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Social capital and the higher education academic achievement of American students:
A cross-classified multilevel model approach to understanding the impact of society on
educational outcomes

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of
Philosophy at Virginia Commonwealth University.

By

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Abstract

In recent years, especially after the publication in 2000 of Robert Putnam's book *Bowling Alone: The Collapse and Revival of American Society*, there has been a heightened interest in the concept of social capital. Many scholars have made the connection between social capital and education by examining its effects on educational outcomes. However, a lot still needs to be understood. The aim of this dissertation is to provide a better understanding of the influence of social capital on the higher education academic achievement of American students. Using data from Waves I, II, and IV of the National Longitudinal Study of Adolescent to Adult Health (Add Health) this study explored how the domains and types of social capital make a difference to educational outcomes in higher education. The longitudinal design of Add Health data allowed for extracting a large number of variables to represent the different domains of social capital. Variables that correlated appropriately with the networks, reciprocity, and trust inherent in social relationships were isolated to represent family, school, and neighborhood social capital. Cross-classified multilevel models were used to analyze the data to determine which domains of social capital were the strongest contributor to college graduation. The models also examined if gender, racial identity, and children's agency influenced the relationship.

The findings of this dissertation support prior research in the area of social capital that highlights the importance of schools, family relationships, and neighborhood characteristics on educational success. Consistent with other studies, this current study shows that White students have higher odds of completing higher education than students from other racial and ethnic groups. This study also suggests that females more than males have an advantage when it comes to social capital and educational outcomes. However, the effects of the different domains of social capital differ for different groups of students and are impacted by the school and neighborhood contexts. In addition, this study found that parental income and occupation, more

than parental education, appeared to increase the impact of the different domains of social capital on academic achievement. These results add to existing theory on the social capital and academic achievement in America. A major implication of this study is the importance of social capital to educational outcomes of American students. The study also shows that a lack of understanding of the impact of the different domains of social capital on higher education academic achievement may result in poorly designed education reform interventions and policies. This dissertation highlights the need for more research in the area of social capital and educational outcomes globally.

Keywords: social capital, academic achievement, adolescents, family social capital, neighborhood/community social capital, school social capital, educational outcomes, bridging relationships, bonding relationships, race, gender, socioeconomic status

Dedication

To my FATHER, the One who is the beginning and the end. Thank you FATHER.

This is all because of You.

To my father, whose belief in education caused me to dream. I still miss you.

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Acknowledgements tell the story of support or my bonding and bridging networks.

Everyone has a story. This is my story of thank-you(s).

I would like to start by saying thank you to my adviser, chair, teacher, and mentor, Dr. Charol Shakeshaft. Thank you for believing in me, for listening to me even when I wasn't sure of what I was saying, and for all the lifts back to my apartment after ELDP 713. Thank you for agreeing to be part of this journey with me; your critical feedback and support have been unquantifiable.

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There is an African concept that I reference a lot because I believe in it. It is called *Ubuntu* – it simply means, I am because we are. *Ubuntu* started me on this journey and kept me going. Without everyone mentioned here and so many others, this story would never have progressed to this stage; I thank you for all your support, care, prayers, and just for being.

Eshe pupo. Oluwa yio bukun fun gbobo yin. Amin!

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Chapter One - Introduction

Introduction to the Study

The underlying basis of social capital theory is relationships (Bourdieu, 1986; Coleman, 1988; Putnam, 1995, 2000; Ryan & Junker, 2019; Salloum, Goddard, & Berebitsky, 2018). As Portes (1998) notes, “to possess social capital, a person must be related to others, and it is those others, not himself [sic] who are the actual source of his or her advantage” (p. 7). This connection to others (Bourdieu, 1986) distinguishes social capital from other forms of capital and makes it attractive and applicable to research in different fields and disciplines. Social capital provides a means of studying and understanding, analytically and theoretically, the strength and value of relationships, connections and resources, and how these impact access and outcomes for different individuals in different environments and sectors (Carolan, 2014). Social capital, therefore, presents a useful way to understand social phenomena, how different factors in society interact and influence its individual members.

In the education literature, scholars tend to raise a number of questions in seeking to understand social capital: What is social capital and what does it look like for students? Can social capital influence students’ academic success? Is the social capital that successful students hold different from that of students who are not achieving academically? Why should education leaders care about social capital? A review of literature on the concept leads to a general understanding that in education, social capital is about how relationships developed by students with peers and other members of the community impact the students’ educational outcomes. As researchers examine these relationships, the interactions that exist between the student and the

different members of their¹community, whilst sometimes complex, suggest that social and cultural factors may be as important as school factors in explaining academic outcomes. For instance, parental support or family social capital helps improve educational achievement and outcomes for students generally (Burt, Williams, & Palmer, 2019). Siraj and Mayo (2014) also note that a child's early home learning environment as well as what children do with their parents, rather than who their parents are or their socio-economic status, influences children's educational outcomes.

The 1966 Coleman Report produced by a team of researchers led by James S. Coleman showed that what happens in schools, the composition of the school's student population, and the interactions that the students' have in their home environment all affect the students' academic achievement. This finding was made based on data collected in 1965 from a sample of over 645,000 students in thousands of schools across the United States. While the report confirmed that racial segregation remained in American schools, it also revealed that a lack of racial integration was not the only reason for the academic achievement gap that exists among different racial student groups. The report highlighted the need to examine other variables in trying to understand unequal school performance between different groups of students, especially in the same school. The study findings spurred new research on subjects such as how family background and community context play a role in educational outcomes (Alexander & Morgan, 2016; Coleman et al., 1966).

Findings from various other studies show that social capital is directly correlated with educational outcomes in terms of aspirations and academic achievement (Ryan & Junker, 2019).

¹ In this dissertation I try as much as possible to use pronouns that represent all groups no matter their gender identity. This does not apply to direct quotations or situations where gender is identified

Rury (2013) states that social capital is directly responsible for success in school because of the effect that social ties and relationships have on school attendance and completion. This statement means that to ensure academic success for all students, attention needs to be paid to the ways in which social capital influences and affects educational outcomes. This dissertation is therefore aimed at drawing attention to the concept of social capital, exploring its relevance, and understanding its value in enhancing the educational outcomes and academic achievements of students in the K-12 system.

Statement of the Problem

Almost all countries in the world see education as the pathway to attaining social mobility and improving economic success (Neem, 2017; United Nations, 2018; Winthrop, Barton, & McGivney, 2018). For the United States, ever since the publication of *A Nation at Risk* in 1975, the need to remain globally relevant has led to the implementation of federal education policies aimed at increasing accountability in the public education sector and raising educational attainment and achievement rates in the country generally (Orfield, 2016; Spring, 2011; Winthrop et al., 2018). The No Child Left Behind Act (NCLB) introduced in 2001 had the aim of closing the achievement gap and improving educational outcomes for all children, especially those from minority populations and lower socio-economic backgrounds (McGuinn, 2016). Consequently, the law did little to consider the impact of other social factors on the education of students and assumed that learning and education mean the same thing (Ravitch, 2010). While students are shaped by their formal education and what happens in schools, they are also part of a complex society with many influential social relationships outside of the school system. These

relationships equally affect their performance and interactions and are referred to as social capital.

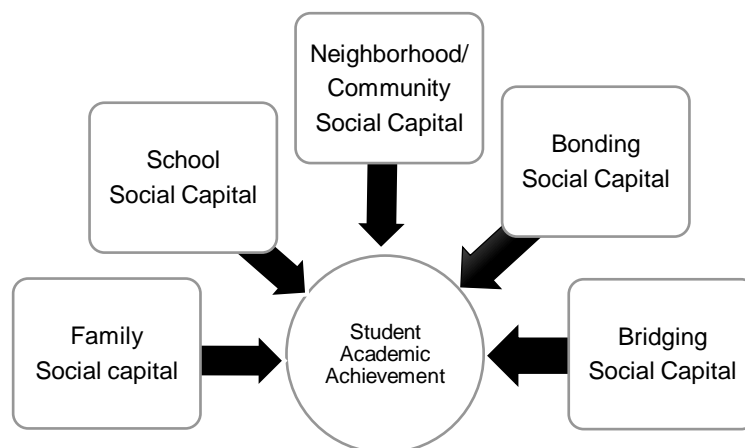
Research shows that social capital, or the “connections within and between social networks” make a difference to “early childhood development, educational attainment, avoidance of delinquency, labor market entry or aging well in your retirement” (Imandoust 2011, p. 52). In other words, people, or in this case students, with the right social relationships and resources including family, community, and peer social capital, can better overcome challenges that may hinder their educational attainment. Having networks to call upon, strengthens students’ ability and willingness to remain in school, complete their education, and help close or reduce the education achievement gap. Recent studies have shown that social capital matters more than financial capital in the reading and math scores of students in Michigan schools (Salloum et al., 2018). The assumption that inadequate funding alone is responsible for poor academic achievement, while a valid claim, leaves out a huge piece of the puzzle.

Understanding the impact of social capital on students’ educational achievement offers education researchers and policymakers a reason to pay more attention to the environments and relationships that affect the academic wellbeing of their students. Salloum et al., (2018) note that the Every Student Succeeds Act’s (ESSA), the most recent reauthorization of the Elementary and Secondary Education Act, is premised on the belief that increased funding to schools with large numbers of minority students will help close the achievement gap. However, one of the arguments against this position is that increased spending has not resulted in improved educational performance among different racial groups to date (Hanushek, 2015). Several bodies have also noted that current funding levels have not returned to the levels before the recession (AFT 2018). In my opinion, given the debates and issues around funding, it is imperative that

attention be paid to the link between social capital and student's academic achievement, and additional ways of supporting students.

This study analyzed data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), a nationally representative longitudinal study of U. S. adolescents who were in grades seven to twelve in 1994 when the first wave of the study was carried out, to explore some of these issues. There have been five waves of data collection to date; this study examined data from Wave I, II, and IV to explore the relationship between social capital and students' educational outcomes. College completion is used to represent student overall academic achievement. A number of variables from Waves I and II were combined to represent the domains and types of social capital. A simple analytic model for the study is shown in Figure 1. Specifics of the model are discussed in detail in chapters two and three of this dissertation.

Figure 1: Analytical Model Linking Social Capital Environments with Student Academic Achievement



Theoretical Framework

The theoretical framework for this study is social capital theory. Social capital theory has been used in many research fields to date, and the body of research on the concept in the field of education is growing. Critics note that it can be anything and everything (Alder & Kwon, 2002; Portes 1998; Portes & Landolt, 2000) and because of this ambiguity there is disagreement on how rigorously it can be used in empirical research. Social capital as a concept comprises many dimensions with different theorists focusing on specific aspects. This makes it imperative that any study using social capital as its theoretical foundation provides as diverse an analysis as possible of the different theoretical perspectives. There has also been a lot of debate on whether social capital resides only in communities/groups, or individuals, or is a property of both groups and individuals (Nieminen et al., 2008). Therefore, to make this study relevant, there is a need to operationalize social capital in such a way that it covers all notions, as it relates to both individuals and groups, and all perspectives, from power relations to gender and agency.

This study therefore uses the distinct social capital frameworks developed by Pierre Bourdieu, James Coleman, and Robert Putnam. All three theorists are well regarded in the social capital arena and provide distinct approaches to the concept that are relevant to understanding how it is conceptualized in relation to race, gender and class, the key issues that will be examined in this study. Pierre Bourdieu (1986) conceptualizes social capital primarily in the light of inequalities in social class and power, and as an asset of individuals. Bourdieu's view allows the consideration of issues of privilege, exclusion, and class systems that perpetuate the inequalities in society. James Coleman (1988, 1990) locates social capital within the family and education. According to him, social capital comes about as a by-product of other activities from group networks and norms. While Coleman sees social capital as residing in the group or

community, he also acknowledges it as an asset that can be accumulated by individuals. Robert Putnam's (2000) approach lies in the strength of relationships between groups. This is seen in his distinction of bonding and bridging social capital. Bonding social capital refers to the networks in exclusive, close-knit groups such as family. On the other hand, bridging social capital applies to those networks that connect exclusive groups. His focus is on connections between communities. Putnam notes that "A society of many virtuous but isolated individuals is not necessarily rich in social capital" (2000, p. 16).

As the preceding paragraph shows, social capital as a theory is one that is multidimensional. The nature of the concept means that it may be difficult to find indicators that are appropriate for different contexts (Nieminen et al., 2008). This research study will connect all three theoretical perspectives of social capital in evaluating the research questions by examining variables representative of each perspective. In doing this, I hope that the study will provide, through these multiple approaches, a more nuanced way to facilitate in-depth analysis for understanding and applying the concept of social capital to education.

Purpose of Research

The purpose of this research is to determine the influence of different domains and types of social capital on a student's academic achievement. The study also intends to uncover which domain of social capital matters more for academic achievement. The present study aims to highlight the importance of social capital to the educational aspiration and achievement of students in the American educational system and the need to further understand that impact. While many studies have focused on specific segments of the population, for example, state or community, rural or urban adolescents, economically disadvantaged minorities or specific

minority groups etc. this study attempts to examine social capital with a more comprehensive lens. This study will specifically pay attention to how contextual factors such as family, school, and neighborhood or community influence the development of social capital. The study will in addition examine the relationship of these variables to the educational achievement of K-12 students in different racial groups, and how these relationships differ by gender on a national scale.

The planned research questions that will guide this study are:

1. What influence does social capital have on the higher education academic achievement of American students nationally?
2. Does the social capital in the life of children aged twelve to eighteen years old in the K-12 system influence their higher education academic achievement as adults?
3. What is the relationship between the types (bonding and bridging) and domains of social capital (family, school, neighborhood), and higher education academic achievement?
4. Does the influence of social capital differ based on gender and racial/ethnic group?
5. What impact does children's agency have on social capital?
6. Is the relationship between children's agency and social capital moderated by student gender?

Significance of the Study

Understanding social capital and its impact on educational outcomes can help explain the education gaps that exists among different groups of students in the United States. Existing studies have shown the importance of social capital to educational outcomes (Israel, Beaulieu, & Hartless, 2001). However, there are few studies that examine the impact of social capital on

students' educational outcomes using a longitudinal and multilevel approach. This study is one of the first to examine several contextual social capital factors simultaneously using both a longitudinal and multilevel approach. Using a multilevel approach allows variables on different levels to be analyzed and the interaction between levels to be observed (Hox & Maas, 2005). Neem and Arzi (2005) note that "many of life's activities are organized around years" (p. 138). This means that data from longitudinal studies are probably the better way to understand the longer-term effects that occur in disciplines like education. The impact of social capital that this study plans to identify requires the passage of time to see whether change has occurred.

This study helps close the gap in knowledge that exists because current research makes little effort to examine the interaction between the different domains of social capital by exploring how school, family, and community level social capital affect students using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health) survey. This study will enhance scholarly understanding of social capital and education by not only showing the effects of the different contexts of social capital on academic achievement, but also highlight if social capital from any particular context matters more. The study will also add to the body of empirical knowledge on the connection between relationships and student success, how this differs for boys and girls, and between racial groups.

The current education policy environment in the United States and globally raises questions on how social capital works. This heightens the need to better understand how schools, families, and communities work at developing social capital and how this leads to improved student outcomes. This study provides insight for policy makers and educators on the type of resources that are required in different contexts and by different groups that will in turn enhance social capital. The study also shows the need for policy and practice initiatives to be designed to

be gender specific. One major contribution that the findings of this study provides is a national picture of social capital and education that covers all the domains. I am not aware that any other study has attempted to do this.

In respect to practice specifically, this study highlights the agency that children themselves have in the creation of social capital for their academic success. It should not be assumed that children are passive or silent participants in their education. The relationships they have with adults as well as their peers in school and in their neighborhoods and their siblings are important factors in their education. These all work to provide opportunities for educational success. It is, therefore, necessary for educators and educational leaders to understand how to support the growth of their students' social capital. This knowledge will contribute to the development of social capital in the school, family, and community, and in the general society.

Limitations of the Study

While this study has the potential to provide useful information in understanding the impact of social capital on the academic achievement of American students, there are limitations. Foremost is the exclusive use of social capital as the theoretical framework. As noted previously, the concept has received some criticism because of its complexity and the various perspectives of social capital. Because the concept of social capital is intricate, has different components, and can be conceptualized in a myriad of ways, it is still unclear whether any single way of measuring it will be acceptable to all researchers. Another limitation of this study is the use of secondary data. Because the Add Health data was collected for a purpose different from the focus of this study, the questions were not designed to measure social capital specifically. However, Waves I and II of the study ask direct questions about school, family, and neighborhood context

which are related to how the concept is operationalized from the three perspectives that form the basis of this study (<https://www.cpc.unc.edu/projects/addhealth>). Waves III and IV of the survey also provides concrete data regarding college participation and completion rates. Therefore, despite the limitations that may be attached to using secondary data in the measurement of social capital, the Add Health survey provides many variables that relate to the concept of social capital as defined by Bourdieu, Coleman, and Putnam.

Definition of Terms (as used in this study)

1. Educational Achievement – refers to the highest level of education attained; in this case enrolment and completion of a four-year college degree.
2. Educational Attainment – same as educational achievement.
3. Academic Achievement – the same as educational achievement.
4. Educational Outcomes – refers to the consequence of a student being educated. It is used interchangeably with educational achievement.
5. Domains of social capital – the context in which social capital is observed; for example in the school, in the family, in the neighborhood, or community.
6. Social Capital – the benefits that accrue from our relationships and networks.
7. Family Social Capital – This reflects the relationship between students and their families. It includes the relationship that the student has with his/her parents as well as siblings and extended family members. It takes into consideration the amount of time families spend together on activities, the amount of decision making power the student has and family size.
8. School Social Capital – reflects the connectedness the student feels with the school, with teachers, and with peers/friends within the school.

9. Neighborhood/Community Social Capital – reflects the networks that the student has built in the community with peers and mentors in the neighborhood including characteristics of the neighborhood and how likely neighbors are to look out for each other/relate with each other. Community and neighborhood are used interchangeably to mean individuals that live in proximity and interact with each other. It is not necessarily a geographical location.
10. Gender – gender refers to the socio-cultural differentiation of the two sexes; for this dissertation it is female and male.
11. Racial Groups – the racial categories identified in the U.S. Census and in the Add Health data.
12. Stata Statistical Software – refers to the general-purpose statistical software used for data analysis in this study.
13. Logistic Regression Models – refers to the statistical procedure used to explain the relationship between a categorical dependent variable with two levels and one or more independent variables.
14. Multilevel Modeling – refers to the statistical procedure used to explain statistical models that vary at more than one level for example a child within a school or a family.
15. Structural Equation Modeling – refers to the statistical procedure that is used for the analysis of structural relationships. It incorporates factor analysis and multiple regression analysis to understand the structural relationship between latent constructs and measured variables.

Organization of the Dissertation

This dissertation is organized into six main chapters. The first is this introductory chapter which introduces the research study and presents the problem investigated. The objective of this chapter is to provide a rationale for the research problem and to establish the theoretical framework for the study. Chapter two is the review of the literature that guides this study. It includes a comprehensive review of the literature on social capital, as well as social capital and education, with a focus on academic achievement and educational outcomes. The literature review also considered aspects of gender, race and ethnicity, children's agency, and socioeconomic status (SES) in relation to social capital. The third chapter of this dissertation is the section that deals with methodology, data, and measurement. It contains information on the National Longitudinal Study of Adolescent to Adult Health data set, the sample, the variables, and the statistical procedures for the analyses. The data analysis and results are presented in the fourth chapter. Chapter five discusses the findings of the study, and chapter six concludes the study by highlighting the study's implications for future research, interventions, and policy.

Chapter Two - Literature Review

Introduction

This chapter provides a review of literature on social capital, the theoretical framework for this study. The chapter is organized in five sections: the first and second sections explore the history, definitions and theoretical foundations of social capital. The definitions reviewed are linked to the types of social capital – bonding and bridging social capital. The third section is devoted to further elaborating on the concept of social capital that this study uses as its framework, and a discussion on the measurement of social capital. The contexts in which social capital can be observed and empirical research are discussed in the fourth section. Some attention is also paid to methodological issues and gaps in studies of social capital. The fifth section is the conclusion which provides a summary of the review.

This review relies on sources that include peer-reviewed journal articles, books, book chapters, dissertations, and electronic publications between 1986 to date². The time frame is based on the theoretical emergence of the concept which can be traced to the publication of *The Forms of Capital* by Pierre Bourdieu in 1986. The databases searched included ERIC, Education Research Complete, Web of Science, and ProQuest dissertation database. The web search engine, Google scholar, was also used to search for literature. The main search term used was “Social Capital”; this was then combined with “Education”, “Educational Attainment”, “Educational Outcomes” and “Academic Achievement”. Measurement, Gender, Racial Identification/Race and Socioeconomic Status (SES) were also used as descriptors. The studies reviewed were secondary studies including contextual papers that reviewed the history and concept of social capital, as

² There is one exception – the 1966 Coleman report

well as primary studies in which social capital was a research variable. The reference lists of articles and dissertations reviewed for this chapter also provided a source of literature as did opinion papers that provided critiques on the concept.

Social Capital: History and Definition

History of the Intellectual Development of Social Capital

The commonalities that strengthen networks and relationships between individuals, and within and between groups, families, and communities, known as social capital, have been around for some time but were never formally studied until recently (Bhandari & Yasunobu, 2009; Neem, 2009; Neem, 2017). Neem (2017) links social capital's concept's current relevance to Robert Putnam's *Bowling Alone* and says that the term has a "complicated history and an often unclear meaning" (Neem, 2009, p. 473). Social capital is historically visible in the way societies work together to organize and improve their situation for themselves and for the public good (Neem, 2017). Early theorists, Coleman and Bourdieu, argue that social capital is a "resource from which an individual or class may draw on to maintain or to achieve power within a particular society" (Neem, 2009, p. 474).

The earliest recorded use of the term social capital has been credited to L. J. Hanifan, an educator, who was unhappy with the economic and social decline he found in his native community of West Virginia (Farr, 2004; Herreros, 2004; Plagens, 2011; Putnam, 2002). In tracing the origin of the use of social capital as a term, Plagens and Putnam highlight that in 1916 Hanifan wrote:

...The individual is helpless socially, if left to himself...If he comes into contact with his neighbor, and they with other neighbors, there will be an accumulation of social capital, which may immediately satisfy his social needs and which may bear

a social potentiality sufficient to the substantial improvement of living conditions in the whole community. The community as a whole will benefit from the cooperation of all its parts, while the individual will find in his associations the advantages of the help, the sympathy, and the fellowship of his neighbors....When the people of a given community have become acquainted with one another and have formed a habit of coming together occasionally for entertainment, social intercourse, and personal enjoyment, then by skillful leadership this social capital may easily be directed towards the general improvement of the community well-being (Plagens, 2011, p. 42-43; Putnam, 2000, p. 19; Putnam, 2002, p. 4-5).

Hanifan's ideas, though clearly connected to Neem's reference on the history of social capital, remained largely unexamined for years. Putnam's analysis of Hanifan's writings shows that he incorporates many aspects connected with the concept of social capital in the present day (Putnam, 2002), especially as his work centered on community.

Defining Social Capital

Social capital as a concept is one that is difficult to pin a definition on (Alder & Kwon, 2002; Farr, 2014; Field, 2003; Grossman, 2013; Plagens, 2011; Portes, 1998; Rury, 2013). From the preceding paragraphs, it is obvious that the concept of social capital is not new. It is a sociological concept that has been imported into different disciplines including the field of education (Portes, 1998). Bourdieu (1986) first introduced the term to present-day literature in a coherent way by defining it as the "aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words to membership in a group" (p. 248). Coleman (1988, 1990), responsible for introducing the concept to American sociology, connects social capital to its function and products by noting that it exists in the relations among persons that provide resources that they benefit from or find value in. However, Putnam (1995, 2000)

gave social capital its current popularity by connecting the concept to civic participation, membership of voluntary associations, and social connections.

The increasing level of interest in social capital as a concept has led to many definitions. Table 1, from Alder and Kwon (2002), presents a glimpse into the expanse of thought around the issue of social capital and how different scholars emphasize different aspects of the concept (Alder & Kwon, 2002; Vorhaus 2014). Bourdieu (1986) links social capital to the resources that relationships provide, the same as other authors in the “external” category. Coleman (1988), on the “internal” social capital side, focuses on the actions of those within the relationship or structure and the advantage this provides to individuals and the group. A third group of scholars, those who take both the internal and external view, see the resources that accrue from relationships, as well as the actions taken by people/individuals within the relationship, as both being important. The perspectives of most researchers are either egocentric (external) or socio-centric (internal) or, to be neutral, both viewpoints (Alder & Kwon, 2002). Regardless of which side, social capital involves people, networks, interactions, and resources (Grossman, 2013) or involvement in social relationships (Herrerros, 2004).

Table 1: Definitions of Social Capital

External versus Internal	Authors	Definitions of Social Capital
External	Baker	"a resource that actors derive from specific social structures and then use to pursue their interests; it is created by changes in the relationship among actors" (1990: 619).
	Belliveau, O'Reilly, & Wade	"an individual's personal network and elite institutional affiliations" (1996: 1572).
	Bourdieu	"the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (1985: 248). "made up of social obligations ('connections'), which is convertible, in certain conditions, into economic capital and may be institutionalized in the form of a title of nobility" (1985: 243).
	Bourdieu & Wacquant	"the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (1992: 119).
	Boxman, De Graaf, & Flap	"the number of people who can be expected to provide support and the resources those people have at their disposal" (1991: 52).
	Burt	"friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital" (1992: 9). "the brokerage opportunities in a network" (1997b: 355).
	Knoke	"the process by which social actors create and mobilize their network connections within and between organizations to gain access to other social actors' resources" (1999: 18).
	Portes	"the ability of actors to secure benefits by virtue of membership in social networks or other social structures" (1998: 6).
	Internal	Brehm & Rahn
Coleman		"Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure" (1990: 302).
Fukuyama		"the ability of people to work together for common purposes in groups and organizations" (1995: 10). "Social capital can be defined simply as the existence of a certain set of informal values or norms shared among members of a group that permit cooperation among them" (1997).
Inglehart		"a culture of trust and tolerance, in which extensive networks of voluntary associations emerge" (1997: 188).
Portes & Sensenbrenner		"those expectations for action within a collectivity that affect the economic goals and goal-seeking behavior of its members, even if these expectations are not oriented toward the economic sphere" (1993: 1323).
Putnam		"features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (1995: 67).
Thomas		"those voluntary means and processes developed within civil society which promote development for the collective whole" (1996: 11).
Both	Loury	"naturally occurring social relationships among persons which promote or assist the acquisition of skills and traits valued in the marketplace . . . an asset which may be as significant as financial bequests in accounting for the maintenance of inequality in our society" (1992: 100).
	Nahapiet & Ghoshal	"the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network" (1998: 243).
	Pennar	"the web of social relationships that influences individual behavior and thereby affects economic growth" (1997: 154).
	Schiff	"the set of elements of the social structure that affects relations among people and are inputs or arguments of the production and/or utility function" (1992: 160).
	Woolcock	"the information, trust, and norms of reciprocity inhering in one's social networks" (1998: 153).

Note. Reprinted from "Social capital: Prospects for a new concept", by Adler, P.S., and Kwon, S.-W., 2002, *Academy of Management Review*, 27(11), p. 20

Types of Social Capital

Putnam (2000) distinguishes two types of social capital which he refers to as bonding social capital and bridging social capital. Adler and Kwon's (2002) table (see Table 1) shows how the definitions of the concept vary depending on the type and structure of relationships developed by individuals or groups. Adler and Kwon (2002), in line with Putnam's notion, refer to bridging relationships as "external ties" and bonding relationships as "internal ties". Putnam (2000) says that bonding social capital refers to the relationships that are formed by people in homogenous groups such as families, among people with the same nationality, or among ethnic and religious groups. It can also refer to the networks formed by individuals living in the same neighborhood who derive certain benefits from each other or share resources that are of mutual advantage. Being a member of such groups creates a sense of belonging, community, and identity.

Marginalized groups have been known to use bonding social capital to create safe spaces for themselves and a place to share opportunities. For instance, a study found that inner-city "African American adolescents living in neighborhoods with relatively high levels of social capital were less depressed than those living in less close-knit neighborhoods" (Putnam, 2000, p. 299). However, in the same way that "bonds" provide an advantage, they can also be disadvantageous. For example, peers who are not in school can negatively influence a friend to drop out of school (Carolan, 2014). Equally, the values and norms attached to clans and religious groups can mean those who belong to these groups can face undue pressure to conform (Portes & Landolt, 2000). Portes (1998) refers to this as the dark side of social capital, or what can be better termed as bad use of social capital.

Bridging social capital, on the other hand, refers to relationships between people that are different or do not have much in common. Relationships between people in different socio-economic classes, or between people with different religious beliefs or nationalities would fall under this category (Putnam, 2000). Whereas bonding social capital can be referred to as strong ties because of the strength of bonds formed, bridging social capital is considered weak ties because of the frequency of engagement in such relationships. With bridging ties, the same norms and values are often not shared (Putnam, 2002). Notwithstanding the reference to bridging social capital as weak ties, Putnam (2000) considers this type of social capital necessary for getting ahead. In his opinion, bridging social capital paves the way for acquiring financial and human capital. Claridge (2018) notes that while friendships are normally considered bonding relationships, they may, in fact, be bridging relationships because they may be between people from different cultural or socioeconomic backgrounds.

A third type of social capital, commonly seen as an extension of bridging social capital is known as linking social capital. In the literature, a distinction is not often made between linking and bridging social capital as linking social capital is seen as a subset of bridging social capital. It is used to refer to the associations between individuals with different amounts of power (Allan & Catts, 2012; Claridge, 2018; Woolcock, 2001). Woolcock (2001) suggests that bridging social capital can be horizontal and vertical, and linking relationships are observed when people in different social strata, different levels of wealth and power connect. This dissertation focuses on the bonding/bridging types of social capital as including a further divide between bridging and linking social capital makes things complicated. The concept of linking social capital was included to the literature on social capital by the World Bank as it is used to describe the type of

relationships that exist between government agencies and the communities they serve (Claridge, 2018). This distinction is more relevant in government and politics.

Bridging social capital is considered more valuable because of the access it provides to diverse networks and resources (Plagens, 2011). A number of scholars have aligned trust with the types of social capital saying that bridging social capital can also be considered generalized trust, a trust that is earned. Bonding social capital, on the other hand, is seen as assumed trust; because of the type of relationship, people assume it must exist (Engbers, Thompson, & Slaper, 2017; Grossman, 2013; Putnam, 2000). With regard to education, I believe both forms of social capital are useful in facilitating successful educational outcomes for students. Bonding social capital strengthens information sharing, for example, parents from the same ethnic group tend to share education information with each other. Bridging social capital while also creating opportunity for information sharing leads to accessing resources that may not have been available in bonding relationships (Plagens, 2011; McGonigal et al., 2007). Plagens (2011) alludes to the same importance indirectly by stressing the benefits both types of social capital bring to schools. In practice, bonding and bridging social capital are not mutually exclusive. Strong ties or bonding social capital, while sometimes exclusive, can create the opportunity to form bridging ties. In the same way, bridging social capital, intended to be inclusive, can lead to integration and the development of bonding social capital. The different types of social capital are useful in different contexts, none is fixed to a particular time, place, or group/community. Social capital is, therefore, context-specific.

Theoretical Foundations of Social Capital: Bourdieu, Coleman, and Putnam

James Coleman, Pierre Bourdieu, and Robert Putnam have greatly influenced the development of social capital as a concept. They are the most frequently cited researchers in contemporary social capital literature.

Pierre Bourdieu

Bourdieu's (1986) work which examines cultural, economic, and social capital highlights the dependence of social capital on economic and cultural capital. Bourdieu's writings focus on issues of class, power, and individual interests, and he shows how relationships can be exploited for the benefits they provide. In essence, Bourdieu's conceptualization of social capital highlights the notion of recognition. He sees the relationships that people develop as a form of cultural capital influenced by habits that are gained and ingrained in them depending on their society. He refers to this as habitus. The concept of habitus is directly related to power, inequality, and agency, and Bourdieu asserts that the development of social capital is based on the context or fields in which people find themselves (Bourdieu, 1986; Carolan, 2014; Navarro, 2006; Tzanakis, 2013). The way Bourdieu frames social capital eliminates any form of altruism. Bourdieu's theory of social capital has helped in explaining how differences in class, gender, and ethnicity affect the educational experiences of students (Dika & Singh, 2002).

While this dissertation is focused on social capital, it will be incomplete without briefly delving into the other forms of capital from which Bourdieu conceptualizes social capital. These other forms of capital will add to understanding Bourdieu's analysis of capital and society in general. According to Bourdieu, "the volume of social capital possessed by a given agent depends on the size of the network of connections he can effectively mobilize and on the volume of the capital (economic, cultural, or symbolic) possessed in his own right by each of those to

whom he is connected” (1986, p. 249). In this case, economic capital refers to money or economic resources, cultural capital is what a person knows that bestows a level of social privilege on them, and symbolic capital is the amount of prestige that a person has, and is derived from the combination of social, economic and cultural that a person possesses (Bourdieu, 1986). Bourdieu's concept of social capital is not as developed as his concept of cultural capital.

For Bourdieu, cultural capital exists in the knowledge that is acquired and inherited from being socialized in our environments. As socialization starts early in life, it becomes ingrained in a person's habitus and becomes the norm. Cultural capital can also be objectified in physical things, for example, in ownership of paintings or the type of clothes a person wears, and in the institutional recognition of an individual's cultural capital, for example, in certificates and formal awards (Bourdieu, 1986). Bourdieu argues that cultural capital, and economic capital, are both tied to fields, that is the idea that social context determines cultural and economic capital. These in turn directly impact the creation and accumulation of social capital. Thus, for Bourdieu, positions or fields play an essential role in the formation of social relationships or social capital. Bourdieu's interest lay in how different types of capital worked to create social inequality in society. Bourdieu (1986) implicitly shows that the existing norms and conditions in a society which determine one's position in the social hierarchy affect the social capital one can acquire. Based on this, Bourdieu sees social capital of consisting of two elements – social relations and the resources that arise from those connections (Keshvala, 2008). Bourdieu's theoretical framework of social capital provides a way to explore inequality and issues of race differences in the education space.

James Coleman

In his study of the concept, Coleman's (1988, 1990) emphasis is on the public/common good aspect of the phenomenon. Like Bourdieu (1986), Coleman also sees social capital as emanating from networks but rather than focus on the individual/collective interests, he sees social capital as already existing within social structures and adding to the further integration of these systems (Tzanakis, 2013). Coleman's reference to the public good, naturally acknowledges his value of the collective. Coleman's view is that social relations provide access to non-tangible and tangible resources that are redeemable not only in that context but in other situations where the actors are known to each other or have networks that connect them. Coleman operationalizes social capital within the networks of family and community highlighting the notions of trust and shared values (Coleman, 1988).

Coleman links social capital to human capital and social mobility (Coleman, 1988, 1990) and makes clear connections between the concept and the field of education. Coleman (1988) notes that "If the human capital possessed by parents is not complemented by social capital embodied in family relations, it is irrelevant to the child's educational growth that the parent has a great deal, or a small amount, of human capital" (p. S110). While Bourdieu focuses on the inequality and power that arises out of social capital, Coleman concentrates on the individual and community goals for good that social capital can bring. It is in this area that Coleman's theory has received some of the major criticisms in the literature. Portes (1998) highlights how Coleman's theory does not consider the negative effects of bonding social capital. As Portes sees it, Coleman assumes that the community's motivation to engage in acts to build social capital is without selfish interests and thus altruistic.

Coleman's (1988) conceptualization of social capital connects the creation of social capital to what it means to have social capital. For him, it appears that there is no real difference in what social capital is and the things that social capital produces. Coleman (1990) also sees social capital as existing within social structures and the social structures allowing the actors within them to take action. However, Coleman notes that social capital comes about as a by-product of the actor's action for other purposes, not as a result of a calculated choice to develop social capital. This distinguishes social capital from human capital (Field, 2003). Coleman's (1988, 1990) theoretical framework saw the family as one of the main structures for promoting social capital. Based on this he defines social capital as "the norms, the social networks, and the relationships between adults and children that are of value for the child's growing up" (Coleman, 1990, p. 334). He also notes that in existing outside the family, social capital can be seen in the "intrusiveness of one adult in the activities of some else's child" (Coleman 1990, p. 334).

Social capital is conceptualized by Coleman (1988) as existing in three forms: obligations and expectations, information channels, and norms and sanctions. Central to these three forms is the issue of trust. Regarding obligations and expectations, Coleman (1988) notes that if A does a favor for B, A trusts that B will reciprocate this action; this leads to an expectation in A, based on trust, that when the time comes, B will carry out the obligation of returning the favor. This shows the importance of trust to Coleman's concept of social capital. Without a degree of trustworthiness, actors will be reluctant to do things for each other. In the same vein, norms and sanctions, are tied to trust. In the family, for example, selfless actions by members of the family based on 'family interest' result in rewards – a family member trusts that when she/he follow the norms of the family, it strengthens ties and leads to a happier family and environment for all. It is

important to note that there may be sanctions for going against established norms but the general consensus is that actors tend to follow agreed norms because of the benefits they will obtain.

The final form of social capital based on Coleman's theory is information channels. This refers to the relationships actors develop to gain access to information that procures benefits now or in the future. While it may at first look like the sharing of information is not linked to trust, one needs to consider that actor A who shares information with actor B trusts that when actor B comes across information that may be of interest to actor A, the action will be reciprocated. Coleman (1988) says that certain types of social structures where this network closure occurs facilitates social capital. With regard to parents and children, Coleman introduces the structure of intergenerational closure. In this structure, Coleman highlights that when parents have a relationship with their children's friends' parents, it is easier to monitor and enforce norms and sanctions. Social closure or intergenerational closure also ensures "the trustworthiness of social structures that allows the proliferation of obligations and expectations" (Coleman 1988, p. S107).

Robert Putnam

Robert Putnam's (1995, 2000) conceptualization of social capital shifts attention solely to the community, away from the individual. Similar to Coleman, Putnam has also received criticism for not giving attention to the negative consequences of social capital. Putnam sees social capital as what helps communities develop the relationships and mutual trust that they need to become strong societies (Munro, 2018; Poteyeva, 2016; Putnam, 1995; Putnam, 2000). More important for Putnam are the democratic benefits that accrue in the community from social capital. Putnam's (2000) study, *Bowling Alone*, linked social capital to civic engagement and showed that social capital and civic engagement are presently on the decline in the United States because Americans are no longer connecting with members of their extended communities.

Putnam argues that this lack of connectedness impacts social goods such as health, productivity, and education (Putnam, 2000). In his analysis, Putnam acknowledges the increasing diversity in the country and its impact on the formation of social capital. He, however, notes that while other factors such as poverty, inequality, and racial composition affect test scores and retention rates, low "social capital was the single most important explanatory factor" for poor educational outcomes (Putnam, 2000, p. 300).

In recent times, Putnam's theory of social capital has become the dominant theory. The interdisciplinary nature of his concept and the thoroughness of the empirical work that went into his study *Bowling Alone* may be responsible for this (Field, 2003). Putnam argues that "the core idea of social capital theory is that social networks have value" and that "social contacts affect the productivity of individuals and groups" (Putnam, 2000, p. 18-19). He notes that communities that are "healthy, wealthy, and wise" are the result of well-established civic and social relationships (Putnam, 2000, p. 287). Unlike Coleman (1988, 1990) who focuses on the action that social capital facilitates – the function of social capital – Putnam (1995, 2000) goes a step further by illuminating how social capital facilitates action. He notes that social capital facilitates production of other forms of capital, and that it allows for cooperation and coordination at the community level which enhances the well-being of individuals in the community.

Putnam (2000) in the same way as Coleman (1988, 1990) connects social capital to trust as the glue that creates the bonds needed for the voluntary associations inherent in social capital. Thus, citizens with the "universal lubricant" required for social capital will see higher levels of civic engagement, volunteerism, giving, and voting within their society (Putnam, 2000). Putnam (2000) notes a number of ways in which social capital works in society through generalized trust. Generalized trust, as explained previously is the kind of trust that is earned and is usually found

in bridging relationships or weak ties. First, Putnam sees networks and social norms that arise from social capital as ways to solve problems in society. Secondly, social transactions become less costly when citizens trust each other. Thirdly, Putnam notes that social capital increases the realization that as members of a community we are all connected and our peaceful coexistence lies in tolerance and trustworthiness. Finally, contrary to Bourdieu (1986), Putnam (2000) links social capital to altruism and sees social capital as participating with others to achieve a common goal for all. Putnam calls this “doing with” (2000, p. 116).

In *Bowling Alone* (Putnam, 2000), Putnam illustrates his argument with his investigation of the relationship between social capital and social indicators of well-being in America. He looks at conditions like economic prosperity, education, health, and civic engagement and develops a composite index of social capital made up of 14 separate indicators which he then uses to gauge the levels of social capital across the 50 states. These indicators are listed below in Table 2 to highlight how Putnam’s theory conceptualizes social capital. The results from Putnam’s study provide evidence for his assertion of the link between social capital and well-being generally, and that there is a decline in social capital in America (Field, 2003; Putnam, 2000). As expected, there have been a number of criticisms to his work especially with regards to his definition of social capital and his linkage of trust with networks and associations. Field (2003) however defends the study and its findings, and notes that Putnam stays true to his definition of social capital as active membership in networks and the “norms of reciprocity and trustworthiness that arise from them” (Putnam, 2000, p. 19).

Table 2: Putnam's Social Capital Index

Measures of community organizational life: <ul style="list-style-type: none"> • Percentage served on committee of some local organization in last year; • Percentage served as officer of some club or organization in the last year; • Civic and social organizations per 1000 population; • Mean number of club meetings attended in the last year; and • Mean number of group memberships
Measure of engagement in public affairs <ul style="list-style-type: none"> • Turnout in presidential elections, 1988 and 1992; and • Percentage attended public meeting on town or school affairs in last year;
Measures of community voluntarism: <ul style="list-style-type: none"> • Number of non-profit organizations per 1000 population; • Mean number of times worked on community project last year; and • Mean number of times did volunteer work last year;
Measures of informal sociability: <ul style="list-style-type: none"> • Agree that 'I spend a lot of time visiting friends'; and • Mean number of times entertained at home last year;
Measure of social trust: <ul style="list-style-type: none"> • Agree that 'Most people can be trusted'; and • Agree that 'Most people are honest'.

Note. Adapted from "Social capital: Critical perspectives", by Baron, S., Field, J., and Schuller, T., 2000, p. 12, New York, NY: Oxford University Press.

Operationalizing Social Capital

The preceding section outlined the three most cited theoretical approaches to the concept of social capital. This sub-section considers the ways in which Bourdieu, Coleman, and Putnam, as well as other scholars in the field have operationalized the concept. Putnam and Coleman, along with other scholars within the normative school of thought on social capital view it as the property of groups such as families, schools, communities, and neighborhoods (Ryan & Junker, 2019). Putnam (2000) is of the view that social capital generates the kind of behavior that encourages trust and reciprocity among people and builds/strengthens networks and the democracy. For Putnam (2000) what is essential to social capital is the trust that underlies reciprocity. Putnam (2000) argues that it is the reciprocity in social relations that is the bedrock of social capital and that this is tied to trust. Coleman (1988, 1990) also agrees that trust is central to the shared values inherent in social capital. In discussing trust, Coleman (1988) notes that when individuals devote resources to establish trust, they do so for personal benefit and

usually do not consider the advantage or otherwise that it may provide to others within the community.

Resource social capitalists, on the other hand, are grounded in Bourdieu's (1986) definition of the concept which focuses more on individual access to, and use of, social capital (Ryan & Junker, 2019). Bourdieu's discussion of the collective is housed in his concept of cultural capital. Bourdieu (1986) emphasizes social inequality and power based on class, race, and gender. Whereas it can be argued that Bourdieu ignores the concept of trust, his conceptualization of the concept of social capital highlights issues of distrust and barriers to accessing social capital (Field, 2003). Trust can, therefore, be said to be a feature of social capital, along with networks and reciprocity that Bourdieu, Coleman, and Putnam's conceptualizations have in common. Fukuyama (1995) actually defines social capital as a "capability that arises from the prevalence of trust in a society" and that "communities depend on mutual trust" (Fukuyama 1995, p. 26, 25). Trust, or the lack of it, is therefore central to almost every relationship.

The use of both schools of thought in the conceptualization of social capital are useful in examining the inclusive and exclusive nature of the concept, and enhance the explanatory power of this research study. Putnam's (1995, 2000) and Coleman's (1988, 1990) concept of social capital allows one to assess if and how different groups and communities differ in their stock of social capital, through understanding the level of social trust in society. In education, the levels of social capital that exist in the school, family, and neighborhood can contribute to the academic success of students, reflected through enrollment, retention and graduation rates as well as in the behavior and development of students generally and in their participation in school and voluntary activities (Acar, 2011; Israel et al., 2001; Putnam, 2000). Coleman (1988) actually highlights that

the resultant effect of high levels of social capital in a society is increased trust and community cohesiveness meaning that everyone is able to draw upon the available social capital making it more of a public good than a private good. Bourdieu (1986) on the other hand sees social capital being unevenly distributed through the inequality that is reproduced in the education system.

As noted earlier, the literature examining trust and social capital distinguishes between generalized trust and assumed trust, and links these to bridging and bonding social capital respectively (Engbers et al., 2017; Grossman, 2013; Putnam, 2000). Field (2003) notes that assumed trust, or what he refers to as particularized trust, is based on an individual's experience of trustworthiness in another, while generalized trust is a more open type of trust which may involve people in the individual's immediate or extended network. However there have been debates about whether trust warrants being considered part of social capital or a distinct concept that stands alone or arises as a result of social capital (Allan & Catts, 2012; Fields, 2003). This is understandable as the inclusion of trust as a factor of social capital along with networks and reciprocity increases the complexity of the concept. While some scholars see it as a factor that should or may result from social capital (Field, 2003), I see it as an integral part of social capital as do Fukuyama (1995) and Putnam (2000, 2002). Without trust, whether assumed trust or generalized trust, no relationship can operate effectively. Similar to Fukuyama (1995), I believe that relationships, communities, and networks rely on trust.

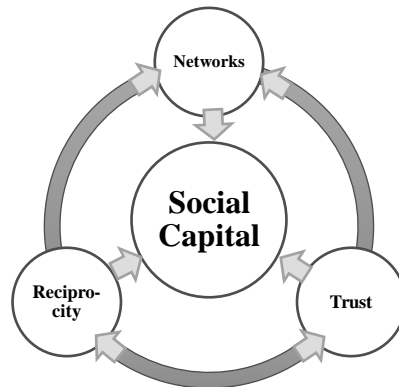
In addition, trust allows the interaction and integration of individuals and groups in society. People who trust are open to more opportunities and in many cases will achieve more than those who do not trust. In a similar vein, reciprocity can be linked to trust. People trust that when they perform an act or duty, there is every likelihood that they or someone else will receive something as an outcome of the act. The trust that reciprocity will occur also leads to increased

trust and when acts are not reciprocated, trust begins to erode. Simply put, without trust, reciprocity will not exist. Both trust and reciprocity adhere in networks. For networks to be useful, they need to provide resources, which they do through the norms of trust and reciprocity that exist in them (Glanville, 2004). Network structures can be closed or open as seen in Putnam's (2000) reference to bonding and bridging social capital and Coleman's (1988) social closure networks. The inclusion of trust and reciprocity in relational networks allows the concept of social capital to extend beyond either structural or functional dimensions and increases its relevancy for educational research where trust has been widely investigated and addressed in multiple contexts.

As members of families, schools and communities, students receive support from these structures that facilitate their successful educational outcomes. Goddard (2003) highlights the importance of including both the structural and functional components of social capital in any conceptualization of the component. He considers relationships or networks the structural aspect of social capital and sees factors like norms, trust, and reciprocity as the functions of social capital. Goddard (2003) draws attention to two studies that examined the influence of social capital on students' education. He notes that the study that only included the structural aspect of social capital produced mixed results but the study that considered both functional and structural aspects of the construct found a relationship between increased social capital and an increase in the likelihood that students would complete high school and enroll in college. In the effort to fully understand the influence of social capital, it is important to not only examine the number and types of networks that an individual forms, but also, the quality and strength of those relationships.

In his own study Goddard (2003) employed an 11-scale item based on structural and functional aspects of social capital. Data collected from 45 elementary schools, including 2,429 students and 444 teachers, in a large urban school district in the American Midwest, showed that social capital was positively related to students' educational outcomes. While the results showed only a modest relationship, these were still significant. However, apart from the statistically findings of this study, Goddard (2003) posits that his study provides learning for other researchers on issues regarding measurement of social capital, a matter that has been problematic. He notes that research studies can benefit from using measures that incorporate both structural and functional aspects of social capital. Goddard (2003) uses the example of intergenerational closure and its impact on children; research rather than just focusing on the connection between adults and children, should also consider how children themselves are interacting to enable intergenerational closure.

Based on this exploration of the literature on social capital, this study therefore operationalizes social capital as the trust and reciprocity that exists within and between relational networks in society (illustrated in Figure 2). This definition recognizes that social capital has functional and structural components that are essential to its proper conceptualization and understanding. As Goddard (2003) and other scholars (Bourdieu, 1986; Coleman, 1988; Field, 2003; Fukuyama, 1995; Putnam, 2000) show, a thorough appreciation of the concept of social capital needs to recognize its structural and functional components. The structural and functional components of social capital add to the complexity of the concept and shows the level of attention that needs to be given to its measurement. Given that this study also embeds the concept in both the normative and resource-focused schools of thought, social capital can be explored at the individual and group levels.

Figure 2: Conceptualization of Social Capital in this Study

Measurement of Social Capital

There have been many criticisms of the measurement of social capital as a concept. While it is easy to agree with the underlying logic of social capital, that is the idea that who you know and what you do with the people you know matters (Carolan, 2014), it is not so easy to measure the concept of social capital. How social capital is measured is dependent on the way it has been conceptualized. Carolan (2014) links the measurement of social capital to its conceptualization as either a public (collective) good or a private (individual good). Imandoust (2011) notes that there is a difference between what social capital is and what it does. Woolcock (1998, p. 156) queries whether social capital is the “medium” or the “message”, or both. Ashtiani and Feliciano (2018) also highlight that having social capital, that is, its availability is not the same as putting it to use; they use the terms access and mobilization. Ryan and Junker (2019) raise the issue of the elements and value of social capital and question whether it resides in groups or individuals, or if it is definite or a process.

This dissertation takes the approach that what social capital is can be the same as what it does, and excessive efforts to differentiate between the two result in tautology. While some

researchers believe this is problematic (Portes, 1998), the view taken by me in this study is one supported by Lyons (2000), who argues that a distinction cannot be made between what causes social capital and what it actually is. Stone (2001) highlights the need to have a clear conceptualization of social capital in order to achieve theoretical rigor in its measurement. It is the “gulf between theoretical understandings of social capital and the ways social capital has been measured in much empirical work to date...which leads to empirical confusion about the meaning, measurement, outcomes, and relevance of social capital” (Stone 2001, p. 1). For this reason the first few sections of this chapter have sought to provide a comprehensive overview of the concept including its theoretical foundations before arriving at its own notion view of what social capital is.

Tzanakis (2013), as well as Dika and Singh (2002), posit that longitudinal studies are the best way to understand the relationships between social capital and educational outcomes because they provide a way to interrogate the causal relationships that emerge with outcomes. However, Dika and Singh (2002), and Stone (2001) note that most of the measures used in understanding and measuring social capital come from studies that were not originally designed to measure the concept, and that variables used to indicate networks, social trust, and reciprocity may not actually be doing that. Engbers et al., (2017) identify several issues with this. First, because of the way social capital is often used to mean all things, there has been a proliferation of measures for the different constructs within the concept. This means that some constructs have received more attention than others and are well developed, while others are not as well developed because they may be difficult to explain.

Another challenge is that a concept of social capital may be associated with many measures or indicators. For example, academic achievement can be measured by math

achievement scores, high school graduation, and/or enrolment in college. While measures used will depend on theory and research questions, attention needs to be given to the issue of multicollinearity in quantitative models with highly related indicators. The use of factor analysis (exploratory and confirmatory) is useful in this area because it allows the isolation of variables that cluster. Latent factors or constructs can be developed from these (Engbers et al., 2017). In measuring social capital, indicators used can either be distal or proximal (Stone, 2001). Distal indicators are social capital indicators that are not related to its core component, which in this study are trust, reciprocity, and networks. An example of a distal indicator would be child-parent relationships. Proximal indicators are indicators that directly emerge from the outcomes or results of social capital's components, for example, related to trust would be how much children trust that adults in their neighborhood care about them (Stone, 2001).

Stone (2001) notes that social capital research that uses secondary data more often relies on a combination of proximal and distal indicators. While it may be good that research on social capital can pull from many measures, Baron, Schuller, and Field (2000) highlight that the strengths of the concept are also some of its weaknesses. This criticism is also raised by Portes (1998) who posits that social capital can be referred to whenever an outcome of social relations is observed. However, Stone (2001) asserts that:

A theoretically informed approach to the measurement of social capital is essential to overcoming empirical confusion and enabling proper investigation of social capital as it relates to a range of outcomes. By linking social capital measurement directly to theoretical understandings of the concept, we are able to: first, recognize that social capital is a multidimensional concept comprising social networks, norms of trust, and norms of reciprocity; second, understand social capital properly as a resource to action; and third, empirically distinguish between social capital and its outcomes (Stone, 2001, p. 6).

This dissertation builds on the framework that recognizes the multidimensionality of social capital and acknowledges that it is a resource for action (Stone, 2001). In addition, similar to the view held by Coleman (1988) that social capital is seen in what it does, this study takes the view that ultimately, social capital cannot really be distinguished from its outcomes.

A deeper dive into the conceptualization of social capital arrived at above reveals ways in which networks, trust, and reciprocity are measured in research studies. Putnam (1995, 2000) notes that networks can be formal or informal. Informal networks are those observed in families, amongst friends, within neighborhoods and other closely related groups. Formal networks are seen in voluntary organizations, between communities, and in organized institutions. Coleman (1988), for example, studies social capital in the family in the form of child-parent relations. Measures he used include the presence of adults in the home and the number of children in the household. Coleman recognizes the absence of adults as homes that are “structural deficiency in family social capital” and ties this directly to single-parent families (Coleman, 1988, p. S111). Coleman’s definition of family is based on the traditional norm where there is a nuclear family with extended family members, uncles, aunts, grandparents, and cousins, available to provide support when needed.

Coleman (1988) also notes that the size of the family with reference to number of children and the position of the child amongst their siblings as being disadvantageous when it comes to family social capital. More children mean that parents are not able to devote appropriate attention to their children; and the position of the child determines how much attention s/he will receive. Coleman’s claims are supported by empirical evidence from research on achievement and IQ (Coleman, 1988). These measures have been criticized because Coleman

does not take into account the quality of the child-parent relationship where there is only one parent and assumes a large number of siblings are a strain on the quality of bonds between the parent and child without accounting for the social capital these relationships provide (Dika & Singh, 2002; Stone, 2001).

Apart from the network type, the size and capacity of the network are also included in measures of a network. These measures seek to reveal how integrated, or not, the networks are. Research studies examining network size and capacity characteristics in relation to social capital ask questions on how well people know their neighbors and how long they have lived in the community. There are also questions with regards to participation in community activities or events; intergenerational or social closure is also investigated. In the measurement of trust and reciprocity, it is important to note that the way relational components will emerge will be different in different types of networks (Stone, 2001). Trust can be measured as generalized trust or assumed trust depending on the network. Questions relating to feelings of safety within the networks as well as the level of confidence people have with network members are usually examined. Where social capital research measures reciprocity, reciprocity is usually tied to the norms of social behavior.

The following section of this review summarizes findings from a variety of research on social capital in different domains and amongst different types of networks connected to social capital in this study. This section also demonstrates the way in which the dimensions and characteristics of social capital discussed above have been measured in empirical studies and are helpful for this research because it provides a guide on how the elusive concept has been quantified in some studies and the type of indicators used. I am following Field's (2003) lead to highlight how the theory discussed in the previous sections withstands empirical analysis.

Domains of Social Capital: Family, School, and Neighborhood Social Capital

The use of the concept of social capital in education involves translating it from a theoretical understanding to its practical application in societal interactions. For example, “social capital is defined by its function” (Coleman, 1988, p. 98). Portes (1998) highlights how social capital has been used in empirical literature as a predictor of academic performance, school enrollment and retention, and the intellectual development of children. Social capital works in the school, neighborhood, and family to shape the student’s performance (Acar, 2011). It should also be noted that various institutions impact the growth and development of children (Dufur, Parcel, Hoffman, & Braudt, 2016).

Family Social Capital

Coleman says that social capital is “the set of resources that inhere in family relations and in community social organization and that are useful for the cognitive or social development of a child or young person” (Coleman, 1990, p. 300). Coleman (1988) highlights the influence of the different types of capital within the family on a child’s academic performance. Coleman’s analysis grounds the importance of family social capital in education. Coleman does not contend that financial capital (a family’s wealth) and human capital (a family’s level of education) are both vital to academic success. However, he sees factors such as the amount of time parents spends with their child on schoolwork and the time parents spend developing the academic interests of their child as more relevant for academic achievement. Even discussions centered on life skills, for example, making and managing a budget, is of greater importance than financial and human capital (Coleman, 1988). So, while the availability of family social capital may be modified by both financial and human capital, these have little or no impact on educational outcomes without family relations.

Coleman's (1988) article goes further to show the difference social capital within the family makes to school dropout rates for children even when human capital and financial capability are present. Coleman uses data from the *High School and Beyond* study (Table 3) to provide likely dropout rates for different family situations. Item 5 in the table shows that when a child has the support/attention of both parents, fewer siblings, and there is an expectation of college attendance, drop-out rates fall significantly compared to when these factors are not present. The data shows a 22.5% difference between the two family situations (Item 5, Table 3). The use of indicators "number of siblings the student has", "mother's expectation of college completion" etc. are based on other studies done on student achievement and IQ (Coleman, 1988). However, Coleman's work fails to consider the unequal access to resources that may be responsible for differences in family situations. It cannot be assumed that desiring social capital and having it mean the same thing.

In discussing family and Coleman's concept of social capital, consideration needs to be given to the family structure and its effect on educational outcomes. Harding, Morris, and Hughes (2015) report on mothers' access to social capital and its influence on educational outcomes. In their theoretical paper based on Bourdieu's concept of social capital, the authors note that maternal education is a "salient marker of advantage not only for mothers themselves but also for their children" (Harding et al., 2015, p. 73). The focus of Harding et al.'s (2015) analysis is on how a mother's education can increase her social capital and thus the benefit it brings for her children. Mothers' networks matter to educational outcomes for children as they provides access to information, either directly or indirectly to the student, and can contribute to academic achievement. However, maternal education is also directly related to the economic

capital of the mother and/or of the family, highlighting a situation in which it may be difficult to determine which variable is responsible for the benefits gained by the child.

Table 3:
Dropout rates between Spring, Grade 10, and Spring, Grade 12, for students whose families differ in social capital, controlling for human capital and financial capital in the family

	Percentage Dropping Out	Difference in Percentage Points
1. Parents' presence:		
Two parents	13.1	} 6.0
Single parent	19.1	
2. Additional children:		
One sibling	10.8	} 6.4
Four siblings	17.2	
3. Parents and children:		
Two parents, one sibling	10.1	} 12.5
One parent, four siblings	22.6	
4. Mother's expectation for child's education:		
Expectation of college	11.6	} 8.6
No expectation of college	20.2	
5. Three factors together:		
Two parents, one sibling, mother expects college	8.1	} 22.5
One parent, four siblings, no college expectation	30.6	

Note. Reprinted from "Social capital in the creation of human capital", by Coleman, J. S., 1988, *The American Journal of Sociology*, 94, p. S112

School Social Capital

Social capital can also exist outside the family. In schools, it is seen in the relationships between the teacher and student(s), in in-school and out-of-school peer groups, and in students' feelings of being valued and accepted by the institution (Ahn, 2017). Again, using a sample of different schools from the *High School and Beyond* data set, Coleman (1988) showed that children who attended religious schools were less likely to drop out of school compared to children attending non-religious schools. Retention rates were linked to the community cohesion within the religious schools rather than to the religious affiliations or socioeconomic status of the students. The sense of community was based on the shared norms and values between students as well as adults within the school community. Coleman believes that the data provides evidence to show that “social capital in the community compensates in part for its absence in the family” (Coleman, 1988, p. S115). The study points to the “importance of social capital in the creation of human capital” and in the educational attainment of the children (Coleman, 1988, p. S116).

Ashtiani and Feliciano (2018) note that while family social capital seems to be more of a predictor of student's academic performance, schools, too, have a role to play in providing access to social capital. Social capital in schools provides a way for students to connect to resources and knowledge (Salloum et al., 2018). When students engage with their peers they are likely to gain access to information that could lead to educational opportunities that they may not have known about. The importance of the school on student's academic performance has also been indirectly supported by the Every Student Succeeds Act (ESSA) which places accountability on schools for student's success (Salloum et al., 2018). Schools, teachers, counselors, community liaison officers, etc. have the power to create the social capital students

need to improve their educational outcomes especially those that do not have access to this in their familial connections (Salloum et al., 2018).

Community or Neighborhood³ Social Capital

Local community contexts are another domain of social capital (Ashtiani & Feliciano, 2018). Neighborhoods have the ability to “affect the educational norms, values, and resources in the community outside of school” (Sanbonmatsu, Kling, Duncan, & Brooks-Gunn, 2006, p. 2). Both Putnam (1995, 2000) and Coleman (1988) acknowledge that community social capital can lead to improvements in educational outcomes. One way in which community or neighborhood social capital benefits its members is through its capacity to provide the opportunity for wider interaction and more resources. Putnam says that neighborhoods known for their civic engagement and established ways of reciprocity usually have high levels of social capital (Israel et al., 2001). A number of attributes can influence the presence of community social capital and its impact on educational opportunities and outcomes. These include the socioeconomic status of its residents, inequality, physical isolation, and residential instability (Israel et al., 2001).

Higher levels of education are usually directly correlated to economic wealth and income levels seen in wealthier neighborhoods. This, in turn, leads to greater investment in education or the desire for educational resources. The reverse occurs in poor communities. Weak ties are also more likely in places where residents are isolated due to population density and/or distance to amenities such as schools. This results in low social capital as there is less involvement in local/neighborhood activities (Israel et al., 2001). Inequality in neighborhoods leads to fragmentation and a “disaffected community in which little social capital is available” and

³ Community and neighborhood are used interchangeably to mean individuals that are living in close proximity and interacting with each other. It is not necessarily a geographical location.

structural integration is inhibited (Israel et al., 2001, p. 48). Residential instability, that is situations in which there is a high turnover of residents, can also disrupt relationships and reduce the opportunity to build social capital (Coleman, 1988).

The influence of community social capital on a child's development and performance has been debated in several studies. Researchers have argued that childhood environment, and individual and family attributes, are more important for success than neighborhood conditions alone (Sanbonmatsu et al., 2006). *Moving to Opportunity* (MTO), a housing mobility experiment carried out in 2002 by the U.S. Department of Housing and Urban Development (HUD), showed that interventions that focused solely on neighborhoods were not able to solve the many problems of children growing up in poverty (Sanbonmatsu et al., 2006). However, Israel et al. (2001) in their own study using data from the National Education Longitudinal Survey (NELS) found that process and structural features of family and community social capital are key to students' educational success. Specifically, their findings highlight that community social capital does make a difference, even if only a little, in children's academic performance. The authors note that residential stability and length of stay in the neighborhood were the community attributes that had the most effect on student performance.

Coleman (1988) also reports that children who change neighborhoods frequently tend to have low educational outcomes. In the MTO experiment children often moved neighborhoods and had not been in their new locality for an extended period of time when the survey was conducted (Sanbonmatsu et al., 2006). Similarly, children who develop an attachment to low-income neighborhoods hinder their own educational success. Maurizi, Ceballo, Epstein-Ngo, and Cortina (2013) say that such communities tend to lack role models who have completed high school and this may limit any opportunity adolescents have for prioritizing education. All these

allude to the impact of the structural features of the community in building the type of relationships that foster social capital. In sum, the goal is to build social capital in the family, school, and community in such a way that students will benefit through improved educational outcomes. Evidence of social capital in the family, school, and neighborhood, as well as major measures and constructs within these domains are summarized in the table below (Table 4).

Table 4: Domains of Social Capital: Family, School, and Neighborhood Social Capital

	Family social capital	School social capital	Neighborhood/Community social capital
Evidence of social capital	<ul style="list-style-type: none"> • Family relationships including the resources available to members of the family. This is influenced by the level of education of parents (or adults within the household) and the wealth of the household (financial and cultural) • The reciprocity in these relationships that result in interpersonal trust 	<ul style="list-style-type: none"> • Relationship between teachers and student, as well as between students • Relationship between in-school and out-of-school peer groups 	<ul style="list-style-type: none"> • Relationships not specifically tied to place but that emanates from a connection with people in close proximity to a person – so this can include relationships with people that live close to you as well as people in the neighborhood store which may be a couple of blocks/streets from your home. These relationships lead to wider interaction and connection to more resources
<i>Quantified/Operationalized by</i>			
Major constructs and measure	<ul style="list-style-type: none"> • Amount of time parents spend with the child doing academic and social activities • Resources parents are able to provide for the child (financial, emotional, cultural etc.) • Educational level of parents (linked to resource provision) • Family structure 	<ul style="list-style-type: none"> • Shared norms and values between students and adults resulting in: <ul style="list-style-type: none"> - Information sharing - Connection to resources - A sense/feeling of belonging to the school by students and parents - Connection to teachers in the school - School community 	<ul style="list-style-type: none"> • Length of time in the neighborhood • Proximity to other members of the neighborhood • Residential stability • Sense of attachment/belonging to the neighborhood • Resources available within the community/neighborhood (including human resources) • Community interactions

Social Capital and Academic Achievement

In response to Section 402 of the Civil Rights Act of 1964, the U.S. Department of Health, Education and Welfare authorized a survey to assess the “lack of equal educational opportunities for individuals by reason of race, color, religion, or national origin in public educational institutions at all levels in the United States” (Coleman et al., 1966, p. iii). This resulted in the publishing of the 1966 Equality of Educational Opportunity report (the Coleman report). It was the first formal attempt of the U.S. Government to create an evidence-based that would support education reform policy and practice. Coleman’s (1966) early work which examined the performance of minority students, specifically, African American children in education institutions opened the flood gates for researchers to study the effect of different types of capital especially contextual issues on academic achievement (Field, 2003).

The Coleman report revealed that there was indeed an achievement gap between white students and students from minority backgrounds. The study focused on education outcomes by measuring academic achievement (using standardized tests developed for the survey) rather than on education inputs (facilities, teacher quality, per-pupil funding, integration, etc.) (Coleman et al., 1966). One significant finding from the Coleman report was that achievement scores of minority/underserved children are affected by the quality of the education/schooling they receive. This has influenced the provisions of Title 1 of 2015 Every Student Succeeds Act (ESSA), the recent reauthorization of the 1965 federal education policy (U.S. DOE, 2015). While Coleman’s 1966 study did not aim to uncover these additional findings, results from the research showed that minority students’ academic achievement is equally affected by what happens in schools, by who is in the school with them, and by what happens in their home life. His study

showed that the educational achievement of children from disadvantaged backgrounds was affected by more than just funding (Coleman, 1966, 1988; Field, 2003).

Dika and Singh's Review

Sandra L. Dika and Kusum Singh in their 2002 critical synthesis of literature on educational research and social capital titled *Applications of Social Capital in Educational Literature: A Critical Synthesis* provide a review of literature that is particularly helpful in understanding academic achievement and social capital. All the papers reviewed, both theoretical and empirical, examine the assertion that social capital is positively associated with successful educational outcomes. In their review, Dika and Singh highlight the difference between educational achievement and attainment, however, I do not in this dissertation. Rather, I use the terms educational or academic achievement, attainment and outcomes interchangeably to mean college completion.

The review does a thorough job of investigating the themes, indicators of social capital, methods, and outcomes in empirical studies on social capital and educational outcomes from 1990 to 2001. Dika and Singh observe that studies in the first five years following the theoretical development of social capital typically focused on students from minority and disadvantaged backgrounds. These studies had sample sizes ranging from 200 to 3,796 participants and incorporated Coleman's (1988, 1990) and Bourdieu's (1986) theories on social capital. Some of the variables used were child-parent relations, intergenerational closure, family size and structure (Coleman). Several works focused on Bourdieu's concept of cultural capital. Dika and Singh included 39 studies where social capital was either the outcome or an independent variable in their review.

Of the studies reviewed by Dika and Singh, 13 investigated the connection between social capital and educational attainment and 14 the relationship between social capital and educational achievement. Most of these studies found that there was a statistically significant positive relationship between social capital and educational attainment, and social capital and educational achievement. Dika and Singh's review note that only two of the quantitative studies examined in their review use hierarchical linear modeling or multilevel modeling. Most of the others used regression models to show the relationship between social capital and educational outcomes. Dika and Singh's review, however, does not report actual statistics only a general summary of the findings of studies. Out of all the studies reviewed by the authors, one found no evidence of a relationship between social capital and educational achievement. Dika and Singh argue that for many of the studies reviewed, the "theoretical and empirical support [for social capital] could be stronger" (p. 41). The authors also opined the need for further research on access to, and mobilization of social capital to better understand social capital's impact educational aspirations and parental expectations.

Dika and Singh in their review note that in the years leading to up 2001, a number of studies employed qualitative methods in exploring social capital. In one of these studies, which used Putnam's (2000) theory of social capital, participants aged between 12 and 15 were asked to write about the most important person to them and why, take pictures of places that were important to them and write why, and finally, have discussions in groups with other young people about important issues in their neighborhoods and communities. These studies were analyzed using Coleman's (1988, 1990) concepts of information channels, norms, and trust. The studies during this time period used variables similar to those in the earlier years of research; educational achievement outcomes included GPA, standardized test scores in science and scores

in math and reading, and educational attainment outcomes comprised variables on retention and attrition in school, number of years of schooling and enrollment in college. Dika and Singh's review highlights the use of educational aspiration as an outcome variable in some of the studies; some of the studies also focused on comparing educational outcomes among special groups.

Ashtiani and Feliciano's study

Using the data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), the Parent Questionnaire and the Adolescent Health and Academic Achievement Study (AHAA), Ashtiani and Feliciano (2018) evaluate access to and mobilization of social capital. The authors measure access to social capital in three contexts – family, schools, and communities. For family social capital, the authors focus on parents' level of education and parents' expectations of college. Three variables are used to measure school social capital. The first is a composite variable capturing how much students feel attached to their school. The second variable measured the strength of the relationship between the student and teacher, paying attention to how teachers treated and cared about the student. The third variable measured involvement in extracurricular activities. Community social capital measured the context and participation in social community structures. Mobilized social capital is measured through mentorship relationships: mentors can be in the family, community, or school context. Findings from the study which focused particularly on low-income youths indicate that educational attainment is aided by access to and mobilization of social capital.

Salloum et al.'s study

In another empirical study, Salloum et al. (2018) using data from elementary schools in Michigan, compare the impact of social and financial capital on student learning. A total of 78 schools participated in the study which was conducted between 2004 and 2005. The study was

based on Coleman's (1988, 1990) conceptualization of social capital, and it aimed to show the level to which trust, networks, and norms support student achievement. Social capital was measured using nine items (see Table 5). These items all sought to capture the level of social capital in the Michigan schools based on teachers' perceptions of the relationships of trust developed with students and their families. Salloum et al. (2018) note that research in education has shown that "social trust is significantly related to academic outcomes" (p. 283). This means that social capital that emanates from trust can strengthen the relationships between the schools, families, and communities, and make a difference to educational outcomes. However, because the concept of social capital is complex, has different components, and can be conceptualized in a myriad of ways, it is still unclear whether any single way of measuring it will be acceptable to all researchers.

Table 5: Social Capital Items

Items
- Parents in this school are reliable in their commitments
- Parent involvement supports learning here
- Teachers in this school trust the parents to support them
- Parents of students in this school encourage good habits of schooling
- Community involvement facilitates learning here
- Teachers in this school trust their students
- Students in this school can be counted on to do their work
- Teachers in this school have frequent contact with parents
- Students are caring toward one another

Note. Adapted from "Resources, learning, and policy: The relative effects of social and financial capital on student learning in schools", by Salloum et al., 2018, *Journal of Education for Students Placed at Risk (JESPAR)*, 23(4), p. 290.

In conclusion, summarizing the three studies reviewed above, social capital contributes positively to academic achievement in most cases. Dika and Singh (2002) note that Coleman's approach to social capital is the basis of many of the studies reviewed, as seen in Salloum et al.'s (2018) study. Many of the variables used centered on the family and the school. The studies all highlight the value of different stakeholders, or networks, to educational success. For example,

Ashtiani and Feliciano (2018) show how family, school, community, and mentor networks aid in access to, and mobilization of social capital. Salloum et al. (2018) also show the value of networks, norms, and trust in improving education outcomes. While a few studies focused on Bourdieu's (1986) conceptualization of social capital (Dika & Singh, 2002), it appears that in the field of education in general, especially in K-12 institutions, social capital is seen as residing in groups rather than in individuals.

Social Capital and Race/Ethnicity⁴

Race has featured in research on social capital since Coleman's 1966 report. Many studies have highlighted the importance of social capital to successful educational outcomes (Coleman 1988; Dika & Singh, 2002; Putnam, 2000), but a search of literature comparing different racial groups academic achievement generally produces few results. Most of the studies on race and educational outcomes focus on specific groups or treat other races/ethnicities as a homogenous group referring to them as minorities, immigrants, or underrepresented groups. These studies also either pay attention to specific academic subjects or institutions or include the examination of race with socioeconomic status or gender. Strayhorn (2010), for example, measures the effect of social capital and socioeconomic status on the college preparation of African American and Latinx men. From a nationally representative sample from the National Center for Education Statistics' (NCES) National Education Longitudinal Study (NELS),

⁴ As noted in chapter one, race is categorized using the racial categories identified in the U.S. Census and in the Add Health data. Race is capitalized e.g. White rather than white, and where used, Black rather than black; though the term African American is preferred. Also, in place of Hispanic/Latino, Latinx, which is gender neutral, is used to represent peoples from Spanish speaking nations/non-White Americas. See appendix for U.S. Census classification of race.

Strayhorn (2010) identified 171,936 African American males and 140,222 Latinx males enrolled in four-year colleges. The dependent variable for the study was undergraduate grades measured as the student's grade point average (GPA). The independent variables included the academic ability of the students when they were in high school, college readiness of the students with regards to involvement in college preparation programs, and social and cultural capital for the students.

The third independent variable, social and cultural capital, was estimated from the following items: socioeconomic status, the highest level of education attained by parent(s), child-parent relationship based on discussions about college attendance, parental expectations, and the student's participation in school clubs and organizations. The findings from the study showed that social and cultural capital are essential in predicting students' academic performance in college. However, when the results were disaggregated based on the individual independent variables on social and cultural capital, the findings revealed that while discussing college with their parents led to African American and Latinx males performing better in college, overall, Latinx males benefitted more. The most powerful predictor of college success for African American males was socioeconomic status, which interestingly had no effect on achievement for Latinx males. Strayhorn (2010, p. 322) reports that "sociocultural capital can have a compensatory effect on low socioeconomic status African American and Latinx males as well."

To clarify his position, Strayhorn (2010) notes that in his study predicted grades, GPA, for African American and Latinx men with low socioeconomic status but with high stocks of social and cultural capital are likely to be higher than 4.85. Whereas, when all other variables in the model are controlled for including sociocultural capital, the GPA for African American men would be 3.57 and for Latinx men it would be 3.32. Strayhorn's finding is supported by Ashtiani

and Feliciano (2018) whose research results show that access to and mobilization of social capital in schools, families, and communities aid educational attainment for low-income youth.

Bourdieu (1986) notes how social capital provides access to resources such as information and networks. These resources provide the influence and connections that benefit the individuals. Caldas and Cornigans (2015) report how both Bourdieu and Coleman's conceptualization of social capital indicates that children in middle-income and high-income families have high stocks of social capital which increases their educational achievement. Seemingly contradictory to the above, Letki (2008) in examining race and social capital in British neighborhoods, notes that while the British government has placed emphasis on racial cohesion in its communities, "low socio-economic status of a neighborhood is the main factor undermining all types of interactions and positive attitudes among neighbors (Letki, 2008, p. 101). Letki's stand is consistent with Orfield's (1978 in Goza & Ryabov, 2009, p. 2) assertion that "the basic damage inflicted by segregated education comes not from racial isolation but from the concentration of children from poor families." Goza and Ryabov (2009) claim that socioeconomic class matters more than race when it comes to educational outcomes. Missing from this analysis is the fact that race and socioeconomic status are inherently linked in America and the same may be true for Britain.

Social Capital and Socio-Economic Status (SES)

Socioeconomic status (SES) defined as "the social standing or class of an individual or group" by the American Psychological Association (APA 2019) does not appear to have an agreed way in which it is operationalized in research (Broer, Bai, & Fonseca, 2019, p. 8). In many studies, it has been operationalized as a composite or latent construct depending on the

information available. Early studies conceptualized it around the occupation of the father or male head of the household. Later studies moved on to measure it based on education level, income earned, occupation, as well as family structure (Broer et al., 2019; Sirin, 2005). There are several issues highlighted by these measures. First concerns the accuracy of this information as most of it is self-reported or collected from students/children regarding their parents in education research. Second, people may not be willing to share this information as it is confidential and its retrieval may be intrusive to a lot of communities. Finally, because there are a number of indicators for socioeconomic status and there is no consensus on which ones to use, it is up to researchers to decide which ones best fit their studies (Broer et al., 2019). As can be expected, this leaves room for inconsistent interpretations.

In spite of the above, socioeconomic status has been associated with many studies on academic achievement as well as studies investigating social capital (Han, Chu, Song, & Li, 2015). In a study to test, amongst other things, whether socioeconomic status has any influence on social capital, Han et al., (2015) carried out a survey on students aged 12 to 18 in two high schools in Beijing, China ($n=520$, female=57%, male=43%). Socioeconomic status was measured as family socioeconomic status with the following variables: family income, education level, and occupation of the parents. Social capital was composed of 20 measures from family support, peer support, and support from others. The results reported from the study revealed a significant positive relationship between family socioeconomic status and social capital, meaning that a student from a family with high socioeconomic status has access to more social capital (Han et al., 2015).

The findings of the study validate Bourdieu's (1986) observation that the people with higher levels of economic wealth are able to access and mobilize social capital easier compared

to those with low socioeconomic status. In other words, Bourdieu (1986) argues that access to economic capital provides the benefits that derive from resources in social relations which ultimately leads to the reproduction of social class and inequality. Tzanakis (2013) notes that while Bourdieu has been challenged for assuming that economic capital is the only way to access social capital, socioeconomic status does influence the capacity of some to opportunities and resources. In the American education system because school funding is tied to the socioeconomic status of localities, it is almost impossible to separate socioeconomic status from educational outcomes and the available opportunities for success. This study frames social capital as the trust and reciprocity that exists within and between relational networks in society. Given that networks provide resources, it can be assumed that networks with higher economic wealth will be able to gain better resources, and therefore better social capital.

Results from a meta-analysis (Sirin, 2005) shows that socioeconomic status can be a strong predictor of academic achievement depending on the measure and context. Coleman (1988) in addition, highlights the influence of family socioeconomic status on students' educational outcomes. He says that students with parents that have access to wealth are more likely to receive the resources they need to succeed in school, and through this success gain social capital. Dufur et al. (2016) highlight the need for research to further investigate the link between socioeconomic status and social capital, as findings from their study show that "the potential buffering effects of social capital may not be as available for youth who are already disadvantaged financially" (p. 20). This study incorporates Dufur et al.'s suggestion by including the effect of SES in its analysis of the influence of social capital on students' academic achievement.

Social Capital and Gender

Karhina, Eriksson, Ghazinour, and Ng (2019) assert that gender, like social capital, is context specific. The authors borrow from the World Health Organization's 2016 definition of gender and define it as "being the socially constructed roles, behaviors, and attributes that given society considers appropriate for women and men" (p. 2). Social capital as conceptualized by Putnam (1995, 2000), Coleman (1988, 1990), and Bourdieu (1986) have largely ignored the gender dynamics of the concept. Gidengil and O'Neill (2006) and Morrow (1999) note that social capital literature has mostly been blind to gender differences in how social capital is acquired, distributed, and used by groups in society. In their opinion, there has been a "distinct male bias" (p.3) which does not allow for the consideration of ways in which social capital is affected by inequalities in communities especially with regards to social roles. A gendered analysis of social capital emphasizes its context-dependent nature showing that not everyone has equal access to social resources (Gidengil & O'Neill, 2006).

While Putnam (2000) does not say much about gender and social capital directly, he does allude to the fact that women and men tend to form relationships differently. However this is in respect to their establishing social networks in line with their civic engagement. Whereas civic engagement is not one of the variables to be examined in this study, there are a number of points from the literature that can be highlighted which do influence the way this study is structured. Culture and societies tend to assume that women and men access social capital differently. Norris and Inglehart (2003) agree this to be the case, stating that women tend to form bonding relationships in groups that are homogenous, comprised of only women, and develop bridging relationships in groups that are heterogeneous. On the other hand, men form both bonding and bridging relationships in heterogeneous groups. According to Norris and Inglehart (2003), few

associations and relationships prove gender-neutral; however many relationships are dependent on the resources of time, money, and knowledge, which are not evenly distributed among the genders. This study hopes to explore some of the gender dynamics that exist between social capital and academic achievement, and tie this in with race. Few studies have examined whether social capital influences academic success for females differently than for males.

Dufur et al. (2016) one of the few studies that examined gender and social capital focused on the ways in which social capital in the home and school are created and used by White and African-American girls and boys. Using data from the second wave of the National Educational Longitudinal Study (NELS) ($n=8,941$), the authors hypothesize based on existing literature that girls and boys build social capital in the home and school differently, and that race is also a factor in the difference. Academic achievement was the dependent variable for the study. This variable was derived from a composite of high school standardized test scores in math, reading, comprehension, and science. The independent variables were family and school social capital. The indicators for family social capital included the following: parental trust in the child with higher scores indicating greater trust; child discuss issues with parents with higher scores indicating greater frequency of discussion; and, parent checks student's homework with higher scores also indicating more interaction time. There were six responses for these three measures ranging from "only rarely" to "all the time".

For the other measures of family social capital - parents attend school meetings and parents attend school events, parents reported the total number of times from zero (0) to five (5). The final measure, student participation in extracurricular activities was measured by a four item scale (Cronbach alpha $\alpha=.74$) which the student completed. All the measures used for family social capital in this study were based on ways children develop their social capital as they move

to adolescence (Dufur et al., 2016). For school social capital, the indicators were: high teacher morale with scores ranging from one – low teacher morale, to five – high teacher morale; low conflict between teachers and administrators with scores ranging from one – frequent conflict, to five – no conflict as reported by teachers; teachers respond to individual needs with responses from one – never, to five – often, and this was reported by parents. The final measure, school environment, was calculated using a 14 item scale (Cronbach alpha $\alpha=.88$) which higher scores indicating a more positive school environment.

The results reported show that female and male students build social capital in the same way irrespective of family or school context and race. The only indicator where there was a difference with regards to the accumulation of social capital was in parental trust. Dufur et al. (2016) note that control issues, especially pertaining to African American male children, can reduce the level of trust in child-parental relationships leading to a reduction in social capital for these boys but generally African American boys build social capital in similar ways to girls and White boys. However, when it comes to returns on or benefits from social capital, in this case, the impact social capital has on test scores, this differs for girls and boys. Dufur et al. (2016) suggest that generally girls benefit more from family social capital than boys. However, when the results are further disaggregated by race, White girls benefit more from family social capital than African American girls in terms of academic success and the same is true for White boys and African American boys. Surprisingly, the benefits that African American girls gained from family social capital were the same as those of White boys. In contrast, both genders received the same returns from school social capital. Overall, the influence of family social capital on test scores was greater than school social capital for both girls and boys. However, African American

boys received the least benefits from family social capital compared to African American girls and White girls and boys.

Social Capital and Children's Agency⁵

Little attention has been given to youths in research on social capital (Leonard, 2005; Neves, Dias de Carvalho, Serra, Torres, & Fraga, 2019). Children and adolescents are usually seen to benefit from the social capital of their parents or other adult networks around them. The view that children act only on the social capital provided by their parents is simplistic (Leonard, 2005). As children grow into adolescence, they become less dependent on parents and family and begin to develop their own identity. At this point, they begin to form and create their own networks, and become embedded in peer groups. These groups exert an influence on its members. Understanding the effect of this influence on social capital especially in the field of education is important and merits interest. However, Bourdieu, Coleman, and Putnam do not address how children directly generate and utilize social capital.

Stanton-Salazar (2016) notes that it is difficult to disentangle adolescents' social capital from that of their parents or the network of adults directly related to them. While this is true, children are aware of ways to develop their own networks, especially as they grow and can make their own independent decisions. It seems unlikely that adults can provide all the social capital that children or adolescents require. While there is a paucity of studies that examine the issue of youth and social capital in education, a few scholars have examined youth and social capital in a number of complementary domains. Leonard (2005) examines children's agency with regard to

⁵ In this dissertation, agency refers to the capacity or power that individuals have to take independent action based on choice.

their employment opportunities. Following research conducted in the Republic of Ireland which focused on how individuals in two communities developed strategies to manage poverty, Leonard (2005) reveals that many of the children in those communities depended on their own networks to gain access to information about work opportunities.

The sample for Leonard's study was 150 families and 120 children aged 14 to 16 in community A, and members of 30 households in community B. In community A, one in two children interviewed had worked while in school while in community B, one in seven children had held a part-time job while in school. Results from the study showed that just half of the children in community A received information about work from their parents and their neighbors. In community B, very few of the children got information about work from their parents and neighbors. Peer groups were an important source of information for most children. In some cases, older children passed on jobs to their siblings or other children in their locality. The jobs done by most children included babysitting for money and newspaper delivery. This provides strong evidence of the complex relationship that exists between and among children. The study also highlights how some children use the relationships established by their parents to their own advantage. While some children use their parents' existing networks sometimes, at other times they chose to exercise their agency by developing their own networks to make income for themselves or provide additional resources for their families (Leonard, 2005).

According to Coleman (1988), social capital can be found in the sources of information that people use to connect them to the help or resource they need; social capital can be linked to things, such as information, that allow people to take action (Coleman, 1990). Coleman (1988, 1990) argues that intergenerational closure, the networks that parents form with their children's friends and parents, can lead to avenues for information exchange which will help improve both

families' children's educational outcomes and ensure socially acceptable behaviors. However, Coleman's (1988) theory does not discuss instances where children are the source of information and exchange information amongst themselves. Morrow (2006) argues that social capital can be better conceptualized to show the ways that children themselves promote and broker their own social capital, including the ways in which they support their parents, and are supported by their siblings. Morrow (1999, p. 757) notes that though Bourdieu (1986) does not allude to children in his conceptualization of social capital, the fact that he sees social capital as "rooted in the processes and practices of everyday life" to an extent takes into consideration that adolescents can be agents of their own social capital.

In a similar vein, Offer and Schneider (2007) also investigate the role of children in intergenerational closure (Coleman, 1988). Using data from the 500 Family Study which investigates the life experiences of middle-class families dwelling in urban and suburban communities in America, the authors show that adolescents living in these communities develop strong friendship ties that contribute to their families' social capital. The sample was White families ($n = 321$) which included both parents and adolescent children. Many of the parents had advanced college degrees and earned more than average middle-class families. Social support or social capital was measured at the family level as an aggregate of individual scores based on answers to the following questions seeking to understand the amount of perceived extra-familial social support: "If I need to work late, I can easily find someone to watch my children"; "If I'm unavailable to get my child to the doctor, friends or family will help"; "If I have an emergency and need cash, family or friends will loan it to me"; and "If I have troubles or I need advice, I have someone I can talk to." The responses -- never, sometimes or always -- were averaged to create a single index (Offer & Schneider, 2007).

Adolescent social involvement was examined as a means of measuring opportunities for social support. Variables such as involvement in school social activities, involvement in activities outside of school, friendship quality and popularity were used. Popularity was included in this study as studies not including this personality trait when considering adolescent social support have been criticized. Friendship quality was measured from: “I trust my friends”; “I can tell my friends about my problems and troubles”; and “I have friends that I can count on” using a five-point scale - never, rarely, sometimes, often, always. An instrumental variable was included for the friendship variable to capture parental approval of friends. The assertion is that friendships that are approved by parents are more likely to lead to parents forming ties with the approved friend’s parents (Offer & Schneider, 2007).

The findings from the study (Offer & Schneider, 2007) suggest that “friendship quality rather than the degree of popularity is what matters for social support” (p. 1135). When adolescents engaged more in out of school activities, they tended to develop strong friendships with a more diverse group. These diverse groups helped increase their family’s social support or social capital (Offer & Schneider, 2007). The above supports the notion raised in this dissertation that children have agency to develop and utilize social capital in addition to that provided by their parents. The findings also highlight the gap in Coleman’s (1988) model of social/intergenerational closure. Children can be agents of the relationships their parents form with each other. Offer and Schneider (2007) note that their study provides strong empirical evidence to warrant more focus on children’s agency in the use of social capital. The findings of this study can contribute to understanding education and academic achievement, even though this was not the focus of the study. The findings also highlight the importance of out of school activities in creating non-bonding ties or bridging social capital.

Neves et al., (2019, p. 90) investigated how “young people accrue, perceive, and mobilize their social capital over time” in a cohort of young people in Portugal. Using a mixed-method design, the authors explored social capital, agency, and structure in the lives of a group of youth ($n = 1,650$) at ages 17, 21, and 24 – as they transitioned to adulthood. The questions asked centered around bonding and bridging social capital, and how their bonding and bridging relationships changed as they aged. Bonding social capital was measured from answers to the questions “Do you receive economic support from family, friends, or neighbors?” and “Do you receive emotional support from family, friends, or neighbors?”. These were answered on a 4-point scale from never to often. Bridging social capital was based on similar questions: “Do you receive economic support from institutions?” and “Do you receive emotional support from institutions?” Institutions referred to charity organizations, government institutions, schools, etc.

Neves et al.’s mixed-methods approach meant that in-depth interviews with 70 participants and case studies of a small number of them provided a deeper understanding of social capital and youth transitions. Findings from the study showed that family, friends, and neighbors provided more support for participants than their formal networks. Two-thirds of the interviewed participants said that parental support was extremely helpful in their academic, professional, and academic transitions. However, a number of participants ($n = 40$) noted the role that friends and peers played in their progress; for one-tenth of those interviewed “when family support was lacking or deemed insufficient, friends were the source of bonding” (p. 103). While participants showed their ability to actively negotiate their relationships and forge bonds beneficial to their success, they also showed that their ties to friends which did not start off being as strong as ties with family could become strong when the need arose. The findings from this

study points to the fact that as children grow into young adulthood, they have the agency to negotiate their own social capital and bridging social capital can develop into bonding ties.

Conclusion

There is no doubt that social capital is a concept worth paying attention to. Tzanakis (2013) says that the conceptual and methodological gaps identified in the literature on social capital should not be a reason to discard the concept's use in research, but should provide an opportunity for productive and continuous debate. Indeed social capital as a concept has been given the burden of being linked to many issues and measured in different ways leading to criticisms and debates about its use, however, the result of this should be the building and implementation of a more rigorous conceptual tool that has the ability to be meaningfully applied in different spheres. Baron et al., (2000) note that for a concept such as social capital which has such breadth of utility all that may be possible is to "acknowledge the weight of certain criticisms" and state its "enormous potential for opening up new issues and providing fresh perspectives" (p. 23). Field (2003) maintains that the concept of social capital functions as a useful way to examine ways in which networks and shared values provide a resource for people. This dissertation further explores the ways in which social capital can help in understanding differences in academic achievements between race and gender in the field of education because of its theoretical relevancy to address the inequalities seen in educational outcomes.

This review of literature reveals that while social capital is context specific, it cannot be studied independently. To elaborate: while social capital can occur in different contexts, because it is basically about individuals and their networks and relationships, and these are not embedded in a specific context, it is important to consider the impact of other contexts even in a specific context. For example, family, school, and community social capital influence networks different,

however, networks, even though formed in neighborhoods, can also experience the effect of family factors; and the same applies to school. Robust research needs to examine the ways that the different domains and types of social capital interact and connect. This makes it imperative that any study of social capital in one context needs to consider the effect of other ‘invisible’ contexts on the studied context; in other words, explore the intersectionality of social capital in the society. This dissertation therefore examines the influence of different domains of social capital on academic achievement individually as well as collectively.

Chapter Three - Methods and Methodology

Purpose of Research

The purpose of this research was to determine the influence of different domains and types of social capital on a student's higher education academic achievement. The study also intended to uncover which domain of social capital mattered more for higher education academic achievement. The study aimed to highlight the importance of social capital to the educational aspiration and achievement of students in the American educational system and the need to further understand that impact. While many studies have focused on specific segments of the population, for example, state or community, rural or urban adolescents, economically disadvantaged minorities or specific minority groups etc. this study attempts to examine social capital through a more comprehensive lens. This study specifically paid attention to how contextual factors such as family, school, and neighborhood or community influence the development of social capital. The study in addition examined the relationship of these variables to the educational achievement of K-12 students in different racial groups, and how these relationships differed by gender on a national scale. In thinking about social capital and its influence, it is important to note that "social capital theory implies purposeful investment" (Dufur et al., 2016).

Research Questions

The research questions that guided this planned study are:

Research Question 1: What influence does social capital have on the higher education academic achievement of American students nationally?

- Research Question 2: Does the social capital in the life of children aged from twelve to eighteen in the K-12 system influence their higher education academic achievement as adults?
- Research Question 3: What is the relationship between the types (bonding and bridging) and domains of social capital (family, school, neighborhood), and higher education academic achievement?
- Research Question 4: Does the influence of social capital on higher education academic achievement differ based on gender and/or racial/ethnic groups?
- Research Question 5: What impact does children's agency have on social capital?
- Research Question 6: Is the relationship between children's agency and social capital moderated by student gender?

Data and Sample

The data for this research comes from the National Longitudinal Study of Adolescent to Adult Health (or Add Health for short). Add Health is a longitudinal study of a nationally representative sample of adolescents who were in grades 7 to 12 in the United States in 1994 to 95. Add Health is designed to provide information on the social settings in which young people live their lives. The longitudinal design of Add Health allows for the examination of multiple contexts that influence adolescent attitudes, actions, and performance. The data collected in the Add Health study, though geared at health behaviors, included a wide range of variables such as demographics, educational aspirations and achievements, religious practices, family relationships, romantic relations, sexual encounters, substance use, criminal activities, neighborhood/community characteristics and relationships, student/adolescent interaction with

friends and siblings, economic information, employment, school climate, and other important social characteristics of schools, neighborhoods, and families.

Add Health uses a multi-wave, multi-survey, interdisciplinary, school-based design. The five waves of the Add Health study were conducted from 1994 to 2018 (see Table 6 for a summary of the five waves). Data for Wave I was collected from 1994 to 1995. In-school questionnaires were administered to over 90,000 students in 132 public and private schools. In addition, in-home surveys were also administered and students who participated in the in-school survey were eligible to be part of the in-home sample. A total of 20,745 adolescents were surveyed for the in-home survey to allow for a better understanding of the children's personal characteristics and their family and community interactions. The 20,745 adolescents from the in-home survey were part of the 90,000 in-school survey. The in-home samples were selected with unequal probability. Students in each school were stratified by grade and sex; 17 students were then randomly chosen from each stratum leading to a total of approximately 200 participants from each school (Chen & Chantala, 2014; Harris, 2013).

Table 6: Summary of Add Health survey - Waves, Time-frame, Age of Participants, and Sample size

Wave	Age of participants	Period data collection took place	Socio-environmental data collected	Sample size
Wave I	12-18	1994-1995	School; Family; Romantic relationships; Neighborhood; Community; Peers	In-school: Students-90,118; School Admin-114 In-home: Adolescents-20,745; Parents-17,670
Wave II	13-18	1996	School; Family; Romantic relationships; Neighborhood; Community; Peers	In-school: School Admin-128 In-home: Adolescents-14,738
Wave III	18-26	2001-2002	College; Family; Romantic relationships; Neighborhood; Community; Peers	Young adults-15,197; Partners-1,507
Wave IV	24-32	2008	College; Family; Romantic relationships; Neighborhood; Community	Adults-15,701
Wave V	33-42	2016-2018	Work; Family; Romantic relationships; Neighborhood; Community	Adults-12,000 (projected)

Note. Adapted from "The Add Health study: Design and accomplishments", by Harris, K. M., 2013. Retrieved from <https://www.cpc.unc.edu/projects/addhealth>

Devices with the Global Positioning System (GPS) were used to collect data on the exact geographical location of participants. This was especially useful for the in-home surveys and for those households without a formal address. The information was used to tie together spatial and social networks and construct community contexts. Add Health data contains over 2,500 attributes for community and neighborhood contexts in which adolescents are embedded. Sources such as the U.S. Census, the Centers for Disease Control and Prevention, the National Center for Health Statistics, the Federal Bureau of Investigation, and the National Council of Churches provided the neighborhood and community context data (Harris, 2013).

In Wave I questionnaires were also administered to school administrators and parents; 144 school administrators, usually principals, and 17,670 parents, usually the resident mother, were surveyed. The school administrator questionnaire gathered information on school policies, climate, and other school characteristics. The parent questionnaire asked questions related to parents' education, household income, employment, neighborhood characteristics, marriage and relationships, interaction and communication with adolescents, and relationship with adolescents' friends and friends' parents. Peer network data were also obtained from the in-school and in-home questionnaires. As part of Wave I, adolescents were asked to nominate their best friends both at home and/or in school, and the information obtained from their friends can be linked back to each respondent as a way of understanding the influence of peers on students (Harris, 2013).

From the in-school survey, Add Health collected supplemental samples based on ethnicity (Cuban, Puerto Rican, and Chinese), and oversampled black adolescents with highly educated parents (Harris, 2013). A unique feature of the Add Health social context data is that information on the adolescent's environment and interactions was not obtained through self-reports alone.

Data on family context, school context, neighborhood context, and peer networks were derived from several perspectives. For instance, for family context data, parents were interviewed, target adolescents were also interviewed both at home and in school, and other adolescents living in the same household were interviewed. This was all part of Wave I of Add Health. Information from all these sources can be combined to generate a true and comprehensive picture of family context (Harris, 2013).

Wave II of the Add Health study which occurred in 1996 included follow-up in-home interviews with the target participants and follow-up school administrator interviews. In this second wave, participants who were in the 12th grade in Wave I were excluded. 128 school administrators and 14,738 adolescents were included in this wave of the survey (Harris, 2013). Add Health Wave I and II data represent the adolescent years of the study's participants. By Wave III of the Add Health study, in 2001, the original participants were aged between 18 to 26 years. A total of 15,197 young adults were surveyed in in-home interviews to track changes in their health, relationships, education, community involvement, and economic status. One of the key aims of this third wave was to understand how what happens in the adolescent years can influence the transition to adulthood. Wave IV of Add Health was conducted from 2007 to 2008 with the original participants from Wave I. Participants, 15,701 aged 24 to 32 (52 respondents were 33-34 years old), were surveyed (Harris et al., 2009; Harris, 2013).

Wave IV like Wave III sought to understand adolescent transition to adulthood in terms of health risk behaviors, participation in higher education, employment status including finances, relationship history, military service, and contact with the criminal justice system amongst other things. The data collected in Wave IV was from in-home interviews and biological data. Data was also collected on residential history and mobility in the Wave III reports. Wave IV data

collection was very successful with a response rate of 80.3%; a rate higher than can be found in most longitudinal studies despite the almost seven-year gap since Wave I interviews. The attrition rate was also low, resulting in negligible bias in population estimates, low item non-response, and high reliability in Wave IV. The final and most recent wave of the Add Health study, Wave V, occurred from 2016 to 2018. Wave V collected repeat information on health measures such as hypertension, diabetes and obesity, and retrospective information on childhood circumstances from the study participants as they progressed through their fourth decade of life (Harris, 2013; Harris et al., 2009). The survey data from Wave V was released in late 2019 but as it provides no new or useful information for this study, it will not be used.

The design structure and data content for all the five waves of the Add Health study are detailed here to show the scope and uniqueness of the study. While not all this information was used in this research, it is useful to understand the amount of detail that went into the study design. As data has been gathered over the years, Add Health has made every effort to maintain the longitudinal integrity of all previously collected data (Harris & Udry, 2018). All the information about the Add Health study included in this dissertation, as well as additional information on Add Health, can be found on the website:

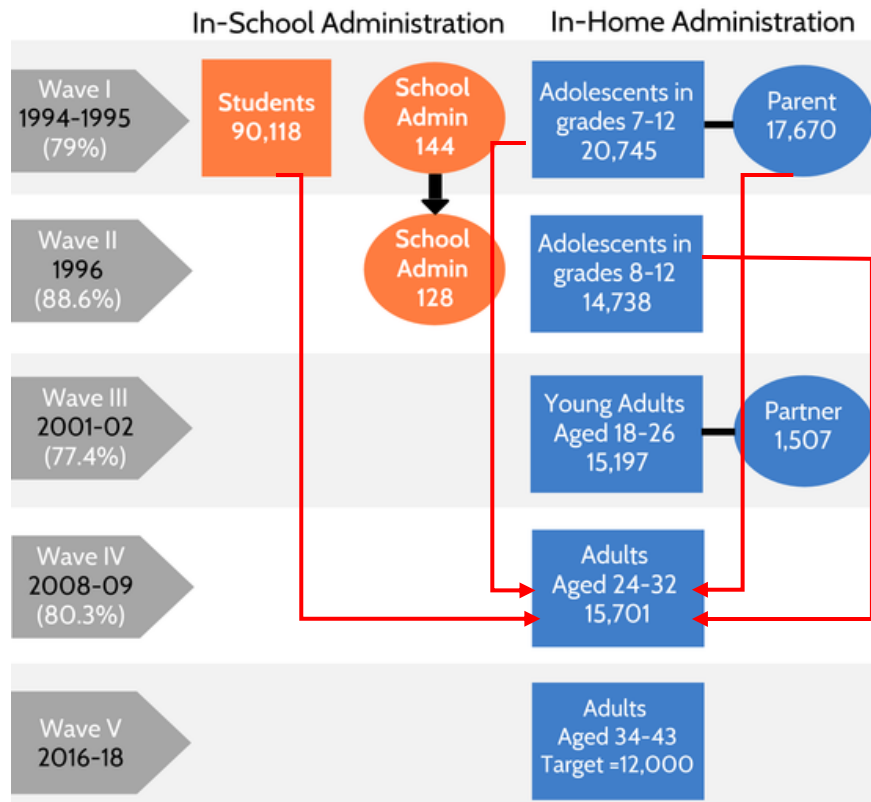
<http://www.cpc.unc.edu/projects/addhealth/>. The statement below is required by Add Health to

acknowledge the use of its data:

This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Information on how to obtain the Add Health data files is available on the Add Health website (<http://www.cpc.unc.edu/addhealth>). No direct support was received from grant P01-HD31921 for this analysis.

Figure 3 below is a diagrammatic illustration of the Add Health longitudinal design as depicted on the Add Health website. I included red arrows to show how this study will work with the Add Health data to answer the research questions.

This dissertation does not present any ethical issues as it uses archival data. It also strictly complies with the guidelines set by the Institutional Review Board for archival data analysis. This research analyzed data from Waves I, II, and IV. Waves I and II contain data from the in-home and in-school surveys, parent and school administrator interviews, as well as information on neighborhoods and friendships; all the measures on parent, neighborhood, and adolescent characteristics were extracted from these waves. Wave IV, an improvement over Wave III (Harris, 2013), is the stage at which most respondents who indicated the intention of attending college in Wave I would have completed college. This dissertation uses information from Waves I and II for its independent variables and information from Wave IV for its dependent variable, graduation from a four year college. Data from these waves provided the information needed to understand the impact of social capital in the family, school, and community have on a students' academic achievement, taking into consideration racial and gender differences and the influence that children themselves exert in these relationships.

Figure 3: Add Health Longitudinal Design

Note. Adapted from “Study Design”. Retrieved from: <https://www.cpc.unc.edu/projects/addhealth> (Add Health website). Red lines are included to show how the study links the different waves

The Rationale for the use of Longitudinal Secondary Data

Using the National Longitudinal Study of Adolescent to Adult Health provided several advantages. First, the Add Health survey, a nationally representative dataset, provided a cost-effective and ideal sample size to answer the research questions in this study. Developing an original dataset would have required not only a large number of participants sampled randomly but an appropriate level of responses to make the information meaningful (Davis-Kean & Jager, 2017; Kwek & Kogut, 2015; Smith 2008). This involves time, effort, and a lot of money

especially if the data is to be nationally representative. The robust nature of Add Health means that the study findings can be generalizable to the whole population. Siddiqui (2019) notes the advantage of longitudinal datasets as a valuable resource for research because they enable the researcher to study patterns and trends over a period of time.

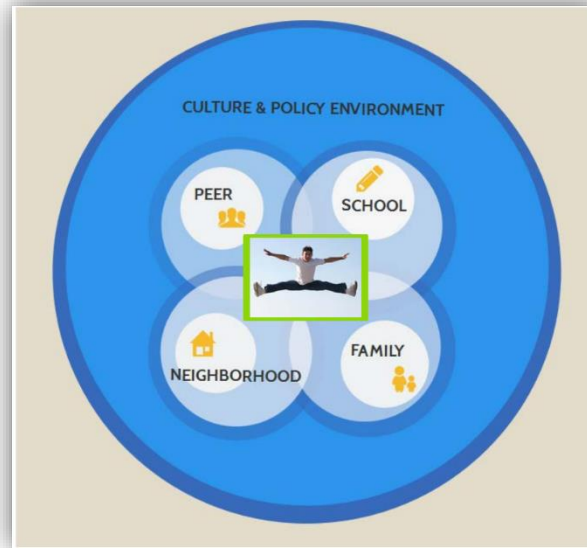
Using Add Health data for this study is not only cost effective, it reduces the monopoly that certain populations have over what constitutes good research. Kwek and Kogut (2015) in talking about the benefits of secondary data analysis emphasize how large data sets tend to be of a better quality and standard than normal surveys carried out by social scientists. The authors that note that the use of secondary data reduces oligarchy by allowing early and independent researchers access to high quality data. The utility of the data is also extended which provides an additional advantage for funding organizations and institutions because the data now has a longer life span (Kwek & Kogut, 2015; Smith 2008). In situations where the survey is supported by public funds, the applicability of the data to other contexts, e.g. the Add Health study originally intended to provide data for the health sector being used in the field of educational leadership and policy, is justification for the amount of financial resources invested in the study.

Equally important is the fact that large data sets such as the Add Health study provide an opportunity to study different groups in society; not just racial groups but socioeconomic groups, adults and children (teachers, students, parents), groups in different contexts (schools, communities, families) etc. With such extensive data educational researchers can answer a myriad of questions related to academic achievement and other factors that affect educational outcomes (Davis-Kean & Jager, 2017). Using secondary data also increases research collaboration locally and internationally. A number of recent literature reviews have called on researchers to consider the benefits of data transferability so that early researchers can enhance

their research skills and researchers from developing countries where resources are not as readily available for research as in the more advanced nations have access to high quality data (Davis-Kean & Jager, 2017; Kwek & Kogut, 2015). Kwek and Kogut (2015) note that collaboration in this manner is "...key to developing a culture of collaborative inquiry" (p. 15).

Finally, Add Health's contextual model is similar to the model for this dissertation (see Figure 4), thus avoiding one of the limitations of the use of secondary data in research studies. The cautions voiced by Goes and Simon (2013) and Siddiqui (2019) about the mismatch between available data and new study purposes and questions do not apply in this case. The measures in the dataset include items from the individual (student) level, the family (parent and home) level, the school and peer groups level, and the community level. These different contexts and the multiple questions asked of respondents in the Add Health sample provided a wide range of possible social interactions that fit the study's research questions.

Dika and Singh (2002) highlight that most of the measures used in understanding and measuring social capital come from studies that were not originally designed to do this, which might be an advantage. As noted earlier in this study, Dika and Singh (2002) and Tzanakis (2013) argue that longitudinal studies are the best way to understand the relationships between social capital and educational outcomes. In addition, this dissertation, unlike most other studies that have used the Add Health dataset, analyzed the more extensive restricted-use data. There are several reasons why other studies tend to use Add Health's publicly available data. These include the cost of accessing the dataset and the strict process involved in applying for Add Health restricted-use data. Additionally, there are a number of time-consuming security procedures for securing the data.

Figure 4: Add Health Contextual Model

Note. Reprinted from “Add Health Contextual Model”.
Retrieved from: <https://www.cpc.unc.edu/projects/addhealth>
(Add Health website)

Add Health requires that only individuals who have a Ph.D. or hold a faculty/research position at an institution of higher education can apply for access to the restricted data. This is to reduce the risk of deductive disclosure and maintain the confidentiality of participants’ data in line with research ethics. The restricted-use dataset contains the full sample of participants which adds to the results/findings being more generalizable. The public-use data does not allow for connections to be made between survey responses; so the data cannot be linked. For example, in the restricted-use data, an original participant’s response can be linked to those of friends and peers. This information is useful in understanding the agency that students have with regard to social capital use and accumulation. The restricted-use data also contains more information on the neighborhood environment than the public-use data.

Data and Statistical Analysis

The research design for this dissertation is quantitative using secondary data from the Add Health study. Multilevel modeling (MLM) utilizing cross-classified multilevel models were performed using Stata statistical software, version 15.1 (StataCorp, College Station, TX). The three waves of Add Health data used in this study were combined into one dataset using IBM SPSS Statistics for Windows version 26 (IBM Corp., Armonk, N.Y.). The relevant variables were then isolated and cleaned, and exported to Stata for the MLM analysis. MLM is best used when there is clustering of the outcome variable by a categorical variable in a way that makes error dependent and ordinary least squares (OLS) regression no longer appropriate (Garson, 2019). MLM offers several benefits: it allows for analyzing data with complex hierarchical, and sometimes non-hierarchical, structures where there is a high level of clustering. MLM also allows for multivariate responses, the inclusion of predictors at the group level and the analysis of repeated measures (Buxton, 2008; Garson, 2019).

Cross-classified multi-level modeling, a type of MLM, is appropriate for longitudinal data like that in the Add Health dataset where one individual may be linked to several groups e.g. schools, family and neighborhood and do not follow a strict hierarchy. This means that the effect of different contexts can be considered simultaneously which is especially important in the area of education where a student's academic performance can be influenced by what happens in the family, school, and community. An illustration of this type of interaction is provided in Figure 5 where students are nested in schools, families, and communities. Usually, what is found in many studies are two-way cross-classifications, i.e. students nested in schools and neighborhoods, or students nested in classrooms/teachers and schools. In this study, based on the research questions being answered, a four-level structure is proposed with students (level 1) nested in different

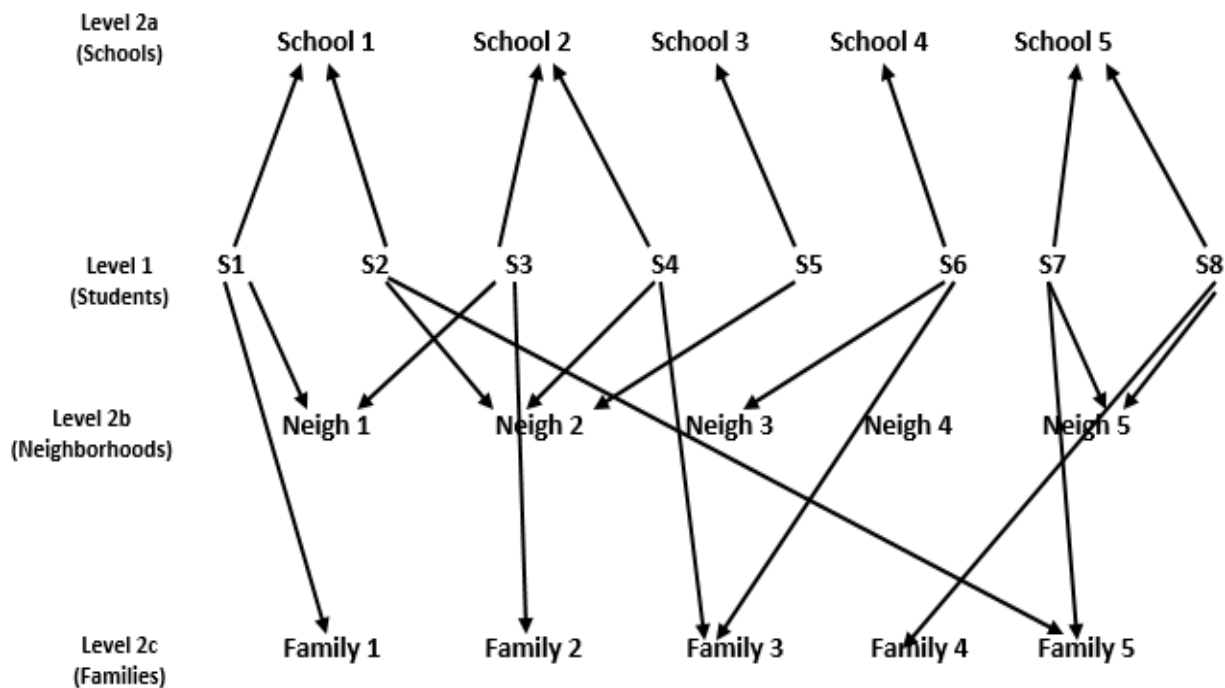
schools (level 2a), in different neighborhoods (level 2b), and in different families (level 2c) (see Figure 5).

Cross-classified models can help researchers make a proper interpretation of complex relationships that exist between variables (Acock, 2018; Garson, 2019; Heck & Thomas, 2000). Garson (2019) observes that when cross-classified models are not used when they should be used, there is a high probability of "...underestimating the standard errors of school-level and neighborhood-level variables where school and neighborhood are the cross-classified variables" (p. 386). For this study, family-level variables are also included. Ye and Daniel (2017) note that in a number of educational studies that require the use of cross-classified models, researchers have been reluctant to use these structures. The authors posit a number of reasons for this including the fact that cross-classified models are not well known and can be complex (Ye & Daniel, 2017). However, it is vital to be mindful that in using any statistical model, attention must be given to identifying and selecting the appropriate sample as the inferences made are only as good as the data and theory on which they are based (Garson, 2019; Heck & Thomas, 2000).

MLM was employed in this study to assess the connection between social capital and student success, how this differs for boys and girls, between racial groups, and the interaction of gender and race in the Add Health dataset. The effect of children's agency on social capital and educational outcomes was also considered. To conduct the MLM analysis, this dissertation study started by combining all the data from Waves I and IV into one dataset. The variables relevant to the research questions were then isolated. These variables are discussed in detail in the section following. As Add Health provided many indicators for the different domains of social capital to be assessed in this dissertation, several composite variables were conceptualized and created based on the theoretical concepts of social capital on which this study relies. Previous empirical

research studies were also used to construct the composite variables. Factor analysis was used to test how well the indicator variables were related to the underlying construct or whether there was a need to create multiple constructs relating to different dimensions of a phenomenon.

Figure 5: Cross-Classified Multilevel Structure



Note. Adapted from "Multilevel Modeling" by Garson G. D., 2019

Factor Analysis

There are two types of factor analysis: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). These are statistical techniques used to determine the relationship between variables or indicators that make up a new and often more complex variable (Brown, 2015). This study used CFA to confirm that the indicators or variables identified actually represent the construct. In CFA, the focus is on maximizing the amount of variance explained and the variables have been selected based on strong empirical research (Acock, 2018;

Brown, 2015). For EFA, the aim is to find the lowest number of factors/variables that hang together to describe a concept and can be used to create the latent variable (Acock, 2018; Brown, 2015). Stata was used for the CFA in this study (Acock, 2018) and the new created variables are referred to as composite variables.

Measures

Variables that were used to answer the research questions for this study were identified and selected from Waves I, II, and IV of the Add Health dataset. For the composite variables created using CFA only constructs with Cronbach's alpha (internal reliability/consistency) measuring at least 0.7 were used (Mitchell & Jolley, 2013). The dependent variable and independent variables that were be used in this study are described below. In order to construct reliable independent variables demographic information related to race and ethnicity, household income, and parental educational achievement outcomes were gathered from the Waves I and II of the survey.

Dependent Variable

Higher Education Academic Achievement

The dependent variable for this study is from Wave IV of the Add Health data. In Wave I, participants were asked about their college aspirations. As the study progressed to Wave III participants were again asked if they are in any form of postsecondary education and in what year. However, a proper picture of participants' academic achievement is seen in Wave IV. This was measured by a single item that asked: "What is the highest level of education that you have achieved to date?" (Variable H4ED2 in Add Health). At this time the respondents are aged 24 to 32 presuming the completion of any postsecondary aspirations made known in Wave I. The

questionnaire provided a range of 14 options from eighth grade or less; some high school; high school completion; some vocational/technical training (after high school); completed vocational/technical training (after high school); some college; completion of college (bachelor's degree); some graduate school; completed a master's degree; some graduate training beyond master's degree; completed a doctoral degree; some professional education; completed professional education; and no response.

To create the dependent variable for this study, 13 of the 14 options were collapsed into two binomial outcomes; the last option of 'don't know' was ignored. The first six "no higher education academic achievement" were used to represent all respondents who did not go to college or complete college. The remaining seven responses related to "higher education academic achievement" represented all those who completed college and studied beyond a bachelor's degree. A number of research studies have linked social capital with high school academic achievement among children (Acar, 2011; Coleman, 1988; Israel et al., 2001) noting that social capital is positively correlated with academic success. However, few researchers have made the connection between social capital and higher education outcomes. This dissertation chose to use college completion as an indicator of academic achievement because of the suggestion that network inequality within the society may be reduced if more people attended and graduated college (Andersson, 2018).

Independent Variables

The independent variables for this dissertation were gathered from Waves I and II of the Add Health study. These variables, from which some composite variables were created, were then used to evaluate the potential influence of the different domains and forms of social capital

on the academic achievement of students in Wave IV. These variables were all measured at the individual level and then aggregated to calculate group responses.

Family Social Capital

Coleman (1990) notes that the term family social capital refers to the social networks and relationships that benefit children as they grow up. Israel et al., (2001) supports this notion by saying that social capital is an investment in relationships that emanate from interpersonal interactions. Coleman (1988) also argues the need for intergenerational closure as a means of building social capital in families. Coleman bases this on the fact that parents knowing their children's friends and parents can lead to avenues for information exchange which will help improve both families' children's educational outcomes and ensure socially acceptable behaviors.

Family social capital was measured by creating several composite variables made up of indicators relating to how much time the adolescent spends with her or his parents, the strength of the relationship, and information sources parents employ that benefit their children. In Waves I and II of the Add Health study, a number of questions were asked relating to participant-parental and family relationships and information sources. Table 7 shows the composite variables for family social capital and the questions from Add Health that were used as indicators for these. Parent-adolescent relationship was measured from adolescent responses to activities done with their mothers and their fathers in the past four weeks. The questionnaire provided a range of responses options – “no”, “yes”, “don't know”; there were also options for “refused”, “legitimate skip”, and “not applicable”. All responses apart from “no” and “yes” were coded as missing. This led to the creation of a binary variable indicating 1 = did activities with mother or father, and 0 = did not do the activities with mother or father.

The strength of parent-adolescent relationship was measured from adolescent responses to how much they felt close to their mother and father, and how much they felt that their parents cared about them. Again, a binary variable was created from the questions from the Add Health study which had a range of nine possible options from “not at all”, “very little”, “somewhat”, “quite a bit”, “very much”, “refused”, “legitimate skip”, “don’t know”, and “not applicable”. The first three options were used to indicate 0 = no strength in the parent-adolescent relationship; the next two options were used to indicate 1 = strength in the parent-adolescent relationship; and last four options were coded as missing. Intergenerational closure or the information sources that parents use to improve the opportunities for educational success for their children was measured from parents’ response to how many parents of their children’s friends they spoke with in the last four weeks. The Add Health study provided for options of “none” to up to six parents. A binary variable was created with 0 representing no conversation and 1 representing conversations with one or more parents.

Table 7: Created Composite Variables for Family Social Capital

Composite Variable	Questions from the Add Health study (Wave I)	Variable Name in Add Health
Parent-adolescent relationship	Which of the things listed on this card have you done with {MOM NAME} in the past 4 weeks? talked about your school work or grades talked about other things you’re doing in school	H1WP17H H1WP17J
	Which of the things listed on this card have you done with {DAD NAME} in the past 4 weeks? talked about your school work or grades talked about other things you’re doing in school	H1WP18H H1WP18J
Strength of participant-parent relationship	How close do you feel to your {MOTHER/ADOPTIVE MOTHER/ STEPMOTHER/ FOSTER MOTHER/etc.}? How much do you think she cares about you?	H1WP9 H1WP10
	How close do you feel to your {FATHER/ADOPTIVE FATHER/ FATHER/ STEPFATHER/FOSTER FATHER/etc.}? How much do you think he cares about you?	H1WP13 H1WP14
Intergenerational Closure /Information Sources	Please think about all of {NAME}’s friends. How many parents of {NAME}’s friends have you talked to in the last four weeks?	PC17

Neighborhood/Community Social Capital

Neighborhoods have the ability to “affect the educational norms, values, and resources in the community outside of school” (Sanbonmatsu et al., 2006, p. 2). Both Putnam (1995, 2000) and Coleman (1988) acknowledge that community social capital can lead to improvements in educational outcomes. One way in which community or neighborhood social capital benefits its members is through its capacity to provide the opportunity for wider interaction and more resources. There are a number of variables used to depict the neighborhood/community characteristics in Wave I of the Add Health dataset. Residential stability is one of such variables. Residential stability is a measure of the length of stay of adolescents and their families in their local communities.

The interest of community members in the adolescent and the adolescent’s interaction within the community also provide ways to evaluate neighborhood social capital. Some of the questions that Add Health asks in relation to this include: “Do you know most of the people in your neighborhood”; “In the past month you have stopped on the street to talk with someone who lives in your neighborhood”; “Do people in this neighborhood look out for each other” etc. For this study, three composite variables were created that relate to neighborhood social capital. Table 8 below shows the composite variables created and the questions from Add Health that were used as indicators for these. Residential stability was measured from the adolescent’s response to the question in Wave II of the Add Health study asking how long s/he had lived in the neighborhood. A binary variable was created with 0 representing six months or less of living in the neighborhood and 1 representing seven to twenty-four months of living in the neighborhood.

Interest of the community/neighborhood members in the adolescent, neighborhood interest, was created from adolescent “true” or “false” responses to the indicator on which stated “people in this neighborhood look out for each other?” Responses that were not true = 1 or false = 0 where coded as missing. Neighborhood interaction which refers to adolescents’ interaction with members of their community or neighborhood was created from adolescents’ response to the query “you know most of the people in your neighborhood”. Again, this variable was a binary variable with a true = 1 or false = 0 option. All other options, “refuse”, “don’t know”, and “not applicable” were coded as missing.

Table 8: Variables for Neighborhood/Community Social Capital

Variable	Questions from the Add Health study (Waves I and II)	Variable Name in Add Health
Residential stability	How many months have you lived here?	H2NB9
Interest of community/neighborhood members in adolescent	People in this neighborhood look out for each other	H1NB3
Adolescents’ interaction with community members	You know most of the people in your neighborhood	H1NB1

School Social Capital

School social capital is seen in the relationships between the teacher and student(s), relationships between peers in-school and out-of-school, and in the students’ feelings of being valued and accepted by the institution (Ahn, 2017). In Add Health, the following questions were asked in Wave I regarding the participants school: how much do you agree or disagree with the following statements: “you feel close to people at your school”; “you feel like you are part of your school”; “you are happy to be at your school”; “the teachers at your school treat students fairly”; “you feel safe in your school”; and, “how much do you feel that your teachers care about you”? These questions were combined to create one composite variable representing school

social capital (see Table 9). In the Add Health study, the questions related to school social capital were on a five-point likert scale; the options were 1 = “strongly agree”, 2 = “agree”, 3 = “neither agree or disagree”, 4 = “disagree”, and 5 = “strongly disagree”. These were reordered so that the most negative response had the lowest value and the most positive response had the highest value. The options for “refused”, “legitimate skip”, and “don’t know” were coded as missing.

Table 9: Composite Variable for School Social Capital

Composite Variable	Questions from the Add Health study (Wave I)	Variable Name in Add Health
Social capital in school	You feel close to people at your school	H1ED19
	You feel like you are part of your school	H1ED20
	You are happy to be at your school	H1ED22
	The teachers at your school treat students fairly	H1ED23
	You feel safe in your school	H1ED24

Other Independent Variables: Gender, Race/Ethnicity, Socioeconomic Status (SES) and Children’s Agency

The demographic variables found in Add Health that were used in this study are gender and race/ethnicity. Gender is categorized as two levels in the Add Health dataset – males = 0 and females = 1. There was also an option included for “refused” to answer the question which was recoded as missing. Only participants who responded to this question were included in the study. The race or ethnicity variable was based on the self-report of the adolescents in Wave I. Participants were first asked if they were of Hispanic or Latino origin. Participants were then asked to tick their race and could tick more than one option. The available responses were: White, Black or African America, American Indian or Native America, Asian or Pacific Islander,

and Other. The interaction of these variables on the independent variables will be examined. Demographic data will be taken from Wave I of Add Health.

In understanding the influence of social capital on students' higher education academic achievement, the review of literature has shown how important it is to include family socioeconomic status (SES) as a variable to understand the effect of social class. Many research studies have noted the link between social capital and socioeconomic status (Broer et al., 2019; Sirin, 2005). These studies generally show that individuals with low income are at a disadvantage with regards to social capital. The literature also shows that parental education is important in predicting a student's access to higher education opportunities (Gooding, 2001). Therefore, considering the importance of SES in predicting an individual's access to social capital and higher education opportunities, this study includes it as a variable. However, because socioeconomic status has different measures, this study uses a composite measure which includes several indicators. Sirin (2005) highlights the importance of using parents' self-report of SES rather than children's responses. Though Add Health contains data provided by both children and parents, information provided by parents only was used to compute family socioeconomic status.

In this study family socioeconomic status included parent education, parent occupation, and parent income. Sirin (2005) says that these are three most used indicators of family SES and notes that many empirical studies have shown that the indicators are moderately correlated. In addition, Sirin (2005) highlights a rarely used indicator, home resources, which directly refers to family/household possessions such books or a home library, home computer(s), laptops, or ipads etc., and access to paid-for after-school educational support. Unfortunately, Add Health does not provide information on this specifically though these would have been good proxies for family socioeconomic status. Table 10 below shows the three indicators used to represent family SES

and the questions from Add Health that are related to this. These variables were extracted from the parent questionnaire in Wave I of the Add Health data.

In this study the variable which provided information on parental education was recoded to create a variable with 0 = “No education”, 1 = “High school or less”, 2 = “More than high school but no college”, and 4 = “College education”. Responses that did not fall into any of these categories were coded as missing. Parent income at the individual level was generated from information on the ability of parents to pay all their monthly bills. A binary variable with 0 representing parents who did not have the resources to pay their monthly bills and 1 representing parents who had the resources to pay their monthly bills were created. Parent occupation employment was also created as a binary variable from a “no” or “yes” response to the question “are you employed full time?” Responses that did not fit into these categories were coded as missing.

Family SES	Questions from the Add Health study (Wave I - Parent Survey)	Variable Name in Add Health
Parent Education	How far did you go in school?	PA12
Parent Occupation	Are you employed full time?	PA17
Parent Income	Do you have enough money to pay your bills?	PA56

Literature shows that adolescents are active participants in developing the social capital that can lead to their educational success (Leonard, 2005). The way that adolescents relate to the social networks in their schools, community, and family can have an important and often unacknowledged influence on their educational outcomes. For this study, adolescents’ social interaction with their siblings and friends were assessed to gauge the effect of peer influence on

their educational outcomes. Previous studies have examined the influence of peers on adolescents' behavior using Add Health data (Payne & Cornwell, 2007), however, this influence has not been linked to educational outcomes. Waves I, II and III of the Add Health dataset provide information on the adolescents' friends and siblings that can also be linked to the original participant.

The ability to decide their own friends, and the participation of children or adolescents in decision making within the family or home are some of the ways in which children exercise their agency (Morrow, 1999; Offer & Schneider, 2007). Other ways include how much influence friends and peers exert over adolescents compared to their parents, other adults in their family, and adults in school (Leonard, 2005; Morrow, 1999; Offer & Schneider, 2007). In Add Health, a number of questions were asked in relation this. Table 11 below provides information on variables that connect to children's agency in using their own networks, and developing social networks with their peers, and the effects of these on academic achievement. The focus is how they, children, develop social capital for themselves through their own ties and networks, and the consequence of this on their education. In addition, this study considers sibling ties as bonding social capital and friendships as bridging social capital.

In this study, children's agency is denoted by three indicators. The first is sibling relationships. In the Add Health survey, adolescents were asked how much time they spent with their siblings and how much time they and their siblings spent with the same friend or groups of friends. The response options were "a lot", "some", "little", and "none". These responses were reordered so that the lowest response (none) was equivalent to zero, and the highest response (a lot) was equivalent to four. Although Add Health provides responses for seven siblings, this study used only the first four siblings as the number of missing response values increased after

the fourth sibling. The second indicator was friendship relationships. In the Add Health study, respondents nominated up to five of their best female and female friends. The children were then asked what activities they engaged in with their friends, female and male. Response options to these questions were “yes” or “no” and “refused”, “legitimate skip”, and “don’t know”. The last three response were coded as missing.

This study kept the responses for female and male separately to see which set of friends had the most impact. Also, in creating the composite variables for female and male friendships, a different set of questions from the Add Health study were combined. For male friendships, the measures used were: “Did you meet with (friend name) after school to hang out or go somewhere during the past seven days?” and “Did you spend time with (friend name) during the past weekend?” The response choices were (0) “no” and (1) “yes”. For female friendships, the measures used were “Did you meet with (friend name) after school to hang out or go somewhere during the past seven days?”, “Did you spend time with (friend name) during the past weekend?”, and “Did you talk to (friend name) about a problem during the past seven days?” The response choices were (0) “no” and (1) “yes”. The last measure for female friends was omitted for male friends because it reduced the standardized coefficient and the scale reliability coefficient (Cronbach Alpha) for the variable. The presumed reason for this could be that based on gender stereotypes, males may not have admitted to talking about problems with their friends.

The final indicator for children’s agency is parents’ perception of the influence of their children’s best friend. This variable was measured from a question in the parent questionnaire from Wave I from the Add Health study which asked “What kind of influence is (name’s) best friend – good, bad, or neither?” The response options were (1) “a good influence”, (2) “a bad

influence”, (3) “neither a good or a bad influence”, (6) “refused”, (8) “don’t know”. The last two options were coded as missing.

Table 11: Variables for Children's Agency		
Variables for Children's Agency	Questions from the Add Health study (Wave I)	Variable Name in Add Health
Sibling relationships and influences (Bonding social capital)	How much time do you and {NAME} spend together?	H1WS1A-D
	How much time do you and {NAME} spend with the same friend or group of friends?	H1WS2A-D
Friendships and peer relationships (Bridging social capital) (The questions were asked for five female friends)	Did you meet {NAME} after school to hang out or go somewhere during the past seven days?	H1FF7A-E
	Did you spend time with {NAME} during the past weekend?	H1FF8A-E
	Did you talk to {NAME} about a problem during the past seven days?	H1FF9A-E
Friendships and peer relationships (Bridging social capital) (The questions were asked for five male friends)	Did you meet {NAME} after school to hang out or go somewhere during the past seven days?	H1MF7A-E
	Did you spend time with {NAME} during the past weekend?	H1MF8A-E
	Did you talk to {NAME} about a problem during the past seven days?	H1MF9A-E
Parents perception of their children's friends influence	What kind of influence is {NAME}'s best friend—good, bad, or neither?	PC13

Table 12: Study Composite Variables, Reliability Coefficients (Alphas) and Items Used

Composite Variables	Cronbach Alphas	Items
School social capital	0.76	1.You feel close to people at your school; 2.You feel like you are part of your school; 3.You are happy to be at your school; 4.The teachers at your school treat students fairly; 5.You feel safe in your school
Parent-adolescent relationship with Mom	0.64	Which of the things listed on this card have you done with {MOM NAME} in the past 4 weeks? 1. talked about your school work or grades; 2. talked about other things you're doing in school
Parent-adolescent relationship with Dad	0.65	Which of the things listed on this card have you done with {DAD NAME} in the past 4 weeks? 1. talked about your school work or grades; 2. talked about other things you're doing in school
Strength of parent-adolescent relationship with Mother	0.64	1. How close do you feel to your {MOTHER/ADOPTIVE MOTHER/ STEPMOTHER/ FOSTER MOTHER/etc.}? 2. How much do you think she cares about you?
Strength of parent-adolescent relationship with Father	0.72	How close do you feel to your {FATHER/ADOPTIVE FATHER/ STEPFATHER / FOSTER FATHER/etc.}? 2. How much do you think she cares about you?
Sibling relationships and influences	0.83	1. How much time do you and {NAME} spend together? 2. How much time do you and {NAME} spend with the same friend or group of friends?
Friendships and peer relationships (for female friends)	0.82	1. Did you meet {NAME} after school to hang out or go somewhere during the past seven days? 2. Did you spend time with {NAME} during the past weekend? 3. Did you talk to {NAME} about a problem during the past seven days?
Friendships and peer relationships (for male friends)	0.81	1. Did you meet {NAME} after school to hang out or go somewhere during the past seven days? 2. Did you spend time with {NAME} during the past weekend?

Statistical Analysis

Analytic Model

Figures 5 and 6 provide a graphical representation of the overall model for this research study. The overall model simply states that higher education academic achievement is influenced by family social capital, neighborhood/community social capital and school social capital. The specific propositions are:

- Family social capital is a factor variable comprised of three parts: the relationship that adolescents have with the parents, the strength of these relationships, and intergenerational closure. These variables are nominal, i.e., they do not have any numerical value or order. This study explores the influence of these variables collectively called family social capital on adolescents' higher education academic achievement
- Neighborhood/community social capital is also a factor variable made up of three parts: residential stability, the interest shown by community members towards adolescents, and how much interaction adolescents have with members of their community. These indicators are also nominal. Again, this study explores the influence of these variables collectively called neighborhood social capital on adolescents' higher education academic achievement
- School social capital, the relationship between the student and the school, and how connected the student feels to the school, is also investigated as a predictor of adolescents' higher education academic achievement
- Family social capital is also considered as bonding social capital because of the strong ties that exist within this relationship
- Neighborhood and school social capital are considered as bridging social capital because of the weak ties that exist within these relationships

- This study examined the impact of bonding social capital and bridging social capital on the higher education outcomes of adolescents to determine which type of social capital or domain of social capital mattered more
- The possible interaction of gender and race was also investigated
- SES and children's agency (not shown in Figure 5) are variables that research show influence social capital. This study examined their effect on the domains of social capital, and on the dependent variable, higher education academic achievement

Figure 5 is a simple diagram of the overall conceptual framework for this study. Figure 6 provides a simplified version of the multilevel model used in this study. The red line in Figure 6 represents an investigated interaction effect between the aggregate level social capital predictors and one of the indicators for children's agency.

Figure 6: Graphical Representation of the Full Model for the Study

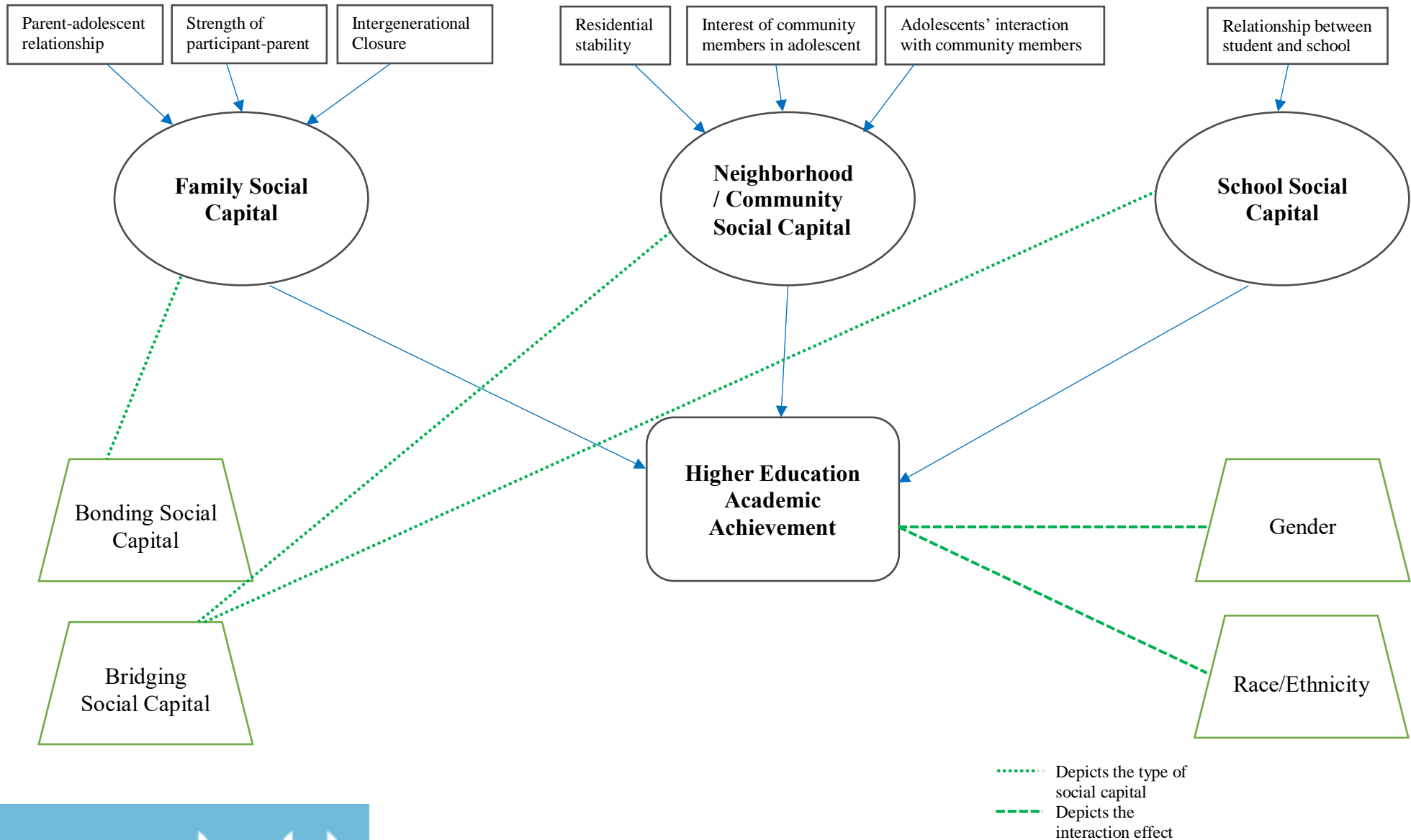
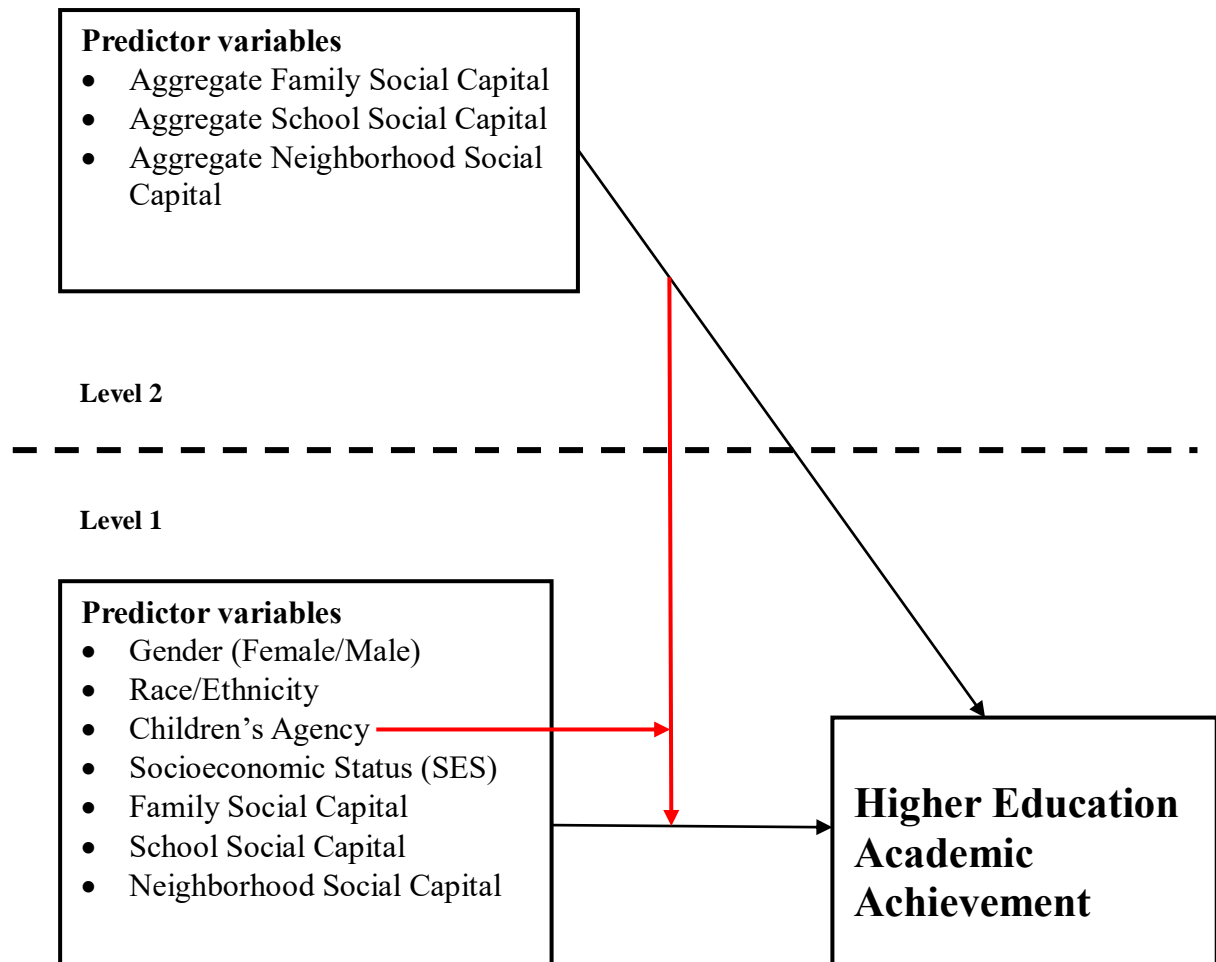


Figure 7: The Hypothesized Multilevel Model of Social Capital Domains on Academic Achievement



Model Equation

As examples, I use the relationship between gender and academic achievement, and race/ethnicity and academic achievement to represent notations for some of the cross-classified model equations for the hypothesized model presented in Figure 6.

For gender and academic achievement, the notation is:

$$y_i = \beta_0 + \beta_1 x_{\text{gender}} + u^{(2)}_{\text{family}(i)} + u^{(2)}_{\text{neighborhood}(i)} + u^{(2)}_{\text{school}(i)} + e_i$$

...(1)

$$u^{(2)}_{\text{family}(i)} \sim N(0, \sigma^2_{u(4)})$$

$$u^{(3)}_{\text{neighborhood}(i)} \sim N(0, \sigma^2_{u(2)})$$

$$u^{(4)}_{\text{school}(i)} \sim N(0, \sigma^2_{u(3)})$$

$$e_i \sim N(0, \sigma^2_e)$$

For race/ethnicity and academic achievement, the notation is:

$$y_i = \beta_0 + \beta_1 x_{\text{race/ethnicity}} + u^{(2)}_{\text{family}(i)} + u^{(3)}_{\text{neighborhood}(i)} + u^{(4)}_{\text{school}(i)} + e_i \quad \dots(2)$$

$$u^{(2)}_{\text{family}(i)} \sim N(0, \sigma^2_{u(4)})$$

$$u^{(3)}_{\text{neighborhood}(i)} \sim N(0, \sigma^2_{u(2)})$$

$$u^{(4)}_{\text{school}(i)} \sim N(0, \sigma^2_{u(3)})$$

$$e_i \sim N(0, \sigma^2_e)$$

where Y_i (Logit) denotes the academic achievement of attainment of student i , β_0 is log odds (logit) coefficient of the model intercept, x denotes the independent variable (gender in equation (1), and race/ethnicity in equation (2)), β_1 is the associated slope coefficient, $u^{(2)}_{\text{family}(i)}$, $u^{(3)}_{\text{neighborhood}(i)}$ and $u^{(4)}_{\text{school}(i)}$ denote the family, neighborhood and school social capital, and e_i denotes the residual error. The subscripts (i) denote the different domains of social capital that impact on the student's academic achievement. $\sigma^2_{(4)}$ denotes the between

family social capital variance, $\sigma^2_{u(2)}$ denotes the between neighborhood social capital variance, $\sigma^2_{u(3)}$ denotes the between school social capital and σ^2_e denotes the student-level residual error variance. The log odds (logit) coefficients are exponentiated into odd ratios for ease of interpretation. The magnitudes of the variance components may then be compared to make statements about the relative contribution of each domain of social capital to the variation in the response, having adjusted for gender and race/ethnicity.

Assessment of Model Fit

Several tests are used to assess model fit in this dissertation. These are the Likelihood Ratio Test (LRT), Akaike's Information Criterion (AIC), and Schwartz's Bayesian Information Criterion (BIC). All these tests measure the deviance value of a model, that is, the measure of error in a model. However, LRT does not recognize a lack of parsimony in the model, therefore tests like AIC and BIC are also considered in assessing model fit. One thing that is common to all these tests is that lower values show better model fit. To assess model fit in this study, a null model is first run – a model without any of the effects to be examined. It is important to note that while AIC does not penalize for complexity in models, BIC does, hence the need to take into consideration all three values – LRT, AIC, and BIC when assessing model fit (Garson, 2019).

Chapter Four - Data Analysis and Results

Introduction

This chapter of the dissertation presents the results of the analyses of the cross-classified models used in testing the influence of school, family, and neighborhood social capital on the higher education academic achievement of students in the United States of America. In this section, model-fit statistics, as well as the findings for all the individual and aggregate level effects of social capital, are presented separately for clarity. The predictors and indicators used, how these were constructed, and their factor loadings based on CFA are discussed in chapter three of this dissertation. A total of 16 distinct/individual traditional and cross-classified models were developed to answer the research questions in this study. For ease of understanding, the 16 individual models have been organized into four groups. These are described in detail below in the model building section.

For each model, the findings are presented in a tabular form showing the intercepts (β logits or log odds coefficients), the standard error (SE) and significance levels of the individual and aggregate level effects. The log odds coefficients are exponentiated into odds ratios for ease of interpretation. In this study, a statistical significance level of 0.05 was used ($p \leq 0.05$) – meaning that all p values equal to or less than 0.05 were treated as statistically significant. For each of the models in the four groups, Akaike's Information Criteria (AIC) and Bayesian Information Criteria (BIC) were used to estimate model fit. Lower values indicate a better model fit. Residuals were also used to check assumptions and detect standard errors in the final models.

Analysis

Model Building

The analysis for this dissertation fits four sets of model groups.

Group 1: Cross-Classified Null Models – Models 1A, B, C, D

The first model group included the null or random-intercept only multilevel models (MLM). These are models with no predictors; these models were run to determine the need for multilevel models rather than ordinary regression models. The first three models in this group are traditional MLM models where respondents, in this case, students, are nested in a single context – school, family, or neighborhood respectively. The final model in this group was the cross-classified null model in which students are nested in all three contexts at the same time. Model 1A is a school-only MLM where students were clustered within schools; Model 1B is a family-only MLM in which students were clustered within families; Model 1C is a neighborhood-only MLM in which students were clustered within neighborhoods; and Model 1D is a cross-classified MLM (CCMM) in which students were grouped in schools, families, and neighborhoods simultaneously. The intraclass correlation coefficient (ICC) output from the single-context models (Model 1A-C) was compared with that of the multi-context model (Model 1D) to confirm the need for cross-classified models in this study. ICC measures within-subject variance that is due to the differences across schools, families, and neighborhoods. The CCMM null model was also used as a baseline for the other CCMM models with predictors.

Group 2: Individual-level Models – Models 2A, B, C, D

The second group of models (Models 2A, B, C, D) were models that had individual-level predictors included. These predictors included the demographic variables relevant to this study's research questions – gender, race, and socioeconomic status (SES) and the key predictors of school, family, and neighborhood social capital. Model 2A is a CCMM containing the demographic variables (gender, race, and family SES) and school social capital as predictors. Model 2B is another CCMM containing the demographic variables (gender, race, and family SES) and family social capital as predictors. Model 2C is also a

CCMM containing the demographic variables (gender, race, and family SES) and neighborhood social capital as predictors. The final model in this group of models, Model 2D, is a CCMM containing the demographic variables (gender, race, and family SES), and school, family, and neighborhood social capital as predictors. The CCMM null model was used as the baseline for all CCMM models with predictors.

Group 3: Aggregate-level Models – Models 3A, B, C, D

The third group of models (Models 3A, B, C, D) differed from the second group of models with the inclusion of aggregate-level social capital predictors. In these models, the social capital predictors were aggregated to check whether the individual-level responses for the different domains of social capital would be different when the responses were grouped. The aggregation of the individual-level data was to verify the assumption that the effect of social capital on individual academic achievement would hold for the group. Similar to the set of models in group two, the demographic variables relevant to this study's research questions – gender, race, and family socioeconomic status (SES) were combined with the individual- and aggregate-level social capital predictors.

Model 3A is a CCMM containing the demographic variables (gender, race, and family SES), individual school social capital, and aggregate school social capital as predictors.

Model 3B is another CCMM containing the demographic variables (gender, race, and family SES), individual family social capital, and aggregate family social capital as predictors.

Model 3C is also a CCMM containing the demographic variables (gender, race, and family SES), individual neighborhood, and aggregate neighborhood social capital as predictors. The final model in this group of models, Model 3D, is a CCMM containing the demographic variables (gender, race, and SES), individual school, individual family, individual neighborhood, aggregate school, aggregate family, and aggregate neighborhood social capital as predictors.

Group 4: Children's Agency Models – Models 4A, B, C, D

The fourth and final group of models relate to the research questions on children's agency. In these models, only aggregate-level social capital variables were used for the analyses. The aim was to understand the influence of peers – friends, and siblings – on social capital as it affects academic achievement. This required the aggregation of the social capital variables to provide the group rather than the individual response. Model 4A examined the effect of the children's agency variable related to sibling relationships on all the domains of social capital. Model 4B examined the effect of the children's agency variable related to friendships on all the domains of social capital. Models 4C examined the effect of the children's agency variable related to parents' perceptions of the influence of friends on all the domains of social capital. Model 4D was the interaction effect of parents' perceptions of the influence of friends directly on the domains of social capital on academic achievement.

Including the interaction effect is important because it provides a better understanding of how one aspect of children's agency and social capital both influence the higher education academic achievement of American students. Models 4A, B, and C examined the main effects or the individual effects of the different variables used for children's agency along with the variables representing the different domains of social capital on academic achievement. Model 4D, on the other hand, examined whether the impact of children's agency was dependent on social capital, and which particular domain of social capital. The decision to examine only the interaction effect of parents' perception of friend's influence was based on the connection of this variable with intergeneration closure.

Survey Weights

Add Health provides survey weights for users because of the unequal probability in its sample selection. This is to ensure that unbiased estimates of population parameters and standard errors are obtained. The survey weights that Add Health currently provides are for single-level and multilevel models (Chen & Chantala, 2014). An effort was made to use the weights provided for general multilevel models but this was not successful. Other studies that have used cross-classified models note that weighting techniques have not yet been developed for cross-classified multilevel models (Dun, Milliren, Evans, Subramanian, & Richmond, 2015). The analyses in this study were therefore conducted without using any weights. Future research able to apply the required survey weights, when these are developed, may provide a better understanding of the impact of social capital on higher education academic achievement and will be more generalizable. However, based on the sample size for some of the analyses in this study and because the data has been stratified, there is a possibility that some of the findings may be generalizable.

Results

This study uses the more robust Add Health restricted-use dataset. Though Add Health is a longitudinal study, cross-sectional analyses are used as the information for most of the respondents in Waves I and II did not change and by Wave IV many of the respondents had completed college. The cross-sectional analyses were based on an overall sample of 20,774 students who attended 132 schools, lived in 2,063 neighborhoods, and were from 1,975 families (see Table 13). It is important to note that multilevel models imply different sample sizes at different levels of investigation. Descriptive statistics for the sample used in this study are provided in Table 14. The sample was relatively equal in terms of gender (50.5% female, 49.5% male). Most of the participants were White (62%); African Americans

accounted for 23%, Latinx 17%, American Indian 4%, Asians 8%, and other races 9% of the population. Of the total population, 68% did not complete higher education. In this study, the parent's SES in terms of the level of education was moderate as over 50% of the surveyed population had more than a high school diploma. With regard to the parents' income and occupation, over half of the population of parents had a full-time job and were able to pay all their bills.

Table 13: Multilevel Data Structure

	<i>n</i>	Mean number of students
Students	20,774	
Neighborhoods	2,063	7.5
Families	1,975	1.2
Schools	132	116.2

Table 14: Descriptive Statistics from the Add Health Sample

	<i>n</i>	Percent (%)
<i>Student's Gender</i>		
Female	10,480	50.52%
Male	10,263	49.48%
<i>Student's Race</i>		
White (reference)	12,747	61.45%
African American	4,807	23.17%
Hispanic (Latinx)	3,535	16.99%
American Indian	740	3.57%
Asian	1,584	7.64%
Other Race	1,958	9.44%
<i>Family Socioeconomic Status (SES)</i>		
Parent Education		
No Education	19	0.11%
High School or less	8,291	47.30%
More than High School but no College	5,190	29.61%
Education		
College Education	4,027	22.98%
Parent Income		
Does not cover Bills	3,311	19.29%
Covers Bills	13,855	80.71%
Parent Occupation		
Does not work full time	2,583	20.48%
Works full time	10,029	79.52%
<i>Higher Education Academic Achievement</i>		
No	10,744	68.45%
Yes	4,953	31.55%

Group 1 – Models 1A, B, C, D**Models 1A, B, C**

Table 15 presents results from the traditional null models and the CCMM null model with higher education academic achievement as a binary outcome. The output from the three traditional null models (Models 1A, B, C) showed that intra-class correlation (ICC) for higher education academic achievement was approximately 0.12, 0.12, and 0.17 respectively. This suggests that 12% of the variation in higher education academic achievement was occurring between schools, 12% of the variation was occurring between families, and 17% of the variation was occurring between neighborhoods. The Likelihood Ratio test for the school-only model was 1569.73 which is high and is statistically significant. Similarly, for the neighborhood-only model, the Likelihood Ratio test was 1133.62 which was also high and statistically significant. For the family-only model, the Likelihood Ratio test was 5.89 which was low and not statistically significant.

Consequently, because the ICC was statistically significant for all three traditional models and above the generally accepted threshold ($ICC > 0.05$), I determined that multilevel modeling was needed for accurate estimates especially because multilevel estimates differ significantly from ordinary least squares (OLS) estimates of standard errors. In addition, in Table 14, the random effect output for all the traditional models (Models 1A, B, C) showed that the residual components (all approximately 0.19) were higher than the variance explained by the school-effect (0.03), the family-effect (0.03), and the neighborhood-effect (0.03). This again suggested the need for a more complex model with additional predictors. The results showed that there was a clustering effect of higher education academic achievement in schools, families, and neighborhoods that needed to be examined.

Table 15: Traditional Null Multilevel Models and the Cross-Classified Null Multilevel Model

<i>Fixed effects estimates</i>	<i>Null Models</i>			
	<i>1A: School only</i>	<i>1B: Family only</i>	<i>1C: Neighborhood only</i>	<i>1D: Cross-classified</i>
Intercept (SE)	0.31 (0.02)	0.31 (0.01)	0.33 (0.01)	0.31 (0.01)
ICC	0.12	0.12	0.17	
Gender				
Race				
Family Socioeconomic Status (SES)				
School Social Capital				
Family Social Capital				
Neighborhood Social Capital				
Children's Agency variables				
<i>Random effects estimates</i>				
School (SE)	0.03 (0.00)			0.02 (0.00)
Family (SE)		0.03 (0.01)		
Neighborhood (SE)			0.04 (0.00)	0.01 (0.00)
Individual (SE)	0.19 (0.00)	0.19 (0.01)	0.19 (0.00)	0.19 (0.00)
<i>Fit Statistics</i>				
AIC (BIC)	18507.08 (18530)	2978.09 (2995.31)	19205.97 (19228.93)	18273.14 (18303.66)
<i>n</i>	15,339	2,295	15,559	15,210

Note. Model 1 (A-D) is the result of the null models (models with no predictors, only the outcome variable – Higher Education Academic Achievement). 1A: School only multilevel model. 1B: Family only multilevel model. 1C: Neighborhood only multilevel model. 1D: Cross-classified multilevel model (CCMM). Coefficients and parameter estimates are presented as well as standard errors (SE). *Significant effects are indicated by $p \leq 0.05$. n equals the number of observations for each analysis. Fit Statistics: Akaike's Information Criteria (AIC) and Bayesian Information Criteria (BIC).

However, based on several reasons, family was dropped as a context for the CCMM models. The first reason was that the Likelihood Ratio test was low and not statistically significant. In their study on cross-classified multilevel models, Chung, Kim, Park, and Jean (2018), also highlighted the importance of sample size to these kinds of models. The authors noted that while fixed effect estimates are not as sensitive to the number of groups as random effects this did not apply to the variance component estimates (Chung et al., 2018, p. 6). Recommendations from other methodologists and researchers in the field of multilevel modeling include having no fewer than a hundred groups with at least ten observations per group to ensure unbiased estimates of the intercept variance (Chung et al., 2018). Given that the family context had a maximum of ten observations per group compared to schools and

neighborhoods which had 1,227 and 242 respectively, this further justified the decision to drop family as a context in this study.

Finally, the issue of multicollinearity, a situation where predictors are strongly correlated leading to biased parameter estimates, was also considered in removing the family as a context in this study. While CCMM's allow for the modeling of nonhierarchical contexts, the fact that a hierarchy could be assumed between families and neighborhoods leading to multicollinearity, provided another reason to remove family as a context in this study. The final model for this study was, therefore, based on the two-way CCMM null model (Model 1D) in which the school and neighborhood contexts were analyzed simultaneously. A version of this model with predictors added was used for all the CCMM analyses in this study.

Model 1D

In the null CCMM model (Table 15, Model 1D), students were cross-classified by schools and neighborhoods. The table shows that the log odds of completing higher education of students in the sample after adjusting for the clustering of students in schools and neighborhoods is 0.31. Since the outcome in this study is binary – students either completed higher education or did not, a logit of 0.31 corresponds to a predicted probability of a 57% chance that students in the sample completed higher education. The CCMM null model also showed that there is no real difference in the between-level variance of academic achievement for schools and neighborhoods (0.02, 0.01 respectively). The school context accounted for about 2% of the total variance in higher education academic achievement while the neighborhoods accounted for about 1% of the total variance in higher education achievement. The residual or unexplained effect, the within-level effect, which showed the variance in higher education academic achievement for students in groups formed from the cross-classification of schools and neighborhoods was about 19%. This reinforced the need

for the CCMM model to be better specified with the addition of more variables. Therefore, I moved to the conditional models or the models with predictors.

Group 2 – Models 2A, B, C, D

Model 2A

Table 16 presents the results of the null CCMM model with the individual-level variables. Model 2A included the demographic variables of gender, race/ethnicity, and family SES, as well as individual-level school social capital. The addition of the individual-level predictor slightly weakened the between-level variance for neighborhoods (0.00) and schools (0.01), and also slightly weakened the within-level variance (0.18) when compared to the null model. These results suggest that the school context contributes a little more to the between-level variation in higher education academic achievement than neighborhoods. The results from model 2A also highlight the impact of school social capital on the binary outcome variable, higher education academic achievement.

The results for Model 2A showed that the demographic variables, gender, race, parent employment, and parent income were statistically significant predictors of higher education academic achievement when school social capital was included in the analysis as an individual-level predictor. In addition, academic achievement was higher among female students than male students; female students were predicted to have higher education achievement compared to male students ($\beta = 0.10$). African American students ($\beta = -0.07$), American Indian students ($\beta = -0.10$), Latinx students ($\beta = -0.12$), and students who reported being from other races ($\beta = -0.09$) were less likely to graduate from college compared to White students. Asian students ($\beta = 0.06$) on the other hand, were more likely to complete college than their White counterparts. All these estimates were statistically significant ($p \leq 0.05$).

The results of this model (2A) also suggest that while parent education, one of the demographic predictors of family SES, was not statistically significant in this model, the other demographic predictors of family SES, parent income, and employment were statistically significant ($p \leq 0.05$). The expected odds of completing higher education increased by ($\beta = 0.07$) ($e^{0.07} - 1$) or 7.25% for students whose parents' income covered their bills. However, the odds of completing higher education decreased by ($\beta = -0.03$) ($1 - e^{-0.03}$) or 2.96% for students whose parents were employed full time compared to those who were not employed full time when the student was in K12. Finally, in this model (2A), the odds of students graduating college increased by ($\beta = 0.07$) ($e^{0.07} - 1$) or 7.25% for school social capital; this was statistically significant ($p \leq 0.05$). These interpreted results assume that all other variables in the model are held constant. As expected, the fit statistics test for the model (AIC, BIC) indicates a significant improvement over the null CCMM model (from 18273.14 to 10611.38 and 18303.66 to 10725.12 respectively) showing good model fit.

Table 16: Cross-Classified Multilevel Models for Individual-level Social Capital Variables

<i>Fixed effects estimates</i>		<i>Individual-level CCMM Models</i>			
		<i>Model 2A</i>	<i>Model 2B</i>	<i>Model 2C</i>	<i>Model 2D</i>
Intercept (SE)		-0.05 (0.19)	-0.46 (0.44)	0.81 (0.39)*	-0.47 (0.19)*
Gender	Male	Ref			
	Female	0.10 (0.01)*	0.10 (0.01)*	0.08 (0.03)*	0.07 (0.04)
Race	White	Ref			
	African American	-0.07 (0.02)*	-0.04 (0.02)	-0.07 (0.04)	-0.09 (0.06)
	Hispanic (Latinx)	-0.10 (0.02)*	-0.09 (0.03)*	-0.04 (0.06)	-0.03 (0.08)
	American Indian	-0.12 (0.03)*	-0.12 (0.03)*	-0.19 (0.09)*	-0.23 (0.11)*
	Asian	0.06 (0.02)*	0.08 (0.03)*	0.13 (0.07)	0.19 (0.08)*
	Other Race	-0.09 (0.02)*	-0.06 (0.03)*	-0.05 (0.06)	-0.09 (0.07)
Family (SES)					
Parent Education	No Education	Ref			
	High School or less	-0.04 (0.19)	0.22 (0.44)	-0.89 (0.38)*	
	More than High School but no College	0.04 (0.19)	0.30 (0.44)	-0.82 (0.38)*	0.04 (0.05)
	College Education	0.25 (0.19)	0.51 (0.44)	-0.66 (0.38)	0.15 (0.06)*
Parent Income		0.07 (0.01)*	0.06 (0.02)*	0.08 (0.04)*	0.12 (0.06)*
Parent Employment		-0.03 (0.01)*	-0.03 (0.01)*	0.05 (0.04)	0.01 (0.06)
School Social Capital		0.07 (0.01)*		0.07 (0.03)*	
Family Social Capital					
	Parent-Adolescent Relationship (with mother)		0.02 (0.02)		0.18 (0.06)*
	Parent-Adolescent Relationship (with father)		0.07 (0.02)*		-0.02 (0.06)
	Strength of Relationship (with mother)		0.05 (0.01)*		-0.03 (0.04)
	Strength of Relationship (with father)		0.02 (0.01)*		0.05 (0.03)
	Intergenerational Closure		0.03 (0.00)*		0.05 (0.01)*
Neighborhood Social Capital				0.07 (0.03)*	0.02 (0.04)
	Residential Stability				
	Neighborhood Interest (in adolescent)			0.03 (0.03)	0.02 (0.05)
	Neighborhood Interaction (with adolescent)			-0.05 (0.03)	-0.09 (0.04)*
<i>Random effects estimates</i>					
Neighborhood (SE)		0.00 (0.00)	0.00 (0.00)	0.01 (0.01)	0.01 (0.01)
School (SE)		0.01 (0.00)	0.01 (0.00)	0.00 (0.01)	1.19e-07 (1.99e-06)
Individual (SE)		0.18 (0.00)	0.18 (0.00)	0.13 (0.01)	0.11 (0.01)
<i>Fit Statistics</i>					
AIC (BIC)		10611.38 (10725.12)	7409.46 (7544.09)	620.38 (701.16)	274.71 (359.89)
<i>n</i>		9036	6198	657	300

Notes. Model 2 (A-D) is the result of the CCMM with the individual level social capital variables and demographic variables – gender, race/ethnicity, family SES. 2A: CCMM with school social capital. 2B: CCMM with family social capital. 2C: CCMM with neighborhood social capital. 2D: CCMM with school, family and neighborhood social capital. Coefficients and parameter estimates are presented as well as standard errors (SE). *Significant effects are indicated by $p < / = 0.05$. *N* equals the number of observations for each analysis. Fit Statistics: Akaike's Information Criteria (AIC) and Bayesian Information Criteria (BIC).

Model 2B

Model 2B (Table 16) included the demographic variables of gender, race/ethnicity, and family SES, as well as individual-level family social capital. Similar to Model 2A, the addition of the individual-level predictor to this model (2B) slightly weakened the between-level variance for neighborhoods (0.00) and schools (0.01) and slightly weakened the within-level variance (0.18) compared to the null model. These results again suggest that the school context contributes a little more to the between level variation in higher education academic achievement than neighborhoods. The results from model 2B also highlight the impact of family social capital based on the functional characteristics of parent-adolescent relationships, the strength of these relations, and intergenerational closure (Coleman, 1988) on the outcome variable, higher education academic achievement.

Model 2B shows that the demographic variables, gender and race, and parent employment and parent income, family SES variables, at the individual-level are significant predictors of higher education academic achievement. As in Model 2A, academic achievement was higher among female students than male students when family social capital was included in the analysis as an individual-level predictor; female students were predicted to have ($\beta = 0.10$) higher education achievement compared to male students. African American students ($\beta = -0.04, p > 0.05$) were not impacted by the inclusion of family social capital in the model. Latinx students ($\beta = -0.09, p \leq 0.05$), American Indian students ($\beta = -0.12, p \leq 0.05$), and students who reported being from other races ($\beta = -0.06, p \leq 0.05$) were less likely to graduate from college compared to White students. Asian students ($\beta = 0.08, p \leq 0.05$) on the other hand, were more likely to complete college than their White counterparts.

The results of Model 2B also suggest that parent education was not statistically significant in this model: students whose parents had a high school qualification or less ($\beta = 0.22, p > 0.05$), students whose parents had more than a high school qualification but not a

college degree ($\beta = 0.30, p > 0.05$), and students whose parents completed college ($\beta = 0.51, p > 0.05$). On the other hand, parent income and employment were statistically significant. The results showed that the expected odds of completing higher education increased by ($\beta = 0.06$) ($e^{0.06} - 1$) or 6.18% for students whose parents' income covered their bills. However, the expected odd of completing higher education decreased by ($\beta = -0.03$) ($1 - e^{-0.03}$) or 2.96% for students whose parents were employed full time compared to those whose parents were not employed full time when they were in K12.

With regards to the family social capital predictors, in this model (2B), the log odds for the parent-adolescent relationship with mother was ($\beta = 0.02, p > 0.05$). With parent-adolescent relationship with father, the odds of students graduating college increased by ($\beta = 0.07, p \leq 0.05$) ($e^{0.07} - 1$) or 7.25%. Further, as students report increased closeness to their mother ad care from their more, that is the strength of the relationship between students and their mothers, the odds of completing college increased by ($\beta = 0.05, p \leq 0.05$) ($e^{0.05} - 1$) or 5.13%; while for an additional increase to the strength of students relationship with their fathers, the odds of completing college increased by ($\beta = 0.02, p \leq 0.05$) ($e^{0.02} - 1$) or 2.02%. Intergenerational closure increased the odds of students' higher education academic achievement by ($\beta = 0.03, p \leq 0.05$) ($e^{0.03} - 1$) or 3.05%. These interpreted results assume that all other variables in the model are held constant. Again, the fit statistics test for the model (AIC, BIC) indicates a significant improvement over the previous model (2A) (from 10611.38 to 7409.49 and 10725.12 to 7544.09 respectively) showing good model fit.

Model 2C

The third model in Table 15, Model 2C, included the demographic variables of gender, race/ethnicity, and family SES, as well as individual-level neighborhood social capital. Similar to Models 2A and 2B, the addition of the individual-level predictor to this model (2C) slightly weakened the between-level variance for neighborhoods (0.00) and

schools (0.01), and greatly reduced the within-level variance (0.13). These results again suggest that the school context contributes more to the between-level variation in higher education academic achievement than neighborhoods. The results from model 2C also highlight the impact of neighborhood social capital on the outcome variable, higher education academic achievement. Neighborhood social capital was based on the structural and functional characteristics of residential stability or the length of time students had spent in the neighborhood, the perceived interest of people in the neighborhood or community in the student, and the level of interaction the student had with people in the neighborhood or community (Israel et al., 2001; Sanbonmatsu et al., 2006).

The results from Model 2C show that in this model gender is again a significant predictor of higher education academic achievement among students in the sample. A number of the race/ethnicity variables were not statistically significant: African American students ($\beta = -0.07, p > 0.05$), Latinx students ($\beta = -0.03, p > 0.05$), Asian students ($\beta = 0.13, p > 0.05$) and students who reported being from other races ($\beta = -0.04, p > 0.05$). On the other hand, American Indian students ($\beta = -0.18, p \leq 0.05$) are less likely to graduate from college compared to White students. For the SES variables, the results from the Model 2C, suggest that the odds of obtaining a higher education qualification decreased by ($\beta = -0.89, p \leq 0.05$) for students whose parents had a high school qualification or less compared to students whose parents had no education.

For students whose parents had more than a high school qualification but not a college degree, the odds decreased by ($\beta = -0.82, p \leq 0.05$) compared to students whose parents had no education. This statistically significant effect disappeared for students whose parents completed college ($\beta = -0.66, p > 0.05$). For parent income, the expected odds of completing higher education increased by ($\beta = 0.08, p > 0.05$) ($e^{0.08} - 1$) or 8.33% for students whose parents' income covered their bills compared to those whose parents did not. With regards to

parent employment, the expected odds of completing higher education also increased by ($\beta = 0.05, p > 0.05$) ($e^{0.05} - 1$) or 5.13% for students whose parents were employed full time compared to those who were not employed full time when the student was in K12.

Results of Model 2C which included the individual-level neighborhood social capital predictors showed that increasing the length of time students spent living in the neighborhood or community beyond six months led to increased odds of students graduating college by ($\beta = 0.07, p \leq 0.05$) ($e^{0.07} - 1$) or 7.25%. However, neighborhood interest ($\beta = 0.03, p > 0.05$) and neighborhood interaction ($\beta = -0.05, p > 0.05$) were not statistically significant predictors of higher education academic achievement. All these interpreted results assume that all other variables in the model are being held constant. The fit statistics for this model (2C) also showed an improvement compared to the previous models (2A and 2B).

Model 2D

The final model in this group of models, Model 2D, presents the results of the CCMM with the combination of all the individual-level social capital variables. Model 2D included the demographic variables of gender, race/ethnicity, and family SES, as well as individual-level school, family, and neighborhood social capital. The addition of the individual-level variables weakened the between-level variance for neighborhoods (0.01) slightly, and schools ($1.19e-07$) considerably, and also reduced the within level variance (0.11). It is necessary to note that Stata (StataCorp, College Station, TX) had a difficult time converging the variables. It is assumed that this was due to the effect of multicollinearity. These results suggest that the neighborhoods contribute more to the between-level variation in higher education academic achievement than schools. The results from model 2D highlight the impact of all the domains of social capital on the outcome variable, higher education academic achievement.

The results from Model 2D show that in this model gender lost its statistical significance ($\beta = 0.07, p > 0.05$). For the variable race/ethnicity, the coefficients were not

statistically significant: African American students ($\beta = -0.09, p > 0.05$), Latinx students ($\beta = -0.03, p > 0.05$), students who reported being from other races ($\beta = -0.09, p > 0.05$). However, American Indian students ($\beta = -0.23, p \leq 0.05$) were less likely to complete college compared to their White counterparts; and Asian students ($\beta = 0.19, p \leq 0.05$) were more likely to complete college compared to their White colleagues. For the SES variables, the results from Model 2D, suggest that parent education is statistically significant only for students whose parents have a college degree. Students whose parents had more than a high school qualification but not a college degree ($\beta = 0.04, p > 0.05$) was not statistically significant. Students whose parents completed college ($\beta = 0.15, p \leq 0.05$) were also more likely to complete college compared to students whose parents had no education and students whose parents had a high school qualification and less.

For parent income, the expected odds of completing higher education increased by ($\beta = 0.12, p \leq 0.05$) ($e^{0.12} - 1$) or 12.75% for students whose parents' income covered their bills. However, this statistically significant association disappeared with parent employment ($\beta = 0.01, p > 0.05$). Results from the model (Model 2D) showed that for school social capital, the odds of students graduating from college increased by ($\beta = 0.07$) ($e^{0.07} - 1$) or 7.25%. For the family social capital predictors, the odds of students graduating college increased by ($\beta = 0.18, p \leq 0.05$) ($e^{0.18} - 1$) or 19.724% for parent-adolescent relationship with mother. The indicators: parent-adolescent relationship with father ($\beta = -0.02, p > 0.05$), strength of the relationship between students and their mothers ($\beta = -0.03, p > 0.05$), and strength of students relationship with their fathers ($\beta = 0.05, p > 0.05$) were not statistically significant. However, for intergenerational closure, the odds of college completion increased by ($\beta = 0.05, p \leq 0.05$) ($e^{0.05} - 1$) or 5.13% for students whose parents interacted with parents of their friends.

Regarding individual-level neighborhood social capital, the predictors showed that increasing the length of time students spent living in the neighborhood or community beyond

six months ($\beta = 0.02$, $p > 0.05$) had no statistically significant impact on the odds of students graduating college. The same was true for neighborhood interest ($\beta = 0.02$, $p > 0.05$).

However, for every additional increase to neighborhood interaction, that is the amount of time students spent interacting with members of their neighborhood or community, the odds of completing college decreased by ($\beta = -0.09$, $p > 0.05$) ($1 - e^{-0.09}$) or 8.61%. All these interpreted results assume that all other variables in the model are being held constant. The fit statistics for this model (2D) also showed an improvement compared to the previous models (2A, 2B, and 2C); however, this may have been due to the reduced sample size.

The overall results of all the Group 2 models showed that depending on the domain of social capital included in the model, both schools and neighborhoods drive the between-level variance in higher education academic achievement. For Models 2A and 2B, which included school and family social capital respectively, schools appeared to be more important than neighborhoods in influencing higher education academic achievement in students. For Models 2C and 2D, which included neighborhood social capital and a combination of all the social capital domains respectively, neighborhoods seemed to be more important than schools in driving higher education academic achievement in students. The results of the analyses also showed that the domain of social capital included in the model informed the impact of the demographic variables on the outcome of higher education achievement, thus indicating that the influence of social capital on academic achievement is more evident when these predictors are accounted for.

Interestingly, in the two models that included school social capital, Models 2A and 2D, the predictor was positive and significant ($\beta = 0.07$, $p \leq 0.05$). Of all the indicators for family social capital, only intergenerational closure was positive and significant in both models in which the predictor was included (Models 2B and 2D). However, none of the indicators for neighborhood social capital were significant in both models where the variable

was included (Models 2C and 2D). Thus, it appears that both school and neighborhood social capital, specifically intergenerational closure for neighborhood social capital, play an important role in influencing higher education achievement of American students after controlling for gender, race and family SES.

Group 3 – Models 3A, B, C, D

Model 3A

Table 17 presents the results of the null CCMM model with the aggregate-level social capital variables. The aggregate-level social capital variables were constructed from the averages of the individual-level social capital variables to measure the group response of students for each of the social capital predictors. Included in each of the models in this group (Model 3A, B, C, D) were the demographic variables of gender, race/ethnicity, and family SES, as well as the individual level social capital predictors and the aggregate level social capital predictors. Table 16 only reports the coefficients of the aggregate level social capital variables; the values of the individual level social capital variables are not presented as they are not the focus of this model and have already been reported in the previous group of models.

Model 3A shows the results of Model 2A and the aggregate-level school social capital predictor. The addition of the aggregate-level school social capital predictor to Model 2A did not change the between-level variance for neighborhoods (0.00) and schools (0.01), and the within-level variance (0.18) for students. The results for Model 3A showed that the demographic variables, gender, race, parent employment, and parent income were all statistically significant predictors ($p \leq 0.05$) of higher education academic achievement when aggregate school social capital was included in the analysis. Specifically, academic achievement was higher among female students than male students; female students were

predicted to have ($\beta = 0.10$) higher education achievement compared to male students. African American students ($\beta = -0.07$), American Indian students ($\beta = -0.09$), Latinx students ($\beta = -0.12$), and students who reported being from other races ($\beta = -0.09$) were all less likely to graduate from college compared to White students. Asian students ($\beta = 0.06$) on the other hand, were more likely to complete college than their White counterparts. All these estimates were statistically significant ($p \leq 0.05$).

The results of this model (3A) show that parent education indicators, one of the demographic predictors of family SES, was not statistically significant in this model: students whose parents only had a high school qualification or less, students whose parents had more than a high school qualification but not college, and students whose parents completed college were reported as ($\beta = -0.04$), ($\beta = 0.04$), and ($\beta = 0.25$) respectively. The other demographic predictors of family SES, parent income and employment were statistically significant ($p \leq 0.05$). For parent income, the odds of completing higher education increased by ($\beta = 0.07$) ($e^{0.07} - 1$) or 7.25% for students whose parents income covered their bills compared to those whose parents did not. However, the odds of completing higher education decreased by ($\beta = -0.03$) ($1 - e^{-0.03}$) or 2.96% for students whose parents were employed full time compared to those who were not employed full time when the student was in K12.

Finally, in this model (3A), the significant association of school social capital ($\beta = 0.07$, $p \leq 0.05$) disappeared for aggregated school social capital ($\beta = 0.08$, $p > 0.05$). These interpreted results assume that all other variables in the model are held constant. The fit statistics test for the model (AIC, BIC) indicates a slight decline over the model with only the individual-level school social capital predictor, Model 2A, (from 10611.38 to 10611.50 and 10725.12 to 10732.35 respectively) demonstrating that the inclusion of the aggregate-level variable did not sufficiently improve the model.

Table 17: Cross-Classified Multilevel Models for Aggregate-level Social Capital Variables

<i>Fixed effects estimates</i>		<i>Aggregate level CCMM Models</i>			
		<i>Model 3A</i>	<i>Model 3B</i>	<i>Model 3C</i>	<i>Model 3D</i>
Intercept (SE)		-0.33 (0.28)	-0.44 (0.47)	0.76 (0.39)	-0.12 (0.87)
Gender	Male	Ref			
	Female	0.10 (0.01)*	0.10 (0.01)*	0.08 (0.03)*	0.08 (0.04)
Race	White	Ref			
	African American	-0.07 (0.02)*	-0.04 (0.02)	-0.07 (0.04)	-0.09 (0.06)
	Hispanic (Latinx)	-0.09 (0.02)*	-0.09 (0.03)*	-0.03 (0.06)	-0.02 (0.08)
	American Indian	-0.12 (0.03)*	-0.12 (0.03)*	-0.18 (0.09)*	-0.21 (0.11)
	Asian	0.06(0.02)*	0.08 (0.03)*	0.13 (0.07)	0.21 (0.08)*
	Other Race	-0.09 (0.02)*	-0.06 (0.03)*	-0.04 (0.06)	-0.08 (0.07)
Family (SES)					
Parent Education	No Education	Ref			
	High School or less	-0.04 (0.19)	0.22 (0.44)	-0.89 (0.38)*	-
	More than High School but no College	0.04 (0.19)	0.30 (0.44)	-0.83 (0.38)*	0.04 (0.05)
	College Education	0.25 (0.19)	0.51 (0.44)	-0.67 (0.38)	0.16 (0.06)*
Parent Income		0.07 (0.01)*	0.06 (0.02)*	0.08 (0.04)*	0.14 (0.06)*
Parent Employment		-0.03 (0.01)*	-0.03 (0.01)*	-0.05 (0.04)*	0.01 (0.06)
School Social Capital		0.08 (0.06)			-0.04 (0.12)
Family Social Capital					
	Parent-Adolescent Relationship (with mother)		0.09 (0.05)		0.04 (0.17)
	Parent-Adolescent Relationship (with father)		-0.04 (0.05)		-0.24 (0.19)
	Strength of Relationship (with mother)		-0.05 (0.04)		-0.13 (0.17)
	Strength of Relationship (with father)		0.03 (0.03)		0.08 (0.09)
	Intergenerational Closure		0.01 (0.01)		0.00 (0.04)
Neighborhood Social Capital					
	Residential Stability			0.00 (0.06)	0.05 (0.09)
	Neighborhood Interest (in adolescent)			0.04 (0.09)	0.04 (0.13)
	Neighborhood Interaction (with adolescent)			0.06 (0.08)	0.08 (0.10)
<i>Random effects estimates</i>					
Neighborhood (SE)		0.00 (0.00)	0.00 (0.00)	0.01 (0.01)	0.01 (0.01)
School (SE)		0.01 (0.00)	0.01 (0.00)	0.00 (0.00)	1.16e-07 (.)
Individual (SE)		0.18 (0.00)	0.18 (0.00)	0.12 (0.01)	0.11 (0.01)
<i>Fit Statistics</i>					
AIC (BIC)		10611.50 (10732.35)	7414.90 (7583.20)	625.24 (719.48)	286.69 (401.50)
<i>n</i>		9,036	6,198	657	300

Note. Model 3 (A-D) is the result of the CCMM with the aggregate level social capital variables and demographic variables – gender, race/ethnicity, family SES. 3A: CCMM with aggregate school social capital. 3B: CCMM with aggregate family social capital. 3C: CCMM with aggregate neighborhood social capital. 2D: CCMM with aggregate school, family and neighborhood social capital. Coefficients and parameter estimates are presented as well as standard errors (SE). *Significant effects are indicated by $p \leq 0.05$. *n* equals the number of observations for each analysis. Fit Statistics: Akaike's Information Criteria (AIC) and Bayesian Information Criteria (BIC).

Model 3B

Model 3B (Table 17) shows the results of the combination of Model 2B and the aggregate-level family social capital predictors. The addition of the aggregate-level family social capital predictors to Model 2B did not change the between-level variance for neighborhoods (0.00) and schools (0.01), and the within-level variance (0.18) for students. The results for Model 3B show that the demographic variables gender, race, parent employment, and parent income were all significant predictors ($p \leq 0.05$) of higher education academic achievement apart from for African American students ($\beta = -0.04, p > 0.05$) when aggregate school family capital was included in the analysis. As in Model 3A, academic achievement was higher among female students than male students; female students were predicted to have ($\beta = 0.10, p \leq 0.05$) higher education achievement compared to male students. Latinx students ($\beta = -0.09, p \leq 0.05$), American Indian students ($\beta = -0.12, p \leq 0.05$), and students who reported being from other races ($\beta = -0.06, p \leq 0.05$) were all less likely to graduate from college compared to White students. Asian students ($\beta = 0.08, p \leq 0.05$) on the other hand, were more likely to complete college than their White counterparts.

The results of Model 3B show that parent education was not statistically significant in this model. The results were reported as follows: students whose parents had a high school qualification or less ($\beta = 0.22, p > 0.05$), students whose parents had more than a high school qualification but not college ($\beta = 0.30, p > 0.05$), and students whose parents completed college ($\beta = 0.51, p > 0.05$). Parent income and employment were statistically significant. The odds of obtaining a higher education qualification increased by ($\beta = 0.06$) ($e^{0.06} - 1$) or 6.18% for students whose parents' income covered their bills. The expected odds of completing higher education increased. However, the expected odds of completing higher education decreased by ($\beta = -0.03$) ($1 - e^{-0.03}$) or 2.96% for students whose parents were employed full time when they were in K12 compared to those who were not employed full time.

With regards to the aggregate family social capital predictors, the results showed that parent-adolescent relationship with mother ($\beta = 0.09, p > 0.05$), parent-adolescent relationship with father ($\beta = 0.07, p \leq 0.05$), strength of the relationship between students and their mothers ($\beta = -0.05, p > 0.05$), the strength of students relationship with their fathers ($\beta = 0.03, p > 0.05$), and intergenerational closure ($\beta = 0.01, p > 0.05$) ($e^{0.01} - 1$) were all not statistically significant. This is contrary to the results of the individual-level family social capital variable. These interpreted results assume that all other variables in the model are held constant. Again, the fit statistics test for the model (AIC, BIC) indicates a slight decline over the model with only the individual-level family social capital predictors, Model 2B (from 7409.49 to 7414.90 and 7544.09 to 7583.20 respectively) indicating that the inclusion of the aggregate-level variables did not improve the model.

Model 3C

The third model in Table 17, Model 3C, included the demographic variables of gender, race/ethnicity, and family SES, as well as individual-level and aggregate-level neighborhood social capital. Similar to Models 3A and 3B, the addition of the aggregate-level predictors to this model (3C) weakened the between-level variance for neighborhoods (0.01) and schools (0.00), and also reduced the within-level variance (0.12). These results suggest that for this model, the neighborhood context contributes more to the between level variation in higher education academic achievement than schools.

Table 17 shows that for Model 3C gender was again a significant predictor of higher education academic achievement among students in the sample ($\beta = 0.08, p \leq 0.05$). For the variable race/ethnicity, only American Indian students ($\beta = -0.18, p \leq 0.05$) were less likely to graduate from college compared to White students. The results for African American students ($\beta = -0.07, p > 0.05$), Latinx students ($\beta = -0.03, p > 0.05$), Asian students ($\beta = 0.13, p > 0.05$) and students who reported being from other races ($\beta = -0.04, p > 0.05$) were all not

statistically significant. For the SES variables, the results from the Model 3C showed that the odds of obtaining a higher education qualification decreased for students whose parents had a high school qualification or less ($\beta = -0.89, p \leq 0.05$) compared to students whose parents had no education. This was also the case for students whose parents had more than a high school qualification but not a college degree ($\beta = -0.83, p \leq 0.05$). There was no statistically significance relationship for students whose parents completed college ($\beta = -0.66, p > 0.05$).

For parent income, the expected odds of completing higher education increased by ($\beta = 0.08, p \leq 0.05$) ($e^{0.08} - 1$) or 8.33% for students whose parents' income covered their bills compared to those whose parents did not. On the other hand, the expected odds of completing higher education decreased by ($\beta = -0.05, p \leq 0.05$) ($1 - e^{-0.05}$) or 4.88% for students whose parents were employed full time compared to those who were not employed full time. Results from Model 3C which included the aggregate-level neighborhood social capital predictors showed that residential stability ($\beta = 0.00, p > 0.05$), neighborhood interest ($\beta = 0.04, p > 0.05$), and neighborhood interaction ($\beta = 0.06, p > 0.05$) had no statistically significant effect on the odds of higher education academic achievement. All these interpreted results assume that all other variables in the model are being held constant. The fit statistics test for the model (AIC, BIC) indicates a decline over the model with only the individual-level neighborhood social capital predictors, Model 2C (from 620.38 to 625.24 and 701.16 to 719.48 respectively) indicating that the inclusion of the aggregate level variable did not improve the model.

Model 3D

The final model in this group of models, Model 3D (Table 17), presents the results of the CCMM with the combination of all the individual-level and aggregate-level social capital variables. Model 3D included demographic variables of gender, race/ethnicity, and family SES, as well as individual-level and aggregate-level school, family, and neighborhood social

capital. The addition of the aggregate-level predictor variables weakened the between-level variance for neighborhoods (0.01) slightly, and schools ($1.19e-07$) considerably, and also reduced the within-level variance (0.11). It is necessary to note that Stata (StataCorp, College Station, TX) had a difficult time converging the variables. It is assumed that this was due to the effect of multicollinearity. These results suggest that neighborhoods contribute more to the between-level variation in higher education academic achievement than schools. The results from Model 3D highlight the impact of all the domains of social capital on the outcome variable, higher education academic achievement.

The results from Model 3D showed that in this model gender ($\beta = 0.08, p > 0.05$) is not a statistically significant predictor of higher education academic achievement among students in the sample. The results for African American students ($\beta = -0.09, p > 0.05$), Latinx students ($\beta = -0.02, p > 0.05$), American Indian students ($\beta = -0.21, p > 0.05$) and students who reported being from other races ($\beta = -0.08, p > 0.05$) were all not statistically significant. Only Asian students ($\beta = 0.21, p \leq 0.05$) were more likely to complete college compared to their White counterparts. For the SES variables, the results from Model 3D, suggest that students whose parents completed college ($\beta = 0.16, p \leq 0.05$) were more likely to complete college compared to students whose parents had no education and students whose parents had a high school qualification or less. The statistically significant effect disappeared for students whose parents had more than a high school qualification but not a college degree ($\beta = 0.04, p > 0.05$).

For parent income, the expected odds of completing higher education increased by ($\beta = 0.14, p \leq 0.05$) ($e^{0.14} - 1$) or 15.03% for students whose parents' income covered their bills compared to students whose parents' income did not. Again, this statistical significance was not present for parent employment ($\beta = 0.01, p > 0.05$). Similarly, aggregate school social capital ($\beta = -0.04, p > 0.05$), the aggregate family social capital predictors, and the

neighborhood social capital predictors were not statistically significant. All these interpreted results assume that all other variables in the model are being held constant. The fit statistics test for the model (AIC, BIC) indicates a slight decline over the model with only the individual-level social capital predictors, Model 2D (from 274.71 to 286.69 and 359.89 to 401.50 respectively) demonstrating that the inclusion of the aggregate-level variables did not improve the model.

The overall results of all the Group 3 models show that depending on the domain of social capital included in the model, both schools and neighborhoods drive the between-level variance in higher education academic achievement. The results from the models in groups 2 and 3 also highlight the importance of the demographic variables of gender, race/ethnicity, and family SES in understanding the influence of social capital on higher education academic achievement. However, the findings from these models need to be interpreted cautiously because of the reduced sample size for the different models. Furthermore, it appears that the different domains of social capital have more of an effect on females' higher academic achievement than males. In addition, this seems to indicate that while individual-level social capital predictors have an impact on academic achievement, the same cannot be said when the variables are aggregated.

Group 4 – Models 4A, B, C, D

Table 18 presents the results of the final group of models for this study. These models (4A, B, C, D) examined the relationship between the social capital predictors and the children's agency variables. Three indicators were used to construct children's agency – the impact of sibling relationships, the impact of friendships, and how parents perceive the influence of their child's best friend. Model 4A included the demographic variables of gender, race/ethnicity, family SES, all the aggregate level social capital predictors, and the

children's agency variable related to sibling relationships. Model 4B included the demographic variables of gender, race/ethnicity, family SES, all the aggregate level social capital predictors, and the children's agency variable related to friendships and peer relationships. Model 4C included the demographic variables of gender, race/ethnicity, family SES, all the aggregate level social capital predictors, and the children's agency variable related to parent's perception of the influence of their child's best friend.

Model 4A

The results from Model 4A showed that the inclusion of the children's agency variable, sibling relationships, slightly weakened the between-level variance for neighborhoods (0.01) and schools (0.00), but did not have much of an effect on the within-level variance (0.18) when compared to the null model. These results suggest that the neighborhood context contributes more to the between-level variation in higher education academic achievement than schools in this model. Model 4A showed that the results for gender ($\beta = 0.03$, $p > 0.05$), Latinx students ($\beta = -0.09$, $p > 0.05$), Asian students ($\beta = 0.08$, $p > 0.05$), and students who reported being from other races ($\beta = -0.09$, $p > 0.05$) were not statistically significant. On the other hand, African American students ($\beta = -0.14$, $p \leq 0.05$) and American Indian students ($\beta = -0.15$, $p \leq 0.05$) were less likely to graduate from college compared to White students.

Parent employment and parent income were statistically significant predictors of higher education academic achievement in this model ($\beta = -0.09$, $p \leq 0.05$; $\beta = 0.07$, $p \leq 0.05$ respectively). This significant association disappeared for parent education and all the aggregate-level social capital variables. However, the odds of students graduating from college increased by ($\beta = 0.04$) ($e^{0.04} - 1$) or 4.08% with the quality of sibling relationships. These interpreted results assume that all other variables in the model are held constant.

Table 18: Cross-Classified Multilevel Models for Children's Agency Variables

<i>Fixed effects estimates</i>		<i>Children's Agency variables and Final Aggregate CCMM Model</i>			
		<i>Model 4A</i>	<i>Model 4B</i>	<i>Model 4C</i>	<i>Model 4D</i>
Intercept (SE)		0.06 (0.53)	-0.20 (0.36)	-0.24 (0.35)	-0.29 (0.36)
Gender	Male	Ref			
	Female	0.03 (0.02)	0.07 (0.01)*	0.08 (0.01)*	0.08 (0.01)*
Race	White	Ref			
	African American	-0.14 (0.03)*	-0.07 (0.01)*	-0.07 (0.02)*	-0.07 (0.02)*
	Hispanic (Latinx)	-0.09 (0.05)	-0.09 (0.03)*	-0.09 (0.03)*	-0.08 (0.03)*
	American Indian	-0.15 (0.06)*	-0.14 (0.04)*	-0.01 (0.03)*	-0.16 (0.03)*
	Asian	0.08 (0.05)	0.07 (0.03)*	0.07 (0.03)*	0.07 (0.03)*
	Other Race	-0.08 (0.03)	-0.08 (0.03)*	-0.09 (0.03)*	-0.08 (0.03)*
Family (SES)					
Parent Education	No Education	Ref			
	High School or less	-0.35 (0.33)	-0.01 (0.22)	0.00 (0.22)	0.01 (0.22)
	More than High School but no College	-0.26 (0.33)	0.07 (0.22)	0.08 (0.22)	0.09 (0.22)
	College Education	-0.03 (0.33)	0.29 (0.22)	0.31 (0.22)	0.32 (0.22)
Parent Income		0.07 (0.03)*	0.08 (0.02)*	0.08 (0.02)*	0.12 (0.08)*
Parent Employment		-0.09 (0.03)*	-0.05 (0.02)*	-0.05 (0.01)*	-0.05 (0.01)*
School Social Capital		0.05 (0.08)	0.06 (0.06)	0.06 (0.06)	-0.04 (0.03)
Family Social Capital					
	Parent-Adolescent Relationship (with mother)	0.015 (0.10)	0.02 (0.06)	0.04 (0.06)	0.02 (0.07)
	Parent-Adolescent Relationship (with father)	0.08 (0.10)	0.09 (0.06)	0.04 (0.06)	-0.01 (0.06)
	Strength of Relationship (with mother)	0.01 (0.06)	-0.01 (0.04)	-0.01 (0.04)	-0.02 (0.04)
	Strength of relationship (with father)	-0.02 (0.05)	0.01 (0.03)	0.03 (0.03)	0.04 (0.03)
	Intergenerational Closure	0.01 (0.02)	0.03 (0.01)*	0.04 (0.01)*	0.01 (0.01)
Neighborhood Social Capital					
	Residential Stability	0.01 (0.04)	0.01 (0.02)	0.01 (0.02)	-0.01 (0.02)
	Neighborhood Interest (in adolescent)	0.14 (0.12)	0.11 (0.07)	0.11 (0.06)	-0.06 (0.06)
	Neighborhood Interaction (with adolescent)	0.01 (0.09)	-0.08 (0.05)	-0.11 (0.05)	-0.12 (0.04)*
Children's Agency					
	Siblings Relationship	0.04 (0.01)*			
	Male Friends Relationship		-0.01 (0.02)		
	Female Friends Relationship		0.01 (0.02)		
	Parent's Perception of Friend's Influence			-0.04 (0.01)*	
<i>Random effects estimates</i>					
Neighborhood (SE)		0.01 (0.01)	0.01 (0.00)	0.00 (0.00)	0.00 (0.00)
School (SE)		0.00 (0.00)	0.01 (0.00)	0.01 (0.00)	0.01 (0.00)
Individual (SE)		0.18 (0.00)	0.18 (0.00)	0.18 (0.00)	0.18 (0.00)
<i>Fit Statistics</i>					
AIC (BIC)		2194.73 (2332.54)	6705.86 (6878.52)	7214.14 (7382.16)	7218.75 (7440.54)
<i>n</i>		1,830	5,675	6,130	6,130

Note. Model 4 (A-D) is the result of the CCMM with children's agency variables, the aggregate level social capital variables, and demographic variables – gender, race/ethnicity, family SES. 4A: CCMM, aggregate social capital, and sibling relationship variable. 4B: CCMM, aggregate social capital, and friendship relationship variable. 4C: CCMM, aggregate social capital, and friends influence variables. 4D: interaction of CCMM, aggregate social capital, friends influence variable. Coefficients and parameter estimates are presented as well as standard errors (SE). *Significant effects are indicated by $p \leq 0.05$. n equals the number of observations for each analysis. Fit Statistics: Akaike's Information Criteria (AIC) and Bayesian Information Criteria (BIC).

The fit statistics test for the model (AIC, BIC) indicates a significant improvement over the null CCMM model (from 18273.14 to 2194.73 and 18303.66 to 2332.54 respectively) showing good model fit.

Model 4B

Model 4B (Table 18) included the children's agency variable related to friendships. Similar to Model 4A, the addition of these indicators, one relating to friendships with females and the other relating to friendships with males, slightly weakened the between-level variance for neighborhoods (0.01) and schools (0.01), and did not have much of an effect on the within-level variance (0.18). These results suggest that when it comes to friendships, both the school and neighborhood contexts contribute equally to the between-level variation in higher education academic achievement. The results from Model 4B showed that academic achievement was higher among female students than male students with the inclusion of the friendship variables; female students were predicted to have ($\beta = 0.07, p \leq 0.05$) higher education achievement compared to male students. African American students ($\beta = -0.07, p \leq 0.05$), Latinx students ($\beta = -0.09, p \leq 0.05$), American Indian students ($\beta = -0.14, p \leq 0.05$), and students who reported being from other races ($\beta = -0.08, p \leq 0.05$) were all less likely to graduate from college compared to White students. Asian students ($\beta = 0.07, p \leq 0.05$), on the other hand, were more likely to complete college than their White counterparts.

The results of Model 4B also showed that while parent education was not statistically significant in this model, parent income and employment were statistically significant. For parent income, the expected odds of completing higher education increased by ($\beta = 0.08$) ($e^{0.08} - 1$) or 8.33% for students whose parents' income covered their bills compared to those whose parents income did not. However, the expected odds of completing higher education decreased by ($\beta = -$

0.05) ($1 - e^{-0.05}$) or 4.88% for students whose parents' were employed full time when they were in K12 compared to those who were not employed full time. None of the predictors for aggregate school social capital and aggregate neighborhood social capital were statistically significant. However, for family social capital, the odds of higher academic achievement increased by ($\beta = 0.03, p \leq 0.05$) ($e^{0.03} - 1$) or 3.05% for intergenerational closure. This was the only family social capital predictor that was statistically significant. Female ($\beta = 0.01$) and male ($\beta = -0.01$) friendships that could influence the academic outcomes of students were both not statistically significant. These interpreted results assume that all other variables in the model are held constant. The fit statistics test for the model (AIC, BIC) indicates a significant improvement over the null CCMM model but a decline over the previous model (4A) (from 2194.73 to 6705.86 and 2332.54 to 6878.52 respectively).

Model 4C

The third model in Table 18, Model 4C, included the demographic variables of gender, race/ethnicity, family SES, and all the aggregate social capital variables as well as the children's agency variable related to parents' perception of friend's influence. Similar to Model 4A and 4B, the addition of the children's agency variable slightly weakened the between-level variance for neighborhoods (0.00) and schools (0.01) but did not have much of an effect on the within-level variance (0.18). These results again suggest that the school context contributes a little more to the between-level variation in higher education academic achievement than neighborhoods. The results from Model 4C are very similar to those from Model 4B. In this model, academic achievement was higher among female students than male students; female students were predicted to have ($\beta = 0.08$) higher education achievement compared to male students.

African American students ($\beta = -0.07, p \leq 0.05$), Latinx students ($\beta = -0.09, p \leq 0.05$), American Indian students ($\beta = -0.01, p \leq 0.05$), and students who reported being from other races ($\beta = -0.09, p \leq 0.05$) were all less likely to graduate from college compared to White students. Asian students ($\beta = 0.07, p \leq 0.05$) on the other hand, were more likely to complete college than their White counterparts. The results of Model 4C also showed that while parent education was not statistically significant in this model, parent income and employment were statistically significant. For parent income, the expected odds of completing higher education increased by ($\beta = 0.08$) ($e^{0.08} - 1$) or 8.33% for students whose parents' income covered their bills compared to students whose parents' income did not. However, the expected odds of completing higher education decreased by ($\beta = -0.05$) ($1 - e^{-0.05}$) or 4.88% for students whose parents were employed full time compared to those who were not employed full time when the student was in K12.

With regards to the aggregate social capital predictors, in this model (4C), none of the predictors for school social capital and neighborhood social capital were significant. However, for family social capital, the odds of higher academic achievement increased by ($\beta = 0.04, p \leq 0.05$) ($e^{0.04} - 1$) or 4.08% for intergenerational closure. Parent's perception of their child's friend's influence decreased the odds of students graduating from college by ($\beta = -0.04$) ($1 - e^{-0.04} - 1$) or 3.92%. These interpreted results assume that all other variables in the model are held constant. The fit statistics test for the model (AIC, BIC) indicates a significant improvement over the null CCMM model but a decline over the previous model (4B) (from 6705.86 to 7214.14 and 6878.52 to 7382.16 respectively).

Model 4D

Model 4D, the final model in this group of models, showed the results of the interaction effect between all the aggregate-level social capital variables and friends' influence indicator. Again, these results were similar to the output from Models 4B and 4C. The addition of the children's agency variable as an interaction effect slightly weakened the between-level variance for neighborhoods (0.00) and schools (0.01) but did not have much of an effect on the within-level variance (0.18). These results again suggest that the school context contributes a little more to the between-level variation in higher education academic achievement than neighborhoods. In this model academic achievement was higher among female students than male students; female students were predicted to have ($\beta = 0.08$) higher education achievement compared to male students.

African American students ($\beta = -0.07$, $p \leq 0.05$), Latinx students ($\beta = -0.08$, $p \leq 0.05$), American Indian students ($\beta = -0.16$, $p \leq 0.05$), and students who reported being from other races ($\beta = -0.08$, $p \leq 0.05$) were all less likely to graduate from college compared to White students. Asian students ($\beta = 0.07$, $p \leq 0.05$), on the other hand, were more likely to complete college than their White counterparts. The results of Model 4D also showed that while parent education was not statistically significant in this model, parent income and employment were statistically significant. For parent income, the expected odds of completing higher education increased by ($\beta = 0.12$) ($e^{0.12} - 1$) or 12.75% for students whose parents' income covered their bills compared to students whose parents' income did not. However, the expected odds of completing higher education decreased by ($\beta = -0.05$) ($1 - e^{-0.05}$) or 4.88% for students whose parents were employed full time compared to those who were not employed full time.

With regards to the aggregate social capital predictors and the interaction effects, in this model (4D), none of the predictors for school social capital and family social capital were statistically significant. The neighborhood social capital indicator, neighborhood interaction, was the only social capital predictor that was statistically significant. Neighborhood interaction decreased the odds of students' higher academic achievement by ($\beta = -0.29, p \leq 0.05$) ($1 - e^{-0.29}$) or 25.17%. This result was similar to the interaction effect between neighborhood interaction and perception of friends' influence. In this case neighborhood interaction also decreased the odds of students' higher academic achievement by ($\beta = -0.12, p \leq 0.05$) ($1 - e^{-0.12}$) or 11.31%. These interpreted results assume that all other variables in the model are held constant. The fit statistics test for the model (AIC, BIC) indicates a significant improvement over the null CCMM model but a decline over the previous model (4C) (from 7214.14 to 7218.75 and 7382.16 to 7440.54 respectively).

The overall results of all the Group 4 models show that the children's agency variables appear to have the most impact on intergenerational closure. The results of Model 4D which contained the interaction effect only showed significance with regards to the variable on neighborhood interaction which was surprising considering that the neighborhood did not drive the between-level variance in higher education academic achievement.

Summary of Findings

The findings from all the models in this study offer insight into the impact of social capital on the higher education academic achievement of students in schools and neighborhoods in America. In some respects, the findings support prior research in the area of social capital that highlights the importance of schools, family relationships, and neighborhood characteristics on

educational success. Consistent with other studies, this current study shows that White students have higher odds of completing higher education than students from other racial and ethnic groups. This study also suggests that females more than males have an advantage when it comes to social capital and educational outcomes. However, the effects of the different domains of social capital differ for different groups of students and are impacted by the school and neighborhood contexts. In addition, this study found that parental income and occupation, more than parental education, appeared to increase the impact of the different domains of social capital on academic achievement.

The findings of this study are discussed in detail in the following chapter (chapter five). For simplicity and ease of understanding the discussion will mainly focus on answering the research questions of this study. All the models in this study are presumed to be additive by default, that is, it assumed that there are no complementarities on students' higher education academic achievement based on the effect of schools and neighborhoods. However, because it is possible that even after controlling for neighborhood or school effects, these environments may interact and have differing effects on students' academic outcomes later in life based on their neighborhood or school (Leckie, 2013), a non-additive CCMM for all the final models (Models 2D and 3D). The non-additive models allowed a random school-by-neighborhood interaction; fit statistics (AIC and BIC) were then used to compare the non-additive models with the previous models which are additive. The results showed that the additive models were the better fit and these were the models retained for this study.

Chapter Five - Discussion

Introduction

This study was designed to determine the influence of different domains and types of social capital on a student's higher education academic achievement. The study also intended to uncover which domain of social capital mattered more for higher education academic achievement. In addition, the study aimed to highlight the importance of social capital to the educational aspiration and achievement of students in the American educational system and the need to further understand that impact. While many studies have focused on specific segments of the population, for example, state or community, rural or urban adolescents, economically disadvantaged minorities or specific minority groups, etc. this study attempted to examine social capital through a more comprehensive lens.

This study specifically paid attention to how contextual factors such as school and neighborhood or community influenced the development of social capital. The study, in particular, examined the relationship of these contexts to social capital variables and how these influenced the educational achievement of students based on gender, racial identity, and socioeconomic status (SES) on a national scale. Four groups of cross-classified multilevel models, a multilevel modeling technique, were employed in answering the six research questions of this study using the Adolescent to Adult Health (Add Health) dataset. This chapter is organized as a series of sections that discuss the findings reported in the previous chapter, Chapter Four, in connection with each of the research questions.

The first section discusses the findings of this study in relation to research questions one and two: Research question one – What influence does social capital have on the higher education academic achievement of American students nationally? Research question two –

Does the social capital in the life of children aged from twelve to eighteen in the K-12 system influence their higher education academic achievement as adults? The second and third sections discuss the findings concerning research question three: What is the relationship between the types (bonding and bridging) and the domains of social capital (family, school, and neighborhood), and higher education academic achievement. The second section focuses on bonding and bridging social capital and its influence on academic achievement while the third section addresses the domains of social capital and academic achievement.

The ways in which gender and race or ethnicity influence social capital and academic achievement are addressed in section four. Research question four states: Does the influence of social capital on higher education academic achievement differ based on gender and or racial/ethnic group? The discussion in this section will tie in SES as this is a variable that directly relates to social constructs such as race and gender. Section five will focus on research questions five and six: Research question five – What impact does children’s agency have on social capital and higher education academic achievement? Research question six – Does agency produce different results for girls and boys? Little attention has been paid in the social capital literature on the impact of peer relationships on academic achievement. In this study, agency was taken to be the capacity or power that individuals have to take independent action based on choice.

The discussions in all the different sections made every effort to relate the findings with previous studies on social capital and educational outcomes, and as well as highlight relevant limitations. Before going into the discussion, I revisit the key variables used in this study and how they were developed to provide a frame through which the findings and discourse on the research questions can be better understood and evaluated.

Study Variables

Variables that were used to answer the research questions for this study were identified and selected from Waves I, II, and IV of the Add Health dataset.

Dependent Variable

Higher education academic achievement

The dependent variable for this study is from Wave IV of the Add Health data. In Wave I, participants were asked about their college aspirations. However, a proper picture of participants' academic achievement is seen in Wave IV. This was measured by a single item that asked: "What is the highest level of education that you have achieved to date?" (Variable H4ED2 in Add Health). At this time the respondents are aged 24 to 32 presuming the completion of any postsecondary aspirations made known in Wave I. The questionnaire provided a range of 14 options from eighth grade or less; some high school; high school completion; some vocational/technical training (after high school); completed vocational/technical training (after high school); some college; completion of college (bachelor's degree); some graduate school; completed a master's degree; some graduate training beyond master's degree; completed a doctoral degree; some professional education; completed professional education; and no response.

To create the dependent variable for this study, 13 of the 14 options were collapsed into two binomial outcomes; the last option of 'don't know' was ignored. The first six "no higher education academic achievement" were used to represent all respondents who did not go to college or complete college. The remaining seven responses related to "higher education academic achievement" represented all those who completed college and studied beyond a bachelor's degree. A number of research studies have linked social capital with high school

academic achievement among children (Acar, 2011; Coleman, 1988; Israel et al., 2001) noting that social capital is positively correlated with academic success. However, few researchers have made the connection between social capital and higher education outcomes. This dissertation chose to use college completion as an indicator of academic achievement because of the suggestion that network inequality within the society may be reduced if more people attended and graduated college (Andersson, 2018).

Independent Variables

The independent variables for this dissertation were gathered from Waves I and II of the Add Health study. These variables, from which some composite variables were created, were then used to evaluate the potential influence of the different domains and forms of social capital on the academic achievement of students in Wave IV. These variables were all measured at the individual level and then aggregated to calculate group responses.

Family Social Capital

Family social capital was measured by creating several composite variables made up of indicators relating to how much time the adolescent spends with her or his parents, the strength of the relationship, and information sources parents employ that benefit their children. Table 7 shows the composite variables for family social capital and the questions from Add Health that were used as indicators for these. Parent-adolescent relationship was measured from adolescent responses to activities done with their mothers and their fathers in the past four weeks. The questionnaire provided a range of responses options – “no”, “yes”, “don’t know”; there were also options for “refused”, “legitimate skip”, and “not applicable”. All responses apart from “no” and “yes” were coded as missing. This led to the creation of a binary variable with 0 indicating the

student did not engage in activities with their mother or father and 1 indicating that the student engaged in activities with their mother or father.

The strength of parent-adolescent relationship was measured from adolescent responses to how much they felt close to their mother and father, and how much they felt that their parents cared about them. Again, a binary variable was created from the questions from the Add Health study which had a range of nine possible options from “not at all”, “very little”, “somewhat”, “quite a bit”, “very much”, “refused”, “legitimate skip”, “don’t know”, and “not applicable”. The first three options were used to indicate 0 = “no strength in the parent-adolescent relationship”; the next two options were used to indicate 1 = “strength in the parent-adolescent relationship”; and last four options were coded as missing. Intergenerational closure or the information sources that parents use to improve the opportunities for educational success for their children was measured from parents’ response to how many parents of their children’s friends they spoke with in the last four weeks. The Add Health study provided for options of “none” to up to six parents. A binary variable was created with 0 representing “no conversation” and 1 representing “had conversations with one or more parents”.

Neighborhood/Community Social Capital

The variables used to depict the neighborhood/community characteristics are found in Waves I and II of the Add Health dataset (see Table 8). Residential stability is a measure of the length of stay of adolescents and their families in their local communities. Residential stability was measured from the adolescent’s response to the question in Wave II of the Add Health study asking how long s/he had lived in the neighborhood. A binary variable was created with 0 representing six months or less of living in the neighborhood and 1 representing seven to twenty-four months of living in the neighborhood.

Interest of the community/neighborhood members in the adolescent, neighborhood interest, was created from adolescent “true” or “false” responses to the indicator on which stated “people in this neighborhood look out for each other?” Responses that were not true = 1 or false = 0 where coded as missing. Neighborhood interaction which refers to adolescents’ interaction with members of their community or neighborhood was created from adolescents’ response to the query “you know most of the people in your neighborhood”. Again, this variable was a binary variable with a true = 1 or false = 0 option. All other options, “refuse”, “don’t know”, and “not applicable” were coded as missing.

School Social Capital

In Add Health, the following questions were asked in Wave I regarding the participants school: how much do you agree or disagree with the following statements: “you feel close to people at your school; you feel like you are part of your school; you are happy to be at your school; the teachers at your school treat students fairly; you feel safe in your school; and, how much do you feel that your teachers care about you? These questions were be combined to create one composite variable representing school social capital (see Table 9). In the Add Health study, the questions related to school social capital were on a five-point likert scale; the options were 1 = “strongly agree”, 2 = “agree”, 3 = “neither agree or disagree”, 4 = “disagree”, and 5 = “strongly disagree”. These were reordered so that the most negative response had the lowest value and the most positive response had the highest value. The options for “refused”, “legitimate skip”, and “don’t know” were coded as missing.

Discussion

The Influence of Social Capital on Academic Achievement

The first two research questions for this dissertation applied to the influence of social capital on academic achievement. Research question one was – What influence does social capital have on the higher education academic achievement of American students nationally? This question sought to examine, in general, the influence of social capital on academic outcomes in America. The results of this study provide strong evidence that social capital influences the higher education academic achievement of students in America. This finding is consistent with existing studies on social capital and academic achievement (Acar, 2011; Ashtiani & Feliciano, 2018; Coleman, 1988; Putnam, 2000; Salloum et al., 2018). This study showed that the different domains of social capital when considered independently were mostly associated with improved odds of higher education academic achievement for American students. However, different domains of social capital in different contexts influenced academic achievement differently.

School social capital at the individual level (see Table 15, Model 2A) was significantly correlated with higher education academic achievement. For every additional increase in school social capital, the expected odds of higher education academic achievement increased by 7.25%. The same pattern held for four of the indicators of family social capital (Parent-Adolescent Relationship with father – 7.25%, Strength of Relationship with mother – 5.13%, Strength of Relationship with father – 2.02%, Intergenerational Closure – 3.05%) (see Table 15, Model 2B) and one of the indicators of neighborhood social capital (Residential Stability – 7.25%) (see Table 15, Model 2C). When all domains of social capital were combined in Model 2D (Table 15), again having school social capital, as well as having a parent-adolescent relationship with

mother and intergenerational closure, two indicators of family social capital increased the odds of higher education academic achievement by 7.25%, 19.72%, and 5.13% respectively.

Neighborhood interaction, an indicator of neighborhood social capital decreased the odds of higher education academic achievement by 8.61%.

Scholars like Acar (2011), Coleman (1988), Dika and Singh (2002), and Putnam (2000) have found positive effects of social capital on academic achievement. Dika and Singh (2002) for example, in their review of literature on social capital and education, concluded that in many cases, there is a positive and significant relationship between social and educational achievement and attainment. Coleman (1988) also noted how good relationships between parents and their children aim in academic success. These types of relationships include parents investing in their children's education by helping with school work, and having conversations with their children on their expectation of their attending college. Putnam (2000) reports the importance of school social capital to the development of children and the creation of networks that support not just the academic advancement of children but also aim in community building.

Schools are the main institutions of learning for children. Children spend a substantial amount of time daily interacting with peers and teachers and picking up social cues in schools. It is therefore not surprising that in Models 2A and 2D, models which included the school social capital predictor, this variable was significantly associated with increased odds of college completion. This, therefore, goes to show in line with other studies that schools are social environments and schools influence the accumulation and use of social capital, and school social capital should, therefore, matter in understanding student's academic outcomes. Similarly, this study showed the importance of family social capital as a predictor of a student's academic achievement (Ashtiani & Feliciano, 2018). The quantity (parent-adolescent relationship) and

quality (strength of relationship with parents) of family social capital were significant predictors of students' academic achievement (Models 2B and 2D). Likewise, intergenerational closure was also a significant predictor of academic achievement (Models 2B and 2D). Finally, neighborhood social capital in the form of residential stability and neighborhood interactions (Models 2C and 2D) were significantly correlated with a student's academic achievement.

Unexpectedly, at the aggregate-level, this study found that none of the social capital variables were statistically significant. The individual analysis discussed above was based on the correlation of the mean responses of each individual to the questions on the different domains of social capital. The aggregate scores, on the other hand, were calculated as the combination of the means of all respondents surveyed for each of the domains of social capital. These results suggest that there is no consensus among individuals on their social capital for each of the different indicators in the models in group three (Table 16). This finding calls attention to the arguments on whether social capital resides in the individual or group. Whereas many scholars believe that social capital can have both individual and aggregate components (Alder & Kwon, 2002; Bhandari & Yasunobu, 2009), both Bourdieu (1986) and Coleman (1990) view it as the property of individuals even though it can be of benefit to groups. Fukuyama (1995) and Putnam (2000) on the other hand believe that social capital lies in groups and is a resource that is of benefit to the collective.

It appears participants of the Add Health study view social capital as the property of individuals. The results suggest that many of these students and most possibly their families and those that they interact with see the social capital they possess for their advantage. A reason for this could lie in the way the questions on the Add Health survey were framed. For example, in creating the indicators for family social capital, items relating to activities the respondent had

done with their parents such as “talked about schoolwork or grades”, and “talked about other things you’re doing in school” were used. Similarly, the variable for neighborhood social capital on neighborhood interaction was created from questions which asked “you know most of the people in your neighborhood” and “in the last month, you have stopped on the street to talk with someone who lives in your neighborhood”. These were all activities that the individual had control over or personally invested in supporting the notion that social capital is an individual thing or a private good (Claridge, 2018). In summary, the results from the social capital predictors in this study indicate that while social capital at the individual level enhances the odd of completing higher education, collective social capital does not make a difference to higher education academic achievement.

The next few paragraphs discuss research question two – Does the social capital in the lives of children aged from twelve to eighteen in the K-12 system influence their higher education academic achievement. Of interest in this question which is similar to research question one, is the context of social capital for this study’s population as well as the role of social capital itself as children transition from adolescence to adulthood. The results of this study show that in the same way that the different domains of social capital influence the academic achievement of students, so do the different environments in which social capital is being created and used. Despite having to drop the family context from the CCMMs in the study, the null model that included the family context (Model 1B, Table 14) showed that 3% of the variance in students' higher education academic achievement was attributable to families. The other traditional null models (Table 14) showed that 3% of the variance in students' higher education academic achievement was attributable to schools (Model 1A) and 4% of the variance in students' higher education academic achievement was attributable to neighborhoods (Model 1C).

When schools and neighborhoods were considered together, more of the variance in higher education academic achievement was attributed to schools (2%) compared to neighborhoods (1%). In all models, however, the amount of variance attributed to students (19%) stayed the same.

This study, unlike previous studies that focused on only one context when studying social capital and educational outcomes, showed that without considering both contexts, it is possible to over- or under-estimate contextual effects. The findings of this study showed that schools appeared to matter more for higher education academic achievement when only school social capital is considered (Model 2A). When only family social capital is considered, again, schools mattered more for higher education academic achievement compared to neighborhoods (Model 2B). However, when neighborhood social capital only and all other domains of social capital were considered (Models 2C and 2D), neighborhoods mattered more than schools. This suggests that neighborhoods make more of a difference than schools to the influence of all domains of social capital on higher education academic achievement.

While these values appear moderate with the larger proportion of the variation in academic achievement at the student level, they are still relevant in understanding the effect that social environments have on educational comes. It is important to reiterate that the contextual effects reported above would not have been uncovered without the use of cross-classified multilevel models. The three theorists reviewed in this paper – Bourdieu, Coleman, and Putnam – to varying degrees touch on the various contexts in which social capital operates. These scholars all note how the sometimes complex relationships that occur in the schools, families, and communities play a major role in fostering the building of networks, trust, and reciprocity (Bourdieu, 1986; Coleman, 1988; Putnam, 2000). However, the studies they report on (Coleman,

1988; Putnam 1995, 2000) use traditional hierarchical models in which students are directly nested in schools or families, or neighborhoods.

Reporting on recent studies done using multilevel models, Rasbash, Leckie, Pillinger, and Jenkins (2010) note that while some studies highlight the importance of neighborhoods on student's educational achievement (Raudenbush, 1993 in Rasbash et al., 2010), others (Leckie, 2009) suggest that neighborhood mobility has a negative association with academic achievement. Leckie (2009) reveals that schools continue to influence the educational success of students even after they have left the school and moved to another. However, there is some caution in comparing these studies as they refer to different contexts and samples of students (Rasbash et al., 2010). In this current study, the results showed that when the demographic variables and the social capital predictors were included in the models, they explained a large proportion of the variation in higher education academic achievement that lies between schools and neighborhoods.

In summary, this study shows that social capital is a valuable concept in understanding the role that different contexts have on educational outcomes. As noted earlier in this dissertation, social capital is context-specific and some environments may be more beneficial to the influence of social capital on academic achievement than others (Dufur, Parcel, & Troutman, 2013). This study also shows that without multilevel modeling techniques, it becomes easy to ignore, or misattribute the effects of different contexts. From a policy point of view, this is an important observation because it reinforces the need to ensure that education policy takes into consideration the wider social environment in which students reside.

Bonding and Bridging Social Capital and Academic Achievement

The third research question in this study was: What is the relationship between the types (bonding and bridging) and domains of social capital (family, school, neighborhood) and higher education academic achievement? This section focuses on the first part of the question which deals with bonding and bridging social capital. As mentioned earlier, this study considers family social capital as bonding social capital based on the fact that family relationships are usually close-knit and are often seen as internal ties (Alder & Kwon, 2002; Putnam, 2000). School and neighborhood social capital are used to represent bridging social capital because these interactions are somewhat weaker and more diverse ties and the bonds between individuals in these relationships are usually not as strong as in family relationships (Alder & Kwon, 2002; Putnam, 2000). However, as mentioned previously, bonding and bridging relationships are not mutually exclusive.

Dufur et al. (2016) refer to family social capital as the bonds that parents have with the children. This relationship includes, among other things, the time that parents spend interacting with their children in activities that enhance their well-being. Coleman (1990) notes how the relationship parents have with their children develops from birth and has a role in shaping the children's interests as they progress to adulthood. The presence of a strong relationship between parent and child is a source of social capital that is necessary for the success of children (Coleman, 1990). The findings from this study showed that bonding social capital in the form of parent-adolescent relationship with father increased the odds of higher education academic achievement by 7.25% (Model 2B). Similarly, mothers that had developed strong relationships with their children increased the child's odds of higher education academic achievement by 5.13% and fathers that had developed strong relationships with their children increased the

child's odds of higher education academic achievement by 2.02%. By spending time with their children, parents can increase the strength of the relationship they have with their children and this, in turn, allows their input on academic matters to be more relevant.

Intergenerational closure also plays an important role in building social capital in the family. Coleman (1990) emphasizes that social relationships that demonstrate closure are sources of social capital. When parents do not have closure with other parents and their children, they lose opportunities to be more aware of what is going on in their children's lives and also work with other parents to guide and control their children's activities. Intergenerational closure also provides a way for parents to assess the influence of their children's peers; whether these are a hindrance or support the goals and aspirations they have for their children (Carbonaro, 1998; Coleman, 1990). In this study, increased levels of intergenerational closure increased the odds that students would complete higher education by 3.05% (Model 2B). This is in line with other research studies that have examined this issue theoretically and empirically. This current study has shown that students can use the bonding relationship with their parents as a tool to increase their academic advantage and opportunities by benefiting from the time their parents invest in their education.

An unexpected finding from this study was that the parent-adolescent relationship with the mother was not significant. This was surprising considering that previous studies have often highlighted the importance of mother-child relationships over the father-child relationship in fostering student success. Coleman (1988, 1990) for instance implies that mothers are more important for developing the social capital children need for socio-economic progress. Coleman, a proponent of traditional families assumes that single-parent families which are mostly female-headed households are a disadvantage for children in terms of providing the type of positive

influence and structure that they need. Coleman also illustrates how the strength of the relationship between a child's parents increases intergenerational closure, but does not pay attention to the quality of the relationship. This study raises questions about these assumptions. Are single-parent households inferior to traditional family settings in fostering social capital and academic achievement?

Interestingly, when both bonding and bridging social capital were included in the model (Model 2D), bonding social capital in the form of adolescent-parent relationship with mother became significant and greatly increased the odds of higher education completion by 19.72%, higher than any of the other indicators for bonding social capital. In this model (2D), intergenerational closure was the only other indicator of bonding social capital that was significant and increased the odds of higher education completion by 5.13%, slightly higher than in Model 2B. The change in the effect of parent-adolescent relationship with mother suggests that the presence of other domains of social capital were necessary to make this indicator significant. This again raises some questions and may lend support to some of Coleman's postulations. Is the time a mother is able to devote to her children determined by the number of children she has? Does having access to support systems through other domains of social capital improve the relationship that mothers can have with their children? It is also possible that when a mother works full-time, it may impact on the kind of relationship she is able to develop with her children. Answers to these questions form the basis of future research.

Bridging social capital in the form of school social capital and residential stability was also predicted to increase the odds of higher education academic achievement for students in this study. Models 2A and 2D showed that bonding social capital in the form of school social capital increased the odds of college completion by 7.25%. Similarly, residential stability increased the

odds of college completion by 7.25% (Model 2C). This is consistent with previous research (Putnam, 2000) that bridging social capital improved academic achievement. Bridging social capital in the form of school social capital shows how relationships with individuals that a student shares the same goals with (peers and teachers) aid in achieving educational success. This finding has a useful implication for supporting diversity in schools and communities. Bridging social capital is associated with heterogeneous groups in which there are many differences, but it also calls attention to how shared goals can bridge the gap between diversity.

In terms of residential stability, this study showed that the odds of increased higher education achievement was directly related to the length of stay of the student in the neighborhood. Students who had stayed in their neighborhoods for more than seven months had increased odds of academic achievement (7.25%, Model 2C). However, it can be argued that living in a neighborhood for longer allows for the creation of roots and can qualify as bonding social capital. As noted previously, bridging relationships can become bonding relationships and this might be the case with neighborhood stability. Research shows that community social capital is important for individual achievements (Putnam, 1995; 2000). The non-significance of the other indicator of bridging social capital in the form of neighborhood interest was inconsistent with the literature on social capital in neighborhoods. Research in this area has shown that neighborhoods can affect access to resources and in turn educational outcomes. One way in which this happens is through the ability of members of neighborhoods or communities to provide the opportunity for interaction and the exchange of information (Coleman, 1988; Putnam, 1995; 2000; Sanbonmatsu et al., 2006). The non-significance of neighborhood interest may be due to multicollinearity with the predictor for neighborhood interaction (Gupta, 2000).

Finally, bridging social capital in the form of neighborhood interaction reduced the odds of higher education achievement for students by 8.61% (Model 2D). This was again inconsistent with existing literature (Coleman, 1988; Putnam, 1995; 2000; Sanbonmatsu et al., 2006). It is important to point out that this indicator was only statistically significant in the model that included all the social capital variables i.e. both bonding and bridging variables. This finding suggests that in examining bridging social capital as it relates to neighborhoods, residential stability appears to be the most important factor influence academic achievement. However, when bridging social capital is considered along with bonding social capital, for neighborhood indicators, neighborhood interaction becomes more of a stronger and observed influence. The effect of neighborhood interaction could be due to the lack of positive role models for students within these neighborhoods or communities (Maurizi et al., 2013). So, while students may know people in the neighborhood and they may interact with them regularly, the interaction in most instances does not lead to students prioritizing education.

Domains of Social Capital and Academic Achievement

This section discusses the second part of research question three: What is the relationship between the types (bonding and bridging) and domains of social capital (family, school, neighborhood) and higher education academic achievement? The domains of social capital examined in this study are school, family, and neighborhood social capital. To a large extent, the previous section has already discussed these findings in light of bonding and bridging social capital. On the domain level, the results of this study reinforce the usefulness of school social capital for higher education academic achievement (Model 2A). Even when combined with other domains of social capital, school social capital remains statistically significant (Model 2D). This

statistical significance may be associated with a sense of community based on shared norms and values that some schools can develop in their students, teachers, and parents, which further strengthens the connectedness that students feel to the school. The findings of this study support that of many other studies that have found that school social capital is an important predictor of children's academic achievement (Ashtiani & Feliciano, 2018; Coleman, 1988; Dufur et al., 2013; Salloum et al., 2018).

In addition, all the indicators of family social capital were all statistically significant predictors of higher education academic achievement. For students in this study, the odds of academic success increased with family social capital. Coleman's (1988, 1990) concept of social capital highlights the importance of the family to successful educational outcomes. Students who spend time with their parents – both mothers and fathers – who believe that their parents genuinely care about them, and whose parents know the parents of their friends have higher odds of higher education academic achievement than students whose parents do not have the same type and level of relationship with them. This is why parents must understand that developing social capital in their children through spending time with them and taking an interest in their school activities increases their opportunities for academic success. While prior research acknowledges that family social capital can be modified by both financial and human capital, Coleman (1988) says that these have little or no impact on educational outcomes without cultivating strong relationships within the family.

This study did show that parental income was particularly relevant to family social capital. Model 2B and Model 2D show that parental income was statistically significant with the inclusion of the variables that made up family social capital. This suggests that the impact of family social capital is attenuated by parent income at the individual level. However, at the

aggregate level, this relationship did not apply; no elements of family social capital were associated with parent income, even though parent income was statistically significant in this group of models (Models 3A – D). This finding highlights a notion by a number of scholars (Portes, 1998) that social capital is better measured at the individual level. The idea of aggregating individual responses and equating them to represent the group or community response can be problematic. Investigating the interaction effect between family social capital and parent income and its impact on higher education achievement was not one of the aims of this dissertation. However, it may be helpful for other studies to examine this relationship in more detail as the way the variables were combined in this study may have masked important connections between family social capital and family income and their impact on educational outcomes.

Findings from this study also support the notion that neighborhood social capital influences academic achievement (Israel et al., 2001; Sanbonmatsu et al., 2006). While only two of the indicators for neighborhood social capital in this current study were statistically significant, as mentioned above, they both showed the importance of neighborhood factors in academic success. Residential stability increased the odds of students graduating from college by 7.25% and neighborhood interaction decreased the odds of students completing college by 8.61%. In their work Sanbonmatsu et al. (2006) found that neighborhoods have the ability to “affect the educational norms, values, and resources in the community outside of school” (p. 2). However, not all community or neighborhood norms are beneficial for the students that live in them and while students reported knowing most of the people in their neighborhood, and stopping to talk to most people in their neighborhood, this relationship did not improve their odds of academic achievement; it actually decreased the odds.

The findings from this current study, in terms of neighborhood interaction, validate arguments made by other researchers that childhood environment, and individual and family attributes, are more important for success than neighborhood conditions alone (Sanbonmatsu et al., 2006). Simply put, while it may be assumed that having close ties with members of one's community and/or neighborhood (neighborhood interaction) is a positive thing, the nature of these ties are also as important. Portes (1998) raises the issue of the negative impact of social capital and the fact that social capital should not always be seen as good. Indeed, this study shows that even though students had strong or good interactions with people in their neighborhood, this sociability did not equate to college completion. Putnam (2000) alludes to the fact that neighborhoods are an important source of social capital as strong communities build networks, trust, and reciprocity. However, he notes that social cohesion in neighborhoods is currently on the decline. This study suggest that this may not necessarily be the case; what may be missing from communities/neighborhoods in this study may be the public good aspect of social capital.

This study operationalizes social capital as the trust and reciprocity that exist within and between relational networks in society (illustrated in Figure 2), and these features underlie all the three domains of social capital discussed above. These features also recognize that social capital has functional and structural components that are essential to its proper conceptualization and understanding (Bourdieu, 1986; Coleman, 1988; Field, 2003; Fukuyama, 1995; Goddard, 2003; Putnam, 2000). The results of this study support Goddard's (2003) view that including both the functional and structural aspects of social capital in studies increases the likelihood of finding a relationship between increased social capital and educational outcomes. Generally, these findings confirm the usefulness of all domains of social capital for higher education academic

achievement. This is encouraging in that if a particular domain of social capital is absent other domains can provide the social capital that students need to succeed academically in terms of higher education achievement.

The results from Model 2B, while somewhat unexpected, as not all indicators of family social capital were statistically significant, suggest that the relationship between mothers' and their children was not statistically significant; this was the only indicator for family social capital that was not statistically significant (Model 2B). This may have been influenced by the inclusion of female-headed households in the study. When mothers are the primary breadwinners, they do not have as much control over the time they can allocate to activities with their children. This reasoning is justified as the strength of the relationship with mothers was statistically significant (Model 2B). Unfortunately, this study does not make a distinction between single-parent households and homes in which there are two parents or adults. This study also does not examine the issue of age or gender with regards to parent-adolescent relationships. Another question this finding raised was whether there are some social conditions that may be hindering mothers from building a relationship with their children? Future research should consider investigating if age or gender influences the parent-adolescent relationships with mothers and fathers, if this has any bearing educational outcomes, and if there are social conditions that may act as a barrier to relationship building.

Social Capital, Gender, Race/Ethnicity, and Academic Achievement

Prior research on social capital has largely ignored the issue of gender. Gidengil and O'Neill (2006) and Morrow (1999) note that the social capital literature has mostly been blind to gender differences in how social capital is acquired, distributed, and used by groups in society.

This current study examines gender as it relates to each of the domains of social capital and links this to bonding and bridging social capital. The results of the study show that for all the domains of social capital tested – school, family, and neighborhood – the odds of female students completing a college education was higher than that of male students. For every additional increase to school and family social capital, the expected odds for higher education completion for females increased by 10.52% more than male students (Model 2A and 2B). For every additional increase to neighborhood social capital, the expected odds for higher education completion for females increased by 8.33% more than male students.

One of the few research studies on social capital that includes gender showed that girls benefit more from family social capital than boys when it comes to test scores. In this study, in contrast, both genders received the same returns on test scores from school social capital. However, another study concluded that the influence of family social capital on test scores was greater than school social capital for both girls and boys (Dufur et al., 2016). The findings from this current study indicate that girls appear not only to develop more supportive structures generally, but they also tend to utilize these networks to influence their educational outcomes more than boys. There may be a reason for this: Norris and Inglehart (2003), believe that few relationships are gender-neutral and are dependent on the resources of time, money, and knowledge which may not be evenly distributed. This study suggests that this may be true.

While it is not possible to know exactly what causes the difference in the odds of higher education achievement between female and male students, research shows that female students have been consistently outperforming their male counterparts for some time (Driessen & van Langen, 2013; Voyer & Voyer, 2014). However, researchers highlight the impact of SES on the underachievement of male students compared to female students. Focus is also directed at which

group of female students are outperforming in education (Martino, 2008). This current study does not examine the higher education achievement of female students in a way that can shed light on the socioeconomic status and race of the female students; this is something that future can explore. However, understanding the composition of the female student groups that are achieving more than male students will help educators and policy makers target interventions appropriately. While there is no evidence for this, the fact that more resources have been targeted at increasing the participation of girls and women in education could also have a role to play in their increased academic achievement.

Norris and Inglehart (2003) also comment on the way women and men form bonding and bridging social capital. The authors state that women tend to form bonding relationships in groups that are homogenous, comprised of only women, and develop bridging relationships in groups that are heterogeneous. This can be linked to their care giving roles in the family and community. On the other hand, men form both bonding and bridging relationships in heterogeneous groups. This assumption may also be tied to the gendered nature of the labour market where men tend to dominate in middle to higher level careers. Though this study ties bonding social capital to family social capital and bridging social capital to school and neighborhood social capital, it is not possible to confirm the patterns that girls and boys use for social interaction. However, it is possible that the way that girls and boys interact may have been responsible for the difference seen in the odds of higher education completion between boys and girls. It is important to highlight that the finding on gender difference switched statistical significance to males though this was negative when all domains or types of social capital were included in the model (Model 2D).

Boys are the reference gender in this study therefore most of the discussion has been on girls/females. However, the findings of this study show that where the results were statistically significant for males (Models 2C and 2D), the odds of boys completing college when neighborhood social capital was included in the model increased by 124.79% (Model 2C) and decreased 37.49% when all the domains of social capital were included in the model. The results for Model 2C in which residential stability was the only statistically significant indicator for neighborhood social capital refer to White male students whose parents had low SES in terms of no education, the students' parents' income could not cover all their bills, and the students' parents' were not employed full time. This suggests that what matters more for males when it comes to neighborhood social capital might be race/ethnicity and how long they have lived in the neighborhood rather than the other variables. Model 2D which includes all the domains of social capital had at least one of the indicators statistically significant and also referred to White male students whose parents had low SES in terms of no education, the students' parents' income could not cover all their bills, and the students' parents' were not employed full time. However, in this case, males have decreased odds of college completion thus supporting the argument that they do not benefit as much as females when it comes to social capital and academic success.

Similar to previous studies investigating social capital and race/ethnicity, this study showed that non-white students apart from Asian students had less access to social capital than White students. At the individual level, the inclusion of school social capital in Model 2A reduced the odds of African American, Latino, American Indian, and students from other races completing college by 6.76%, 9.52%, 11.31%, and 8.61% respectively compared to White students. The inclusion of family social capital, on the other hand, had no impact on African American students but reduced the odds of completing college by 8.61%, 11.31%, and 5.82%

compared to White students for Latino, American Indian, and students from other races respectively (Model 2B). For neighborhood social capital (Model 2C), only American Indian students experienced reduced odds of college completion (17.30%) compared to White students. In Model 2D, when all the domains of social capital were included the odds of American Indian students graduating college was further reduced to 20.55%. Asian students were the only group of students whose odds of completing college increased compared to White students in Models 2A, 2B, and 2D.

These findings on race/ethnicity suggest that all the domains of social capital play a role in influencing higher education achievement for American students. However, it appears that school social capital is a greater influencer than family and neighborhood social capital. This finding is in line with the literature on social capital and race reviewed in this study which linked race/ethnicity to social class or socioeconomic status (Caldas & Cornigans, 2015; Letki, 2008; Strayhorn, 2010). American history is fraught with race divides in education institutions and while many people believe that every student now has equal opportunity in education, this is not quite the case. There remain questions and debates about the achievement and opportunity gaps between White and non-white students. The experience that many minority students have in school continue to be substantially different from those of their white peers. Data continues to show that despite efforts for more equality, many educational institutions continue to remain segregated.

While for most of the models in this current study the relationship between parent education and academic achievement was not statistically significant, Models 2C and 2D showed that students whose parents had less than a college degree had decreased odd of college completion and students whose parents had a college degree had increased odds of college

completion respectively. For children born into poverty and living in poor and troubled neighborhoods, the schools they attend will most likely be highly segregated and poorly resourced. For immigrant children, their status as non-English speakers means that they enter the U.S. school system as English Language Learners (ELL) which will impact negatively on their performance in school. Many of these children will have parents that do not have a college degree and though they may want the best education for their children, may not necessarily have the social capital required to navigate the education landscape. All these are examples of the lack of opportunity that some children enter into school with; many of whom are low income from historically disadvantaged minority groups (African America and Latinx). Apart from those mentioned above, Ladson-Billings (2013) notes how the unequal education practices of the early 19th century were carried on even after the 1954 U.S. Supreme Court decision in *Brown v. Board of Education*. While *de jure* segregation may have been tackled by the Courts, *de facto* segregation was largely left untouched because of the value of liberty and some of the effects of that decision are responsible for the educational inequities seen today.

To better understand the effect of socioeconomic status (SES) this study examined three unique elements of parental wealth or class individually; education level, income level, and employment status which are all highly correlated (Broer et al., 2019; Sirin, 2005). Surprisingly, parent's education had no effect on the odds of students completing higher education when examining school and family social capital. For these two domains of social capital, school and family, parent income and employment status were the only statistically significant predictors of higher education completion. Students whose parents' income could cover all their bills had increased odds of completing college than students whose parents' income could not. However, full-time employment was negatively related to higher education academic achievement. The

finding on parent employment suggests that parents working full are not able to provide their children with the support that they require to succeed academically. This is contrary to Coleman (1988) who notes that family SES provides resources both at home and in school that aids the academic performance of students. This study's findings, therefore, suggest that researchers need to consider different factors when examining SES and its relationship with the student's academic achievement (Sirin, 2005).

Children's Agency and Academic Achievement

This study explored a neglected area of social capital by looking at the relationship between children's agency and social capital. This section responds to research questions five and six: What impact does children's agency have on social capital and higher education academic achievement? And, Does agency produce different results for girls and boys? In this current study, children's agency is defined as the capacity or power that individuals have to take independent action based on choice. This study showed that when it comes to children's agency, the relationship that the students in this study have with their siblings and parent's perception of their children's friends had an influence on higher education academic achievement. The odds of completing college increased by 4.08% the more time children spent with their siblings (Model 4A). However, none of the aggregate social capital variables in this model (Model 4A) influenced the effect.

While friendships, both female and male, had no impact on the odds of achieving a higher education qualification, the inclusion of the friendship indicators in Model 4B highlighted the impact of intergenerational closure on higher education academic achievement. There were no statistically significant effects for the other aggregate social capital variables. The influence of

intergenerational closure was again seen in Model 4C when the indicator for parents' perception of their children's friendships was included in the model. In this case (Model 4C), when parents had a bad perception of their children's friends' influence, the odds of achieving a higher education qualification decreased by 3.92%. Similar to Model 4B, there were no statistically significant effects for the other aggregate social capital variables. The interaction effect between parents' perception of their children's friends' influence and all the aggregate social capital variables yielded only one statistically significant effect with regards to neighborhood interaction. Neighborhood interaction decreased the odds of graduating from college by 11.31%.

This study confirms that children's agency has an impact on social capital in terms of intergenerational closure and neighborhood interaction. This finding is not surprising considering that children have a lot to do with how their parents interact with the parents of their friends and other people in their neighborhood or community. Stanton-Salazar (2016) assertion that it is difficult to disentangle adolescents' social capital from that of their parents or the network of adults directly related to them appears to be justified. Therefore, while it may be true that in some instances children turn to their networks to gain information (Leonard, 2005), these networks are usually tied to those of their parents. This study suggests that children and the friendships they develop play a role in determining the domain of social capital that influences higher education academic achievement. Unexpectedly, sibling relationships did not have the same statistically significant effect. This non-significance could have resulted from the multicollinearity between the friendship and sibling indicators.

There might be a need for future research to further examine the difference between sibling and friendship relationships, and if these relationships on their own have different impacts on educational outcomes and social capital separately. The statistical significance of

friendships on intergenerational closure was not surprising on the other hand because as Coleman (1988) noted the interaction that occurs between students, their friends, their families, and members of their community amounts to social capital that can promote academic success. Offer and Schneider (2007) also call attention to the quality of friendship relationships rather than the number of friends. However, the gender of friends does not seem to matter. This current study's results provide evidence to support this notion (Model 4B). On the other hand, for each of the children's agency indicators, only the demographic variables (gender, race/ethnicity, family SES) were significantly associated with social capital and academic outcomes. Female students had higher odds of higher education completion compared to male students with the inclusion of sibling and friendship relationships.

Chapter Six – Conclusion

Conclusion

The purpose of this study was to determine the influence of different domains and types of social capital on a student's academic achievement. The study also intended to uncover which domain of social capital mattered more for academic achievement. The present study aimed to highlight the importance of social capital to the educational aspiration and achievement of students in the American educational system and the need to further understand that impact. To achieve this, a total of four groups of models were developed using data from the Add Health survey which began in 1994-1995. Add Health was designed to examine the behaviors and health of children when they were aged twelve to eighteen (Wave I and II) and followed them till they were adults (Wave III, IV, and V). This current study specifically used data from Wave I, II and IV at which time the average age of participants was 29 and it was expected that by this time a large number of them had fulfilled their aspirations of completing higher education.

The Add Health dataset was considered suitable for this study as the different waves of the survey called attention to the diverse social situations in which students/adolescents reside. CCMMs were used to estimate the simultaneous effects of the contexts of schools and neighborhoods as these both have an impact on a student's educational outcomes. This study has shown that when students have social capital as adolescents, it influences their academic achievement as adults. This study has also shown that the different domains of social capital impact higher education academic achievement. Unquestionably, social capital is important for improving the educational achievement of children who have access to it. This study has shown that the effect of the different domains of social capital (schools, family, and neighborhood) on students' higher education academic achievement vary depending on the context in which they

are acting. While some indicators of social capital had a statistically significant influence on higher education academic achievement, other indicators had none.

This observation is encouraging because it shows that interventions that are targeted at schools or neighborhoods are still able to influence educational outcomes once social capital is available. It also suggests that school social capital is just as important as family social capital and neighborhood social capital. This is consistent with other studies (Acar, 2011; Coleman, 1988; Plagens, 2011; Strayhorn, 2010) that have shown how social capital in the family and school led to higher retention rates and educational outcomes for students, and ultimately the development of human capital. This current study also suggests that females tend to benefit more than males with regard to the different domains and types of social capital. In almost all of the models, females had higher odds of higher education academic achievement. As mentioned earlier, this observed effect, female students achieving more than male students, is a trend that has been ongoing for some time.

This study underscores the role of school, family and neighborhood social capital as strong influences of American students' educational outcomes. Specifically, school social capital and intergenerational closure were the two indicators of social capital that were significant in both school and neighborhood contexts. Coleman (1988) highlights how the support that students receive from the interaction of their parents with parents of their friends and other members of the community provides social capital resources that contribute to their academic success. These interactions occur both in schools and neighborhoods/communities. This current study also revealed that students who had a relationship with their parents had greater odds of higher education academic achievement than those who did not have a relationship with their parents. The strength of the relationship was also shown to be important. Strong parent-adolescent

relationships provide opportunities for parents to share their values with their children and convey their aspirations for academic success to their children in a conducive and emotionally stable environment.

Finally, this study found evidence to support the existence of a significant but negative cross-level interaction effect between children's agency in the form of parent's perception of a child's friend's influence and the neighborhood social capital indicator – neighborhood interaction. Students whose parents saw their friends as a bad influence decreased their odds of completing college by 11.31%. The fact that students' friendships had an interaction effect on their neighborhood interaction experiences which in turn influence their educational achievement confirms arguments made by researchers like Leonard (2005) and Morrow (2006) that adolescents are active agents in developing their own social capital. Most research on social capital and educational outcomes tends to focus on adults and how their social capital impacts on the education of their children. Little attention is given to children as the source of their own social capital. This current study suggests that the research needs to aware that adolescents' personal relationships and not only those forged through their parents, can influence their academic outcomes.

Indeed, research that fails to consider the wider environment that students inhabit will ignore the impact of social capital and misattribute all the different structural and functional elements in society that influence their educational outcomes making some things seem more important than they really are. This study shows that both schools and neighborhoods, as well as school, family, and neighborhood social capital are equally responsible for the higher education academic achievement of American students. Dufur et al. (2013) note that social capital in different contexts are closely related and in some circumstances work together to increase

educational success. However, Coleman highlights that the possible reason why there is little tangible investment in social capital programs may be because social capital is an investment in others that may not always lead to direct benefits for those making the investment, and as many scholars have noted, may not be easy to measure and produce as evidence.

Implications for Policy, Interventions, and Research

The current climate in the public education sector in the U.S today is portrayed as being dismal. Labaree says “Americans love to beat up on their schools” in the opening sentence of his 1997 article titled *Public Goods, Private Goods: The American Struggle Over Educational Goals* (Labaree, 1997, p.40). His article notes the list of complaints against public schools and says that these have led to many reform efforts. However, Labaree believes that the problem of public education is “fundamentally political” and related to the purpose of education being perceived either as a public good that encourages social capital or as a private good linked to social mobility for the individual (Labaree 1997, p.40). Plagens (2011) examines the effect of social capital on student performance and alludes to the need for federal education policy to consider “that success in education may require resources beyond those that are normally thought to be important” (p.61).

Debray and Blankenship (2016) note that No Child Left Behind (NCLB) has not been effective in lowering the achievement gap. Ladd (2017) and other scholars have also leveraged numerous valuable critiques of NCLB, but omit that NCLB did not place value on social capital, and on education as a public good. NCLB as a federal education policy focused on accountability at the expense of other aspects and factors affecting the lives of students, including developing relationships and trust with other members of the society that lead to shared values and social

capital. If America is to raise 21st-century citizens with the skills needed to succeed in a fast-changing global economy where communication and collaboration are as important as science and math, then social capital needs to be considered in educational reform policies. While the Every Student Succeeds Act (ESSA) which replaced NCLB provided for the social capital focused initiative, Promise Neighborhoods (PN), the results of this dissertation show that more still needs to be done. Horsford and Sampson (2014) highlight that the PN programs look at ways of increasing a student's social capital because the initiative emphasizes that academic achievement is impacted by what happens outside of school.

This study is premised on the fact that though students are shaped by their formal education and what happens in schools, they are also part of a complex society with many social relationships outside of the school system. These relationships equally affect their performance and interactions. The issue, however, is that because PN began as a stand-alone program; and with the reduced role of the federal government in education in the states there is no incentive for states to require its institutions, organizations and non-profit entities to adopt the initiative. Implementing PN may also prove expensive so that without the guarantee of federal funds, it may be difficult for states or individual organizations to execute alone. As the findings from this dissertation have shown, education policy that is focused solely on schools will not be effective in improving student higher education academic achievement. In light of this, every attempt must be made to invest in building social capital in children through the other social influences in their environments such as their families, communities, and peer networks.

In terms of opportunities for future research, one of the limitations of this current study has been the use of secondary data. While Add Health has offered a wide range of variables to use to represent social capital, it cannot be ignored that the dataset was not originally intended to

measure social capital. Future research could, therefore, create predictors that specifically measure the constructs of school, family, and neighborhood social capital. This would allow for a larger number of measures that focus on the elements of networks, reciprocity, and trust inherent in social capital theory. Future research could also consider the use of mixed-methods research design, one that incorporates qualitative research to better understand how students acquire and use social capital towards their higher education academic achievement. The use of qualitative methods lets new research probe further why the interaction effect between neighborhood interaction and parents' perception of their children's friends reduced the odds of students graduating college (Model 4D).

Limitations of the Study

As already mentioned, this study has a number of limitations that should be noted. First, the Add Health data used in this current study were collected for a purpose other than understanding social capital among adolescents and adults. Also, because the information for the first wave of the study was gathered over two decades ago, it is difficult to say if the responses given at that time would be the same in the present society. Second, as noted previously, social capital is a complex concept to understand and measure. In this study, although a number of the measures or indicators used for the different domains of social capital (school, family, and neighborhood) had significant influences on higher education academic achievement, some other measures not considered in this current study could likely have shown stronger positive significance. It is also possible that a different set of measures could show a negative significance with regard to the outcome variable. While this dissertation made every effort to ensure that the measures used truly represented the domains of social capital discussed, there is

still so much disagreement amongst scholars and researchers on the theory of social capital that this could be debatable.

Third, based on the sampling strategy used in Add Health, the number of adolescents per school was larger than the number of respondents per neighborhood and family. A large number of families and neighborhoods had only one respondent. Recall that the family context was dropped from this study due to the number of participants per family. This calls to question the validity of findings as they could be a reflection of the sampling design. There is also the issue of sampling weights that could not be applied because none have been developed for CCMMs. Although many other studies that have used CCMM have omitted using weights, more studies in which CCMM are used in the context of schools and neighborhoods will help determine how much sampling has an impact on the results of CCMMs.

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Appendix

U.S. Census Bureau – Race and Ethnicity

White	Black or African American	American Indian or Alaska Native	Asian	Native Hawaiian or Other Pacific Islander
Europe	Africa	North America	Far East	Hawaii
Middle East		South America	Southeast Asia	Guam
North Africa		Central America	Indian	Samoa
				Pacific Islands

Source: <https://www.census.gov/mso/www/training/pdf/race-ethnicity-onepager.pdf>