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The Effects of Curriculum and Social Capital on Post-Secondary Educational Attainment Among Public High School Students: A Multi-Level Analysis

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THE EFFECTS OF CURRICULUM AND SOCIAL CAPITAL ON POST-SECONDARY EDUCATIONAL ATTAINMENT AMONG PUBLIC HIGH SCHOOL STUDENTS: A MULTI-LEVEL ANALYSIS

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL
IN CANDIDCY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

PROGRAM IN RESEARCH METHODOLOGY

BY
ELISABETH C. DAVIS
CHICAGO, IL
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ABSTRACT

Using a social capital framework, the current study examined the effect of curriculum and cohort size in addition to parental and teacher social capital factors on public high school students’ likelihood of college attendance. Using Hierarchical Generalized Linear Modeling with the ELS (2002), student and school level factors were examined on the likelihood of postsecondary educational attainment among public high school students. At the student level, girls, students with higher SES, more intergenerational closure and higher parent and teacher educational expectations were significantly more likely to pursue postsecondary enrollment. At the school level, lower percentages of girls in the cohort, larger cohorts and schools with higher average parental educational expectations and intergenerational closure were significantly associated with an increased likelihood of postsecondary enrollment. Most cross-level interactions fell into one of two categories; compensation, in which lack of social capital in one environment was compensated for in the other environment, or magnification, in which higher degrees of social capital in one environment were magnified by social capital in the other environment. The results indicate that social capital is as important to the educational outcomes of public high school students as the curricular structure of a school. Educational policy makers should consider these factors in efforts to reform educational policy among public high schools.
CHAPTER ONE
INTRODUCTION

In a global economy where the most valuable skill you can sell is your knowledge, a good education is no longer just a pathway to opportunity – it is a pre-requisite. (President Barack Obama speaking to the joint session of Congress, February 24, 2009)

Transitions through the educational environment consist of several significant milestones. Adolescents need guidance and support from the adults closest to them such as parents, teachers and school administrators in order to help them achieve these milestones and navigate life transitions such as successfully completing high school and continuing on to college. According to the Bureau of Labor Statistics (2010), the average unemployment rate in the US was 8.2%; however, this rate had a strong negative relationship with education level in that Americans with no high school diploma were unemployed at a rate of 14.9%, those with a bachelor’s degree had a 5.4% unemployment rate and those with a doctoral degree had a 1.9% unemployment rate. Research shows a positive relationship of educational attainment with upward social mobility and other aspects of well-being (Cohen & Geske, 1990). Conversely, lack of a high school diploma or subsequent college degree is a disadvantage in the working world, limits job prospects and the potential to earn a living. The current administration has emphasized repeatedly that a high school diploma alone is no longer the key to a middle class lifestyle. In his 2012 State of the Union address, President Obama challenged all Americans to complete
at least one year of formal education past high school, whether at a two- or four-year college or other forms of postsecondary education such as vocational training (Obama, 2012). Even one year of postsecondary education past high school is associated with increased earnings over one’s lifetime (Wood, 2012).

In a recent study examining the high school context on college enrollment, Engberg and Wolniak (2010) show an interdependent relationship between high school students’ family context, such as relationships with parents, and the high school context, such as the student-teacher ratio and sector of a school, in regard to the likelihood of postsecondary enrollment. In order to more fully understand the nature of these relationships, it is important to focus simultaneously on school environments, such as the curricular structure and size of a school, as well as students’ personal environments, such as a student’s access to and relationship with their parents and teachers, as interrelated factors that may influence students’ likelihood of postsecondary enrollment, especially within the context of a struggling economy and an increasingly competitive job market, where employment prospects are becoming increasingly limited for those who choose not to continue their education past high school.

High School Curriculum Reform

The course of study offered to high school students has been studied, criticized and debated for decades (Lee & Ready, 2009). Two broad types of curricular paths have emerged to describe the course of training in high school, differentiated and constrained curricula. The differentiated high school curriculum consists of a wide variety of classes where students are often tracked according to ability level. This system was viewed as a
more democratic model of choice for students with diverse backgrounds and abilities where students would be “matched to society’s needs” (p. 137). Consequently, research examining the effects of differentiated curricula showed social and academic stratification along racial and socioeconomic dimensions, resulting in social disparities (Oakes, 1985). In 1983, the National Commission on Excellence in Education published a scathing report of the state our Nation’s high schools entitled *A Nation at Risk* (1983). The commission claimed that “the educational foundations of our society are presently being eroded by a rising tide of mediocrity”, bringing to light a failing high school system, and made several recommendations for reforming the content, standards and teaching practices of high schools, all aimed at increasing rigor in the high school curriculum. The committee argued that the differentiated high school curriculum where students are given a wide variety of learning options and placed into ability-based levels of educational tracks should be replaced by a more constrained curriculum, a recommendation they termed “the new basics.” This recommendation consisted of a minimum of the following: four years of English and three years each of mathematics, social studies and science. In the report, policy makers and education researchers were calling for a more constrained academic curriculum where all students take the same courses and few if any remedial courses are offered. This “college preparatory” curriculum would produce more students who graduate from high school prepared to attend a college or university and would reduce racial and socioeconomic disparities in academic achievement and college access. As of 2010, 21 states and the District of
Columbia require college preparatory curricula for all high school students (Achieve, Inc., 2010).

Several studies in the past few decades have examined curriculum reform in our nation’s high schools; however, despite the argument that de-tracking high school classrooms would produce more graduates prepared for college, most have focused on curriculum reform’s effects on academic achievement and equity across racial and socioeconomic dimensions measured by standardized test scores, grades and GPA, among others (e.g., Lee & Smith, 1995; Lee & Smith, 1997; Lee, Smerdon, Alfeld-Liro & Brown, 2000; Weiss, Carolan & Baker-Smith, 2010). Furthermore, although several measures of academic achievement such as the factors listed above have been shown to be predictive of postsecondary educational attainment (e.g., Engberg & Wolniak, 2010; Hill, 2008; Perna & Titus, 2005), far fewer studies have examined the direct relationship between the college preparatory curriculum and the likelihood of postsecondary enrollment.

**School Effects Research**

A major thread of research over the last 20 years by Lee and her colleagues (e.g., Lee & Bryk, 1986; Lee & Bryk, 1988; Lee & Bryk, 1989; Lee & Smith, 1997) focuses on the difference in academic outcomes between constrained versus differentiated curricula, or school effects research. Results of these studies consistently show that Catholic schools, where students are more likely to experience a constrained curriculum, produce more positive and equitable academic outcomes along sociodemographic lines than public schools, where the curriculum is more likely to be differentiated. There are several
factors that have been posited as reasons for these consistent findings, such as school size, a more constrained curriculum and a stronger sense of community and collective responsibility among parents, teachers and school administrators. Lee and her colleagues measured several outcomes of school effects research, most focusing on academic achievement within the high school context; outcomes of postsecondary enrollment rates seem to be absent from these works. Although decades of research provide evidence that these factors may influence Catholic schools’ propensity for consistently better academic outcomes, few studies have examined these factors specifically in the context of public high schools in order to examine their relationship with academic success in the absence of the Catholic school environment.

Among the curricular reforms in the years after the publication of *A Nation at Risk*, was the implementation of a “college prep for all” curriculum in the 59 high schools of the Chicago Public Schools (CPS) system in 1997. CPS reformed its curriculum such that all high school students were required to take “the new basics” as recommended by the National Commission on Excellence in Education (1983), Advanced Placement courses were expanded and remedial courses such as Pre-Algebra were eliminated (Lee & Ready, 2009). Additionally, students entering ninth grade who scored below the national average on standardized math or English test scores (about half of the incoming freshman) were placed in “support courses” in math and/or English in addition to their required courses.

One of the few studies in the educational research literature that examines the relationship between curriculum reform and the likelihood of postsecondary enrollment is
a study examining the effects of the CPS curriculum reform by Allensworth, Nomi, Montomery and Lee (2009). The authors examined differences in several academic outcomes between the 1994 entering cohort of freshman students (pre-reform) and the 2004 cohort of entering freshman students (post-reform). Their analysis of the cohort comparison evaluation design revealed that, although the curriculum reforms implemented by the CPS were aimed at improving academic outcomes, these reforms had little effect on grades, standardized test scores, absenteeism, dropout rates or postsecondary enrollment. Lower-ability students were more likely to fail classes and higher-ability students were more likely to be absent from class.

Several possible explanations were given for these findings that seemed starkly discrepant from the school effects research of the 1990s examining curriculum reform, including selection bias within and between schools. Within school selection bias occurs in the examination of differentiated curricula within a high school setting, where the more motivated and highly academic students may select the more academic courses of a college preparatory track and will therefore have more positive academic outcomes than their peers. Between school selection bias occurs when students and their parents choose specific schools to attend based on their curriculum, reputation and ranking. Students who choose these schools, then, would be more likely to produce more positive academic outcomes that their peers in other schools. Specifically, most of the school effects research of the 1990s indicated that Catholic high schools with college preparatory curricula had the best and most equitable academic outcomes for high school students. Students and their parent who opt for a Catholic school education may also have been
more academically motivated and college oriented than most of their public school peers. The results of the Allensworth et al. (2009) study were not influenced by selectivity bias because all schools were (in theory) providing the same core curriculum for their students. Additionally, among Catholic schools, research has shown a greater sense of community, parental involvement, teacher involvement and collective responsibility for student success (Bryk, Lee & Holland, 1993); however, far fewer studies have examined these factors of academic success among public high school students in order to examine these relationships in the absence of Catholic school effects (e.g., Lee, Croninger & Smith, 1997). One major theoretical framework that has helped to explain the relationship between these factors and academic success is Social Capital Theory (Coleman, 1988; Lin, 1999).

**Social Capital Theory**

Social capital is the resources that are manifested as the result of membership in social networks or other structures defined by relationships between people, such as families and classrooms. Individuals who gain social capital as a result of membership in such social structures are able to use these resources in turn to gain other forms of capital, such as human capital (i.e., education) and economic capital (i.e., employment; Coleman, 1988). Thus, high school students gain social capital through their relationships with parents, teachers and peers. Several authors over the last few decades have conceptualized the theory of social capital.

Lin (1999) discusses social capital as embedded resources in social and other networks. By investing in social relationships with others, individuals gain access to
social capital which can subsequently be used to gain access to other forms of capital, a return on one’s investment (Lin, 1999). The more connections one has and the higher the quality of such connections, the greater one’s access to social capital. Bourdieu (1986) posits that social capital is a result of the inequitable distribution of resources passed around by the privileged, arguing that social capital cannot be gained without the investment of other types of capital, such as economic and cultural capital (Portes, 1998). Bourdieu’s theoretical orientation of social capital is similar to Capital Deficiency Theory posited by Massey, Charles, Lundy and Fisher (2003). This theory argues that some people lack the resources for academic success, or have a “capital deficiency”, where capital can take on several forms. Financial capital, or one’s income and assets; human capital, which is one’s skills, abilities and knowledge often measured as years of education; social capital as measured by resources manifested through relationships and cultural capital, or the knowledge of norms and social settings are all forms of capital needed for academic success. Although capital can take on several different forms, all of these forms of capital tend to be highly correlated with one another (Massey et al., 2003). In the current study, I focus mainly on social capital as measured by parent-student and teacher-student relationships, controlling for financial and human capital in the forms of socioeconomic status and parental and teacher education.

By far the most popular theorist of social capital in the realm of education research, Coleman (1988) discusses social capital in the context of resources that emerge as the result of membership within a community. He suggests that social capital is defined by its function of the resources that are created as the result of relationships
between actors. He draws the comparison of physical and human capital to help in his
definition of social capital. Whereas physical capital is the changes in materials to make
tools that facilitate production and human capital is the changes that occur within people
that facilitate new skills and capabilities, social capital is changes that occur within
relationships among people that facilitate productive activity for the possessor of the
social capital (Coleman, 1988). Coleman discusses three mechanisms through which
social capital is manifested; obligations and expectations, information channels and social
norms.

**Obligations and Expectations**

In the wholesale diamond markets in Brooklyn, merchants allow each other the
opportunity to examine thousands of dollars in merchandise in private with no
supervision or insurance policies. Social capital is manifested through obligations of trust
and expectations that this trust will not be violated. Through this implicit trust, merchants
are able to save thousands of dollars in security costs and insurance policies. Thus, social
capital can be used to help gain financial capital.

**Information Channels**

In the mid-1980s, South Korean student radical activists gained access to
information channels through “clandestine ‘study circles’” comprised of students from
the same high school or church community, where demonstrations and other protests
were planned and carried out without detection. These students gained access to social
capital through their membership in these communities; gaining information to which
they would not otherwise have access.
Social Norms

Finally, a mother of six who moved from Detroit to Jerusalem was able to send her young children across town on public transportation without fear for their safety due to the social norm of looking after unattended children. By virtue of her membership in this community (Jerusalem), the mother gained access to social capital through the norm of collective responsibility that exists within this community.

Within the context of families, Coleman (1988) delineates several indicators of social capital within and outside family networks, including parent-child relationships (i.e., involvement in child’s life in and outside of schooling, child’s access to parent), number of siblings a child has (i.e., degree of competition for access to parents), parental expectations of how far children will go academically, intergenerational closure (i.e., the relationship parents have with other parents) and the degree to which parents are involved in their child’s school.

Other authors have expanded Coleman’s conceptualization of social capital to include the social capital that is formed through relationships between teachers, schools, parents and students. Several other indicators of social capital have been introduced in the literature over the past decades such as teacher-student relationships and teacher-parent relationships (Ream, 2003), the number of school-oriented friendships a child has (Ream & Rumberger, 2008), the academic aspirations of a child’s friends (Engberg & Wolniak, 2010) and attendance at Catholic schools (Teachman, Paasch & Carver, 1997). More controversial are indicators of social capital that reach beyond the traditional definition of capital created by the relationship between entities, such as social capital that may be
created by civic norms by attaching guilt and shame to crime (Buonanno, Montolio & Vanin, 2009) and relationships between communities and countries (Putnam, 1995). Extending such a wide net to include global measures of social capital has been criticized in the literature as taking explanatory power away from the concept of social capital (Portes, 1998).

Family support for academics such as parental expectations (Hill, 2008), human capital or parental education (Perna & Titus, 2005) and social capital or parental involvement with their children’s academic lives (Jeynes, 2004) are all established predictors of academic achievement. Perna and Titus (2005) found that students of parents who are involved with the schools and who discuss school with their children are more likely to attend a two- or four-year college after graduation from high school. Student exposure to information resources has also been shown to be predictive of postsecondary enrollment (e.g., Perna, 2000). This exposure can come from parents and teachers who are knowledgeable about the college research and application process. The involvement of parents and teachers in providing information resources and taking responsibility for student success would also have a strong influence on the likelihood of postsecondary enrollment.

There is also evidence to suggest that parental involvement can have a strong influence on the decision to go to college even in the absence of material resources and human capital. A qualitative analysis of first generation college students (college students whose parents did not go to college) revealed that those who broke the educational cycle within their families were able to do so because their parents placed a strong emphasis on
their education, provided positive feedback for academic success, believed in their children’s abilities and sacrificed time and material resources to help their children achieve academically (Gofen, 2009). Additionally, an examination of educational persistence among low-income Appalachian youth showed social capital through parental involvement and support compensated for the absence of financial and human capital (Dyk & Wilson, 1999).

Teachers can also be a valuable source of social capital for students (Croninger & Lee, 2001). Teacher attitudes and beliefs about their students as well as educational expectations can also have a strong influence of student academic achievement (Rosenthal & Jacobson, 1968). Several studies have found that teachers’ collective responsibility for the learning and success of their students is predictive of more positive academic outcomes in primary and secondary educational settings (e.g., Halvorsen, Lee & Andrade, 2009; Lee & Loeb, 2000). Additionally, teacher social capital as measured by support and guidance to their students has been shown to reduce dropout rates among high school students (Croninger & Lee, 2001). Teachers who are knowledgeable in the subject they teach, teach in smaller classrooms where material resources and time are allotted to a smaller number of students, thus providing the students in those smaller classrooms with more resources may influence their students’ decision to enroll in postsecondary institutions.

**Purpose and Research Questions**

In order to gain a more comprehensive understanding of the effect of high school curriculum reform, it is necessary to examine simultaneously several factors that may
influence the likelihood of postsecondary enrollment. My aim with this research is to inform policies regarding the implementation of constrained academic or college preparatory curricula into public high schools. Allensworth and her colleagues (2009) found that, with the intention to improve academic outcomes, increase postsecondary enrollment and decrease dropout rates, the abrupt implementation of a “college prep for all” curriculum into the CPS system without concomitant attention to other factors associated with student academic success, this policy failed to achieve its intended outcomes. Thus, the curriculum to which students are assigned needs to be just one facet of a larger framework of reform that involves teachers, parents and the environment of the school.

It is evident that several interrelated factors related to a student’s family and school environment can influence the likelihood of postsecondary enrollment among high school students; however, few studies have examined these factors simultaneously within a hierarchical context. Using data from the Educational Longitudinal Study (ELS; 2002) within a social capital framework, I examine the roles of curriculum, parental and teacher involvement in the likelihood of postsecondary enrollment among a nationally representative sample of public school students in the United States (US) who were sophomores in high school in the spring of 2002. I include only students in public high schools in this study in order to examine these relationships without the influence of Catholic and other private high schools that have consistently shown more positive academic outcomes over public schools (Lee, Chow-Hoy, Burkam, Geverdt, & Smerdon, 1998). In light of Obama’s (2012) challenge to all Americans to receive at least one year
of formal education past high school and the correlation between even one year of post-
secondary education and one’s potential for higher earnings over a lifetime (Wood,
2012), I examine the likelihood of either immediate or delayed attendance at either a two-
year or four-year college or university. I propose the following research questions:

**Question One**

What are the effects of relationships and educational expectations of parents and
teachers on public high school students’ likelihood of postsecondary enrollment,
controlling for student background, human and economic capital, curriculum, and school
size?

This first research question focuses on social capital at the student-level while
controlling for sociodemographic factors that may affect the likelihood of postsecondary
enrollment. My aim is to examine the effects of the relationships students have with their
families and teachers. The theory of social capital as developed by Coleman (1988)
argues that social capital accrued through relationships in a community can be used to
gain other forms of capital such as human capital (i.e., education) and financial capital
(i.e., higher paying jobs). Coleman as well as several other researchers have shown the
relationship between social capital and the attainment of other forms of capital; however
most have done so using a sample including students from Catholic schools where social
capital has been shown to be higher than among public schools (Teachman, Paasch &
Carver, 1997). Does the social capital that is manifested as a result of relationships—
specifically among public high school students—translate into human capital as measured
by post-secondary educational attainment after accounting for sociodemographic factors like SES and parent and teacher education?

**Question Two**

What are the effects of curriculum, school size and the environment of social capital in schools on students’ likelihood of postsecondary enrollment, controlling for student background, parent and teacher relationships?

Question two focuses on the school environment and its effect on the likelihood of post-secondary educational attainment and specifically examines a school’s curriculum, the size of the school, and the environment of social capital within a school. The effect of the constrained academic curriculum within public high schools has shown mixed results in previous research; Lee and colleagues (1997) tested the “constrained curriculum hypothesis” on a sample of public high school students and found more positive academic outcomes among schools with a constrained curriculum than those with a differentiated curriculum. Conversely, Allensworth and colleagues (2009) found almost no difference in academic outcomes including the likelihood of postsecondary enrollment between two cohorts in the Chicago Public Schools system before and after the implementation of a policy mandating a college preparatory curriculum for all students. Additionally, several studies indicate that a school’s size is predictive of student academic outcomes; specifically that schools that are too small or too large have less positive academic outcomes than moderately-sized schools (e.g., Lee & Loeb, 2000). School size has been measured in previous research in several different ways, such as total school enrollment (Lee & Smith, 1997), cohort size (Weiss et al., 2010) and student-
teacher ratio (Engberg & Wolniak, 2010). The current study sought to measure the effects of school size as measured by cohort size, or the number of students in the sophomore class of each school surveyed, as well as the number of full time teachers in a school on the likelihood of postsecondary enrollment specifically among students enrolled in public high schools. Finally, question two examines the relationship of the environment of social capital within schools as measured by aggregated student-level variables on the likelihood of postsecondary enrollment while controlling for the human and economic capital environment within schools. This is a common practice among previous hierarchical studies examining social capital and postsecondary educational attainment (Engberg & Wolniak, 2010; Hill, 2008; Perna & Titus, 2005).

**Question Three**

Does the relationship between curriculum and likelihood of postsecondary enrollment vary as a function of school size?

The third question in this study examines the possible interaction between the curricular structure of a school (the percentage of student enrolled in a college preparatory curriculum) and the size of the cohort. Previous school effects research has found that smaller schools (including Catholic and private high schools) are more likely to have a constrained academic curriculum; however, smaller public high schools that offer a comprehensive curriculum often result in teachers teaching outside of their areas of expertise (Lee et al., 2000). The aim of the third question in this study was to examine whether the relationship between curriculum and likelihood of postsecondary enrollment varied as a function of the size of the cohort.
**Question Four**

Do relationships and educational expectations of parents and teachers with students vary as a function of curriculum, size of schools and the environment of social capital in schools?

Finally, the fourth question examines the interaction between the student-level characteristics and the school-level characteristics on the likelihood of postsecondary enrollment. Specifically, this question examines whether the relationships between the student level characteristics of parent-student and teacher-student relationships as well as the indirect factors of student sociodemographics and parent and teacher education and the likelihood of postsecondary enrollment vary as a function of characteristics of the school environment. Two distinct yet concomitant arguments have been made in previous studies that inform this question. First, in a hierarchical study examining the interplay of social capital between families and schools, Crosnoe (2004) found that students with more social capital at home (as well as economic and human capital) were more likely to attend schools with richer social capital environments. Conversely, several studies have found evidence that the lack of capital in one area of a student’s life can be made up for by social capital in other areas. For example, studies have found parental involvement and high educational expectations are stronger predictor of success among economically disadvantaged children than their economically advantaged counterparts (Cooper & Crosnoe, 2007; Dyk & Wilson, 1999).
**Definition of Key Terms**

**Social Capital**

Social capital is the resources one accrues through relationships with others that can be used to gain other forms of capital, such as human capital (i.e., educational attainment) and financial capital (i.e., employment; Coleman, 1988). Social Capital Theory is a commonly used theoretical framework to explain the relationship between students, their parents and their schools with student academic success (e.g., Coleman, 1988, Crosnoe, 2004, Engberg & Wolniak, 2010, Hill, 2008; Jeynes, 2004; Ream & Rumberger, 2008) and has also been used as a theoretical framework to examine the role of the student-teacher relationship in students’ academic success and dropout prevention (Croninger & Lee, 2001). In the current study, I operationalize family social capital as the relationship between students and their parents in terms of access, support, educational expectations and the extent to which parents are involved with the school and other parents. Additionally, I operationalize teacher social capital as the relationship between students and their teachers in terms of morale and educational expectations.

**Human Capital**

Human capital is the knowledge and skills one accrues, usually through formal schooling (Coleman, 1988; Massey et al., 2003). Several studies have demonstrated a strong connection between human capital as measured by a parent’s highest level of education and student social capital in academic outcomes of secondary students (e.g., Kelly, 2001). In the current study, human capital is measured by highest level of education completed by the students’ parents and is used as a control variable.
**Economic Capital**

Also referred to as financial capital, economic capital is the financial resources, property and assets available to an individual (Massey et al., 2003). Socioeconomic status (SES) is a common index of economic capital and, like human capital, has been found to be highly correlated with measures of student social capital in academic outcomes of students (e.g., Jeynes, 2004). Lucas (2001) argues that, until children are no longer dependent on their parents for financial support, a student’s SES is the same as their parents, regardless of how independent children become of their parents while still living in their parents’ homes. The current study uses family SES to control for economic capital.

**Differentiated Curriculum**

Curriculum refers to the breadth of classes offered at a particular school. A curriculum is considered to be differentiated when a wide variety of classes are offered to students at different levels of learning. Differentiated curricula are also referred to as “tracking”, where students are placed into tracks according to their ability level as determined by standardized tests, grades and administrative discretion. Generally speaking, these tracks have been referred to as vocational, general and academic tracks for students with lower, moderate and higher learning levels. Academic tracks are also referred to as college preparatory curricula because the aim is to prepare students in this track for college-level course work (Oakes, Gamoran & Page, 1992). Historically, students were placed into rigid tracks early in their academic careers with little mobility between tracks; however, in the last few decades tracking systems have moved towards a
student choice-based system where students, based on the counseling of parents and school administration, decide for themselves which classes they want to take; for example, whether they want to pursue algebra, calculus or trigonometry, and mobility between tracks is more common (Gamoran, 1992). Differentiated curricula have been widely criticized as widening disparities between high and low achievers, which has also been shown to coincide along racial and socioeconomic lines (Lee & Bryk, 1988; Oakes, 1985).

**Constrained Curriculum**

In schools with a constrained academic curriculum, all students take the same core, mostly academic classes and there are few, if any, remedial or vocational courses offered. Catholic and independent private high schools are more likely to offer a constrained academic curriculum and consistently yield more positive academic outcomes than public schools (Coleman, Hoffer & Kilgore, 1982; Lee et al., 1998). Research among public high schools examining the “constrained curriculum hypothesis,” which states that schools offering mostly academic coursework and fewer remedial and vocational courses will yield more positive academic outcomes (Lee, Croninger & Smith, 1997) has been mixed; Lee and her colleagues found support for this hypothesis in a sample of public high schools from the High School and Beyond study (Lee et al., 1997) whereas an examination of a policy mandating a college preparatory curriculum for all students regardless of ability level or preparedness showed little to no improvement in terms of academic achievement, graduation rate and postsecondary enrollment over a cohort of students prior to the mandate (Allensworth et al., 2009). In the current study,
curriculum is operationalized by the percentage of the cohort enrolled in a college preparatory curriculum in their senior year of high school.

Scope

In the current study I use data from the Educational Longitudinal Study of 2002 (ELS; 2002), the fourth in a series of nationally representative longitudinal studies from the National Center for Education Statistics designed to examine factors associated with high school students’ academic achievement, educational attainment and beyond into their community and professional lives. This dataset is the most appropriate source of information for the current study as data were collected from students, their parents and teachers, and school administration and includes information regarding both student level characteristics, such as aspects of family life, as well as characteristics of the students’ schools, such as the curricular distribution and size of enrollment.

I restrict my analytic sample to the cohort of public high school students who were sophomores in the spring of 2002. There are a number of studies that examine the role of curriculum, size, and social capital on student academic success (e.g., Engberg & Wolniak, 2010; Teachman, Paasch & Carver, 1997); however, most of these studies include students from Catholic and independent private high schools in addition to students from public schools, which have shown these private schools to consistently yield more positive academic outcomes than public schools (e.g., Bryk et al., 1993; Coleman, Hoffer & Kilgore, 1982). School effects research has delineated several reasons why Catholic and independent private high schools yield more positive outcomes, including their propensity toward a constrained academic curriculum, smaller average
size and a stronger sense of community and collective responsibility among parents and teachers (e.g., Lee et al., 1998; Lee, Smerdon, Alfeld-Liro & Brown, 2000; Lee & Smith, 1996). By restricting my analytic sample solely to public high school students, I am able to examine these characteristics of private high schools that have been shown in previous studies to be predictive of their consistent advantage over public high schools. Specifically, I examine whether these characteristics of success in private schools are predictive of a specific facet of academic achievement in a sample of public high school students: postsecondary educational attainment.

The outcome of the current study is a dichotomous measure of the likelihood of enrollment in any postsecondary institution, at either a two- or four-year college or university, whether the enrollment was immediate or delayed after completion of high school. My aim for such a wide inclusion criteria for postsecondary educational attainment is centered on the finding that even one year of postsecondary education or training can increase earning potential and employment prospects (Wood, 2012) as well as recent remarks by President Obama, who, in a recent State of the Union address called for all Americans to pursue at least one year of formal education past high school in order to increase our competitiveness for job and career opportunities (Obama, 2012).

Conceptual Framework

The framework of the current study is based on several publications in the past few years that hierarchically examine the interdependent nature of students’ family and school contexts in predicting the likelihood of postsecondary educational attainment (Engberg & Wolniak, 2010; Hill, 2008; Perna & Titus, 2005). The hierarchical designs of
these studies allow simultaneous examination of the contexts of the student and the school, as well as examining how characteristics in one context can vary as a function of characteristics in the other context. Additionally, the analytic sample in which I focus solely on public high school students is informed by the need to examine characteristics of public high school student success that go beyond a schools’ curriculum (Allensworth et al., 2009; Lee et al., 1997) and are not overshadowed by the presence of Catholic and independent high schools that could skew the relationship between these characteristics and the likelihood of postsecondary educational attainment.

The conceptual framework for this study is also informed by Social Capital Theory, which states that resources accrued as the result of relationships with others or membership in a network, group or community can be used as capital to gain other forms of capital such as human, economic or financial capital (Coleman, 1988; Lin, 1999). The current study uses this social capital framework to help explain the connection between public high school students’ relationships with parents, teachers and membership in a school and the likelihood of postsecondary educational attainment.

The following section reviews the literature on several different threads of educational research. This includes studies examining curriculum effects, school size and social capital as defined by parent-student and teacher-student relationships, and lays the theoretical groundwork for the current study.
CHAPTER TWO

LITERATURE REVIEW

This chapter reviews the literature focusing on the roles that students’ environments play in several facets of academic success. I start with a review of the school’s role in student academic success, specifically curriculum and size. I then review the literature on student-teacher relationships as well as the many forms of parental involvement in the lives of their children and the effects of these types of relationships on student academic achievement, including postsecondary educational attainment. Finally, I present a review of research that focuses on the interdependent nature of the relationship between families and schools in securing students’ academic success.

**The School Environment**

The policies, structure and resources of a school have all been shown to affect student’s educational outcomes. The academic organization or curriculum offerings of a high school as well as its size are two factors that have been examined extensively in relation to student outcomes.

**Curriculum**

Several studies in the last few decades have uncovered discrepancies in academic outcomes between public and private high schools (Allensworth et al., 2009; Carbonaro & Covay, 2010; Lee et al., 1997) or more specifically between differentiated versus constrained curricula (Teitelbaum, 2003). Differentiated curriculum offer a wide variety
of classes to a wide breadth of learners, including remedial, vocational, and honors courses. The system created as a result of such a wide variety of course work places students into tracks based on their academic abilities and future career directions (Oakes, Gamoran & Page, 1992). The differentiated curriculum has faced intense scrutiny over the past 30 years. Research has shown that tracking systems can widen disparities between high and low achievers (Lee & Bryk, 1988) and can have negative psychosocial consequences, especially for those who are counseled into lower-ability courses, which consequently is more likely to be disproportionately comprised of low-income and minority students (Oakes, 1985).

Constrained curricula offer mostly academic coursework with few if any remedial (i.e., pre-Algebra) or vocational courses (i.e., Industrial Arts, a.k.a. “shop”). This type of curriculum is also called the college preparatory curriculum because it focuses on preparing students for college coursework. Catholic and private independent high schools offer mostly a constrained curriculum and consistently yield more positive academic outcomes, such as fewer students dropping out, higher and more equitable achievement gains where all students demonstrate gains in achievement regardless of SES or minority status and a higher percentage of graduates continuing on to enroll in college (Lee et al., 1998).

Several studies of cross-sector comparisons have concluded that the constrained academic curriculum is one major factor in why Catholic high schools consistently yield more positive academic outcomes than public schools (Bryk et al., 1993; Coleman, Hoffer & Kilgore, 1982; Lee & Bryk, 1988). Restricting their sample to public high
school students, Lee et al. (1997) demonstrated evidence for the “constrained-curriculum hypothesis,” which states that commonality in course taking behaviors centered around a constrained curriculum of mostly academic courses will yield more positive academic outcomes for students in terms of equity and excellence, which means that all students, regardless of background show higher achievement gains. Lee and her colleagues (1997) found that students attending public high schools, with a more constrained mathematics curricula were more proficient in mathematics than those in schools with more differentiated mathematics curriculum, regardless of socio-demographic background. Conversely, in a study examining the effects of curriculum reform in the Chicago Public School system, Allensworth et al. (2009) found few benefits and some actual disadvantages among students mandated to take a college preparatory curriculum over a cohort of students from a decade earlier, before the mandate took effect. Although a college preparatory curriculum was mandated for all CPS students with the aim of improving academic outcomes, decreasing failure and dropout rates and preparing more students for college, failure rates actually increased, dropout rates stayed relatively stable and students were no more likely to enter college than before the mandate.

There are several mechanisms through which these high schools are able to achieve such positive academic outcomes in addition to the curriculum offered. Catholic schools also tend to be smaller schools; however, qualitative differences have been found between small Catholic schools and small public schools. One study found that the curriculum in small public high schools tends to be geared toward the “middle of the
“road” in order to serve the needs of as many students as possible whereas small Catholic high schools offered mainly academic curricula (Monk & Haller, 1993).

School Size

The size of a high school is associated with several academic outcomes (Lee & Smith, 1997). The literature on school size shows some fundamental differences between smaller schools and larger schools. Large public high schools are more likely to have more specialized classes for all learning types; specifically, these schools are more likely to have classes geared towards gifted students with more academic rigor as well as special education programs. Smaller public high schools are more likely to offer the “middle of the road” classes, where the needs of academically talented students and students with special needs may not be met. This is usually due to either a lack of resources, or simply that there are not enough students in these groups to justify the expense of a specialized curriculum (Lee et al., 2000). In theory, larger schools have more students with similar needs and programs to meet those needs. Small schools may not have the resources to meet the needs of a wide spectrum of students and may choose to focus their limited resources on meeting the needs of mostly average achieving students. Academically challenged or gifted students in these schools are either excluded from programs or placed in classes that are either too challenging or not challenging enough (Monk & Haller, 1993). Thus, as schools get bigger the curriculum becomes more differentiated leading to social stratification of outcomes, which has been shown to have negative consequences on some students (Oakes, 1985).
In a study examining the effects of school restructuring, Lee and Smith (1995) found that smaller high schools were associated with higher student engagement where students are more invested in school and make homework a priority, and engagement was more socially equitable in that all students, regardless of their social background, were invested in school and made homework a priority. Weiss et al. (2010) also found that smaller cohorts were associated with higher engagement in school; however, this effect did not translate equitably to achievement gains. Among small cohorts of students, those who were held back in school or were of minority race had significantly lower math achievement scores, even after controlling for engagement.

There are some common themes within the literature on school size: smaller schools are more effective learning environments than larger schools (e.g., Weiss et al., 2010), it is possible for a school to be too small (Lee & Loeb, 2000), and in terms of educational effectiveness, schools that are small by design can yield quite different academic outcomes than schools that are small by necessity (Lee & Smith, 1997; Ready, Lee & Welner, 2004; Weiss et al., 2010) for fostering student engagement, higher achievement, higher graduation rates and higher postsecondary enrollment. Using a nationally representative sample, Lee and Smith (1997) sought to pinpoint the ideal size of high schools in regard to educational equity and effectiveness, separating high schools into eight categories in intervals of 300 students each. The authors found that moderately sized schools with enrollments between 600-900 students were both the most educationally effective measured by math and reading achievement and the most educationally equitable, where disadvantaged students had the most positive outcomes.
Weiss et al. (2010) found similar results for school size and also for cohort size. As cohorts grew beyond 400 students, they experienced increasingly negative academic consequences.

Smaller schools are more likely to yield more positive academic outcomes than larger schools as a function of two factors: first, smaller schools are able to foster more personal relationships between students, parents and teachers, and second, smaller schools are more likely to have a constrained academic curriculum. However, there are exceptions for each of these factors. For example, schools that are too small have the potential to become too personal. In a sample including both public and private schools, Lee et al. (2000) found that some students felt they were living the consequences of older siblings or parents’ reputations, and that teachers had to work much harder to maintain a personal life outside of the school community. The authors also found smaller public high schools that strived for a comprehensive curriculum often resulted in teachers teaching classes outside their areas of expertise. Additionally, Ready et al. (2004) make the distinction between schools that are small by choice and schools that are small by default, such as rural high schools.

Lee and Burkam (2003) examined the characteristics of schools that are associated with students’ likelihood of completing high school. The authors found that students enrolled in schools that offer mostly academic courses, enroll less than 1,500 students and have an environment of positive teacher-student relationships are less likely to drop out.
Three Phases of Research on High School Curriculum

In 2009, Lee and Ready published a review article summarizing the research on high school curriculum in the last few decades and delineating three phases of research during this time period: research on standards-based reforms, research on the effects of differentiated versus constrained academic curricula and finally, research evaluating the “college prep for all” curriculum.

Phase I: Standards-Based Reforms

In the 1980s, differentiated curricula, or high schools with a wide range of classes designed to meet the needs of a wide range of abilities from remedial to advanced placement and honors classes, began to face intense scrutiny with the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983). This report claimed that US competitiveness was directly tied to the quality of its public education. The authors gave a scathing review of the current state of public education at the time and recommended what would later be known as the constrained academic curriculum: four years of English and three years each of math, science, and social studies. These recommendations resulted in an increase in core academic curriculum and a decrease in electives and vocational courses in most states (Lee & Ready, 2009). The largest impact of this phase was a focus on more stringent graduation requirements. The differentiated curriculum was left intact and at the end of this phase, American high schools consisted of a balanced mix of differentiated and constrained academic curricula.
Phase II: Research on the Constrained Academic Curriculum

Several studies emerged after phase I curricular reform that shed light on variability in course taking. High achievers and motivated students were more likely to seek out more rigorous courses and teachers, whereas low income and minority students were more likely to be steered toward lower level courses (Oakes, 1985). These studies argued against the differentiated curriculum and the existence of lower levels of academic rigor and therefore lower expectations of student performance (e.g., Powell, Farrar & Cohen, 1985; Sedlak, 1986). These studies pointed out, that students were selecting the path of least resistance in regard to their academic careers (Sizer, 1984).

Studies in this phase of research started to recommend a more rigorous academic curriculum (e.g., Adler, 1982; Goodlad, 1984), thus began school effects research. Preliminary studies examined the differences between Catholic and public high schools (Bryk, Lee & Holland, 1993; Coleman, Hoffer & Kilgore, 1982; Gamoran, 1992). Mostly due to Catholic schools having constrained curricula and public schools having differentiated curricula, Catholic schools had a much higher rate of achievement and better outcomes across the board, regardless of socio-demographic background (Bryk, Lee & Holland, 1993) and even tracking in Catholic schools produced more positive academic outcomes than in public schools (Garamond, 1992). All of the research conducted on school effects during this phase of research was methodologically stronger than phase I; authors used hierarchical linear modeling for use with nested data to examine individual and school level effects simultaneously (e.g., Lee & Bryk, 1988). The collective results of these studies lead the Chicago Public Schools (CPS) system to
implement the “College Prep for All” mandate across all of its high schools in 1997, regardless of students’ ability level or preparedness for such coursework. Additionally, several states have now implemented policy changes that require college preparatory curriculums (Allensworth et al., 2009). The subsequent evaluation of these policy changes began research phase III.

**Phase III: Research Evaluating the “College Prep for All” Curriculum**

As mentioned above, in 1997 CPS adopted, sweeping reforms across all high schools in the district. The “College Prep for All” curriculum was implemented, which included four years of English and three years each of mathematics, science and social science, all with specific coursework required in each area. In addition to the changes in core curriculum, more advanced placement (AP) classes were implemented and remedial courses were eliminated. This curriculum reform aimed to reduce the failure and dropout rate (which was around 50%) and increase achievement gains and postsecondary enrollment rates among high school graduates within the Chicago Public School system.

More than a decade after these reforms were implemented, Allensworth and colleagues (2009) published a report examining the effects of the “College Prep for All” curriculum in the CPS system. The authors used a regression discontinuity research design to examine several different outcomes pre- and post-curriculum reform, including earned math and English credits, pass rates, GPA, standardized tests scores, dropout rate, absenteeism and postsecondary enrollment. The “College Prep for All” curriculum was implemented to improve academic outcomes; however, the authors found few improvements post-curriculum reform. Students of lower-ability were more likely to fail
Algebra I and upper-ability students had slightly more absenteeism in grade 9 post-implementation. This suggests that the lower-ability students were less prepared for the rigors of Algebra I and that upper-ability students may have found the coursework not rigorous enough, or frustrated with the slower pace of instructor’s attempts to teach to all levels of ability in a class. Roughly half of the incoming freshman in the post-mandate cohort tested below the national average for mathematics and were subsequently given double-dose Algebra in grade nine for remediation (Nomi & Allensworth, 2009). The authors also found that, among lower-ability students, grades on average were lower and fewer students in this group were likely to attend a four year college after graduating from high school. The only real positive outcome of the evaluation was that dropout rates did not increase post-implementation; however, the dropout rate in the CPS system was around 50%.

The authors offered several explanations for these findings. They argue that students are entering the system unprepared for the level of coursework expected of them, that the instruction may be of poor quality, especially for the lower-achieving students, and that teachers may not have been properly trained to teach a diverse group of learners as students were placed in mixed-ability classrooms. The most interesting possible explanation that the authors provide for these results is that these reforms were implemented without consideration for addressing other factors, such as absenteeism, failure to complete homework, lack of engagement and disruptive classroom behavior. Allensworth and Easton (2007) found these factors to be more predictive of failure than that of test scores.
One lesson learned from the CPS study is that a school system cannot simply implement a curriculum change without addressing the other factors that are associated with student success. It is possible that the reasons for academic success among smaller and Catholic high schools is due as much to the relationships with and the experience and expertise of their teachers as well as the involvement of their parents in their lives and in their schools as the level of rigor in their coursework. Social capital accrued by students, defined by the relationships formed and fostered between high school students and the adults closest to them, primarily their teachers and parents, has been shown to be predictive of positive academic outcomes (e.g., Coleman, 1988; Croninger & Lee, 2001; Crosnoe, 2004).

Social Capital

Social Capital Theory as defined by Coleman (1988) posits that resources are manifested through relationships between people and involvement in a community, network, or group, and can subsequently be used to gain other forms of capital such as human or economic capital. Lin (1999) takes this definition one step further with his discussion of the quality and quantity of one’s network being predictive of the amount of social capital yielded by one’s network. Social capital is a useful theoretical framework in explaining the connection between the relationships high school students have with their parents and teachers, as well as the degree of social capital in the school community and several measures of academic achievement, including standardized test scores, grades, graduation rates and postsecondary enrollment.
Teacher Involvement

Teachers hold the capacity for major influence on the educational outcomes of their students through direct and consistent educational contact. Level of commitment and responsibility, attitudes and beliefs about teaching, experience and expertise and communication styles can all manifest themselves in the classroom environment, affecting the learning experiences of their students.

Teacher expectancy. Research on teacher expectancy centers around Rosenthal and Jacobson’s, *Pygmalion in the Classroom* (1968). Teachers of low income and minority students were manipulated into expecting higher achievement from a random sample of students. Pre-post IQ tests revealed higher gains among students in the expectancy category, suggesting that teachers’ beliefs about their students can have a profound impact on their learning and achievement. The original *Pygmalion* study sparked a large volume of controversy (e.g., Ryan, 1971), many citing that the results could not be replicated (Elashoff & Snow 1971; Thorndike, 1968). A meta-analysis of 18 replications by Raudenbush (1984); however, revealed that only those studies that waited more than two weeks to introduce the manipulation were unable to replicate the results. These results suggest that teachers who have the opportunity to form opinions of students’ abilities are less likely to be manipulated into expecting higher achievement from students.

The mechanism through which teachers impart knowledge to their students is delivered through the filter of that teacher’s attitude toward their role as an educator as well as their beliefs about their students’ abilities (Brophy, 1986). Teachers’ expectations
of their students’ increases the likelihood that those students will perform based on those expectations, whether they are positive or negative (Brophy, 1983). Teachers who do not believe in the learning potential of poorly performing students are less likely to assign them tasks designed to improve and stimulate learning, essentially “not bothering” with such students (Wigfield & Eccles, 2000). Conversely, teachers who do believe in the learning potential of all their students are more likely to see failure of students as a challenge and make them re-do failed work (Brophy, 1986). In one study of elementary students in New York City, Love and Kruger (2005) found that teachers’ positive beliefs about the educational environments of their classrooms, including the notion that they are disseminators of knowledge, the utility of drill and practice, communal attitudes and that every child is successful at something were associated with higher standardized test scores. Additionally, using a social capital framework, Muller (2001) found that at-risk students who believed that their teachers cared about them and expected them to succeed benefited more than non-at-risk students in terms of mathematics gains.

A teacher’s willingness to take responsibility for the success or failure of their students can have a profound impact on student learning. Halversen, Lee and Andrade (2009) used a mixed methods approach to examine individual and collective responsibility of teachers on early elementary school students in urban, economically disadvantaged schools. The authors found higher achievement gains among these low-income schools with higher levels of individual and collective responsibility. This effect has also been observed among high schools. Achievement gains over two years were higher for students in high schools where teachers shared collective responsibility for
student learning (Lee & Smith, 1996). Furthermore, the magnitude of the relationship between teacher responsibility and student academic outcomes can vary by school size. Lee and Loeb (2000) examined the effects of school size on teachers’ attitudes and responsibility as well as one year math gains in elementary schools in Chicago. The authors found that teachers’ attitudes were more positive and they were more willing to take responsibility for their students learning among smaller rather than larger elementary schools.

**Teacher-student relationships.** Investment in relationships between students and teachers can be a rich source of social capital for students. Several previous studies have found positive relationships between teacher-student morale within a school environment and positive academic outcomes (Crosnoe, 2004, Stolz, Barber, Olsen, Erickson, Bradford, Maughan et al., 2004; Woolley & Grogan-Kaylor, 2006).

**Teacher expertise.** One explanation given by Allensworth and her colleagues (2009) for the unexpected negative results of a mandated college preparatory curriculum was that the policy mandating the curriculum reform did not address the issue of teaching higher level content to lower ability students or consider the effects of teaching to mixed-ability classrooms. As Bourdieu (1986) argues, social capital cannot be gained without the investment of other kinds of capital such as human, financial and cultural capital. The teachers’ lack of knowledge and skills in these areas may have hindered lower-ability students’ ability to accrue social capital in these environments. Additionally, Lin (1999) emphasizes access to experts in one’s social network as a source of social capital. Just as parental education has been shown to be consistently predictive of student academic
success (e.g., Hill, 2008), teacher education and expertise may also play a role in student academic success, especially if students foster relationships with such teachers. Parcel and Dufur (2001) argue that teachers with more knowledge as measured by advanced educational degrees and experience may be more equipped at facilitating student achievement, thus fostering higher levels of social capital in those environments. Students who are taught by high quality mathematics teachers as measured by higher levels of educational attainment, certification and years of teaching should have more positive academic outcomes than those who are taught by mathematics teachers with lower levels of educational attainment and fewer years in the field.

**Parental Involvement**

The extent to which parents are involved in their children’s personal and academic lives is a primary indicator of students’ access to social capital (Coleman, 1988) and has been found to be associated with several academic outcomes, including track placement (Kelly, 2004; Ream & Palardy, 2008), standardized test scores (Jeynes, 2005), student engagement and grade point average (GPA; Benner, Graham & Mistry, 2008), dropout rate (McNeal, 1999) and postsecondary enrollment (Perna & Titus, 2005, Gofen, 2009; Engberg & Wolniak, 2010; O’Connor, Hammack & Scott, 2010).

**Educational expectations.** The self-fulfilling prophecy in the educational context posits that when educational expectations are made known for a student, that student is more likely to perform and achieve in the expected direction, whether the expectations are positive or negative (Rosenthal & Jacobson, 1968). Benner et al. (2008), in a sample of ninth graders in Los Angeles using an ecological theoretical framework, examined the
two Microsystems of family and school environments. The authors found that family support for academics has a positive relationship with school engagement and GPA. In a national sample of high school seniors, parental expectations of their children and encouragement from parents were found to be positively associated with the number of earned course credits in mathematics, science and English as well as the chances of enrolling in an academic high school program (Catsambis, 2001). The author suggests that high educational expectations and active encouragement are the most important practices parents can do for their children at that stage in their lives. Additionally, several recent studies of factors affecting postsecondary attainment found parent’s educational expectations for their children to be predictive of whether students enrolled in 2- and 4-year postsecondary institutions (Engberg & Wolniak, 2010; Hill, 2008; Perna & Titus, 2005).

**Socioeconomic status.** Socioeconomic status (SES) is a strong and consistent predictor of academic success. The theory of Effectively Maintained Inequality (Lucas, 2001) posits that higher SES parents have more resources and know how to use them to secure educational advantages for their children, and that social background matters for the kinds of education one receives in high school, thus affecting the likelihood of postsecondary enrollment. Several studies have examined the relationship between parent’s educational attainment, social class and socioeconomic status on children’s academic outcomes with conflicting results. For example, in a sample of elementary school children in Baltimore, “socially advantaged” children experienced a smaller summer learning gap, where discrepancies between test scores at the end of one academic
year and the beginning of the following academic year accrue over the summer break, than socially disadvantaged children (Alexander, Entwisle & Olson, 2007). The authors partially attribute this effect to the idea that socially advantaged children are more likely to participate in summer learning programs than their socially disadvantaged counterparts. In a sample of African American youth, Jeynes (2005) found that parental involvement had a positive effect on academic achievement of high school seniors until SES was controlled for. Controlling for SES in studies examining the relationship between parental involvement and academic achievement reduces the effect that parental involvement has on achievement, suggesting a strong correlation between parental involvement and SES. Additionally, Kelly (2001) revealed a link between SES background and track placement using the National Educational Longitudinal Study (NELS; 88). Students of higher social class and parents with higher levels of educational attainment were more likely to be placed in higher level math classes, even after controlling for grades and standardized test scores. Effectively Maintained Inequality explains these types of relationships in terms of myopia. This theoretical orientation posits that college educated parents can help their children dispel the myopic elements of their decision making in terms of track placement, which sets these students up for a greater likelihood of future success (Lucas, 2001).

Conversely, Catsambis (2001) used the same longitudinal sample and found the associations discussed above regarding the positive relationship between parental expectations and encouragement with academic outcomes was found among all the families in the sample regardless of SES. Cooper and Crosnoe (2007) found that children
of economically disadvantaged parents who were involved in their children’s schooling displayed higher levels of academic orientation measured by commitment to school and the drive to do well in school than those from non-disadvantaged families, and that economically disadvantaged children with parents who are not involved in their schooling displayed lower levels of academic orientation than their non-disadvantaged counterparts. This interaction effect suggests that parental involvement may have stronger effects, at least among some facets of student academic success, among economically disadvantaged children. Furthermore, in a study of low-income Appalachian youth, Dyk and Wilson (1999) found that parents of low human and financial capital made up for these deficiencies by bolstering social capital in the form of parental involvement and educational expectations of their children, enhancing their educational attainment. The authors of this study suggest that educational expectations of parents resulted in their children’s internalization of the importance of educational attainment and integration.

**Family environment.** The environment in which a student is raised can manifest social capital through several mechanisms, including family composition, the number of siblings living at home with the student and parents serving as information and support resources for their children, all of which center around what Coleman (1988) refers to as access to information resources, or more specifically, students’ access to their parents and the investments parents make in their relationships with their children. Several previous studies have shown these sources of social capital to be predictive of academic achievement. Jeynes (2004) found that adolescents from intact families, where the mother
and father were still married and living in the same house, and who had greater access to their parents in terms of discussing school issues and attending school functions had higher standardized test scores than those in non-intact families and with less access to their parents. The family environment is also predictive of mathematics achievement; Parcel and Dufur (2001) found family social capital to be significantly predictive of mathematics gains among elementary students, even after human and financial capital variables were controlled for. Student access to their parents has been shown to be predictive of college major choice (Ma, 2009), track placement and test scores (Ream & Paladry, 2008) and reduced dropout and truancy rates in high school (McNeal, 1999).

Coleman (1988) discusses the role of additional siblings in the home as a dilution of parental attention and therefore a drain on social capital. Coleman and Hoffer (1987), in a sample of students from the nationally representative High School and Beyond study, show a higher dropout rate among students with four siblings compared with students with only one sibling; this difference becomes much more striking when number of parents and educational expectations are held constant. These results indicate that the greater the ratio between parents and siblings, the less access a student will have to their parents and the less social capital they will ultimately accrue from this resource.

Finally, parent-student relationships have been examined extensively as a predictor of postsecondary enrollment, with mixed results. O’Connor and colleagues (2010) found that parent’s actions to learn about financial aid for their children was predictive of postsecondary enrollment in samples of both Hispanic and White students. Parent-student discussions of college are predictive of postsecondary enrollment in both
two- and four-year institutions (Engberg & Wolniak, 2010; Perna & Titus, 2005); however, parent-student cultural activities were predictive of post secondary enrollment only in two-year institutions (Engberg & Wolniak, 2010). Hill (2008) found that family-based college planning resources were not predictive of postsecondary enrollment.

Community environment. Parental social capital reaches beyond the family environment to include intergenerational closure, or the extent to which parents know the parents of their children’s friends, and parent-school involvement. Coleman (1988) cites intergenerational closure as one mechanism through which family social capital is accrued. He argues that links among the parents at a child’s school facilitate active sharing of information and the proliferation of trustworthiness, obligations and expectations. Building a network of parents facilitates the availability of social capital to each parent within that network, a source of social capital that would not otherwise be available (Coleman, 1988). Controlling for demographic background, Carbonaro (1998) found intergenerational closure to be predictive of math achievement and completing high school. Strong parental networks can also offset the contextual effects of low-income and single parent environments on tenth grade achievement (Pong, 1998) and math and writing assessment pass rates (Goddard, 2003). Studies examining intergenerational closure in the context of postsecondary attainment have shown mixed results. Engberg and Wolniak (2010) found parents who know the parents of their students’ friends significantly predicted the likelihood of enrollment in a four-year institution, whereas Perna and Titus (2005) found that the number of other parents to whom parents talked was not significantly predictive of postsecondary enrollment.
Parcel and Dufur (2001) discuss school social capital in terms of parental involvement with their child’s school, creating a bond between parents and schools that can facilitate student learning. Ream and Paladry (2008) argue that when parents become involved in their children’s school, they act as advocates for their children. Parent-school involvement has been shown by several studies to be consistently predictive of student academic success, from truancy and dropout prevention (McNeal, 1999), student engagement, self-efficacy and motivation (Fan & Williams, 2010), test scores and track placement (Ream & Paladry, 2008) and high school completion (Teachman, Paasch & Carver, 1997; Viramontez Anguiano, 2004). In predicting students’ likelihood of postsecondary enrollment from parent-school contact, previous literature again yields mixed results. Parent-school contact regarding volunteering, academics and behavior were all predictive of postsecondary enrollment in a study using the NELS (88) data set (Perna & Titus, 2005) but parent-school contact overall was not significantly predictive of postsecondary enrollment among the ELS (2002) dataset (Engberg & Wolniak, 2010). This discrepancy may be due in part to differential operationalizations of parent-school involvement between these studies.

**Parental monitoring.** Certain types of parental involvement have also been shown to be negatively associated with academic outcomes. Specifically, several studies reveal that parental monitoring, or the degree to which parents check up on their children to make sure their homework is done, is negatively associated with school engagement, grades (Benner, Graham & Mistry, 2008) and standardized test scores (Jeynes, 2005), and was not significantly associated with postsecondary educational attainment (Perna &
Titus, 2005). This effect may be due to the idea that children who struggle academically or who have behavioral problems are more likely to have parents who monitor their homework (Jeynes, 2004).

**The Family-School Partnership**

Christenson (2004) proposes that families and schools have a shared responsibility for the education of children and that there needs to be a reciprocal relationship between these two entities in order to facilitate the learning process. These philosophies, therefore, need to be reflected in the policies and practices of the schools. Hoover-Dempsey and Sandler (1997) suggests that one factor that may explain why parents become involved in their children’s education is the perception of invitations, demands, and opportunities for involvement by the school. This suggests that parents are more likely to get involved if the school provides opportunities for them to do so.

Crosnoe (2004, 2009) has emphasized the importance of examining student outcomes within the simultaneous contexts of school and family. Using multi-level modeling to examine social capital at both the family and school level among a nationally representative sample of high school students using the National Longitudinal Study of Adolescent Health, he found a correlation between family-based and school-based social capital in that, students who possessed more social capital at home were more likely to either attend schools with higher levels of social capital or were more equipped to take advantage of social capital at school (Crosnoe, 2004). Additionally, he found that family-school communication was predictive of higher starting math courses in high school in a study of the transition from middle school to high school among low income and English
Language Learners in the NELS (88) dataset. The results of these studies both suggest and emphasize the importance of an interdependent relationship between the family and school contexts in examining academic outcomes among high school students.

**Conceptual Framework**

Based on previous research examining the hierarchical nature of student- and school-level characteristics in predicting the likelihood of postsecondary enrollment (e.g., Engberg & Wolniak, 2010), and the need to examine established characteristics of student success and their application among a sample solely comprised of public high school students (Allensworth et al., 2009; Lee et al., 1997), the current study examines the interdependent relationship between family and school contexts in predicting the likelihood of postsecondary enrollment among a nationally representative sample of public high school students who were sophomores in the spring of 2002. The figure below illustrates the conceptual model of the current study including student-level characteristics, school-level characteristics, and their interdependent relationship on the likelihood of postsecondary enrollment, among public high school students (see Figure 1).
Figure 1. Conceptual model examining the relationships between student-level social capital as measured by relationships with parents and teachers as well as indirect sociodemographic factors and parent/teacher education, school-level characteristics of curriculum, size, and the environment of social capital and their interdependent relationships between the two levels on public high school students’ likelihood of attending a two- or four-year postsecondary institution.
CHAPTER THREE

METHODOLOGY

Introduction

The current study will use the Educational Longitudinal Study (ELS; 2002) to examine the association between public high school students’ access to social capital as determined by their relationships with parents and teachers in addition to high school curriculum reform on public high school students’ likelihood of continuing on to postsecondary education after graduation from high school. This study used Hierarchical Generalized Linear Modeling (HGLM) to examine the following questions:

Question One

What are the effects of relationships and educational expectations of parents and teachers on public high school students’ likelihood of postsecondary enrollment, controlling for student background, human and economic capital, curriculum, and school size?

Question Two

What are the effects of curriculum, school size and the environment of social capital in schools on students’ likelihood of postsecondary enrollment, controlling for student background, parent and teacher relationships?
**Question Three**

Does the relationship between curriculum and likelihood of postsecondary enrollment vary as a function of school size?

**Question Four**

Do relationships and educational expectations of parents and teachers with students vary as a function of curriculum, size of schools and the environment of social capital in schools?

**Data Source**

The current study used data from the Educational Longitudinal Study (ELS; 2002). This study is the fourth and most current in a series of longitudinal studies sponsored by the National Center for Education Statistics (Ingles, Planty, Bozick & Owings, 2004) designed to track a nationally representative sample of high school students as they progress through high school, college and into the workforce. Data are collected from multiple sources of information and at multiple levels from the students, their parents, teachers, librarians and school administrators.

The ELS (2002) was designed to inform policy and decision makers, educators and parents about the effects of several aspects of students’ family, community and school lives on educational outcomes (http://nces.ed.gov). The National Center for Education Statistics (NCES) lists specific research questions that could be addressed using these data, including: (a) the influence of school structure and size on educational outcomes, (b) the impact of parental involvement on their child’s education, (c) the relationship between school policies and parental involvement, and (d) the influence of
teacher quality and efficacy on educational outcomes (http://nces.ed.gov). The ELS (2002) is the most appropriate data source to employ in order to examine the interdependent relationships between parental and teacher social capital, school curriculum and school size on the likelihood of postsecondary enrollment among graduates of public high schools.

There are four phases of data collection in the ELS (2002); the base year data collection in 2002, first follow up in 2004, second follow up in 2006 and the third follow up slated for data collection in 2012.

**Base Year Data Collection**

The first year of data collection was conducted in 2002 when students in the cohort were high school sophomores. Data were gathered from students, their parents, teachers, librarians, and school administrators. A nationally representative sample of 15,360 sophomores from 750 high schools across the country completed questionnaires in the base year data collection (Ingles et al., 2004). Students were tested on their math and reading abilities and information was gathered on their demographics, interpersonal relationships with parents, teachers and peers, attitudes and beliefs about the school climate, extracurricular activities, use of school resources, educational aspirations and their family and home environment. Students’ parents were surveyed about the home environment, their level of education, immigrant status, level of involvement with the community, their child’s school, their child and the child’s friends and families, opinions about the school and educational aspirations for their children.
Mathematics and English teachers were surveyed during base year data collection. These teachers were surveyed for their demographics, beliefs and observations about the student, the classroom environment, their teaching experience, highest level of education completed, level of contact with the student’s parents and attitudes and beliefs about teaching.

At the school level, along with a check list of the overall appearance of the school, student behaviors and the security and safety of the grounds, information was gathered from school administrators regarding the size, location and sector of the school, the curriculum and extracurricular activities offered, the number of teachers employed, information on testing and assessment of the students, facilities and resources, and the school environment as it pertains to safety, academics and morale.

**First Follow Up Data Collection**

The first follow up data collection was completed in 2004, when the majority of the original students in the sample were seniors in high school. The first follow up sample surveyed at total of 13,420 students which included a “freshened” sample of seniors in order to ensure the validity of the nationally representative sample (Ingles et al., 2004). Along with a follow up mathematics achievement test, students were surveyed regarding their enrollment status, family characteristics, educational expectations and plans for the future. Students who dropped out of high school before data collection, transferred to another school and those who graduated from high school early were identified and surveyed separately, and were not administered the follow up mathematics achievement test (Ingles et al., 2004). All schools in the original base year sample were administered
an abbreviated follow up survey. Schools to which students transferred were not included in the school-level sample (Ingles et al., 2004).

**Second Follow Up Data Collection**

The second follow up data collection was conducted in 2006, collecting information from approximately 14,200 students; about 14,000 of whom were part of the original base year data collection in 2002 (Bozick & Lauff, 2007). For this iteration of data collection, students were surveyed about their high school experiences and postsecondary, employment and community experiences where applicable.

**Analytic Sample**

The sample for the current study includes all public high school students who responded to the second follow up questionnaire in 2006. The current study seeks to gain a better understanding of the interdependent relationship between parental and teacher social capital and the high school environment on public high school students’ likelihood of any postsecondary enrollment. Thus, this study excludes from the analysis students who attended Catholic or other private high schools. In the base year data collection, 12,765 public high school students were surveyed. In the second follow up data collection, 10,944 public high school students in 579 schools from the base year data collection in 2002 indicated whether they had ever attended a postsecondary institution.

**Weights**

For the current study, I used the F2BYWT panel weight for students who responded to the second follow up questionnaire in 2006, two years after the majority of this cohort graduated from high school. This panel weight was designed to generalize to
students in their sophomore year of high school in the spring of 2002 (Bozick & Lauff, 2007). Additionally, I used the BYSCHWT weight at the school level to generalize the schools in the sample to the general population of high schools in the spring of 2002. Applying these weights to the current sample of high school students and their schools resulted in a weighted sample of 3,062,794 students in 24,795 public high schools.

**Dependent Variable**

The current study examined the effects of high school curriculum and size as well as parental and teacher social capital on a single outcome measure, whether public high school students who were sophomores in the spring of 2002 ever attended a post-secondary institution. This question was asked of students during the second follow-up data collection in 2006, where 0 = *no* and 1 = *yes*. This includes high school graduates who continued on to two- and four-year institutions as well as those who continued their postsecondary education immediately after graduation from high school and those who delayed their postsecondary enrollment.

**Independent Variables**

In order to examine the effects of high school curriculum and size as well as parental and teacher social capital on whether public high school students continue on to enroll in postsecondary institutions, I developed several student-based and school-based independent variables to represent theses constructs and their hierarchical nature.

**Level 1: Student-Level Variables**

I developed several student-level variables from the base year data collection representing the perspectives of the student’s parents (from the base year parent
questionnaire) and math teachers (from the base year teacher-math questionnaire).

Additional variables were taken from the base year student questionnaire to control for student demographic variables.

**Gender.** Students were asked to identify their gender in base year data collection. Gender as an independent variable is included for the purposes of controlling for student demographic variables, a common practice in previous studies of postsecondary enrollment (Engberg & Wolniak, 2010; Perna & Titus, 2005). Gender effects in the likelihood of postsecondary enrollment have varied; Perna and Titus (2005) found female students to be more likely than male students to enroll in both two- and four-year postsecondary institutions using NELS (88), while Engberg and Wolniak (2010) found no gender difference in enrollment behaviors among students in the ELS (2002) database. In the current study, females represent the reference group.

**Race.** Students were also asked to identify their race in base year data collection, which is used to control for student demographic background. Several studies show race to be predictive of several academic outcomes including whether a high school graduate continues on to college (Engberg & Wolniak, 2010; Perna & Titus, 2005). The current study used dummy codes to represent the categories of Asian or Pacific Islander (non-Hispanic), African American (non-Hispanic), Hispanic, and White (non-Hispanic).

**Parental education.** The highest level of education earned by parents has consistently been shown to be a strong predictor of student success. Studies have shown that students whose parents are highly educated are more likely to be placed in academic or college preparatory tracks in high school (Kelly, 2004), have higher standardized test
scores and GPAs (Jeynes, 2005) and are more likely to attend postsecondary institutions following graduation from high school (Perna & Titus 2005). In the current study, parental education is included to control for human capital and uses a continuous composite measure of parental education where \( I = \text{did not graduate from high school} \) and \( 8 = \text{PhD, MD or other advanced degree} \). Higher scores indicate a higher level of education attained by the parent.

**SES.** Socioeconomic status (SES), much like parental education, has been shown by several previous studies to be highly predictive of several measures of academic success, from a reduced summer learning gap (Alexander et al., 2007) to track placement (Kelly, 2004). In the ELS (2002), SES is a composite variable based on five equally weighted variables pertaining to parental education, household income and parental occupation. Occupational prestige is measured using the Dunkin index (Dunkin, 1961); a measure specifically designed for such purposes. In the current study, SES is included to control for a student’s economic capital. SES is a continuous variable centered at the mean with a range of -2.11 to 1.82; higher scores indicate higher SES.

**Family composition.** Previous literature demonstrates the relationship between academic achievement and family structure of students in the context of parental social capital (Jeynes, 2005). Specifically, students from intact families where parents are married and both live in the home show more positive academic outcomes than those from single parent households and those living with one parent and one step parent (Jeynes, 2004). Family composition is a base year composite variable with nine answer options, focusing on living arrangements of the parents, whether there are one or two
parents living in the house and whether the parent filling out the questionnaire is married, separated, divorced or single; and whether the parent is living with his or her spouse or partner. The current study used dummy codes to represent the categories of single parent and two parent households.

Number of siblings at home. Coleman (1988) discusses the effect of the number of siblings a child has on their access to parental social capital. He argues that the more siblings a child has, the less parental social capital vis-à-vis parental resources they will be able to access. Specifically, the more siblings a child had, the less time their parents will have to devote to each child. Thus, this continuous variable is an additive composite of six items asking parents the number of full or adoptive, step, and half brothers and sisters living in the home with the student at the time of base year data collection in 2002.

Parental expectations. According to Coleman (1988), one mechanism through which social capital is created is through obligations or expectations. A number of studies show a link between parental educational expectations for their students and those students’ subsequent patterns of postsecondary enrollment (e.g., Engberg & Wolniak, 2010; Perna & Titus, 2005). The following three variables taken from the base year parent questionnaire measure various aspects of parental educational expectations of their children:

- Parents’ educational expectations. Parents are asked how far in school they expect their tenth grader will go, with answer options ranging from high school or less to graduate/professional degree. Higher scores on this measure indicate higher educational expectations.
- **Family rules about maintaining grade point average (GPA).** Parents are asked whether there are rules in the home about students maintaining their GPA, where $0 = no$ and $1 = yes$.

- **Family rules about doing homework.** Parents are asked whether there are rules in the home about students completing their homework, where $0 = no$ and $1 = yes$.

**Parental involvement with school.** Previous studies provide mixed evidence of the magnitude of the relationship between parent-school involvement and students’ subsequent enrollment in two- and four-year postsecondary institutions. Using NELS (88), Perna and Titus (2005) reported a significant relationship between parents contacting schools for a number of reasons and enrollment in both two- and four-year institutions. Conversely, using the ELS (2002), Engberg and Wolniak (2010) provide evidence to suggest that parents’ level of involvement with their child’s school is not a significant predictor of whether that child continues on to enroll in either two- or four-year postsecondary institutions. In the base year parent questionnaire, parents responded to a series of dichotomous items examining the extent to which they were involved in various school-related activities, including whether they belonged to a parent-teacher organization (PTO), attended PTO meetings, took part in PTO activities, volunteered at the school or belong to other organizations with other parents from the school, where $0 = no$ and $1 = yes$. In the current study, in order to maximize the variation of parental involvement with the school, these items were added into a composite variable where $0 =$
no involvement and 5 = high involvement; thus, higher scores on this item indicate more parental involvement with the school-related activities.

**Intergenerational closure.** Parental networks have been shown in a number of studies to be associated with children’s academic achievement. Several authors argue that intergenerational closure is one factor that may give Catholic and smaller high schools advantage over larger public high schools pertaining to several academic outcomes (Coleman 1988; Coleman & Hoffer, 1987). Drawing on previous literature measuring the same construct (Engberg & Wolniak, 2010), intergenerational closure is operationalized as the extent to which parents know the parents of three of their child’s friends. In the current study, this continuous variable (Range = 0-6) is a composite of six dichotomous items from the base year parent questionnaire measuring whether or not the parent knows the mother and the father of their child’s first, second and third friends. Higher scores indicate that the parents know more of the parents of their child’s friends.

**Parent as information resource.** One mechanism by which social capital is accrued is by access to information resources (Coleman, 1988). In his seminal article on social capital theory, Coleman gives the example of Asian immigrant mothers who would buy two sets of their children’s required school text books in order to help them study and do well in school. Coleman argues that the parent’s own knowledge is integral in the formation of social capital for their children only when parents make themselves available to their children, or the extent to which parents are involved in their children’s lives. In the current study, parent as information resource is a factor composite of five variables from the base year parent questionnaire where parents answered 1 = Never, 2 =
Rarely, 3 = Sometimes and 4 = Frequently to the items: parent provides advice about selecting courses or programs, parents provide advice about plans for college entrance exams, parents provide advice about applying to college after high school, parents provide information about community and world events and parents provide advice about things troubling tenth grader (α = .74). Higher scores on this measure indicate greater frequency of information resource to students.

**Parent as support resource.** This variable measures the extent to which students have access to their parents measured by the time they spend doing various activities. In the current study, this construct is a factor composite of 12 items from the base year parent questionnaire that ask parents to what extent they spend time with their child doing a number of activities, including going shopping, attending sporting events, religious services, family events, spending time talking, among others (α = .81). Higher scores on this measure indicate more time spent with student doing these activities.

**Teacher talks to student outside of class.** Student-teacher relationships have been shown in the literature as one form of access to social capital for students (Lee & Burkham, 2003). In the current study, this variable is used as an indication of the relationship between the students’ math teacher and the student. This variable is one dichotomous item where 0 = no and 1 = yes.

**Student-reported student-teacher morale.** Crosnoe (2004) showed a link between student academic outcomes and the degree to which students and teachers get along at a school. Student-teacher morale is a composite measure of four items from the base year student questionnaire asking students to indicate on a four point scale to what
extent they agree with the statements that students and teachers get along at the school, the teaching is good, teachers are interested in the students and teachers praise students’ efforts, where 1 = strongly agree and 4 = strongly disagree (α = .72). These items are reverse scored such that higher scores indicate a greater extent to which students agree with the statements, thus indicating a higher degree of morale.

**Teacher’s educational expectations for student.** In the base year mathematics teacher questionnaire, teachers are asked how far in school they expect their tenth grader will go academically, with answer options ranging from high school or less to graduate/professional degree. Higher scores on this measure indicate higher educational expectations.

**Teacher expertise and education.** Lin (1999) argues that the accessibility of social capital is partially dependent on the quality as well as the quantity of their social network. Previous research shows a link between one’s access and accrual of social capital and the number of experts upon which they can draw within their social network (York-Cornwell & Cornwell, 2008). Since they are not direct measures of social capital, the following items were interpreted as control variables measuring the human capital of student’s math teachers:

- **Teacher’s total years teaching K-12.** This is a single continuous variable measuring the number of years the student’s math teacher has been teaching math.

- **Teacher’s highest level of education.** This is a single continuous variable measuring the level of education achieved by the teacher, from no education
to graduate/professional degree. Higher scores indicate a higher level of education achieved by the teacher.

**Level 2: School-level Variables**

In addition to student-level variables from the perspectives of students’ parents and teachers in which the student is the unit of analysis, the current study also includes several variables designed to measure school-level constructs in which the school is the unit of analysis, including curriculum type, teacher-student ratio and several variables aggregated from the student level designed to examine the environment of social capital at the school level.

**Curriculum.** Previous studies examining the effects of curriculum on academic outcomes have been mixed (e.g., Allensworth et al., 2009; Lee, Croninger & Smith, 1997; Teitelbaum, 2003). There is a wealth of school effects research that consistently shows the educational benefits of college preparatory curricula compared to differentiated curricula; however, all of these studies include Catholic and other private schools that are more likely to offer a constrained curriculum (e.g., Coleman et al., 1982). This well-known program of research has led many states to mandate college prep for all curricula in public high schools (Lee & Ready, 2009). Conversely, a recent study on curriculum policy changes among the CPS system found that students enrolled after the mandated college prep for all curriculum, were no more likely to attend college after graduation than those who attended high school before the policy change (Allensworth et al., 2009). In the current study, the variable curriculum is based on a question from the first follow up data collection administrator questionnaire that asked what percentage of 12th graders
(referring to the cohort of the current study) were enrolled in a college preparatory or specialized academic curriculum. This is a continuous variable ranging from 0-100, where higher scores indicate a higher percentage of students in the cohort enrolled in a college preparatory curriculum.

**Cohort size (number of students enrolled).** The size of high schools has been shown to be associated with several academic outcomes (Lee & Smith, 1997). High schools that are very large (i.e., over 2,000 students) tend to allow students to “fall through the cracks” and the sheer volume of students does not allow for teachers to get to know their students on a personal level (Lee & Smith, 1997). Conversely, schools that are very small (i.e., less than 300) are less likely to have the resources one would find at larger high schools regarding teacher workforce and curricular offerings. Lee and Smith (1997) found that high schools that range in size from 600 to 900 students showed the most positive and equitable academic outcomes; however, this category also included Catholic and other private high schools (Lee & Smith, 1999). Similar results related to the size of schools have been found among studies examining cohort size, or the number of students in one particular grade, rather than total school enrollment (Weiss et al., 2010).

In the current study I include a composite categorical variable from the base year questionnaire indicating the size of the cohort as of the spring of 2002.

**Curriculum*cohort size.** Previous research by Lee and her colleagues shows that smaller schools tend to have a more constrained curriculum; however, smaller public schools that strive to provide a more comprehensive curriculum to their students may result in teachers instructing outside of their content area (Lee et al., 2000; Lee &
Burkham, 2003). The interaction term of curriculum by cohort size was created to help answer the third research question in the current study, which asks if the relationship between the percentage of the cohort in a college preparatory curriculum and the likelihood of postsecondary enrollment varies as a function of school size.

**Number of teachers.** In addition to cohort size, I will also include a categorical composite variable from the first follow up administrator questionnaire indicating the number of full time teachers in the school as of October 2003. Just as Coleman (1988) discusses a child’s access to social capital in terms of the number of siblings in the home, the variables of cohort size and number of teachers will give an indication of students’ access to social capital in terms of the number of students compared to the number of full time teachers employed at the school.

**School-reported student-teacher morale.** In order to examine the environment of student-teacher relationships at the school level, I included several questions from the base year administrator questionnaire aimed at measuring the level of student-teacher morale at the school level. Administrators were asked to report the accuracy of five statements, including “student morale is high”, “teachers press students to achieve”, “teacher morale is high”, “learning is a high priority for students” and “students are expected to do homework”, where 1 = **not accurate at all** and 5 = **very accurate**. These items were averaged together in a composite variable (α = .85), where higher scores indicate higher school-reported student-teacher morale.

**School-level teacher expertise.** Two questions were taken from the base year administrator questionnaire that measure teacher expertise at the school level. In the
current study, these variables are meant to measure the degree of expertise at the school level to which the students have access and, as with the student level variables measuring teacher expertise as an indirect measure of social capital, they will be interpreted as controlling for teacher human capital at the school level.

- **Percent of teachers who are certified.** This question measures the percentage of full time teachers in the school who are certified in their content area.

- **Percent of teachers teaching out of field.** This question measures the percentage of full time teachers in the school who are not teaching in their content area.

**Aggregated student-level variables.** In addition to curriculum, cohort size, number of full time teachers in a school and school-level teacher expertise, I aggregated gender, race, parental education, SES, family composition, number of siblings, parental expectations, rules about GPA and homework, parent-school involvement, intergenerational closure, parent as information and support resource and teacher’s educational expectations in order to examine the effects of these factors at the school level. Aggregating nested data to the second level of analysis in a multi-level analysis gives a better understanding of the effects of the environment in which the level-one units of analysis are nested on the outcome variable. This strategy of aggregation has also been used in multi-level studies using ELS (2002) (Engberg & Wolniak, 2010).
Table 1 below summarizes the types and scales for each of the independent variables in the model predicting post-secondary attendance of public high school students.

Table 1. Independent Variables in the Model Predicting Post-Secondary Enrollment among Public High School Students Who were Sophomores in the Spring of 2002

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever attended postsecondary institution</td>
<td>Dichotomous</td>
<td>0 = no</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = yes (reference)</td>
</tr>
<tr>
<td><strong>Level 1 Independent Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Background Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Dichotomous</td>
<td>0 = male</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = female (reference)</td>
</tr>
<tr>
<td>Race</td>
<td>Series of Dummy Codes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>White</td>
<td></td>
</tr>
<tr>
<td></td>
<td>African American</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td></td>
</tr>
<tr>
<td>Parental Education</td>
<td>Continuous Composite</td>
<td>Higher scores indicate higher education achieved</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td>Continuous Composite of 5 equally weighted variables</td>
<td>Higher scores indicate higher SES</td>
</tr>
<tr>
<td><strong>Family Social Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Composition</td>
<td>Dichotomous</td>
<td>0 = Two parent household</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = Single parent household</td>
</tr>
<tr>
<td>Number of siblings at home</td>
<td>Additive composite of six items</td>
<td>Number of full/adoptive, step and half brothers and sisters living with student in BY</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Variable Type</td>
<td>Scale</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Parental educational expectations</td>
<td>Continuous</td>
<td>Higher scores indicate higher educational expectations</td>
</tr>
<tr>
<td>Family rules about maintaining grade point average</td>
<td>Dichotomous</td>
<td>0 = no</td>
</tr>
<tr>
<td>Family rules about doing homework</td>
<td>Dichotomous</td>
<td>1 = yes (reference)</td>
</tr>
<tr>
<td>Parental involvement with school</td>
<td>Additive composite of five dichotomous variables</td>
<td>Higher score indicates more involvement with school</td>
</tr>
<tr>
<td>Intergenerational closure (parental involvement with other parents)</td>
<td>Additive composite of six dichotomous items</td>
<td>Higher score indicates more involvement with friends’ parents</td>
</tr>
<tr>
<td>Parent as information resource</td>
<td>Composite factor composite of 5 variables measuring parents as an information resource for students</td>
<td>Higher score indicates greater information resource for students</td>
</tr>
<tr>
<td>Parent as support resource</td>
<td>Continuous factor composite of 12 variables measuring parent/student interactions</td>
<td>Higher score indicates more parent/student interaction on these measures</td>
</tr>
<tr>
<td><strong>Teacher Social Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher talks to student outside of class</td>
<td>Dichotomous</td>
<td>0 = no</td>
</tr>
<tr>
<td>Student-teacher morale</td>
<td>Continuous composite of 4 items measuring student reported morale</td>
<td>Higher scores indicate higher student reported student-teacher morale</td>
</tr>
<tr>
<td>Teacher’s educational expectations for student</td>
<td>Continuous</td>
<td>Higher scores indicate higher educational expectations</td>
</tr>
<tr>
<td>Total years of teaching K-12</td>
<td>Continuous</td>
<td>Number of years</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Variable Type</td>
<td>Scale</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>-------</td>
</tr>
<tr>
<td>Highest level of education completed by math teacher</td>
<td>Continuous</td>
<td>Higher scores indicate higher level of education</td>
</tr>
</tbody>
</table>

### Level 2 Variables

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of cohort enrolled in college preparatory curriculum</td>
<td>Continuous</td>
<td>Higher scores indicate higher percentage of student in college prep curriculum</td>
</tr>
</tbody>
</table>
| Cohort Size (#students in cohort)                  | Categorical Composite | 1 = 1-99  
2 = 100-199  
3 = 200-299  
4 = 300-399  
5 = 400-499  
6 = 500-699  
7 = 700 or more |
| Curriculum*Cohort Size                             | Interaction Term | Tests the significance of the interaction of these two school-level predictor variables. |
| Number of Full Time Teachers                       | Categorical Composite | 1 = 0-10  
2 = 11-20  
3 = 21-30  
4 = 31-45  
5 = 46-60  
6 = 61-75  
7 = 76-100  
8 = 101-150  
9 = more than 150 |
<p>| School-reported student-teacher morale             | Continuous composite of 5 items measuring administrator-reported student-teacher morale | Higher scores indicate higher student-teacher morale |
| Percent of teachers who are certified              | Continuous | Higher scores indicate higher percentage of full time certified teachers |</p>
<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of teachers teaching out of field</td>
<td>Continuous</td>
<td>Higher scores indicate higher percentage of full time teachers not teaching in their content area.</td>
</tr>
<tr>
<td>Aggregated student-level variables</td>
<td>Gender, race, parental education, SES, family composition, number of siblings, parental educational expectations, rules about maintaining GPA and completing homework, parent-school involvement, intergenerational closure, parents as information and support resource and teachers’ educational expectations.</td>
<td></td>
</tr>
</tbody>
</table>

**Data Preparation**

**Factor Analysis**

In order to group together the parental involvement constructs of parents as information resource and parents as support resource, I ran a factor analysis using principal axis factoring (PAF) with orthogonal (Varimax) rotation with a two factor solution. PAF analyzes only the variance that can be explained by the factors, or the common variance. PAF excludes the variance that the factors do not explain and thus shows less explained variance than that of principle components analysis. Orthogonal rotation assumes that factors are not correlated which increases interpretability of the factor loadings (Tabachnick & Fidell 2007).

The two factor solution fit the data well. The five items pertaining to parents providing advice about selecting courses or programs, plans for college entrance exams, applying to college/school after high school and things troubling the tenth grader and providing information about community, national and/or world events loaded together as “parent as information resource” with factor loadings between .35 and .85. The 12 items
pertaining to parents attending school activities, concerts, plays or movies, sporting events outside of school, religious services and family social functions with the 10th grader, worked on homework/school projects, hobbies/played sports, took vacations, went shopping or to restaurants, spent time talking and did something else fun with the tenth grader loaded together as “parent as support resource” with factor loadings between .33 and .84.

**Statistical Analysis**

The current study examines the effect of independent variables at multiple levels of analysis on a dichotomous outcome variable. Thus, I employed a specialized variation of hierarchical linear modeling known as hierarchical generalized linear modeling (HGLM) to answer the proposed research questions. HGLM is the appropriate statistical procedure for the current study for several reasons. First, the outcome in the current study, whether the student enrolled in a postsecondary institution, measures the probability of success. The HLM software (Scientific Software International, Inc., Lincolnwood, IL) allows the user to specify a binomial distribution with a probability of success in the outcome variable. Second, the variables proposed for the current study contain multiple units of analysis. Multiple Logistic Regression (MLR), which predicts dichotomous outcomes from several continuous and/or categorical variables does not allow for multiple units of analysis and would therefore be inappropriate in this case. HGLM allows for simultaneous estimation of the relationship between the outcome and several units of analysis, in the current case, students and schools. Third, MLR assumes homogeneity of regression, or that the relationship between individual level and outcome
variables is the same across all groups. HGLM allows for the relationship between level one variables and the outcome to vary across the level 2 variables. This also allows users to examine cross-level interactions between individual- and group-level variables.

Finally, MLR assumes independent observations among independent variables. With multi-level data, observations of individual level variables are dependent on groups in which they are nested. In MLR, this leads to misestimation of standard errors. HGLM accounts for the dependent, nested nature of the independent variables by diving unexplained variance into two components, individual- and group-level.

The predictive model for the current study is displayed below:

**Level 1 Model**

\[
\log\left[\frac{\phi_{ij}}{1 - \phi_{ij}}\right] = \eta_{ij}
\]

\[
\eta_{ij} = \beta_{0j} + \beta_{1j}(\text{Sociodemographic Factors}_{ij}) + \beta_{2j}(\text{Family Social Capital}_{ij}) + \beta_{3j}(\text{Teacher Social Capital}_{ij})
\]

**Level 2 Model**

\[
\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Curriculum}_j) + \gamma_{02}(\text{School size}_j) + \gamma_{03}(\text{Sociodemographic make up}_j) + \gamma_{04}(\text{Family Social Capital agg}_j) + \gamma_{05}(\text{Teacher Social Capital agg}_j)
\]

\[
\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Curriculum}_j) + \gamma_{12}(\text{School size}_j) + \gamma_{13}(\text{Sociodemographic make up}_j) + \gamma_{14}(\text{Family Social Capital agg}_j) + \gamma_{15}(\text{Teacher Social Capital agg}_j)
\]

\[
\beta_{2j} = \gamma_{20} + \gamma_{21}(\text{Curriculum}_j) + \gamma_{22}(\text{School size}_j) + \gamma_{23}(\text{Sociodemographic make up}_j) + \gamma_{24}(\text{Family Social Capital agg}_j) + \gamma_{25}(\text{Teacher Social Capital agg}_j)
\]

\[
\beta_{3j} = \gamma_{30} + \gamma_{31}(\text{Curriculum}_j) + \gamma_{32}(\text{School size}_j) + \gamma_{33}(\text{Sociodemographic make up}_j) + \gamma_{34}(\text{Family Social Capital agg}_j) + \gamma_{35}(\text{Teacher Social Capital agg}_j)
\]
All continuous variables were group mean centered. I applied a school weight (BYSCHWT) to level two and a student weight (F2BYWT) to level one in order to generalize to the population.

**Multiple Imputation of Missing Data**

There are several variables in the current study with missing values. Since the data were obtained from the ELS (2002), a large public-use database collected by an outside source, multiple imputation was used to analyze the missing values. According to Tabachnick and Fidell (2007), multiple imputation can be applied to longitudinal data, retains its sampling variability and is “the method of choice for databases that are made available for analyses outside the agency that collected the data” (p. 69).

Because HLM (Scientific Software International, Inc., Lincolnwood, IL) will not run nested data if there are variables with missing data at level two, I ran a missing data analysis on the school level data in PASW version 17 (SPSS, Inc., Chicago, IL). I chose not to run multiple imputation at the student level with subsequent aggregation to the school level because, given the nested nature of the data at level 1, the multiple imputation would have to be done for each unit at the school level, or about 580 times. The variable “percentage of teachers teaching out of their field” was missing in almost 40% of cases and I excluded it from further analysis. The other level two variables were missing between 5% and 25% of cases. I ran multiple imputation analysis in PASW to impute values for percentage of 12th graders in a college preparatory curriculum, number of full time teachers at the school, percentage of students who talk to teachers outside of class, average teacher educational expectations, percentage of full time teachers who are
certified, school-reported morale, average parental educational expectations, average SES, average parent-school involvement, and average parent as information resource.

I chose the automatic imputation method provided by PASW, which scans the data and decides what method of imputation is appropriate for the data based on the pattern of missing data. This resulted in five multiply imputed school level data sets that were all paired with the same student-level data file to create five separate .mdm files in HLM. Missing cases at the student level are removed by the software when running the analysis. I separately entered each file using the feature designed for multiple imputation in the HLM software application. Analyzing multiply imputed data in HLM produces estimates that account for the uncertainty that is associated with imputed data. The model specified in HLM was applied to all five multiply imputed data files and an average estimated model was computed from the five multiply imputed models. The final unweighted sample included 10,828 students in 578 schools.

**Excluding Variables**

I ran the HGLM model using all variables at levels one and two. The HLM software would not run the model, specifying that the model may be reaching singularity and suggesting that I reduce the predictors in the model. I ran a correlation matrix and logistic regression at level one in PASW, predicting the likelihood of postsecondary enrollment from all of the student-level variables in the analysis. Because the sample was weighted, every predictor was independently predictive of postsecondary enrollment; however, I excluded a few predictors that were highly correlated with others and would still allow me to adequately answer my research questions. The final model included nine
social capital predictors with two control variables at the student level and three school level predictors with three control variables (two aggregated student level variables and one school level teacher control), seven student level variables aggregated to the school level and an interaction term of curriculum by cohort size (see Table 2).

Table 2. Student-level and School-level Variables in the Final Reduced HGLM Model

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Type</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Dichotomous</td>
<td>0 = male 1 = female (reference)</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td>Continuous Composite of 5</td>
<td>Higher scores indicate higher SES</td>
</tr>
<tr>
<td>Family Composition</td>
<td>Dichotomous</td>
<td>0 = Two parent household 1 = Single parent household</td>
</tr>
<tr>
<td>Parental educational expectations</td>
<td>Continuous</td>
<td>Higher scores indicate higher educational expectations</td>
</tr>
<tr>
<td>Family rules about maintaining grade point average</td>
<td>Dichotomous</td>
<td>0 = no 1 = yes (reference)</td>
</tr>
<tr>
<td>Parental involvement with school</td>
<td>Additive composite of five</td>
<td>Higher score indicates more involvement with school</td>
</tr>
<tr>
<td>Intergenerational closure</td>
<td>Additive composite of six</td>
<td>Higher score indicates more involvement with friends’ parents</td>
</tr>
<tr>
<td>(parental involvement with other parents)</td>
<td>dichotomous variables</td>
<td></td>
</tr>
<tr>
<td>Parent as support resource</td>
<td>Continuous factor composite of 12</td>
<td>Higher score indicates more parent/student interaction on these measures</td>
</tr>
<tr>
<td>Student-teacher morale</td>
<td>Continuous composite of 4</td>
<td>Higher scores indicate higher student reported student-teacher morale</td>
</tr>
<tr>
<td>Teacher’s educational expectations</td>
<td>Continuous</td>
<td>Higher scores indicate higher educational</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Variable Type</td>
<td>Scale</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Highest level of education completed by math teacher</td>
<td>Continuous</td>
<td>expectations&lt;br&gt;Higher scores indicate higher level of education</td>
</tr>
<tr>
<td>Percentage of cohort enrolled in college preparatory curriculum</td>
<td>Continuous</td>
<td>Higher scores indicate higher percentage of student in college prep curriculum</td>
</tr>
<tr>
<td>Cohort Size (#students in cohort)</td>
<td>Categorical Composite</td>
<td>1 = 1-99&lt;br&gt;2 = 100-199&lt;br&gt;3 = 200-299&lt;br&gt;4 = 300-399&lt;br&gt;5 = 400-549&lt;br&gt;6 = 550-699&lt;br&gt;7 = 700 or more</td>
</tr>
<tr>
<td>Curriculum*Cohort Size</td>
<td>Interaction Term</td>
<td>Tests the significance of the interaction of these two school-level predictor variables.</td>
</tr>
<tr>
<td>Number of Full Time Teachers</td>
<td>Categorical Composite</td>
<td>1 = 0-10&lt;br&gt;2 = 11-20&lt;br&gt;3 = 21-30&lt;br&gt;4 = 31-45&lt;br&gt;5 = 46-60&lt;br&gt;6 = 61-75&lt;br&gt;7 = 76-100&lt;br&gt;8 = 101-150&lt;br&gt;9 = more than 150</td>
</tr>
<tr>
<td>School-reported student-teacher morale</td>
<td>Continuous composite of 5 items measuring administrator-reported student-teacher morale</td>
<td>Higher scores indicate higher student-teacher morale</td>
</tr>
<tr>
<td>Percent of teachers who are certified</td>
<td>Continuous</td>
<td>Higher scores indicate higher percentage of full time certified teachers</td>
</tr>
<tr>
<td>Aggregated student-level variables</td>
<td>Gender, SES, family composition, parental educational expectations, rules about maintaining GPA, parent-school involvement, intergenerational closure, parents as support resource and teachers’ educational expectations.</td>
<td></td>
</tr>
</tbody>
</table>
The curriculum*cohort size interaction term was not a significant predictor of the likelihood of postsecondary enrollment, nor was it a significant factor in any cross-level interactions in the reduced model. Thus, I removed the interaction term from the model and ran the analysis again. The results reported in Chapter Four are reflective of the analysis run without the curriculum*cohort size interaction term.

Limitations

There are a few limitations that need to be addressed with the current study. First, as with any large scale, longitudinal data collection project, missing data is an issue in the ELS (2002). Steps informed by previous literature were taken to correct these issues; however, the presence of these missing values, despite subsequent multiple imputation, can limit the interpretability of the results of the study and the results should be interpreted accordingly.

Second, the current study seeks to gain a better understanding of the relationship between social capital, the school environment and the likelihood of postsecondary enrollment among a nationally representative sample of public high school sophomores. This study attempts to account for a large number of variables; however, there are most likely myriad other factors involved in the process of public high school students decisions of graduation, postsecondary education, the workforce and beyond. For example, other factors related to the school environment such as whether schools have programs such as dropout prevention, career/college counseling and gang prevention may also affect students’ postsecondary choices.
The third limitation involves the possibility of endogeneity. The measure of curriculum at the school level involves the percentage of the cohort of study within each school enrolled in a college preparatory curriculum. It is possible that academically inclined students may be more likely to self-select into schools with a more rigorous academic curriculum, or a higher percentage of students enrolled in college preparatory curricula. Results suggesting that those in schools with higher percentages of the cohort enrolled in a college preparatory curriculum are more likely to continue on to postsecondary institutions may be biased by the possibility of endogeneity and should be interpreted cautiously.

Finally, although the ELS (2002) was designed to be as comprehensive a study as possible in understanding the journey of this nationally representative sample of high school students from adolescence to adulthood, no venue exists within the ELS to gain an understanding of individual perspectives of the student upon which this study is based. Qualitative inquiry using a purposive sample of individuals choosing different paths in their educational/vocational lives may provide a richer understanding of the interdependent relationship between parental and teacher social capital, school effects and postsecondary choice. More research will clearly be needed to better understand these interdependent relationships and their effects on the life choices of these young people.
CHAPTER FOUR

RESULTS

This chapter reports the results of the predictive model shown in Chapter Three, which was constructed to answer the four questions central to the current study related to the likelihood of postsecondary enrollment. The current chapter discusses the results of the HGLM analysis in three sections related to the likelihood of postsecondary enrollment: student-level predictors, school-level predictors and cross-level interactions. I provide a table at the end of the chapter showing the results of the HGLM analysis including odds ratios and 95% confidence intervals.

Student-level Predictors

At the student level, the current study examined among a cohort of public high school sophomores the relationship between social capital as measured by family composition, rules at home about maintaining a certain GPA, intergenerational closure, parents as a support resource, student reported morale between students and teachers, parental educational expectations and teachers educational expectations and the likelihood of postsecondary enrollment, controlling for gender, SES and teacher education.

Bivariate mean differences between students who enrolled versus did not enroll in postsecondary institutions show that, on average, those who enrolled in a postsecondary institution had higher SES, higher parental education, higher parental educational
expectations, more parent-school involvement, higher degrees of intergenerational closure, more support from parents, higher morale between students and teachers, higher teachers’ educational expectations and higher teacher education. Students in this group were also more likely to be female, come from two-parent households and have rules at home about maintaining their GPA (see Table 3).

Table 3. Bivariate Mean Differences in Student-level Predictor Variables for Public High School Students who Enrolled versus Did Not Enroll in a Postsecondary Institution

<table>
<thead>
<tr>
<th>Student-level Predictor</th>
<th>Enrolled in Postsecondary Institution N = 2,114,292 (69%)</th>
<th>Did Not Enrolled in Postsecondary Institution N = 948,502 (31%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SES</td>
<td>M (SD) .11 (.7)</td>
<td>M (SD) -.38 (.6)</td>
</tr>
<tr>
<td>Parental Educational Expectations</td>
<td>M (SD) 5.18 (1.2)</td>
<td>M (SD) 3.95 (1.6)</td>
</tr>
<tr>
<td>Parent-School Involvement</td>
<td>M (SD) 1.48 (1.5)</td>
<td>M (SD) .95 (1.2)</td>
</tr>
<tr>
<td>Intergenerational Closure</td>
<td>M (SD) 4.02 (1.8)</td>
<td>M (SD) 3.51 (1.8)</td>
</tr>
<tr>
<td>Parent as Support Resource</td>
<td>M (SD) 3.15 (.5)</td>
<td>M (SD) 2.97 (.5)</td>
</tr>
<tr>
<td>Student-reported Morale</td>
<td>M (SD) 2.83 (.5)</td>
<td>M (SD) 2.72 (.5)</td>
</tr>
<tr>
<td>Teachers’ Educational Expectations</td>
<td>M (SD) 4.39 (1.3)</td>
<td>M (SD) 2.94 (1.3)</td>
</tr>
<tr>
<td>Teacher Education</td>
<td>M (SD) 4.07 (1)</td>
<td>M (SD) 3.96 (1)</td>
</tr>
<tr>
<td>Gender (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>1,081,426 (74)</td>
<td>375,604 (26)</td>
</tr>
<tr>
<td>Males</td>
<td>1,032,867 (64)</td>
<td>572,898 (36)</td>
</tr>
<tr>
<td>Family Composition (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Parent House</td>
<td>410,426 (63)</td>
<td>240,418 (37)</td>
</tr>
<tr>
<td>Two Parent House</td>
<td>1,703,866 (71)</td>
<td>708,084 (29)</td>
</tr>
<tr>
<td>Rules about GPA (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1,407,593 (72)</td>
<td>539,724 (28)</td>
</tr>
<tr>
<td>No</td>
<td>706,700 (63)</td>
<td>408,778 (37)</td>
</tr>
</tbody>
</table>
These bivariate relationships between student-level characteristics and the likelihood of postsecondary enrollment indicate a greater degree of social, human and economic capital possessed by those who continued on to postsecondary institutions. Controlling for other variables in the model, HGLM main effects at level 1 revealed that the social capital predictors of parental educational expectations ($p = .002$), teacher educational expectations ($p < .001$) and intergenerational closure ($p = .012$) were significantly associated with the likelihood of postsecondary enrollment. Specifically, higher educational expectations of students from both parents and teachers were associated with a significant increased likelihood of postsecondary enrollment. Additionally, more intergenerational closure at home was associated with a significant increased likelihood of postsecondary enrollment after controlling for the other factors in the model. Additionally, gender ($p = .001$) and SES ($p < .001$) were significantly associated with the likelihood of postsecondary enrollment, where girls had a significantly greater likelihood of college attendance than boys, and higher SES was associated with a significant increased likelihood of college attendance. (see Table 4).

Table 4. Student-level Main Effects in Predicting the Likelihood of Postsecondary Educational Enrollment

<table>
<thead>
<tr>
<th>Level 1 Fixed Effects</th>
<th>Coeff</th>
<th>df</th>
<th>OR</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>.41</td>
<td>10,098</td>
<td>1.51</td>
<td>(1.18, 1.92)</td>
</tr>
<tr>
<td>SES</td>
<td>.84</td>
<td>9,757</td>
<td>2.31</td>
<td>(1.85, 2.87)</td>
</tr>
<tr>
<td>Family Structure</td>
<td>.18</td>
<td>10,098</td>
<td>1.20</td>
<td>(.9, 1.6)</td>
</tr>
<tr>
<td>GPA Rules</td>
<td>-.11</td>
<td>8,400</td>
<td>.89</td>
<td>(.65, 1.22)</td>
</tr>
<tr>
<td>Parental Educational Expectations</td>
<td>.36</td>
<td>8,325</td>
<td>1.43</td>
<td>(1.3, 1.6)</td>
</tr>
<tr>
<td>Parent-School Involvement</td>
<td>.11</td>
<td>10,098</td>
<td>1.11</td>
<td>(.997, 1.24)</td>
</tr>
<tr>
<td>Intergenerational Closure</td>
<td>.09</td>
<td>9,934</td>
<td>1.09</td>
<td>(1.02, 1.17)</td>
</tr>
<tr>
<td>Parent as Support Resource</td>
<td>.12</td>
<td>10,098</td>
<td>1.14</td>
<td>(.85, 1.52)</td>
</tr>
<tr>
<td>Student-level Morale</td>
<td>.17</td>
<td>10,098</td>
<td>1.19</td>
<td>(.91, 1.56)</td>
</tr>
</tbody>
</table>
### Level 1 Fixed Effects

<table>
<thead>
<tr>
<th></th>
<th>Coeff</th>
<th>df</th>
<th>OR</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher’s Educational Expectations</td>
<td>.61</td>
<td>10,098</td>
<td>1.85</td>
<td>(1.67, 2.05)</td>
</tr>
<tr>
<td>Teacher’s Education</td>
<td>.9</td>
<td>10,098</td>
<td>1.10</td>
<td>(.95, 1.26)</td>
</tr>
</tbody>
</table>

#### School-level Predictors

At the level of the school, the current study examined among a cohort of public high school students who were sophomores in the spring semester of 2002 the relationship between the percentage of the cohort enrolled in a college preparatory curriculum, the size of the cohort as of the spring of 2002 and the number of full time teachers at the school and the likelihood of postsecondary enrollment. Specifically, the level two analyses predicted the average likelihood of postsecondary enrollment among students in schools. The school-level analysis also included several student-level predictors aggregated to the school level in order to examine the social capital environment of schools and their associations with the likelihood of postsecondary enrollment among this cohort of public high school students, including the percentage of students in schools from single parent households, the average parental expectations of students within a school, the percentage of students at a school with rules at home about maintaining a certain GPA, the average degree of intergenerational closure at a school, the average degree to which parents are a support resource for their children at a school, the average teacher expectations at a school, school-reported morale between students and teachers, controlling for teacher’s average years of teaching at a school and average SES.
Among three main school-level variables, cohort size \((p = .04)\) was significantly predictive of the likelihood of postsecondary educational enrollment, in that students have a significantly greater likelihood of postsecondary enrollment if they attend a larger compared to a smaller high school. The likelihood of postsecondary enrollment was not influenced by the percentage of the cohort in a college preparatory curriculum or the number of full time teachers at the school, independent of the other variables in the model. Among the student-level variables aggregated to the school level in order to examine the social capital environment of a school, the average degree of intergenerational closure in a school \((p < .001)\), average parental educational expectations \((p = .007)\) and percentage of females in the school \((p = .025)\) were associated with a significant increased likelihood of postsecondary enrollment among students in the cohort. This means that, independent of the other variables, students in schools where parents on average report knowing a higher number of the parents of their children’s friends, where parents have higher average educational expectations and schools that have a lower percentage of girls have an increased likelihood of postsecondary enrollment (see Table 5).

Table 5. School-level Main Effects in Predicting the Likelihood of Post Secondary Educational Enrollment

<table>
<thead>
<tr>
<th>Level 2 Fixed Effects</th>
<th>Coeff</th>
<th>df</th>
<th>OR</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent in college prep</td>
<td>-0.01</td>
<td>117</td>
<td>.99</td>
<td>(.98, 1.01)</td>
</tr>
<tr>
<td>Percent of girls in school</td>
<td>-0.03</td>
<td>536</td>
<td>.97</td>
<td>(.95, .99)</td>
</tr>
<tr>
<td>Average SES</td>
<td>.89</td>
<td>536</td>
<td>2.44</td>
<td>(.64, 9.3)</td>
</tr>
<tr>
<td>Percent single parents</td>
<td>-0.02</td>
<td>536</td>
<td>.98</td>
<td>(.96, 1.01)</td>
</tr>
<tr>
<td>Average parental expectations</td>
<td>.87</td>
<td>536</td>
<td>2.34</td>
<td>(1.3, 4.5)</td>
</tr>
<tr>
<td>Percent GPA rules</td>
<td>-.01</td>
<td>536</td>
<td>.99</td>
<td>(.96, 1.01)</td>
</tr>
<tr>
<td>Average intergenerational closure</td>
<td>1.18</td>
<td>536</td>
<td>3.25</td>
<td>(1.9, 5.6)</td>
</tr>
</tbody>
</table>
In order to better understand the factors associated with college preparatory curricula, I examined the relationship between the size of the cohort and percent of students in a college preparatory curriculum, separating the continuous curriculum variable into quartiles and examined the mean differences of the size of the cohorts as well as several variables from the student level that were aggregated to the school level.

The relationship between cohort size and the percent of students enrolled in college preparatory curriculum is curvilinear. Very small (1-99 students) and very large (700 or more students) cohorts had the lowest average percent of students enrolled in a college preparatory curriculum, whereas cohorts with 400-599 students had the highest average percent of students enrolled in a college preparatory curriculum. Additionally, weighted frequencies of cohort size show that almost half of all cohorts had less than 100 students ($N = 8,679; 47.7\%$) and only about 2% of the cohorts had 700 or more students ($N = 382; 2.1\%$). Figure 2 below illustrates the relationship between these two school-level variables.

<table>
<thead>
<tr>
<th>Level 2 Fixed Effects</th>
<th>Coeff</th>
<th>df</th>
<th>OR</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average parent as support resource</td>
<td>.05</td>
<td>536</td>
<td>1.05</td>
<td>(.11, 9.99)</td>
</tr>
<tr>
<td>Average teacher expectations</td>
<td>.08</td>
<td>536</td>
<td>1.08</td>
<td>(.5, 2.4)</td>
</tr>
<tr>
<td>Percentage teachers certified</td>
<td>-.01</td>
<td>536</td>
<td>1.00</td>
<td>(.94, 1.05)</td>
</tr>
<tr>
<td>School morale</td>
<td>-.06</td>
<td>107</td>
<td>.94</td>
<td>(.48, 1.83)</td>
</tr>
<tr>
<td>Size of cohort</td>
<td>1.81</td>
<td>536</td>
<td>6.14</td>
<td>(1.08, 34.77)</td>
</tr>
<tr>
<td>Number full time teachers</td>
<td>-2.25</td>
<td>536</td>
<td>.11</td>
<td>(.01, 1.17)</td>
</tr>
</tbody>
</table>
Figure 2. Mean percentage of students enrolled in a college preparatory curriculum by the size of the cohort. Very small and very large cohorts have the lowest average percentages whereas mid-sized cohorts (between 300 and 549 students) have the highest average percentages.

The post hoc analysis revealed that average parental education, SES, parental educational expectations, teacher educational expectations and school-reported morale have a positive relationship with the percentage of the cohort enrolled in a college preparatory curriculum in a school, in that the higher the percentage of students in a college preparatory curriculum, the higher the average scores on these measures. Conversely, the percentage of students with rules about maintaining GPA and the average degree of intergenerational closure declined as the percentage of the cohort in a college preparatory curriculum increased. The percentage of students in single parent homes, the average parent-school involvement and the average degree of parents as a support resource did not appear to have a linear relationship with the percent of the cohort in a college preparatory curriculum (see Table 6).
### Table 6. Mean Differences between Quartiles of the Percent of the Cohort Enrolled in a College Preparatory Curriculum on Aggregated Student-level Variables

<table>
<thead>
<tr>
<th></th>
<th>Q1 0-24% (M, SD)</th>
<th>Q2 25%-49% (M, SD)</th>
<th>Q3 50%-69% (M, SD)</th>
<th>Q4 70%-100% (M, SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. SES</td>
<td>-.26 (.3)</td>
<td>-.19 (.3)</td>
<td>-.18 (.3)</td>
<td>.06 (.4)</td>
</tr>
<tr>
<td>% Single Parents</td>
<td>22.8 (12.4)</td>
<td>20.2 (11.8)</td>
<td>22.8 (12.1)</td>
<td>20.8 (15)</td>
</tr>
<tr>
<td>Av. Parent Expectations</td>
<td>4.6 (.6)</td>
<td>4.6 (.5)</td>
<td>4.7 (.4)</td>
<td>4.9 (.5)</td>
</tr>
<tr>
<td>% Rules about GPA</td>
<td>68.8 (12.8)</td>
<td>66.3 (14.7)</td>
<td>65 (13.9)</td>
<td>63.7 (13.5)</td>
</tr>
<tr>
<td>Av. Parent-School Involvement</td>
<td>1.5 (.6)</td>
<td>1.2 (.4)</td>
<td>1.4 (.5)</td>
<td>1.5 (.5)</td>
</tr>
<tr>
<td>Av. Intergenerational Closure</td>
<td>4.6 (.8)</td>
<td>4.1 (.6)</td>
<td>4.4 (.7)</td>
<td>4 (.8)</td>
</tr>
<tr>
<td>Av. Parent as Support Resource</td>
<td>3.1 (.2)</td>
<td>3.1 (.2)</td>
<td>3.2 (.1)</td>
<td>3.1 (.2)</td>
</tr>
<tr>
<td>Av. Teacher Expectations</td>
<td>3.7 (.6)</td>
<td>3.7 (.5)</td>
<td>3.6 (.6)</td>
<td>4.2 (.6)</td>
</tr>
<tr>
<td>School-reported Morale</td>
<td>3.7 (.5)</td>
<td>3.8 (.6)</td>
<td>3.8 (.6)</td>
<td>4 (.6)</td>
</tr>
</tbody>
</table>

### Interaction between Curriculum and Cohort Size

The third research question in the current study examined the interaction between the percentage of the cohort enrolled in a college preparatory curriculum and the size of the cohort. This interaction was not a significant predictor of postsecondary enrollment. Specifically, the relationship between the percentage of the cohort in a college preparatory curriculum and the likelihood of postsecondary enrollment did not vary as a function of the size of the cohort. Since this relationship was not significant, the HGLM analysis was run without the interaction term; the statistics reported for the relationships between the student- and school-level variables are reflective of the analysis excluding the interaction between curriculum and cohort size.
Cross-level Interactions

The final section in this chapter reports the results of cross-level interactions, which examines how the relationships between student-level characteristics and postsecondary enrollment can vary as a function of school-level characteristics.

Percentage of Students Enrolled in a College Preparatory Curriculum

As the percentage of students enrolled in a college preparatory curriculum in a school goes down, the relationship between family composition and the likelihood of postsecondary enrollment becomes stronger ($OR = .98$, $p = .017$, 95%CI .97, .99). Specifically, this result may indicate that students in single parent homes may benefit more in terms of the likelihood of postsecondary enrollment if they attend schools with a lower percentage of their cohort in college preparatory curriculum. This may also mean that students from single parent homes may be at an increased disadvantage in terms of college attendance if they attend schools where a larger percentage of their cohort is enrolled in a college preparatory curriculum.

Average SES in Schools

As the average SES of schools goes down, female students are significantly more likely than male students to continue on to postsecondary institutions, ($OR = .36$, $p = .022$, 95%CI .14, .86). To explore this relationship further, I dividing schools into quartiles along average SES and examined the relationship between gender and likelihood of postsecondary enrollment at each quartile. This analysis shows that females are more likely than males to attend postsecondary institutions within each quartile; however, the difference in likelihood of postsecondary enrollment is greater the lower the
quartile. In the lowest average SES quartile, females are 24% more likely to attend postsecondary institutions than males (63% versus 51%, respectively); in the highest quartile, females are 10% more likely than males to attend postsecondary institutions (86% versus 78%, respectively). This indicates that female students have an increased advantage over male students among lower SES schools in terms of the likelihood of postsecondary enrollment.

**Average Teacher Expectations in a School**

As the average educational expectations from teachers in a school go up, female students are significantly more likely to attend postsecondary institutions than male students \((OR = 2.02, p = .002, 95\% CI 1.3, 3.15)\). This means that females are at an increased advantage over males among schools with higher teacher expectations in terms of postsecondary enrollment. To examine this relationship further I divided average teacher expectations in a school into quartiles and examined the relationship between gender and likelihood of postsecondary enrollment separately for each quartile. Overall, females at each quartile have a higher likelihood of postsecondary enrollment than males and both genders increase their likelihood of postsecondary enrollment with increased average teacher expectations. Further examination; however, shows a 23% relative increase in the likelihood of females continuing on to postsecondary institutions between the first and second quartiles and a 15% relative increase in the likelihood of males continuing on to postsecondary institutions between the first and second quartiles. This shows a greater increased likelihood of postsecondary enrollment among females relative
Figure 3. Gender differences in likelihood of postsecondary enrollment among quartiles of average teachers’ educational expectations in a school.

As the average teacher expectations in a school increase, students in schools with a higher percentage of single parents have a significantly increased likelihood of postsecondary enrollment ($OR = 1.75, p = .045, 95\%CI = 1.01, 3.02$). Specifically, students in schools with a higher percentage of single parents may benefit from higher teacher educational expectations to a greater degree in terms of the likelihood of college attendance than students in schools with a lower percentage of single parents.

**Average Degree of Parental Support**

As the average degree of parental support in a school goes down, the relationship between parent-school involvement becomes stronger ($OR = .42, p = .033, 95\%CI = .19, .93$). This suggests that students whose parents are more involved in their school are at an
increased advantage in terms of college attendance when they attend schools with lower than average parental support, or the degree to which parents serve as a support resource for their children.

**School-reported Morale**

Intergenerational closure is a stronger predictor of postsecondary enrollment among students in schools with higher school-reported morale ($OR = 1.15, p = .013, 95\%CI 1.03, 1.28$). Specifically, students in schools with higher school-reported morale between students and teachers benefit more from intergenerational closure in terms of the likelihood of postsecondary enrollment than those in schools with lower school-reported morale.

In order to understand this relationship further, I divided school-reported morale into quartiles and looked at the relationship between intergenerational closure and likelihood of postsecondary enrollment at each quartile. Across all levels of school-reported morale, students who continued on to postsecondary institutions reported higher degrees of intergenerational closure than those who did not continue on to postsecondary institutions. However, in schools with the highest quartile of school-reported morale, there was a greater difference in the degree of intergenerational closure between those who continued on to postsecondary institutions and those who did not. Students in the highest quartile of school-reported morale who enrolled in postsecondary institutions ($M = 4.2, SD = 1.7$) had significantly higher degrees of intergenerational closure on average than those who did not enroll ($M = 3.4, SD = 1.8$). The difference in intergenerational closure between those who enroll in postsecondary institutions and those who do not is
similar within the lowest three quartiles of school morale. These results indicate that, among schools where school-reported morale between students and teachers is the highest, parents who know a greater number of other parents is a stronger predictor of postsecondary enrollment than in schools where school-reported morale is lower (see Figure 4).

**Cohort Size**

As the size of a cohort decreases, students with rules at home about maintaining GPA have a significantly increased likelihood of postsecondary enrollment \((OR = .14, p = .031, 95\%CI .03, .84)\). This indicates that students in larger schools are at an increased disadvantage in terms of the likelihood of postsecondary enrollment if they do not have to maintain a certain GPA at home than students in smaller schools.

Figure 4. Mean differences in intergenerational closure among public high school students who continued on versus did not continue on to postsecondary institutions by quartiles of school-reported morale between students and teachers.
In order to understand these relationships further, I divided cohort size into thirds: small (1-199 students), medium (200-399 students), and large (400 and above) cohorts. In each of these categories, those with rules at home about maintaining their GPA were more likely to attend postsecondary institutions than those without rules about maintaining GPA. However, as the size of a cohort gets bigger, the difference in the likelihood of postsecondary enrollment between those with rules at home and those without rules at home becomes greater. Among students in the smallest cohorts, there is an 11% relative difference in likelihood of postsecondary enrollment between those without rules about maintaining GPA (63%) and those with rules (70%). Among students in the largest cohorts, there is a 16% relative difference between these groups (64% versus 74%, respectively). Cohort size seems to have less of an impact on the likelihood of postsecondary enrollment for those without rules at home. Those with rules at home to maintain their GPA are at an increased advantage in terms of postsecondary enrollment among larger schools (see Figure 5).
Figure 5. Difference in likelihood of postsecondary enrollment among those with and without rules to maintain GPA among small, medium and large cohorts.

**Number of Full Time Teachers**

As the number of full time teachers in a school increases, the relationship between rules about maintaining GPA and the likelihood of postsecondary enrollment becomes significantly stronger \((OR = 9.24, p = .038, 95\% CI 1.13, 75.7)\). I divided the number of full time teachers in a school into thirds: small (1-30), medium (31-60) and large (over 60) in order to better understand the relationships among the number of teachers, rules about maintaining GPA and the likelihood of postsecondary enrollment. I ran Chi square tests of independence for each level between rules about maintaining GPA and likelihood of postsecondary enrollment; however, the percentages in the crosstabs do not reflect the odds ratio of the cross-level interaction in the HGLM analysis. I repeated the Chi square tests of independence using all six original categories of the number of full time teachers in a school to examine the relationship between rules about maintaining GPA and
postsecondary enrollment at each level. The graph below shows the non-linear relationship between rules about maintaining GPA and postsecondary enrollment at each level of the variable for number of full time teachers. Among students in schools with 11-20 teachers, the rate of postsecondary enrollment is the same for both those with (72%) and without (72%) rules at home about maintaining their GPA. Among students in schools with 21-30 full time teachers, there is a 28% relative decrease in the percentage of students with no rules at home about maintaining their GPA who continue on to postsecondary institutions (52%) versus an eight percent relative decrease in the percentage of students with rules about maintaining GPA who continue on to postsecondary institutions (65%; see Figure 6). Note that there is a relatively small number of students in schools with 0-10 teachers ($N = 16,851, .5\%$) compared to the overall number of students in the weighted sample.

As the number of full time teachers in a school increases, the relationship between the degree of parents as a support resource for their children and the likelihood of postsecondary enrollment becomes significantly stronger ($OR = 23.19; p = .02, 95\%CI 1.66, 324.77$). Mean differences of parents as support resources at each level of school size show the largest difference between those who continued on to postsecondary institutions ($M = 3.13, SD = .49$) and those who did not ($M = 2.93, SD = .54$) is among schools with 60 or more full time teachers and the smallest difference was among schools with 30 or fewer teachers ($M = 3.21, SD = .43$ vs. $M = 3.09, SD = .49$, respectively). This may mean that the degree of parental support is more beneficial in terms of the likelihood of postsecondary enrollment among students in larger schools than those in smaller
It is also interesting to note that, as the number of teachers in a school increases, the degree of parents as support resources goes down, for both those who continue on to postsecondary institution and those who do not.

Figure 6. Percentage of students enrolling in postsecondary institutions with and without rules at home about maintaining GPA by the number of full time teachers at their high school.

**Average Degree of Intergenerational Closure**

As the average degree of intergenerational closure in a school goes down, the relationship between rules about maintaining GPA and likelihood of postsecondary enrollment becomes stronger ($OR = .4, p = .003, 95\%CI .22, .73$). To examine the nature of the relationships between average intergenerational closure rules about maintaining GPA and the likelihood of postsecondary enrollment, I separated average intergenerational closure in schools into quartiles and ran four separate chi-square tests of independence for each quartile. These analyses show that, although students with rules at
home about maintaining GPA are more likely than those without rules to continue on to postsecondary institutions at each quartile of average intergenerational closure in a school, the greatest difference between these two groups lies among students in the second quartile (72% versus 61%, respectively). These results indicate that rules about maintaining GPA is a stronger predictor of postsecondary enrollment among students in schools with lower than average intergenerational closure (but not the lowest quartile of average intergenerational closure). Figure 7 below illustrates the differential likelihood of postsecondary enrollment among those with and without rules about maintaining GPA within each quartile of average intergenerational closure.

As the average degree of intergenerational closure in a school goes up, the relationship between student-reported morale and the likelihood of postsecondary enrollment becomes stronger \((OR = 2.13, p < .001, 95\% CI 1.36, 3.31)\). This indicates that students in schools where more parents know each other who also report higher morale between students and teachers benefit more in terms of likelihood of postsecondary enrollment than those in schools where parents know fewer of the other parents overall.

Post hoc comparisons of school-level intergenerational closure quartiles show an interesting relationship. Among students who continue on to attend postsecondary institutions, there is a positive linear relationship between student-reported morale and the average intergenerational closure in a school, in that the higher the average intergenerational closure in a school, the higher students will rate the morale at a school. Conversely, among students who do not continue on to postsecondary institutions, there
is no linear relationship between student-reported morale and the level of intergenerational closure at a school.

As the average degree of intergenerational closure goes up, the relationship between teachers’ educational expectations and the likelihood of postsecondary enrollment becomes stronger \((OR = 1.23, p = .044, 95\% CI 1.01, 1.5)\). Specifically, this indicates that students with high teacher educational expectations may be at an increased advantage in terms of the likelihood of college attendance in schools with higher as opposed to lower average intergenerational closure.
CHAPTER FIVE

DISCUSSION

Introduction

The current study used a social capital framework to examine the hierarchical relationship between public high school students’ family and school environments and the likelihood of postsecondary educational attainment. A school’s curricular structure, size and student social capital operationalized by several measures of parent-student relationships, teacher-student relationships, parent-parent relationships and parent-school relationships predicted the likelihood of postsecondary enrollment while accounting for human capital and economic capital factors that may be associated with postsecondary educational attainment, such as SES and teacher education. Overall, the results of the current study show that measures of social capital at both the student level and the school level are the strongest predictors of postsecondary enrollment, even after controlling for human and economic capital characteristics, curriculum and school size. At the student level, in addition to gender and SES, parents’ and teachers’ educational expectations as well as intergenerational closure are strong predictors of postsecondary educational attainment. At the school level, after controlling for social, human, and economic capital variables, curriculum and the curriculum-size interaction were not significant predictors; however, cohort size, the percentage of girls in the cohort, average SES and the average
degree of intergenerational closure among student in a school significantly predicted postsecondary educational attainment.

Additionally, there were several significant cross-level interactions that, as I discuss below, fall into two main themes. First, several cross-level interactions provide evidence that a lack of social capital in one environment can be compensated for in another environment. Such relationships have been demonstrated in studies examining persistence (Dyk & Wilson, 1999) dropout prevention (Croninger & Lee, 2003) and mathematics scores (Cooper & Crosnoe, 2007), among others. Second, several other cross-level interactions indicate that greater degrees of social capital in one environment can magnify social capital in the other. This theme is based on Crosnoe’s (2004) assertion that students who have more social capital at home are either (a) more likely to attend schools with higher levels of social capital or (b) better equipped to benefit from the social capital in a school environment, as well as Lucas’s (2001) Theory of Effectively Maintained Inequality and Capital Deficiency Theory posited by Massey et al. (2003).

I start this chapter with a discussion of the findings at the student level, school level and the interactions evident within these two environments, and their relevance to previous literature. I will then discuss directions for future research and finally conclude with the overall implications of this work in an educational policy context.

**Student-level Characteristics**

At the student-level, the final predictive model examined the effect of family composition, parental and teacher educational expectations, family rules about maintaining GPA, parent-school involvement, intergenerational closure, parents as a
support resource and student-reported morale between students and teachers on the likelihood of postsecondary enrollment while controlling for student gender, SES and teacher education. Among these predictors, gender, SES, intergenerational closure, parental and teacher educational expectations significantly independently predicted the likelihood of postsecondary enrollment.

**Parental Educational Expectations**

The current study found a strong positive relationship between parental expectations and likelihood of postsecondary enrollment, where the higher a parent’s educational expectation for their children, the higher a student’s likelihood was of enrolling in a postsecondary institution. This finding provides further evidence for the well-established relationship between family support for academics, parents’ educational expectations of their children and academic outcomes (e.g., Benner et al., 2008; Catsambis, 2001; Engberg & Wolniak, 2010; Singh et al., 1995). Catsambis (2001) argues that high educational expectations are the most important practice for parents of students at this stage in their lives. Further, Singh and colleagues (1995) found that parental aspirations for their children had the strongest positive effect on student achievement when compared with three other components of parental involvement, namely parental participation in school activities, a supportive home structure and parent-student communication about school. As the current study found no significant student-level main effects for parent-school involvement and parent as support resource, the results of the current study provide further evidence to support previous claims that parental expectations are the most important component in fostering student academic
success and extends these claims to the relationship between parental expectations and the likelihood of postsecondary enrollment. Additionally, also using data from the ELS (2002), Engberg and Wolniak (2010) recently found a strong positive relationship between parental educational expectations and the likelihood of postsecondary enrollment in both two- and four-year institutions among a sample of high school students from several high school sectors, including Catholic, independent private and public schools. Results of the current study show that this relationship between parental expectations and the likelihood of postsecondary enrollment persists even after Catholic and independent private high schools are excluded from the analysis.

**Teachers’ Educational Expectations**

The results of the current study show that teachers’ educational expectations of their students are the strongest predictor of the likelihood of postsecondary enrollment at the student level, in that the further teachers expect their students to go academically, the more likely those students are to enroll in a postsecondary institution. There are two possibilities that may help explain this relationship, which may both have merit. First, because teachers operate in such close proximity to their students and have first-hand knowledge of their students’ academic abilities, most may be able to quite accurately predict their students’ future academic directions (Brophy, 1983).

Second, this finding supports decades of research on teacher expectancy and the self-fulfilling prophecy (e.g., Brophy, 1983, 1986; Rosenthal & Jacobsen, 1968; Wigfield & Eccles, 2000), where students whose teachers expect them to achieve more and perform at a higher level academically will show significantly more positive academic
outcomes. Brophy (1986) claims that the link between student achievement and teacher attitudes, and behaviors is so strong that any attempt to improve student achievement must involve effective teaching attitudes and behaviors. For example, a study by Love and Kruger (2005) showed that students in urban classrooms, where teachers believed in their role as disseminators of knowledge, a communal learning environment and the success of all students showed higher academic achievement than those with teachers who did not believe in these ideals as strongly. Teachers who believe in their students are helping them live up to raised academic expectations that might not be there without that teacher’s faith in their abilities. Conversely, students whose teachers do not believe in their academic abilities or who have given up on them don’t have that higher academic standard to live up to.

One mechanism through which teacher expectations play such a strong role in student achievement and educational attainment may lie in collective responsibility, or the extent to which teachers take personal responsibility for their students learning. Lee and her colleagues over the last few decades have expanded on this concept (e.g., Croninger & Lee, 2003; Halversen et al., 2009; Lee & Loeb, 2000; Lee & Smith, 1996) to show that the extent to which teachers take responsibility for their students learning can have a profound impact on student academic success such as achievement gains and decreased dropout risk, especially among at-risk students in both primary and secondary education (Halversen et al., 2009; Lee & Loeb, 2000). Teachers who take personal responsibility for their students’ learning may expect more from their students, as they see the failure or success of their students as a reflection of their own teaching abilities.
The results of this study show that parents and teachers of public high school students both hold this responsibility. Among all the student-level variables in the model, parent and teacher educational expectations were independently predictive of the likelihood of postsecondary enrollment among public high school students, regardless of family composition, parental education and SES. These finding are reflective of the sentiments of Castambis (2001), who claims that high education expectations are the most important factor for parents to impart on their children in their secondary education, and Brophy (1986) who argues that attempts to improve student achievement must include concomitant steps to improve effective teaching attitudes and behaviors.

**School-level Characteristics**

At the school level, the final model examined the relationships between the percentage of the cohort in a college preparatory curriculum, the size of the cohort, the number of teachers in each school and several aggregated measures of student characteristics aimed at measuring the environment of social capital in a school with the likelihood of postsecondary enrollment, controlling for the same measures of human and economic capital at the student level aggregated to the school environment. The size of the cohort and the average degree of intergenerational closure in a school significantly predicted the likelihood of postsecondary enrollment, in that controlling for all other variables in the model, students in larger schools and schools with higher average degrees of intergenerational closure are significantly more likely to continue on to enroll in postsecondary institutions than students in smaller schools and schools with lower average intergenerational closure.
Curriculum

The current study found no relationship between the percentage of students enrolled in a college preparatory curriculum and students’ likelihood of postsecondary enrollment, in that, when controlling for size and measures of social, human and economic capital, students in public high schools with a higher percentage of the cohort enrolled in a college preparatory curriculum were no more likely to continue on to enroll in postsecondary institutions than those in schools with lower percentages of their cohort in a college preparatory curriculum. Two previous studies examine academic outcomes among public high school students, with discrepant findings.

Allensworth and colleagues (2009) found no difference in the likelihood of postsecondary enrollment between a cohort of CPS students enrolled in a mandated “college prep for all” curriculum and a comparable cohort who matriculated through high school before the mandate went into effect. They also found that grades declined, failure rates increased and test scores did not improve before and after the mandate, arguing that the policy failed in its aims to improve student academic outcomes because it was implemented into a system without concomitant attention to teacher preparedness, student engagement and behavior and other factors that are associated with student success. The results of the current study provide further evidence for the finding that curriculum alone may not increase the likelihood of postsecondary enrollment and that other factors related to the home and school environment need to be considered. Factors related to social capital, and not curriculum, were the strongest predictors of postsecondary educational attainment.
A second study that examined academic outcomes among public high school students was conducted by Lee and her colleagues (1997). Lee et al. (1997) tested the “constrained curriculum hypothesis” in a subsample of public high schools and found significant achievement gains among students in public high schools with a more constrained curriculum. The findings of the current study do not support those of Lee et al. (1997); however, this discrepancy may be due to measurement differences between the studies. The item in the ELS (2002) database that measures the percentage of students in a college preparatory curriculum may be a poor measure of this concept. In their discussion of tracking in high schools, Oakes et al. (1992) warn against the varying definitions that can be assigned to the different tracking levels across schools. They discuss the risk of oversimplification of differentiated curricula; “academic”, “general” and “vocational” tracks may not be easily identifiable in that students may differ in their track placement subject by subject. In their measurement of curriculum, Lee et al. (1997) used several measures to identify constrained curricula in a school, focusing specifically on mathematics courses. These included variability in course taking in mathematics, the proportion of graduates in a college preparatory curriculum specifically in mathematics, and the proportion of math courses at a school that were considered academic. The conceptualization of curriculum in the current study does not differentiate by subject; focusing specifically on math courses may have yielded different results. Because Lee et al. did not measure the likelihood of postsecondary enrollment among public high school students as with the current study or that of Allensworth et al. (2009), it is possible that a more constrained curriculum may improve academic achievement while not improving
the likelihood of postsecondary enrollment among public high school students; however, this is unlikely as academic achievement is a well established predictor of postsecondary enrollment (e.g., Cabrera & La Nasa, 2001).

**Curriculum by Size Interaction**

The current study sought to explore the possibility that the relationship between the curricular structure of a public high school as measured by the percentage of the cohort enrolled in a college preparatory curriculum may vary as a function of the size of the cohort. Several previous studies show that smaller schools tend to have a more constrained curriculum, which may be the result of including Catholic and other private high schools in the analysis, and that larger public high schools tend to have a more differentiated curriculum to serve the needs of all levels of learners (e.g., Lee et al., 2000). Smaller public schools that strive for a more comprehensive curriculum may result in teachers teaching out of their area of expertise (Ready et al., 2004). The results of the current study show that the relationship between curriculum and likelihood of postsecondary enrollment did not vary as a function of school size. Post hoc analysis showed a curvilinear relationship between cohort size and percent of students enrolled in a college preparatory curriculum, where very small and very large cohorts had a lower percentage of students enrolled in a college preparatory curriculum and moderately sized cohorts had higher percentages of students enrolled in college prep. These results may be illustrative of the difference between smaller public high schools and smaller Catholic schools, where Catholic schools are more likely to have a more constrained curriculum (Lee & Loeb, 2000). It would be interesting to examine the differences in the likelihood
of postsecondary enrollment in relation to curricular structure between small public and private high schools.

**Exploratory School-level Analyses**

In order to gain a better understanding of the relationships between the curricular structure and the social, human and economic capital environments within the schools, I ran exploratory analysis by dividing the percentage of students enrolled in a college preparatory curriculum into quartiles. I found several relationships that are consistent with the literature on tracking. Average SES, average parental and teachers’ educational expectations and school reported morale are all positively associated with the percent of students enrolled in a college preparatory curriculum at the bivariate level. In an examination of NELS (88), Kelly (2001) established a link between parental education and SES and student’s track placement. The exploratory analysis in the current study supports this finding, and may be evidence of upwardly mobile families self-selecting into schools with higher levels of academic rigor. Interestingly, there was no apparent linear relationship between the percentage of students from single parent homes, the average parent-school involvement and the average degree of parents as a support resource and the percentage of students in a college preparatory curriculum. These results may support claims by Jeynes (2005), who found that, in studies examining the relationship between parental involvement and student achievement, the effects of parental involvement are reduced when the analysis controls for SES.

Finally, the percent of students with rules about maintaining GPA and the average degree of intergenerational closure were both negatively associated with the percentage
of students in a college preparatory curriculum. Regarding rules about GPA, it could be the case that this variable is an indication of parental monitoring, which has been shown to be negatively associated with academic outcomes (Jeynes, 2004), the argument being that parents of children with academic or behavioral troubles are more likely to monitor their behavior. It may be that those in schools with a higher percentage of students in college prep don’t need rules at home about maintaining GPA and those in schools that have a lower percentage do; however, the bivariate relationship between rules about maintaining GPA and the likelihood of postsecondary enrollment in the current study shows that those with rules at home about maintaining their GPA are significantly more likely to enroll in a postsecondary institution than those without such rules. The negative association with intergenerational closure is curious, because this variable is so strongly associated with other variables in the cross level interactions, as I discuss below.

**Cross-level Interactions**

The final research question in the current study examines slopes as outcomes in the HGLM model, or whether the relationship between student-level characteristics and the likelihood of postsecondary enrollment vary as a function of school-level characteristics. Several significant cross-level relationships were found in the current study and most fall into one of two overall themes. First, there are several examples in the literature on the effects of social, human and economic capital on student academic outcomes showing that a lack of capital in one area can be compensated for in another area. Second, research on these relationships has also shown that greater degrees of
capital in one environment can magnify the effects of capital on student academic outcomes in other environments.

A growing body of evidence suggests that social capital is an especially powerful resource among “at risk” or low income students. Social capital gained through both parents (e.g., Cooper & Crosnoe, 2007; Dyk & Wilson, 1999; Gofen, 2009; Pong, 1998) and teachers (e.g., Croninger & Lee, 2001; Halverson et al., 2009; Muller, 2001) can have a stronger effect on the academic outcomes of low income, low SES and academically at risk students than on their more privileged, less at risk peers. Several findings from the current study provide evidence for this growing consensus and extend this concept to include its utility in predicting the likelihood of postsecondary enrollment among a subsample of public high school students.

First, the current study found that, in predicting the likelihood of postsecondary enrollment, parents as a support resource is a stronger predictor among schools with a higher number compared with a lower number of full time teachers (or, among larger compared with smaller schools) and rules at home about maintaining GPA is a stronger predictor among larger rather than smaller cohorts and schools with lower compared with higher average intergenerational closure. Finally, parent-school involvement is a stronger predictor of the likelihood of postsecondary enrollment among schools with lower as compared to higher average levels of parental support. In all of these results, a lack of capital at the school level (school size, intergenerational closure and average parental support) was compensated for by higher levels of social capital at home as measured by parent-school involvement, parental support and rules at home to maintain GPA.
Additionally, the current study found that students from single parent homes are more likely to enroll in postsecondary institutions if they attend schools with higher compared to lower levels of teacher educational expectations. Coleman (1988) argues that students have less access to their parents and therefore less access to social capital if they live in single parent households. This result indicates that, schools with higher average teacher educational expectations can help to mitigate the lack of social capital from single parent households. This result mirrors the findings by Pong (1998), who found that students in schools with higher percentages of single parent households yielded more positive academic outcomes when the school had a stronger parent network. In this example, these results support the argument that strong positive relationships in a school environment may mitigate a lack of social capital in the home environment.

A separate yet coexisting theme found in the current results suggest that higher levels of capital in one environment can magnify the effects of capital in another environment. The central tenet of Capital Deficiency Theory (Massey et al., 2003) posits that some people lack the resources for academic success. Along the same line, Crosnoe (2004) suggests that students who possessed more social capital at home are more likely to both attend schools with higher levels of social capital and be more likely to benefit from social capital at school. It would follow then, that students who possess less social capital at home are less likely to attend schools with higher levels of social capital and/or benefit from social capital at school. The results of the current study show several examples of this.
First, in predicting the likelihood of postsecondary enrollment, intergenerational closure is a stronger predictor among students in schools with higher compared to lower school-reported morale, rules about maintaining GPA is a stronger predictor of postsecondary enrollment among schools with a smaller compared with a larger number of full time teachers, and student-reported morale is a stronger predictor in schools with higher compared with lower average degrees of intergenerational closure. These results show that the effects of social capital in a school as measured by school morale, smaller school size and the environment of intergenerational closure may increase the magnitude of the relationship between social capital at home and the likelihood of postsecondary enrollment, which provides evidence to support the assertion by Crosnoe (2004) and extends this concept to the likelihood of postsecondary enrollment among a subsample of public high school students. These results also provide evidence for both Capital Deficiency Theory (Massey et al., 2003) and Effectively Maintained Inequality (Lucas, 2001). In Capital Deficiency Theory, Massey et al. (2003) propose that some people simply lack the resources for academic success.

**Gender Differences in Postsecondary Enrollment**

Finally, the results of the current study show two cross-level interactions related to gender. It is well established in the literature that females are more likely than males to go to college; in 2004 women comprised 57% of all college matriculates (e.g., Knapp, Kelly-Reid & Whitmore, 2006). The findings of the current study support this trend at the bivariate level; however, gender was not predictive of postsecondary enrollment when controlling for the other variables in the model. Furthermore, some school-level
characteristics can magnify this gender discrepancy effect. First, females’ likelihood of postsecondary enrollment becomes increasingly higher than males’ likelihood as the average teachers’ educational expectations in a school increases. This may be reflective of the trend in previous studies showing that females tend to have higher grades and be more engaged in school than males (Buchman & DiPrete, 2006) and that males are more likely to get into trouble for behavior problems and come to class unprepared than females (Jacob, 2002). Second, females are at an increased advantage over males in terms of the likelihood of postsecondary enrollment among schools with higher average SES. Buchman and DiPrete (2006) found that males more than females were at an increased risk of lower academic performance and postsecondary enrollment among lower educated families and single parent, specifically fatherless, households. In the current study, it is important to note that, in the lowest SES quartile, only 50% of males continued on to college. A more recent study also shows that, at least among Hispanic and white high school students, females have more social capital at school in the form of more academically focused friendships which may contribute to their advantage over males in terms of postsecondary enrollment (Riegle-Crumb, 2010).

The cross-level interactions discussed above as well as the student- and school-level main effects illustrate the interdependent nature of the school and family environment in predicting postsecondary enrollment among public high school students. These findings and their connection to the extant literature both support previous findings and create new questions that may be explored through further research in this area.
Directions for Future Research

In this study, I used several variables from the ELS (2002) that were designed to examine the relationship between student and school level characteristics and student academic success. There are a few improvements to these measurements that I suspect would improve the validity of the study. First, because more modern systems of tracking, or the difference between differentiated versus constrained curricula can vary between schools in their reporting and within schools by subject tracking (Oakes et al., 1992), curriculum as a factor may be more accurately defined as a predictor using several different measures specific to one subject, namely mathematics, similar to the methods used by Lee and her colleagues (1997) in examining the “contstrained curriculum hypothesis” in a sample of public high schools. Additionally, future studies may benefit from a more accurate measure of students’ access to their teachers. The current study used categorical composite measures of both cohort size and the number of full time teachers in a school; a measure of student-to-teacher ratio might provide a more valid measure of this construct. This measure was used to examine the likelihood of postsecondary enrollment in a recent study by Engberg and Wolniak (2010) and used a data licensing contract with the National Center for Education Statistics to gain access to the restricted variables of total school enrollment and a continuous measure of the number of full time teachers used in the measure. Student-teacher ratio was not independently predictive of postsecondary enrollment in either two- or four-year institutions in the study; however, it may be of interest to examine this ratio among a subsample of public school students.
There are several directions I want to take with this research. First, collective responsibility among teachers is an established predictor of academic achievement among primary (Lee & Loeb, 2000) and secondary students (Lee & Smith, 1996). Collective responsibility has also been shown to reduce dropout risk, especially among high risk high school students (Croninger & Lee, 2001). Although similar measures were included in the current study, it would be interesting to examine the effects of teachers’ sense of responsibility for their students’ success on the likelihood of post secondary enrollment. The ELS (2002) database includes several items that may help measure teacher responsibility both at the student level and collectively across schools, including items measuring to what extent people can learn to be good at math or must be born with the ability, as well as several measures assessing the importance of different factors on student success, including teaching methods, a teacher’s attention to the students and a teacher’s enthusiasm for the material.

Second, I want to explore the effects of social capital among a subsample of at risk students, including male students of low SES, low parental education or single parent homes. Capital Deficiency Theory (Massey et al., 2003) and Effectively Maintained Inequality (Lucas, 2001) both posit that these at risk students are less likely to succeed academically in terms of postsecondary enrollment; however, a growing body of evidence suggests that at risk populations may benefit from social capital resources to a greater degree that their non-at risk peers in certain circumstances (e.g., Cooper & Crosnoe, 2007; Dyk & Wilson, 1999; Gofen, 2009). It would be interesting to examine
the effects of social capital resources on the likelihood of postsecondary enrollment on a
subsample of at risk students.

Finally, one argument of Effectively Maintained Inequality states that higher
income/SES individuals will always secure the advantage in education (Lucas, 2001).
This advantage can be quantitative, where if postsecondary education is not the norm, more individuals of higher SES will attain postsecondary education. If postsecondary education is the norm or if most people continue their education past high school, higher SES individuals will secure a qualitative advantage, in that they will attain postsecondary education at more prestigious institutions. SES, after controlling for the other variables in the current study, was not a significant predictor of postsecondary enrollment, which according to Effectively Maintained Inequality would suggest that postsecondary enrollment is the norm. To understand the effect of SES on postsecondary enrollment, it would be interesting to examine the types of colleges and universities in which students enroll; according to Effectively Maintained Inequality, this is where the SES difference would most likely be found (Lucas, 2001).

**Conclusion**

The results of the current study indicate that measures social capital, specifically parental and teacher educational expectations of students at the student level as well as the environment of intergenerational closure at the school level are the strongest predictors of postsecondary enrollment among a cohort of public high school students, even after controlling for curricular structure, school size and human and economic capital variables. These results provide evidence to support the conclusions made by
Allensworth et al. (2009), arguing that attempts to improve academic performance in a school system need more than a simple “college prep for all” mandate. While a major thread of research in the 1980’s and 1990’s established that constrained academic curricula consistently yield more positive academic outcomes (Lee & Bryk, 1988), efforts to reform an educational institution need to focus on all established aspects of academic success, including students’ academic orientation (Cooper & Crosnoe, 2007), parental involvement (e.g., Catsambis, 2001), collective responsibility of teachers (e.g., Lee & Loeb, 2000; Halverson et al., 2009), and classroom size (Lee et al., 2000) as well as the specific course of instruction assigned to the students.

In her article on the family-school partnership, Christenson (2004) argues that families and schools have a shared responsibility to work together to facilitate the learning process and foster the potential of all students. Interventions aimed at improving student outcomes that are implemented in isolation lack the collective resources of collaboration with other stakeholders of student success (Kania & Kramer, 2011). Interventions such as the Chicago Public Schools’ Pathways to Success program and Strive have markedly improved academic outcomes through broad and coordinated efforts of dozens of organizations including research consortiums, nonprofits as well as the schools that set aside “…individual agendas in favor of a collective approach to improving student achievement.” (Kania & Kramer, 2011, p. 36) It is the inclusion of all of these aspects of the educational system that will help improve students’ academic success and subsequent likelihood of continuing their education at a postsecondary institution, thereby improving their prospects for employment and upward mobility.
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