social capital is viewed as a source of informal social control, family mediated benefits, and extrafamilial-mediated benefits (Adam and Roncevic 2003; Dika and Singh 2002; Portes 2000). Thus, social capital as a resource provides a way to bridge individual, community, and institutional relationships (Cancino 2005).

Despite the popularity of social capital theory in recent years, it is not without criticisms and controversies (Adam and Roncevic 2003; Bankston and Zhou 2002; Dika and Singh 2002). Portes (1998:6) states that the three key elements of the theory are often mixed in any discussion of social capital. He cautions that any systemic treatment of the concept must distinguish among: 1) the possessors of social capital (those making claims), 2) the sources of social capital (those agreeing to these demands) and, 3) the resources themselves. The most prominent controversy is with the unit of analysis used to measure the concept of social capital.

To date, social capital has been located at the level of the individual, the informal social group, the formal organization, and the community (Bankston and Zhou 2002, Portes 2000). Some researchers argue that it is an individual attribute as it is an extension of social exchange theory (Astone, Nathanson, Schoen, and Kim 1999) or, it is an investment by individuals to gain resources for purposive action (Lin 2001). Others view it as a collective resource that enables productive outcomes for the common good (Putnam 2000). However, Cancino (2005:290) states that "the utility of social capital is its ability to manifest itself in a variety of community (e.g., residents) and institutional

(e.g., schools, church) resources" that can be utilized not only for the benefit of individuals, but also for the common good.

For the purposes of this study, social capital is conceived as "a multidimensional function encompassing different aspects of social structure (e.g., human and institutional relationships) that foster potential benefit for individuals and groups" (Cancino 2005:291).

An overview of the integrated theoretical framework used in this study is presented in the following subsection.

## 2.4 Integrated Theoretical Framework

It is evident that social capital theory is seen as a "conceptual link to help extend social disorganization theory" (Cancino 2005, p. 293). The systemic model blurred the lines between the traditional model and social capital theory making it difficult to differentiate the key concepts of each. However, the incorporation of the concept of social networks and informal social control, linked to the concept of collective efficacy in contemporary social disorganization theory, has blended the lines that separated the two so that it is now impossible to use one theory without referring to the other. This has created a dynamic model in which to examine the effects of neighborhood structural constraints and the educational outcomes for youth.

An integrated theory of the two provides a framework in which to explain the mechanisms that convert the resources of social networks (social capital) into collective action (collective efficacy) that enable residents to overcome neighborhood structural constraints and provide positive educational outcomes for children. This theory posits that through information sharing and mutual obligations, social relationships build trust and social cohesion, leading to the willingness of neighbors to take action and intervene on behalf of the children in the neighborhood. Neighborhood action can take the form of informal social control, the transmission of norms, and information exchange about social, educational, and employment opportunities that are beneficial to both parents and children.

2.5 Review of Existing Literature

The purpose of the following literature review is to outline the prior empirical tests that have examined the connection between neighborhood, family, school, and student factors and their connection to youth outcomes.

2.5.1 Neighborhood Factors

Salamon (2003) writes, "Youth who develop successfully reflect a resourceful, interconnected community…" (p. 189). A student's attachment to the neighborhood in which they reside, developed through interactions with neighborhood residents, contributes to the student's conformity to appropriate norms and expectations that can lead to positive educational outcomes (Israel, Beaulieu, and Hartless 2001). Current research has shown that adverse structural constraints (e.g., poverty, residential instability, and racial or ethnic heterogeneity) undermine social relationships in the neighborhood, resulting in weak social ties and ineffective methods of informal social control (Ainsworth 2002; Crowder and South 2003; Nash 2002).

The type of adult role models local youth are exposed to outside the home shapes the development of positive school-related values, attitudes, and behavior. For example, children living in disadvantaged neighborhoods marked by poverty, joblessness, and residential instability are less likely to develop high educational expectations or effort, in part, because they have not had direct evidence that these behaviors or attitudes are desirable (Ainsworth 2002; Crowder and South 2003; Israel, Beaulieu, and Hartless 2001; Nash 2002). On the other hand, children living in advantaged neighborhoods with high employment rates, high socioeconomic status and residential stability are more likely to develop normative attitudes and behaviors that lead to success in school due, in

part, to the positive behaviors and attitudes modeled by neighborhood residents (Ainsworth 2002; Crowder and South 2003; Israel, Beaulieu, and Hartless 2001; Nash 2002).

Strong, long-term relationships take time to develop. Residential mobility can affect the opportunity to develop strong ties and attachment to the neighborhood for both parents and students contributing to the development of weak social ties and lack of informal social control (Coleman 1998; Israel, Beaulieu and Hartless 2001; Teachman, Paasch and Carver 1997). The composition of a neighborhood also has an effect on social cohesion and informal social control. A neighborhood that has racial or ethnic homogeneity provides opportunities for residents to develop strong social ties instrumental in forming consensus about norms and values (Ainsworth 2002, Crowder and South 2003; Israel, Beaulieu and Hartless 2001; Smith, Atkins, and Connell 2003).

2.5.2 Family Factors

Current research has shown that family involvement plays a significant role in the educational success of students (Israel, Beaulieu and Hartless 2001; Coleman 1988; Crosnoe 2004). Parents are instrumental in providing information related to education and future opportunities, establishing norms of expected behavior and achievement, and assistance in navigating through the educational system (Bankston and Zhou 2002).

Parent-student interaction is a key mechanism that provides students with information and support to help them achieve academic success. Parents share their knowledge about school subjects by helping with homework, providing suggestions for classes to take, and suggestions for navigating the education system. This interaction also serves as a form of social control that encourages students to comply with school norms

and expectations in order to achieve success at school (Ainsworth 2002; Coleman 1988; Crosnoe 2004; Ross and Broh 2000).

Compositional attributes of the family are also shown to affect, not only the opportunity, but also the quality of parent-child interactions.  The number of parents in the home as well as the number of siblings can shape the frequency and duration of the interactions between parents and children (Ainsworth 2003; Bankston and Zhou 2002, Crosnoe 2004; Israel, Beaulieu and Hartless 2004).

2.5.3 School Factors

Public schools are social institutions created to help socialize children into mainstream society.  The education process is intended to provide students with the knowledge, skills, and abilities to become productive members of society.  The knowledge, skills, and abilities acquired include the values, attitudes, and beliefs of the culture in which the students reside (Henslin 2007).

The school system plays an important role in the development of children by providing a positive learning environment (Anguiano 2004).  Student-school relationships provide an opportunity for administrators and teachers to set expectations for appropriate behavior and provide information that will help students achieve academic success (Ainsworth 2002; Anguiano 2004; Brookover 1978; Goddard 2003).

Neighborhood structural characteristics can also have an impact on school climate through an inability to attract and retain quality teachers.  The inability to attract and retain teachers may have an additional impact on student-teacher relationships through limited opportunity and frequency of interactions (Ainsworth 2002; Roscigno 1998).

2.5.4 Student Factors

Current research has found that children living in neighborhoods with adults, who have limited time to monitor their behavior or help organize structured activities, are more likely to participate in deviant activities.  Further, in neighborhoods with ineffective informal social control processes, local youth are more likely to be influenced by negative peer subcultures and adopt antischool attitudes and behaviors (Ainsworth 2002; Crowder and South 2003, Israel, Beaulieu, and Hartless 2001; Nash 2002).

Ross and Broh (2000) found that doing well in school influenced a student's perception of personal control.  A student's academic success and feelings of competence and being in control of one's life acts like a feedback loop in that academic success fostered feelings of being in control, which then influenced additional academic success. One way students can develop feelings of being in control is through their willingness to talk with parents, administrators, teachers, and neighbors about educational matters.  In addition, being engaged in the academic process such as regular attendance, helps facilitate the development of social networks within the school that will in turn help improve academic performance (Broh 2002; Teachman, Paasch, Carver 1997).

## 2.6 Contribution to Existing Literature

This study builds on existing literature in several ways. First, it provides an assessment of changes in academic achievement over time with a nationally representative, longitudinal sample of students in the United States and the use of multi-level modeling techniques. Second, it provides an extended model for examining the educational outcomes of students by testing the combined effects of neighborhood, family, school, and student factors on academic achievement. Although prior studies investigate the effects of neighborhood, family, school, and student factors on academic achievement, they have not provided a model in which the combined effects have been tested. Finally, it expands the limited perspective of NCLB by offering an integrated theoretical framework in which to examine key mechanisms that contribute to student success.

3 METHODS

3.1 Data

The data for this analysis is taken from the Education Longitudinal Study of 2002/2004 (ELS:2002), a national longitudinal study conducted by the National Center for Education Statistics (NCES) of the U.S. Department of Education's Institute of Education Sciences (IES). The ELS:2002 dataset is comprised of tenth graders first surveyed in 2002 (wave 1) with a follow-up survey of those same students in the twelfth grade conducted in 2004 (wave 2). The ELS:2002 data is well suited for the purpose of this study for several reasons. First, respondents are followed longitudinally. This allows for the covariates used in this study to be at points in time prior to the outcome of interest. Second, the data can be linked to the 2000 U.S. census data at the ZIP code level in order to assess the neighborhood contexts in which the student lives. Finally, ELS:2002 contains information gathered from parents, teachers, and principals, which allow for the creation of specific measures of family, school, and student social capital.

The base-year survey, wave 1, involved a stratified national probability sample of 15,362 students in their sophomore year of high school from 752 public, private, and parochial schools within the United States. In addition to the student surveys, 13,488 parents, 7,135 teachers, 743 principals, and 718 librarians completed a base-year questionnaire. Students provided information on school experiences, activities, attitudes, future education and occupational goals, family background characteristics, and language proficiency. Parent surveys gathered information on family characteristics, parental educational expectations for their children, and parental perceptions of their children's school experiences. School staff surveys gathered information on school environment,

staff characteristics, and staff perceptions of student learning. Further, NCES

administered cognitive tests designed to measure student achievement in reading and

mathematics to all students completing a questionnaire.

The follow-up study, wave 2, included base-year students who remained in their

base-year schools and a school administrator questionnaire. An assessment test in

mathematics was administered to students participating in wave 2.

The measures used in this study reflect the information taken from 11,477

respondents of public schools who participated in both the wave 1 and wave 2 data

collection. The controls and independent variables are taken from wave 1, while the

dependent variable is taken from wave 2 in order to assess the effects of the

neighborhood, family, school, and student factors at a point in time prior to the outcome

of interest, academic achievement as measured by standardized math tests.

<div align="center">3.2 Measures</div>

Most of the measures used in this study are standardized values with a mean of zero and a standard deviation of one. Two of the control variables, student's sex and race, are not standardized because they are categorical variables. Further, a similar method of scale construction is used for each of the scaled indicators in this analysis. First, each individual item is standardized. Second, an average is calculated by taking the sum of the indicators and dividing by the number of items in the scale. Finally, a standardized value is created from the average score. The advantage of using standardized values is to allow for comparison across models using a common metric (Kowaleski-Jones, Dunifon and Ream 2006).

<u>3.2.1 Independent Variables</u>

<u>3.2.1.1 Measures of Neighborhood Social Capital.</u> There are four dimensions of *Neighborhood Social Capital* used in this analysis: proportion of high status residents, racial/ethnic diversity, student mobility, and parental ties to the neighborhood. Two of the four dimensions, proportion of high status residents and racial/ethnic diversity, measure the structural features of the neighborhood, while the remaining two dimensions, student mobility and parental ties to the neighborhood are process measures that measure the opportunity for neighborhood interactions.

*Proportion of High Status Residents* is a standardized composite of the proportion of college graduates among persons over 24 years of age and the proportion of employed persons, ages 16 years or older, in professional or managerial occupations. The data is taken from the 2000 U.S. census and matched to the ELS:2002 data by the Zip code in which the student lived between the 10th and 12th grade. This variable indicates

<div align="right">20</div>

neighborhood advantage, in that it represents the potential pool of positive role models within a student's neighborhood (Ainsworth 2002; Kowaleski-Jones, Dunifon, and Ream 2006; Smith, Atkins and Connell 2003). The scores range from -1.99 to 3.82, with high scores indicating a higher proportion of residents in the neighborhood are college graduates employed in professional or managerial occupations, while low scores indicate a low proportion of neighborhood residents are college graduates employed in professional or managerial occupations. The proportions were standardized and averaged to create a proportion of high status residents ($\alpha$=.96).

Racial/Ethnic Diversity is a standardized composite calculated by taking one minus the sum of the squared proportions of each of the following racial/ethnic groups: whites, blacks, Asians, Native Americans, and others (Ainsworth 2003). The data is taken from the 2000 U.S. census and matched to the ELS:2002 data for the Zip code in which the student lived between the 10th and 12th grade. This variable represents the diversity of racial and ethnic groups within a student's neighborhood. The scores range from zero to .8, with high scores indicating a neighborhood that is racially and ethnically heterogeneous and low scores indicating a racially and ethnically homogenous neighborhood. Theoretical expectations are that the more diverse the neighborhood, the less likely residents within the neighborhood can form a consensus about norms, values, and appropriate behavior that are important resources of social capital.

Student Mobility is a continuous variable taken from the ELS:2002 parent survey. The question asks the number of times a student has changed schools, other than for promotion, since the first grade. Student mobility measures the amount of social integration experienced by the student. Students who move frequently lack the

opportunity to develop strong connections to their neighborhood and school and are less able to access or mobilize the necessary resources to help them successful navigate through the educational system. The scores range from zero to five with high scores indicating students changing schools frequently and lower scores indicating greater residential stability, thus providing opportunities to develop long-term social relationships.

*Parental Ties to the Neighborhood* is a dichotomous variable taken from the parent survey that measures how involved parents feel in their neighborhood or community. The higher scores indicate perceptions of the neighborhood or community as just a place to live while lower scores indicate greater parental connections to the neighborhood or community. The variable was reverse-coded with a range of zero to one so that a high score is indicative of greater parental connections to the neighborhood or community and lower scores indicate perceptions of the neighborhood or community as just a place to live.

3.2.1.2 Measures of Family Social Capital. Four dimensions of *Family Social Capital* used in this analysis are parent educational aspirations, parent-child interaction, number of siblings, and family composition. Two of the four measures, number of siblings and family composition, represent the structural aspects of the family, including the presence of one or both parents in the home and the number of siblings. They measure opportunity for interpersonal interactions between parents and children that can influence the creation of social capital. The other two variables, parent educational aspirations and parent-child interactions, represent the process aspects of family social

capital.  They measure the quality and quantity of the interactions between parents and children.

*Family Composition* is a dichotomous variable that indicates the structure of the student's family, as reported by the parent.  The original composite variable, constructed from two questions on the parent survey, consisted of nine items indicating family structure.  The dichotomous variable was created to indicate a two-parent family structure with one indicating a two-parent family structure and zero indicating all other family structures.

*Number of Siblings* is a continuous variable representing the number of siblings the tenth grader has regardless of whether they live in the same household as the student.  Data is reported by the parents and includes adopted siblings, half-, and stepbrothers and sisters.  The scores range from zero siblings to six or more siblings, with higher scores indicating more siblings while lower scores indicate fewer siblings.  Number of siblings is a measure of the frequency and duration of parent-child interactions that influence the transmission of pro-social attitudes and values toward education.  Prior research has found that the number of siblings has a negative influence on a student's academic achievement (Coleman 1988; Israel, Beaulieu and Hartless 2001).

*Parent Educational Aspirations* is a scaled variable consisting of two items, based on the student's perspective, that measure how far in school both mother and father expects the 10th grader to go. The scores range from one to seven with one indicating less than a high school diploma and seven shows receiving a Ph.D., MD, or other advanced degree.  This variable is a measure of the degree to which parents communicate high educational expectations for their children.  Higher scores indicate parents have

communicated higher educational expectations, while lower scores indicate parents have communicated lower educational expectations.  The two items were then standardized and averaged to create the parental educational aspirations scale ($\alpha$=.85).

*Parent-Child Interactions* is a scaled variable consisting of eight items, reported by the student, measuring the degree to which parents and children talk about matters related to school and personal experiences.[1] The items in the scale deal with conversations between parents and children regarding student's grades, going to college, school courses the student is taking, current events, and any problems the student is experiencing.  High scores indicate more frequent parent-child interactions related to school and personal experiences while a low score indicates infrequent or no interaction regarding school matters and personal issues between parents and the student. The eight items were standardized and averaged to create the parent-child interaction scale ($\alpha$=.86).

3.2.1.3 Measures of School Social Capital. Three dimensions of *School Social Capital* used in this analysis are school norms and expectations, percent of certified teachers, and student/teacher ratio.  Two of the three measures, percent of certified teachers and student/teacher ratio represent the structural aspects of the school's educational environment that influence student learning.  School norms and expectations represent the process aspects of school environment by measuring the degree to which schools have set high standards for student learning.

*School Norms and Expectations* is a scaled variable, consisting of three items that measure the degree to which the school has set high standards for student learning as reported by the principal. The items in the scale deal with whether teachers press students to achieve academically, if learning is a high priority for students, and if students are

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expected to do homework. Higher scores indicate that high standards for student learning have been established while lower scores indicate that high standards have not been established. The three items were standardized and averaged to create the school norms and expectations scale ($\alpha$=.81).

*Percent of Certified Teachers* is a continuous variable indicating the percent of full-time teachers employed in the school that are certified. The scores range from a low of 2 percent of the teachers are certified to 100 percent of the teachers are certified. A high score indicates a greater proportion of the teachers employed in the school are certified, while a low score indicates that a lower proportion of the teachers are certified. This measure serves as a proxy indicator of the highly qualified teacher standard imposed by NCLB. However, although the data indicate the percent of certified teachers employed in the school, it does not allow us to know the percent of certified teachers teaching subjects in which they received certification as required by the highly qualified teacher standard.

*Student/Teacher Ratio* is a continuous variable measuring the proportion of students per full-time teachers employed in the school during the 2001-2002 school year. A high score on this measure indicates a high number of students per full-time teacher, while a low score indicates a low number of students per full-time teacher. This indicator is a proxy measure for class size. It is expected that a smaller class size will provide more opportunity for individualized attention given to the students within a classroom.

3.2.1.4 Measures of Student Social Capital. The four dimensions of *Student Social Capital* used in this analysis are the number of close friends who dropped out of school, the number of siblings who dropped out of school, the importance of grades to the

student, and the degree to which a student prepares for class. These measures represent a student's normative orientation toward education by assessing 1) the attitudes and behaviors a student has towards education and school; and, 2) the ability the student has to develop and maintain social relationships that will help facilitate academic achievement.

*Number of Friends Who Dropped out of School* is a continuous variable, measuring the number of close friends dropping out of school. This measure, taken from the student survey, asks if none of their close friends dropped out of school, some of their close friends dropped out of school, most of their close friends dropped out of school, or all of their close friends dropped out of school. A high score on this measure indicates that a high number of close friends have dropped out of school, while a low score on this measure indicates that some or none of their close friends have dropped out of school.

*Number of Siblings Who Dropped out of School* is a continuous variable measuring the number of siblings dropping out of school. This measure is the parent's response to the question that asks the number of siblings that have dropped out of school. The scores range from zero siblings to six or more siblings who have dropped out of school. A higher score indicates a higher number of siblings who have dropped out of school, while a low score indicates none or some of the student's siblings have dropped out of school.

*Importance of Grades* is a continuous variable measuring the importance of grades to the student. The measure is based on the student's response to a question that asks if grades are not important, somewhat important, important, or very important to the

student.  Higher scores on this measure indicate that the student feels grades are important, while lower scores indicate the student feels grades are not as important.

*Student Class Preparation* is a scaled variable consisting of three items that measure the degree to which a student comes to class unprepared.  The measure based on the survey asks how often a student comes to class without a pencil/pen or paper, without books, or without homework done.  The items were reverse-coded so that a high score indicates the student usually comes to school prepared for class, while a low score indicates the student never comes to school prepared for class. The items were then standardized and averaged to create a student class preparation scale ($\alpha$=.81).

3.2.2 Dependent Variable

3.2.2.1 Academic Achievement.  The 12th grade standardized math test score is used to measure the dependent variable, academic achievement.  Although there are limitations and bias related to examining test scores, they provide a common metric in which to compare results across schools and between students.  Further, there is an increase in the use of standardized tests as a way to measure student progress as part of the federal accountability requirements for schools (Ainsworth 2002, Dworkin 2005).

3.2.3 Control Variables

Several control variables are included in this analysis in order to address concerns related to spuriousness.  First, a relationship could emerge due to individual level characteristics in the sample that could predict academic achievement. Second, an association could emerge due to family characteristics that predict academic achievement.  Individual characteristics included as controls are: *Sex* (a categorical variable; males = 1 and females = 2) and *Race* (a categorical variable; non-whites = 0 and

white = 1).  *Family SES* (a standardized composite variable consisting of father's and mother's education level, father's and mother's occupation, and family income) is included as a control for family characteristics.  Also included is the *10th grade standardized math test score* in order to measure changes in test scores because of maturation in age and knowledge level.

4 ANALYSIS

The purpose of the analysis is to test the following hypotheses that: (1) measures of neighborhood social capital have independent effects on academic achievement, net the effects of the control variables, (2) measures of family social capital have independent effects on academic achievement, net the effects of the control variables, (3) measures of school social capital have independent effects on academic achievement, net the effects of the control variables, (4) measures of student social capital have independent effects on academic achievement, net the effects of the control variables; and, (5) measures of neighborhood, family, school, and student social capital have a combined effect on academic achievement, net the effects of the control variable. As a first step in addressing the stated hypotheses, it is important to confirm that there is a relationship at the bivariate level.

4.1 Bivariate Results

Table 1 below contains the means, standard deviations and intercorrelations for each of the variables in this study. While primary concern is given to the theoretical variables, there are some interesting correlations pertaining to the controls that deserve to be addressed.

First, it is important to note the strong correlation between scores on the Grade 10 standardized math test and scores on the Grade 12 standardized math test. The correlation suggests that a student's prior achievement on standardized math tests is an important predictor of current performance on standardized math tests. Second, a significant positive correlation between family socioeconomic status and a student's performance on standardized math tests indicate that the higher the socioeconomic status

of the family, the better students perform on standardized math tests. This is consistent with social capital theory in that there is a relationship between structural factors and students academic outcomes.

**Table 1. Means, Standard Deviations, and Intercorrelations**

| Variables | Mean (s.d.) | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Gr 10 Standardized Math Test | .00 (1.00) | .40** | -.05** | .26** | .24** | -.16** | -.09** | .10** | .26** | .17** | -.19** | .15** | .20** | .08** | -.05** | -.25** | -.17** | .12** | .18** | .55** |
| 2. Family SES | .00 (1.00) | — | -.02* | .24** | .32** | -.19** | -.04** | .19** | .27** | .21** | -.21** | .18** | .22** | .08** | -.05** | -.17** | -.20** | .06** | .09** | .30** |
| 3. Student Sex | 1.51 (.50) | | — | .00 | .01 | -.00 | -.01 | -.01 | .09** | .14** | .03** | -.00 | .02 | -.00 | .02 | .01 | .02 | .16** | .12** | -.01 |
| 4. Student Race | .53 (.50) | | | — | .02 | -.48** | -.10** | .20** | .00 | .05** | -.17** | .15** | .10** | .14** | -.23** | -.08** | -.09** | -.12** | .11** | .15** |
| 5. Proportion of High Status Residents | .00 (1.00) | | | | — | -.15** | -.01** | .02* | .13** | .09** | -.14** | .04** | .34** | .07** | .02 | -.08** | -.10** | .02* | .02 | .18** |
| 6. Racial/Ethnic Diversity | .00 (1.00) | | | | | — | .05** | -.14** | -.00 | -.05** | .09** | -.06** | -.13** | -.27** | .19** | .07** | .08** | .07** | -.07** | -.10** |
| 7. Student Mobility | .00 (1.00) | | | | | | — | -.15** | -.03* | -.01 | .12** | -.07** | -.01 | .01 | .06** | .06** | .09** | -.02* | -.04** | -.13** |
| 8. Parent Ties to Neighborhood | .00 (1.00) | | | | | | | — | .04** | .10** | -.08** | .11** | .04** | .04** | -.08** | -.05** | -.09** | .01 | .05** | .10** |
| 9. Parent Educational Aspirations | .00 (1.00) | | | | | | | | — | .22** | -.09** | .04** | .11** | .01 | -.03* | -.11** | -.08** | .20** | .07** | .21** |
| 10. Parent-Child Interactions | .00 (1.00) | | | | | | | | | — | -.10** | .06** | .08** | .02 | -.01 | -.13** | -.10** | .37** | .15** | .17** |
| 11. Number of Siblings | .00 (1.00) | | | | | | | | | | — | -.04** | -.11** | -.03* | .05** | .09** | .35** | -.01 | -.05** | -.17** |
| 12. Family Composition | .00 (1.00) | | | | | | | | | | | — | .06** | .05** | -.01 | -.08** | -.09** | .02* | .07** | .13** |
| 13. School Norms and Expectations | 00. (1.00) | | | | | | | | | | | | — | .14** | -.04** | -.09** | -.09** | .01 | .05** | .14** |
| 14. Percent of Certified Teachers | .00 (1.00) | | | | | | | | | | | | | — | -.16** | -.04** | -.01 | -.03* | .03** | .07** |
| 15. Student/Teacher Ratio | .00 (1.00) | | | | | | | | | | | | | | — | .04** | .05** | .06** | -.03** | -.06** |
| 16. Number of Friends Who Dropped Out | .00 (1.00) | | | | | | | | | | | | | | | — | .12** | -.14** | -.12** | -.28** |
| 17. Number of Siblings Who Dropped Out | .00 (1.00) | | | | | | | | | | | | | | | | — | -.05** | -.05** | -.20** |
| 18. Importance of Grades to Student | .00 (1.00) | | | | | | | | | | | | | | | | | — | .21** | .17** |
| 19. Student Class Preparation | .00 (1.00) | | | | | | | | | | | | | | | | | | — | .14* |
| 20. Gr 12 Standardized Math Test | .00 (1.00) | | | | | | | | | | | | | | | | | | | — |

*Correlation is significant at the .05 level (two-tailed)
**Correlation is significant at the .01 level (two-tailed)

A review of the theoretical variables indicate bivariate support for the relationship between measures of neighborhood, family, school, and student social capital and academic achievement as posited by social capital theory. Two negative correlations of interest are between scores on the Grade 12 standardized math test and the number of close friends and siblings who dropped out of school. These associations indicate that students who have higher scores on standardized math tests have fewer friends and siblings dropping out of school.

With the confirmation of correlations among measures at the bivariate level, the next step is the assessment of patterns at the multivariate level. Ordinary least squares regression is used to evaluate the ability of the measures of neighborhood, family, school, and student social capital in predicting the variations in scores on academic achievement.[2]

### 4.2 Multivariate Results

#### 4.2.1 Control Variables

In the analysis there are concerns for spuriousness. Several control variables are included to address these concerns. First, a relationship could emerge due to individual level characteristics in the sample that predict both neighborhood, family, school, and student dimensions of social capital and academic achievement. Second, an association could emerge due to family characteristics that predict both neighborhood, family, school, and student dimensions of social capital and academic achievement. The controls are presented in equation one in all of the models as a reference.

The following discussion of the controls is relevant for all models and will not be repeated in each of the subsections. In equation one, the effects of the controls on

academic achievement indicate the controls account for 32 percent of the variation in scores on academic achievement. This is largely due to the influence of the effects of a student's prior achievement on standardized math tests. Scores on the Grade 10 standardized math test ($\beta$=.52) is a significant predictor of academic achievement, as measured by the scores on the Grade 12 standardized math test. Family socioeconomic status ($\beta$=.10) is also a significant predictor of the academic achievement of seniors in public schools. These results are consistent with the correlations found at the bivariate level.

<u>4.2.2 Hypothesis One.</u>

      Table 2 below contains the three equations that provide a test of the first hypothesis that measures of neighborhood social capital have independent effects on academic achievement, net of the effects of the controls for prior achievement, individual, and family characteristics.

**Table 2**. **The Effects of Measures of Neighborhood Social Capital on Academic Achievement**
**(n=11,477)**

| Variables | 1 | 2 | 3 |
|---|---|---|---|
| Grd 10 Std Math Test Score | .52*** | | .51*** |
| | .51 (.01) | | .49 (.01) |
| Family SES | .10*** | | .10*** |
| | .10 (.01) | | .10 (.01) |
| Student Sex | .02* | | .02* |
| | .04 (.02) | | .04 (.02) |
| Student Race | -.01 | | -.02 |
| | -.02 (.02) | | -.04 (.02) |
| Proportion of High Status Residents | | .19*** | .03** |
| | | .18 (.01) | .03 (.01) |
| Racial/Ethnic Diversity | | -.06*** | .01 |
| | | -.06 (.01) | .01 (.01) |
| Student Mobility | | -.11*** | -.07*** |
| | | -.10 (.01) | -.07 (.01) |
| Parent Ties to Neighborhood | | .07*** | .02 |
| | | .07(.01) | .02 (.01) |
| Adjusted $R^2$ | .32 | .06 | .34 |

Note: For each variable, the standardized coefficient is shown in the top row and the unstandardized coefficient and standard error (in parentheses) are shown in the bottom row.

*p<.05    **p<.01    ***p<.001    (two-tailed tests)

Equation two shows the effects of neighborhood indicators of social capital on academic achievement.  The strongest predictors of variations in scores on academic achievement are the *Proportion of High Status Residents* (β=.19) and *Student Mobility* (β=-.11).  The results show that the proportion of high status residents has a significant, positive effect on academic achievement, while student mobility has a significant, negative effect.  These results are consistent with social capital theory in that a greater proportion of high status residents provide positive role models that influence pro-educational behavior and attitudes in students.  Conversely, the relationship between student mobility and academic achievement demonstrates the negative effect on academic

achievement when students do not have the opportunity to develop close ties with neighborhood residents and school personnel. The adjusted $r^2$ for the equation indicates that the measures of neighborhood social capital account for 6 percent of the variation in scores on academic achievement.

Equation three shows the effects of the measures of neighborhood social capital, net the influence of the controls. *Proportion of High Status Residents* ($\beta$=.03) and *Student Mobility* ($\beta$=.-.07) show a significant, but moderated, effect on academic achievement when accounting for prior academic achievement and individual and family characteristics. When taking into account prior academic achievement, and individual and family characteristics, *Racial/Ethnic Diversity (*$\beta$=.01) and *Parent Ties to Neighborhood* ($\beta$=.02) are rendered spurious. In this model, measures of neighborhood social capital contribute a 2 percent increase in the explained variation in scores on academic achievement over the effects of the controls shown in equation one.

4.2.3 Hypothesis Two.

Table 3 below contains three equations that provide a test of hypothesis two, that the measures of family indicators of social capital have an independent effect on academic achievement, net the effect of control variables.

**Table 3. The Effects of Measures of Family Social Capital on Academic Achievement**
**(n=11,477)**

| Variables | 1 | 2 | 3 |
|---|---|---|---|
| Grd 10 Std Math Test Score | .52*** | | .52*** |
| | .51 (.01) | | .48 (.01) |
| Family SES | .10*** | | .07*** |
| | .10 (.01) | | .07 (.01) |
| Student Sex | .02* | | -.01 |
| | .04 (.02) | | -.03 (.02) |
| Student Race | -.01 | | -.02 |
| | -.02 (.02) | | -.03 (.02) |
| Parent Educational Aspirations | | .18*** | .04*** |
| | | .16 (.01) | .04 (.01) |
| Parent-Child Interaction | | .11*** | .06*** |
| | | .10 (.01) | .06 (.01) |
| Number of Siblings | | -.12*** | -.04*** |
| | | -.12 (.01) | -04 (.01) |
| Family Composition | | .13*** | .05*** |
| | | .12 (.01) | .04 (.01) |
| | | | |
| Adjusted $R^2$ | .32 | .09 | .35 |

Note: For each variable, the standardized coefficient is shown in the top row and the unstandardized coefficient and standard error (in parentheses) are shown in the bottom row.

*p<.05   **p<.01   ***p<.001   (two-tailed tests)

Equation two shows the effects of the measures of family social capital on academic achievement. The strongest predictor of academic achievement is *Parent Educational Aspirations* (β=.18), followed by *Family Composition* (β=.13), *Number of Siblings* (β=-.12), and *Parent-Child Interaction* (β=.11). *Parent Educational Aspirations* has a significant positive effect on academic achievement indicating that the more schooling parents want for their children, the better the student performs on standardized math tests. In addition, *Family Composition* has a significant positive effect on academic achievement, indicating that students who live in two-parent homes score higher on standardized math tests. Conversely, the *Number of Siblings* has a significant negative

effect on academic achievement, indicating that the greater the numbers of children in the family, the less time parents have to provide individualized attention resulting in a negative impact on academic achievement. The adjusted $r^2$ for the equation shows that measures of family social capital account for 9 percent of the variation in scores on academic achievement.

Equation three shows the effects of the measures of family social capital, net the influence of the controls. *Parent Educational Aspirations* ($\beta=.04$), *Parent-Child Interactions* ($\beta=.06$), *Number of Siblings* ($\beta=-.04$), and *Family Composition* ($\beta=.05$) show a significant, but moderated, effect on academic achievement when taking into account prior achievement, as well as individual and family characteristics. This model indicates that measures of family social capital add 3 percent to the explained variation in scores for academic achievement over the effects of the controls shown in equation one.

4.2.4 Hypothesis Three.

Table 4 below contains the three equations that provide a test hypothesis three, that the measures of school social capital have an independent effect on academic achievement, net the effects of control variables.

**Table 4. The Effects of Measures of School Social Capital on Academic Achievement**
**(n=11,477)**

| Variables | 1 | 2 | 3 |
|---|---|---|---|
| Grd 10 Std Math Test Score | .52*** | | .53*** |
| | .51 (.01) | | .51 (.01) |
| Family SES | .10*** | | .10*** |
| | .10 (.01) | | .10 (.01) |
| Student Sex | .02* | | .02 |
| | .04 (.02) | | .03 (.02) |
| Student Race | -.01 | | -.03** |
| | -.02 (.02) | | -.05 (.02) |
| School Norms and Expectations | | .14*** | .00 |
| | | .13 (.01) | .00 (.01) |
| Pct of Certified Teachers | | .04*** | .02 |
| | | .04 (.01) | .02 (.01) |
| Student/Teacher Ratio | | -.04*** | -.03*** |
| | | -.04 (.01) | -.03 (.01) |
| Adjusted R$^2$ | .32 | .02 | .32 |

Note: For each variable, the standardized coefficient is shown in the top row and the unstandardized coefficient and standard error (in parentheses) are shown in the bottom row.

*p<.05    **p<.01    ***p<.001    (two-tailed tests)

Equation two shows the effects of the measures of school social capital on academic achievement. The strongest predictor of academic achievement is *School Norms and Expectations* ($\beta$=.14) indicating that students in schools who have high standards for learning are more likely to have higher scores on standardized math tests. It is important to note that *Student/Teacher Ratio* ($\beta$=-.04) has a significant negative effect on academic achievement. The results indicate that the larger the class size, the lower the student's scores on standardized math tests. The adjusted r$^2$ for the equation shows that the measures of school social capital account for 2 percent of the explained variation in scores of academic achievement.

Equation three shows the effects of the measures of school social capital net the influence of the controls. *Student/Teacher Ratio* ($\beta$=-.03) continues to demonstrate a significant, but moderated, effect on academic achievement when taking into account a student's prior academic achievement as well as individual and family characteristics. With the introduction of the controls, the *Pct of Certified Teachers* ($\beta$=.02) is rendered spurious. The effect of School *Norms and Expectations* ($\beta$=.00) on academic achievement is mitigated when taking into account prior achievement and individual and family characteristics. The adjusted $r^2$ for the equation indicates that measures of school social capital do not add to the explained variation in scores of academic achievement when prior achievement and individual and family characteristics are taken into account. This is an important finding in that it shows that there is a strong association between school factors and structural factors measured by the controls.

4.2.5 Hypothesis Four.

Table 5 below contains the three equations that provide a test of hypothesis four, that measures of student social capital have an independent effect on academic achievement, net the effect of the controls.

**Table 5**. **The Effects of Measures of Student Social Capital on Academic Achievement**
**(n=11,477)**

| Variables | 1 | 2 | 3 |
|---|---|---|---|
| Grd 10 Std Math Test Score | .52*** | | .50*** |
| | .51 (.01) | | .47 (.01) |
| Family SES | .10*** | | .07*** |
| | .10 (.01) | | .07 (.01) |
| Student Sex | .02* | | -.01 |
| | .04 (.02) | | -.01 (.02) |
| Student Race | -.01 | | -.01 |
| | -.02 (.02) | | .01 (.02) |
| Number of Friends Who Dropped Out | | -.23*** | -.12*** |
| | | -.22 (.01) | -.12 (.01) |
| Number of Siblings Who Dropped Out | | -.15*** | -.07*** |
| | | -.15 (.01) | -.07 (.01) |
| Importance of Grades to Student | | .12*** | .07*** |
| | | .11 (.01) | .06 (.01) |
| Student Class Preparation | | .05*** | .01 |
| | | .05 (.01) | .01 (.01) |
| Adjusted $R^2$ | .32 | .11 | .37 |

Note: For each variable, the standardized coefficient is shown in the top row
and the unstandardized coefficient and standard error (in parentheses) are
shown in the bottom row.

*p<.05      **p<.01      ***p<.001      (two-tailed tests)

Equation two shows the effects of measures of student social capital on academic achievement. The strongest predictor of academic achievement is the *Number of Friends Who Dropped Out* (β=-.23), followed by the *Number of Siblings Who Dropped Out* (β=-.15), *Importance of Grades* (β=.12), and *Student Class Preparation* (β=.05). Both friends and siblings who dropped out show a significant negative effect on academic achievement indicating that students with high scores on standardized test scores have fewer friends and siblings dropping out of school. In addition, *Importance of Grades* has a significant positive effect indicating that students who place greater importance on grades have higher scores on standardized math tests. The adjusted $r^2$ for the equation

indicates that measures of student social capital explain 11 percent of the variation in scores of academic achievement.

Equation three shows the effects of the measures of student social capital on academic achievement, net the influence of the control variables. *Number of Friends Who Dropped Out* ($\beta$=-.12), the *Number of Siblings Who Dropped Out* ($\beta$=-.07), and the *Importance of Grades* ($\beta$=.07) show a significant, yet moderated effect on academic achievement when taking into account prior achievement and individual and family characteristics. The effect of *Student Class Preparation* ($\beta$=.01) on academic achievement is rendered spurious with the introduction of the controls. The adjusted $r^2$ for the equation indicates that the measures of student social capital add 5 percent to the variation in scores for academic achievement over the influence of the controls shown in equation one.

4.2.6 Hypothesis Five.

Table 6 below contains the three equations that provide a test hypothesis five, that the measures of neighborhood, family, school, and student social capital have a combined effect on academic achievement, net the effects of the control variables.

Of particular interest, is the difference in the effect of student race in the individual models compared to its effect in the full model. In the individual models, the effect of student race is not significant. However, in the full model (see Table 6 below), the effect of student race becomes significant. Discussion related to this find can be found later on in the paper.

| Variables | 1 | 2 | 3 |
|---|---|---|---|
| Grd 10 Std Math Test Score | .52*** | | .48*** |
| | .51 (.01) | | .45 (.02) |
| Family SES | .10*** | | .05** |
| | .10 (.01) | | .05 (.02) |
| Student Sex | .02* | | -.03 |
| | .04 (.02) | | -.05 (.03) |
| Student Race | -.01 | | -.05** |
| | -.02 (.02) | | -.09 (.03) |
| Proportion of High Status Residents | | .11*** | .02 |
| | | .10(.02) | .12 (.02) |
| Racial/Ethnic Diversity | | -.02 | .00 |
| | | -.02 (.02) | -.00 (.02) |
| Student Mobility | | -.07*** | -.05*** |
| | | -.06 (.02) | -.05 (.01) |
| Parent Ties to Neighborhood | | .02 | .01 |
| | | .02 (.02) | .01 (.01) |
| Parent Educational Aspirations | | .16*** | .05** |
| | | .15 (.02) | .05 (.02) |
| Parent-Child Interaction | | .04* | .03* |
| | | .04 (.02) | .03 (.02) |
| Number of Siblings | | -.05** | -.01 |
| | | -.05 (.02) | -.01 (.02) |
| Family Composition | | .10*** | .05*** |
| | | .10 (.02) | .05 (.01) |
| School Norms and Expectations | | .05** | .01 |
| | | .05 (.02) | .00 (.01) |
| Pct of Certified Teachers | | .02 | .03 |
| | | .02 (.02) | .02 (.01) |
| Student/Teacher Ratio | | -.01 | -.01 |
| | | -.01 (.02) | -.01 (.01) |
| Number of Friends Who Dropped Out | | -.16*** | -.11*** |
| | | -.16 (.02) | -.11 (.02) |
| Number of Siblings Who Dropped Out | | -.08*** | -.06*** |
| | | -.09 (.02) | -.06 (.02) |
| Importance of Grades | | .07*** | .04** |
| | | .07 (.02) | .04 (.02) |
| Student Class Preparation | | .03 | .01 |
| | | .03 (.02) | .01 (.01) |
| Adjusted $R^2$ | .32 | .18 | .37 |

Note: For each variable, the standardized coefficient is shown in the top row and the unstandardized coefficient and standard error (in parentheses) are shown in the bottom row.

*p<.05   **p<.01   ***p<.001   (two-tailed tests)

Equation two shows the combined effects of measures of neighborhood, family, school, and student social capital on academic achievement. The most significant predictors are *Parent Educational Aspirations* ($\beta$=.16), which has a positive effect on academic achievement and the *Number of Friends Who Dropped Out* ($\beta$=-.16), which has a negative effect on academic achievement. These are followed by *Proportion of High Status Residents* ($\beta$=.11), and *Family Composition* ($\beta$=.10), both indicating a significant, positive effect on academic achievement, and the *Number of Siblings who Dropped Out* ($\beta$=-.08) showing a significant, negative effect. *Importance of Grades* ($\beta$=.07), *School Norms and Expectations* ($\beta$=.05), and *Parent-Child Interactions* ($\beta$=.04) also indicate a significant, positive effect on academic achievement, while *Student Mobility* ($\beta$=-.07) and the *Number of Siblings* ($\beta$=-.05) indicate a significant, negative effect. The adjusted $r^2$ for the equation shows that measures of neighborhood, family, school, and student social capital account for 18 percent of the explained variation in scores on academic achievement.

Equation three presents the combined effects of neighborhood, family, school, and student measures of social capital, net the influence of the controls. The most notable change is in the *Proportion of High Status Residents* ($\beta$=.02) which is rendered spurious when taking into account prior achievement and individual and family characteristics as measured by the controls. The most significant predictors of the variation in scores on academic achievement are the *Number of Friends Who Dropped Out* ($\beta$=-.11) followed by the *Number of Siblings Who Dropped Out* ($\beta$=-.06) demonstrating a significant, but moderated effect on academic achievement when taking into account prior achievement and individual and family characteristics. Additional

measures showing a significant, moderated effect on academic achievement are *Student Mobility* ($\beta$=-.05), *Family Composition* ($\beta$=.05), *Parent Educational Aspirations* ($\beta$=.05), *Importance of Grades* ($\beta$=.04), and *Parent-Child Interaction* ($\beta$=.03). In addition to the proportion of high status residents, the effects for *Number of Siblings* ($\beta$=-.01) and *School Norms and Expectations* ($\beta$=.01) on academic achievement are rendered spurious, when taking into account prior academic achievement and individual and family characteristics. The introduction of the controls mitigates the effect of *Racial/Ethnic Diversity* ($\beta$=.00) on academic achievement. The adjusted $r^2$ for the equation indicates that the measures of neighborhood, family, school, and student social capital contribute an additional 5 percent of the explained variation in scores of academic achievement over the effects of the control variables shown in equation one.

Overall, the regression results indicate that the full model significantly predicts academic achievement of high school seniors in public schools, $R^2$=.37, $R^2_{adj}$=.37, $F(19, 3087)$=96.69, $p$<.001. However, while the model accounts for 37 percent of the variation in scores on academic achievement, the individual and combined effects for the neighborhood, family, school, and student factors on academic achievement are quite small. The implications of these findings and recommendations for future research will be discussed in the following section.

5 DISCUSSION AND CONCLUSION

Current federal education law places the responsibility of the academic achievement of students with schools while ignoring other social factors that this analysis shows influence youth educational outcomes. This study employs an ecological-developmental approach to examine neighborhood, family, school, and student factors that influence academic achievement in order to determine their role in assessing school accountability efforts. The results indicate a number of significant and interesting findings discussed below.

First, when accounting for neighborhood, family, and student factors, measures of school social capital show a nonsignificant effect on academic achievement. This finding has major implications related to the effectiveness of current school accountability efforts. NCLB proposes that if a school employs highly qualified teachers (i.e., they have degrees and full certification in the subjects they teach) and sets high expectations for learning, then students will achieve academic success. However, these findings do not support this premise. In contrast, they demonstrate the importance of examining the overall effects of the social systems in which the student resides in order to assess effective school accountability efforts.

Second, when assessing the combined effects of neighborhood, family, school, and student factors on academic achievement, a student's race becomes significant. This is interesting, as a student's race is not a significant predictor of academic achievement in the individual models. This finding highlights the institutional nature of race and its influence on the educational outcomes of students. That is, a student's race becomes a

significant issue when placed within the broader social contexts in which students, families, schools, and neighborhoods interact.

Third, the results indicate that the number of friends and siblings who have dropped out of school is a significant predictor of academic achievement.  Thus, students with higher scores on standardized math tests have fewer friends and siblings who have dropped out of school.  This finding is important in that it demonstrates the influence of peer groups on a student's attitudes and beliefs toward educational performance, over and above the effect of family composition and parental expectations for high educational attainment. It lends support to the collective socialization perspective of social capital theory, which states that social networks influence a student's norms, values, attitudes, and behaviors.  In addition, these findings further the argument that the outcomes of membership in social networks are not always positive.

Finally, the results indicate that the effects of neighborhood structural constraints, as measured by the proportion of high status residents and racial or ethnic heterogeneity, are not significant when accounting for family, student, and school factors.   This finding lends support for an integrated social disorganization/social capital theoretical approach as it shows that social ties can mediate the effects of neighborhood structural characteristics.

Several limitations with this study merit attention when considering the implications of these findings.  First, the significant effects of the indicators may be due to the size of the sample used in the models.  With a large sample, the results can be statistically significant even though the differences are minimal, leading us to a false conclusion of a significant association when, in fact, there is none.  Second, measures of

social capital used in this study were constructed from existing data. An improvement would be to construct measures that are more precise in order to capture the structure, duration, and depth of the social networks in which students are members. Finally, ZIP codes are used to match neighborhood structural characteristics to schools. However, areas defined by ZIP codes are larger than what is typically considered a neighborhood, especially in urban areas.

The results of this study indicate that the combined effects of neighborhood, family, school, and student factors account for a small proportion of the variance in academic achievement. The findings presented here extends current research by using an integrated theoretical framework in explaining the structural and individual-level factors that impact the educational outcomes for students. The integrated theory provides a micro-macro link by showing that the resources available through individual social networks can help mediate neighborhood structural constraints.

Given the limitations and results of this study, there are several recommendations for future research on neighborhood, family, school, and student factors that influence academic achievement. First, multi-level modeling can be a useful tool in analyzing hierarchically structured data, as it provides better estimates of contextual effects at different levels of the hierarchy, such as students nested within schools nested within neighborhoods. Second, further research is necessary to identify indicators that will better measure a school's accountability efforts. Precise measures are needed that identify the key mechanisms in which neighbors, schools, parents, and students interact in order to create a positive learning environment that contributes to the academic success of students. Third, future research is needed using student data at the elementary and

middle school level.  It will be important to know if similar results are achieved at earlier stages of the educational process.  This could have implications in the design of support systems to help students achieve positive educational outcomes.  Fourth, the current study used the scores on Grade 12 standardized math tests as the measure for academic achievement.  It will be beneficial to examine other measures of academic achievement to assess their impact.  For example, other researchers have used time spent on homework, grades, and GPA. Finally, the significant results of a student's race should be investigated further by examining differences in the social support available based on race or ethnic categories.

Many factors influence a student's chance at being successful in school. The objective of this study was to examine the effects of neighborhoods, family, school, and student factors that contribute to academic achievement in order to determine their role in assessing school accountability efforts.  This study has demonstrated that without the consideration of both structural and individual-level factors and their relationship to one another, our understanding of the educational process is incomplete.  If we are to look at ways to improve education programs for students, then it is important to adopt a holistic approach in examining all factors that influence the educational outcomes for students. From an ecological-developmental perspective, it does take a village to ensure the academic success of our children.

## Notes

[1] A principal components analysis with varimax rotation was conducted on *Parent-Child Interactions, School Norms and Expectations,* and *Student Class Preparation*. In all cases, items used in the construction of the scaled variable are the items that loaded highly on a single factor.

[2] Data were screened for missing data, outliers, and other potential data entry errors. Univariate and multivariate examinations of the data were performed to test assumptions of normality, linearity, and homoscedasticity. Linearity was assessed through an examination of bivariate scatterplots. Normality was evaluated through the assessment of the values for skewness, kurtosis, and Kolmogorov-Smirnov assessed using the Box's M test.

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Appendix


Appendix A    Measures and Descriptions

**APPENDIX A   Measures and Descriptions**

| Measure | Description | Survey |
|---|---|---|
| **Dependent Variable** | | |
| Math Standardized Test Score (F1TXMSTD) | The standardized T score provides a norm-referenced measurement of achievement, that is, an estimate of achievement relative to the population (spring 2004 12th graders) as a whole.  The standardized T score is a transformation of the IRT theta (ability) estimate, and has a mean of 50 and standard deviation of 10 for the weighted subset of 12th graders in the sample. | |
| **Neighborhood Social Capital – Independent Variable** | | |
| Neighborhood high-status residents (U.S. Census) | Standardized composite of the following proportions for youth's neighborhood of residence: (1) proportion of college graduates among persons over 24 years of age; 2) proportion of employed persons with professional or managerial occupations. | Census |
| Neighborhood racial/ethnic diversity (U.S. Census) | One minus the sum of the squared proportions of each of the following racial/ethnic groups in youth's neighborhood: whites, blacks, Asians, Native Americans, and others. | Census |
| Student Mobility (BYP45) | Number of times student changed schools since 1$^{st}$ grade (not due to promotion). | Parent |
| Parental Ties to Neighborhood (BYP66) | Do you feel as though you are a part of your neighborhood or community or do you think of it more as just a place to live?<br>1 = Feel part of the neighborhood/community<br>2 = Just a place to live<br>(Recoded to 0=Just a place to live, 1 = Feel part of the neighborhood/community). | Parent |
| **Family Social Capital – Independent Variable** | | |
| Family Composition (BYFCOMP) | Composite variable based primarily on variables BYP01 and BYP04 (relationship of parent respondent and spouse/partner to student).  Also considered was whether respondent lived with student at least half-time.<br>Range: 1 = Mother & Father to 9 = Respondent lives with student less than half-time. | Parent |
| Number of Siblings (BYP08) | The question asked for the number of siblings, including adoptive, half-, and step-brothers and sisters, regardless of whether they live in the same household with your tenth grader.<br>Range: 0 = 0 Siblings to 6 = 6 or more | Parent |

| Measure | Description | Survey |
|---|---|---|
| Parent-Child Interactions (BYS86a-i) | How often do parents talk with child about several issues, ranging from school courses to problems child is having.<br>Scaled variable consisting of 9 items.<br>1=Never  2= Sometimes  3= Often | Student |
| Parent Educational Aspirations (BYS65a,b) | Parent expectations about college (Student Perspective)<br>Range 1 = < H.S. diploma to 7 = Obtain Ph.D., MD, other Advanced Degree | Student |
| **School Social Capital – Independent Variable** | | |
| Pct of Certified Teachers (BYA24a-b) | Continuous variable indicating the percent of full-time and part-time teachers in the school that are certified. | Admin |
| Student/Teacher Ratio (CP01STRO) | Continuous variable indicating student-teacher ratio as reported by schools through NCES CCD. | |
| School Norms and Expectations (BYA51b,d,e) | Scaled variable that measures the perception of universal school norms and expectations based on the responses from the School Administrator survey. | Admin |
| **Student Social Capital-- Independent Variable** | | |
| Importance of grades (BYS37) | Scaled variable that measures importance of grades to student.<br>1=Not Important<br>2=Somewhat important<br>3=Important<br>4=Very Important | Student |
| Student Class Preparation (BYS38a-c) | Scaled variable consisting of 3 items that measure coming to class prepared to learn.<br>1=Never<br>2=Seldom<br>3=Often<br>4=Usually | Student |
| Close friends who dropped out (BYS91) | Scaled variable measuring number of close friends dropping out of school.<br><br>1=None of them<br>2=Some of them<br>3=Most of them<br>4=All of them | Student |
| Number of Siblings dropped out of school (BYP09) | Number of siblings dropped out.<br>Range:  0= 0 Siblings to 6 = 6 or more siblings | Parent |

| Measure | Description | Survey |
|---|---|---|
| **Control Variables** | | |
| Student's Sex (BYSEX) | Sex is a categorical variable measured at the nominal level:  (1) Male, (2) Female.<br>(Recoded to 0 = Male; 1 = Female) | Student |
| Student's Race (BYRACE_R) | Student's reported race\ethnicity.  This is a categorical variable measured at the nominal level.  The original variable included 8 categories.  Recoded into two categories:<br>0 = Non-whites   1= Whites | Student |
| Math Standardized Test Score  (BYTXMSTD) | Math standardized T Score.  The standardized T score provides a norm-referenced measurement of achievement, that is, an estimate of achievement relative to the population (spring 2002 10th graders) as a whole.  It provides information on status compared to peers (as distinguished from the IRT-estimated number-right score which represents status with respect to achievement on a particular criterion set of test items).  The standardized T score is a transformation of the IRT theta (ability) estimate, rescaled to a mean of 50 and standard deviation of 10. | |
| Family Socioeconomic Status (BYSES2) | Standardized composite variable consisting of:<br>Father's education level (BYFATHED)<br>Mother's education level (BYMOTHED)<br>Father's occupation (BYOCCUFATH)<br>Mother's occupation (BYOCCUMOTH)<br>Family Income (BYINCOME) | |

Note:  Data name as found on survey and in dataset is in parentheses.

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