ABSTRACT

Title of Document: BEFORE IT'S TOO LATE: AN ANALYSIS OF THE IMPACT OF PARENTAL INVOLVEMENT AND MIDDLE SCHOOL CULTURE ON EIGHTH GRADERS' ACADEMIC PREPAREDNESS FOR COLLEGE BY THE TWELFTH GRADE.

Erin Ward Bibo, Ph.D., 2012

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This study used a general two-level model to explore data from the National Education Longitudinal Study of 1988-1992 to determine the extent to which student-level (parental involvement) and school-level (school culture of college preparedness) factors individually and collectively influenced eighth grade students' eventual academic preparedness for college by the time they reached the twelfth grade. The study's models supported my foundational hypothesis that the middle school years play a critical role in preparing students for college. That said, the impacts of both parental involvement and school culture, at the middle school level, appear to have a very trivial influence, on average, on students' eventual levels of academic readiness for college. The study's models' random effects results, however, paint a slightly more complex picture. These resulted indicated that, at some schools within the study, some or all of the four parental involvement variables had a statistically

significant impact on students' eventual ACRES scores. While I was unable to determine whether these significant effects were mostly positive or negative, it certainly supports the notion that parental involvement indeed plays an important role in preparing students to be academically prepared for college. Additionally, the study determined that students' middle school grades had the most positive influences on ACRES scores, and student poverty levels and first-generation status were associated with the most negative impacts on students' academic preparedness for college. The study concludes by calling on policymakers, educational leaders, teachers, and parents to focus their time, attention, and resources on the middle school years to improve students' eventual academic readiness for college.

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By

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Dissertation submitted to the Faculty of the Graduate School of the
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Dedication

To William C. Ward, whom I wish was still here to celebrate this achievement with me, for teaching me to always give it my best shot.

To Anna, for inspiring me every day with her persistence and determination, and for making me want to be the best person I can be. I cannot wait to watch you grow and achieve your dreams.

To David, for his unwavering support and encouragement, for knowing me better than anyone else, and for never letting me do anything but my best.

To my parents, for instilling in me a belief that I could do anything I put my mind to, and sharing with me their passion for education.

To C, for her company, as I wrote this dissertation and so many other papers.

And to P, for pulling me through.

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I am also grateful to Drs. Scott Thomas and Ronald Heck for so graciously sharing their knowledge of SPSS, multilevel modeling, and multiple imputation with me. Their generosity of time and expertise, and their clear passion for their profession and scholarship was genuinely inspiring. Dr. Cliff Adelman was also incredibly generous with his knowledge of the ACRES measures, and how to incorporate them within my

models. Dr. Cheryl Holcomb-McCoy provided extremely helpful insights on school counselors, and the important role they play in creating a culture of college preparedness.

Paulina Perez Mejias, who is one of the most generous and genuine people I have ever met, spent many mornings and afternoons providing critical feedback on my models and methodologies. She was also always there for me whenever my confidence waivered, and kept me motivated by never once doubting that we would graduate side by side. Jee Shim Deogracias patiently walked me through the multiple imputation process, and regularly amazed me with her deep and nuanced understanding of multilevel models. Dr. Wendell Hall provided tough love whenever I needed it, and never let me forget to keep my eyes on the prize.

I am incredibly grateful to my family and friends for their unwavering support, love, and encouragement. Thank you for expecting so much of me, and for being there for me during this journey. And finally, to the boys of Washington Jesuit Academy. Every week, during study hall, you reminded me why this dissertation was important. You taught me more than you'll ever know, and I believe in each and every one of you. Show the world what you can do.

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Chapter 1: Introduction

Nearly half of eighth grade students are not academically prepared for college by the time they reach the twelfth grade (Cabrera & LaNasa, 2001). This statistic is gravely concerning. When students are academically prepared for college, they are more likely to complete high school, and apply to, enroll in, and successfully complete a four-year degree (Adelman, 1999; Adelman, 2006; Cabrera, Burkum, & LaNasa, 2005; Cabrera & LaNasa, 2001; Swail, Cabrera, Lee, & Williams, 2005). Steps taken at both school (Corwin & Tierney, 2007; Horn & Nunez, 2000; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994) and at home (Cabrera & LaNasa, 2001; Catsambis & Beverige, 2001; Catsambis & Garland 1997; Fan & Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Simon, 2001; Stage & Hossler, 1989; Sui-Chu & Willms, 1996) can positively influence children's preparedness to academically succeed in college.

The purpose of this study is to examine to what extent practices of parental involvement, a school's culture of college preparedness, and the joint interaction of such factors promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade. Through the analysis of national longitudinal survey data, I followed a representative sample of eighth grade students, their parents, teachers, and school principals over a four-year period of time to answer the following three research questions:

1. To what extent do practices of parental involvement promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?

2. To what extent does a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?

3. To what extent does the joint interaction of practices of parental involvement and a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?

The Importance of Academic Preparedness for College

This study builds upon extant literature by viewing school students through the lens of their academic preparedness for college. Being academically qualified for college significantly increases a student's chances of graduating high school, applying to college, and successfully attaining a four-year degree (Adelman 1999; Adelman, 2006; Cabrera & LaNasa, 2001; Cabrera, Burkum, & LaNasa, 2005; Swail, Cabrera, Lee, & Williams, 2005). Researchers assert that in order to become and remain academically qualified for college, students must achieve a specific series of outcomes during their high school years. These steps, which include enrolling in and completing rigorous courses, earning strong grades, and taking standardized college admissions tests, (Adelman, 1999; 2006; Berkner & Chavez, 1997; Horn & Nunez, 2000), align well with the factors college admissions counselors consider when evaluating applications for enrollment (NACAC, 2008, 2011).

Cabrera & LaNasa (2001) found that 46% of twelfth graders were not academically prepared for college. These students were less likely to apply for or enroll in college than their peers who possessed higher levels of academic preparedness. Moreover, if these poorly prepared students enrolled in a postsecondary institution, they were less likely to persist through and complete their

degrees than peers with higher levels of academic preparedness for college. Given both the significant political, sociological, and economic benefits associated with college completion (Baum, Ma, & Payea, 2010; Murnane & Levy, 1996; Pascarella & Terenzini, 2005; U.S. Department of Education, 2008), it is imperative to identify ways to enhance students' academic preparedness for college, and increase the number of students equipped to succeed in college.

The Middle School Years

The middle school years are a critical period during students' academic lives. Students' academic actions and choices during these grades highly influence important outcomes including placement in a given high school academic track, as well as their eventual prospects for qualifying for and going to college (Balfanz, 2009; Balfanz, Herzog, & MacIver, 2007; Cabrera & LaNasa, 2000; Camblin, 2003; Hossler, Braxton, & Coopersmith, 2003; Rumberger, 1995; Wimberly & Noeth, 2005).

Notably, a vast majority of middle school students - 82% - aspire to attend college (Wimberly & Noeth, 2005). However, given that over eight percent of students drop out of school annually (NCES, 2010), and that only 33% of high school graduates enroll in four-year college (NCES, 2008), a significant gap exists between students' college-going aspirations and their actual attainment outcomes. As such, *something* appears to be getting in the way of students' postsecondary attainment goals.

Even though the middle school years play such a central role in students' eventual academic and college-going outcomes, relatively little research focuses on

this time during a student's life (e.g. Adelman, 1999; 2006; Berkner & Chavez, 1997; & Perna & Titus, 2005). Among the research that does focus on middle school students, most only study outcomes pertaining to students' grades (Lee & Smith, 1993; Phillips, 1997; Sui-Chu & Willms, 1996) or high school graduation rates (Balfanz, 2009). As such, a real need exists for studies to explore the relationship between the middle school years and students' eventual college qualification, enrollment, and completion outcomes.

The Influence of Parental Involvement on Student Outcomes

Among both middle and high school students, parental involvement is positively associated with improved academic (Fan & Chen, 2001; Lee & Croninger, 1994; Simon 2001; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Sui-Chu & Willms, 1996) and college-going (Cabrera & LaNasa, 2001; Stage and Hossler, 1989; Perna and Titus, 2005) outcomes. As such, a number of studies recommend improving inputs of parental involvement to increase student success outcomes (e.g., Cabrera & LaNasa, 2000; Corwin & Tierney, 2007; Lee & Croninger, 1994; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Perna & Titus, 2005). That said, few studies focus specifically on parental involvement at the middle school level (e.g. Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002), and no known quantitative parental involvement studies focus on outcomes of academic preparedness for college.

This study applied a revised scope and definition of parental involvement, building upon past works that have discovered that practices of parental involvement are positively linked to increased outcomes of student achievement and college-going

(e.g., Catsambis & Garland, 1997; Fan & Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Stage & Hossler, 1989; Sui-Chu & Willms, 1996). First, while some works identify the efforts of schools (e.g., Catsambis & Garland, 1997; Fan & Chen, 2001; Sui-Chu & Willms, 1996) or children (e.g., Lee & Croninger, 1994; Sui-Chu & Willms, 1996) to engage parents as instances of parental involvement, this study focused the construct to include only actions and behaviors initiated by parents. This decision to narrow the construct to parental reports of their own involvement is supported by survey methodologists Todorov (2003) and Tourangeau, Rips, and Rasinski (2000), who found that proxy reports (e.g., those from students or school administrators) are less accurate than individuals' assessments of their own actions and behaviors.

The study's measure of parental involvement also targeted factors that capture parents' actions and behaviors only, and did not take into account their beliefs or perceptions. Actions and behaviors are concrete, and can be witnessed and measured by the parent as well as those around them. Even though studies by Lee and Croninger (1994), Fan and Chen (2001), Perna and Titus (2005), and Stage and Hossler (1989), also incorporate parents' aspirations, beliefs, or ideas into their parental involvement constructs, this study did not do so, because parents do not necessarily act upon or proactively share with their children such goals or thoughts (Catsambis & Garland, 1997; Cunningham, Erisman, & Looney, 2007). Finally, the construct is also limited to parents' actions and behaviors that directly relate to their child's academics. It is not inherently clear, for example, that parents' rules about their child's television viewing, chores, or behavior at school, are intrinsically linked

to a goal of improving their children's academic outcomes. This decision to narrow the construct to parents' academically- focused actions is supported by Simon (2001), who found that parents' efforts regarding their child's non-academic behaviors were negatively associated with student achievement.

The Influence of School Culture on Student Outcomes

In addition to parental involvement, increasing attention has been paid to the role schools play in enabling students to be academically prepared for college. While research concurs that schools bear a significant influence on students' educational outcomes (e.g., Cabrera & LaNasa, 2000; Cabrera & LaNasa, 2001; Corwin & Tierney, 2007; Lee & Croninger, 1994; Lee & Smith, 1993; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994; Swail, Cabrera, Lee, & Williams, 2005), little agreement appears to exist as to which school characteristics best promote students' achievement and academic readiness for college.

This study reframed the concept of school culture by fusing together key factors within the models of academic press (Lee, Smith, & Croninger, 1997; Phillips, 1997 & Shouse, 1994), college-going culture (Corwin & Tierney, 2007; McClafferty McDonough, & Nunez, 2002), talent development (Madhere & MacIver, 1996), and school restructuring (Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997). Individually, these studies identified structural, organizational, and human resource practices that schools and their leaders can implement to influence student success outcomes. However, even though these studies share the same focus, relatively little overlap exists between the factors highlighted within each of their

models. As such, this dissertation attempted to bring together the findings of each work in an effort to create a comprehensive illustration of theoretical best practices of how school organization and effort can promote positive student achievement outcomes.

This work also built upon extant research on parental involvement (Cabrera & LaNasa, 2001; Catsambis & Beverige, 2001; Catsambis & Garland 1997; Fan & Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Simon, 2001; Stage & Hossler, 1989; Sui-Chu & Willms, 1996) and school culture (Corwin & Tierney, 2007; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994) by analyzing the joint interaction of each factor on student's academic preparedness for college. To my knowledge, this is the first quantitative study to analyze the joint interaction between such home and school inputs on students' eventual academic preparedness for college. The absence of this approach in quantitative studies is striking given the ample evidence within qualitative research regarding the importance of the collaboration between home and school to ready students for college (e.g., Corwin & Tierney, 2007; McClafferty, McDonough, & Nunez, 2002; and Madhere & MacIver, 1996).

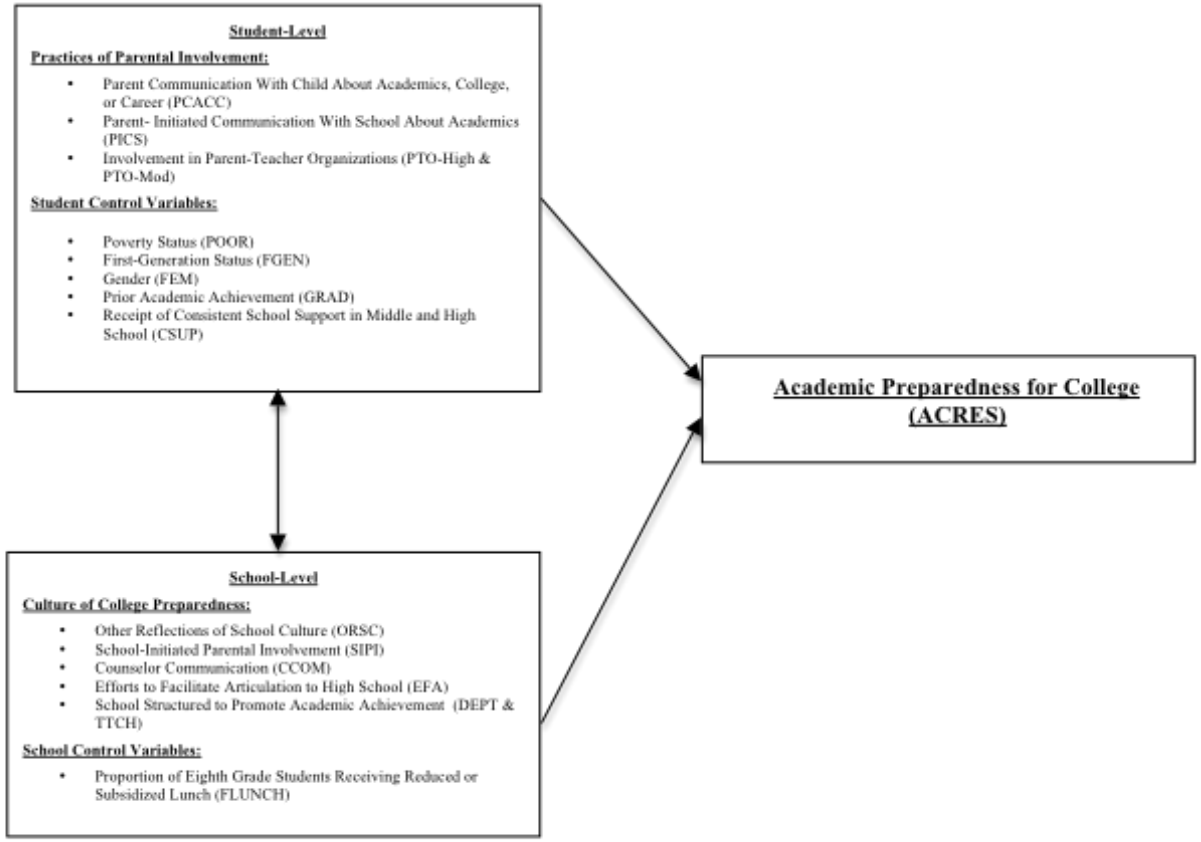
Conceptual Model

While past research has focused on middle school students (Balfanz, 2009; Balfanz, Herzog, & MacIver, 2007; Cabrera & LaNasa, 2000; Camblin, 2003; Hossler, Braxton, & Coopersmith, 2003; Rumberger, 1995; Wimberly & Noeth, 2005), as well as on the individual impacts of parental involvement (Cabrera & LaNasa, 2001; Catsambis & Beverige, 2001; Catsambis & Garland 1997; Fan &

Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Simon, 2001; Stage & Hossler, 1989; Sui-Chu & Willms, 1996) or school culture (Corwin & Tierney, 2007; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994) on student outcomes, this study built upon extant literature by addressing these factors collectively. Moreover, the study applied redefined constructs of parental involvement and school culture that clearly focus on outcomes of student's academic preparedness for college. These strategic approaches contributed to the study's unique scope and structure, as well as its ability to address specific gaps within current scholarship on factors influencing student success outcomes.

The study's conceptual model is based on extant literature on academic preparedness for college, the middle school years, and the influences of both parental involvement and school culture on student achievement. The model postulates that students' academic preparedness for college (ACRES), an outcome measured at the twelfth grade, is influenced through a longitudinal process by both student and school level factors captured during the middle school years. It specifically focuses on student-level influences in the form of parental involvement and the school-level influences in the form of school culture of college preparedness. The model also suggests that a student's academic preparedness for college is influenced by both individual and interactive inputs of parental involvement and school culture of college preparedness.

Figure 1: Final Conceptual Model



Organization of Dissertation

This dissertation is organized into five chapters. The second chapter provides a comprehensive review of literature relevant to the study. Specifically, it focuses on previous studies exploring the relationship between both parental involvement (e.g. Cabrera & LaNasa, 2001; Catsambis & Beverige, 2001; Catsambis & Garland 1997; Fan & Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Simon, 2001; Stage & Hossler, 1999; Sui-Chu & Willms, 1996) and school culture (e.g. Corwin & Tierney, 2007; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994) and student achievement outcomes. I draw upon these works to inform and craft the constructs of parental involvement and school culture of college preparedness I use within this study's research models.

Chapter 3 discusses the research methods applied to conduct the analysis. It details and provides my rationale behind using a general two-level model to explore the extent to which student-level (parental involvement) and school-level (school culture of college preparedness) factors influence students' eventual academic preparedness for college to answer its three research questions. It also provides important information on the study's data source, the National Education Longitudinal Study of 1988-1992 (NELS:88-92), which was designed to measure the characteristics, behaviors, and test scores of a nationally representative group of nearly 25,000 eighth graders from over 1,000 private and public schools (Curtin, Ingels, Wu, & Heuer, 2002). Finally, the third chapter provides the reader with a

step by step review of the processes I used to prepare and clean the data, and create the variables and constructs used to conduct the study's analysis.

Chapter 4 presents the results of the analysis. It reviews the findings of all of the study's models, and compares these findings to the study's initial hypotheses. The study's models first indicated that the middle school years play a critical role in preparing students for college. That said, it suggested that the impacts of both parental involvement and school culture, at the middle school level, appeared to have a very trivial influence on students' eventual levels of academic readiness for college. These findings refuted the study's hypotheses that factors of both parental involvement and school culture would have a positive influence on students' academic preparedness for college. Additionally, even though students' academic preparedness for college varied significantly across schools within this study, the interaction between parental involvement and school culture played a negligible role in that variation. This finding also refuted one of the study's primary hypotheses, that the joint interaction of parental involvement and school culture would have a positive influence on students' levels of academic preparedness for college. Within this study. students' middle school grades had the most positive influences on academic preparedness for college, and student poverty levels and first-generation status were associated with the most negative impacts on students' academic preparedness for college.

Finally, Chapter 5 discusses how the findings support or contradict extant literature, and suggest how the findings can influence research, practice, and policy. The chapter also discusses how this study builds upon and advances existing

scholarship on middle school students, academic preparedness for college, parental involvement, and school culture. Finally, it acknowledges critical limitations of the study, which should be taken into account when interpreting its findings.

Chapter 2: Literature Review

Literature suggests that the process of becoming academically prepared for college begins as early as the middle school years (Balfanz, 2009; Balfanz, Herzog, & MacIver, 2007; Cabrera & LaNasa, 2000; Camblin, 2003; Hossler, Braxton, & Coopersmith, 2003; Rumberger, 1995; Wimberly & Noeth, 2005), and is a function of influences from both the home (Cabrera & LaNasa, 2001; Catsambis & Beverige, 2001; Catsambis & Garland 1997; Fan & Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Simon, 2001; Stage & Hossler, 1999; Sui-Chu & Willms, 1996) and school (Corwin & Tierney, 2007; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994). Because of these collective findings, this dissertation focused on the extent to which the individual and joint influences of parental involvement and school culture of college preparedness influence outcomes of academic readiness for college among middle school students.

Academic Preparedness for College

Being academically qualified for college significantly increases a student's chances of graduating high school, applying to college, and successfully attaining a four-year degree (Adelman 1999; Adelman, 2006; Cabrera & LaNasa, 2001; Cabrera, Burkum, & LaNasa, 2005; Swail, Cabrera, Lee, & Williams, 2005). Researchers assert that in order to become and remain academically qualified for college, students must achieve a specific series of outcomes during their high school years. Berkner and Chavez (1997), for example, report that students' college qualifications are

directly linked to their high school grade point average (GPA), academic rank, and standardized test scores. Similar to Berkner and Chavez's college qualification index, Adelman's (1999; 2006) ACRES measure, a composite of twelfth graders' academic preparedness for college, captures students' GPA, high school rank, and aptitude test outcomes. In addition to those measures, however, ACRES also accounts for the quality and intensity of the high school curriculum in which students were enrolled. The strategy of taking into account school curriculum for explaining readings for college is also supported by Horn and Nunez (2000), who found that students who took advanced mathematics courses in both middle and high school were more likely to enroll in college.

The three major components of the ACRES academic preparedness composite – high school rank and GPA (Berkner & Chavez, 1997; Geiser & Santelices, 2007; NACAC, 2008), curricular intensity (NACAC, 2008, 2011), and aptitude test scores (Willingham, Pollack, & Lewis, 2000) have also been found in separate literature to be highly predictive of college preparedness and enrollment. In fact, college admissions counselors consistently report relying heavily on each of such factors when making their enrollment choices (NACAC, 2008, 2011). More importantly, however, Adelman (1999; 2006) and Swail, Cabrera, Lee, and Williams (2005) found ACRES to be the best pre-college predictor of bachelor's degree attainment among high school graduates.

The Middle School Years

The middle school years are a critical period during students' academic lives. Students' academic actions and choices during these grades highly influence

important outcomes including placement in a given high school academic track, as well as their eventual prospects for qualifying for and going to college (Balfanz, 2009; Balfanz, Herzog, & MacIver, 2007; Cabrera & LaNasa, 2000; Camblin, 2003; Hossler, Braxton, & Coopersmith, 2003; Rumberger, 1995; Wimberly & Noeth, 2005).

Both Cabrera and La Nasa (2000) and Hossler, Braxton, and Coopersmith (2003) view the college choice experience as a three-stage process, which Cabrera and La Nasa (2000) visualize as beginning in the seventh grade, and continuing through a student's enrollment in college. The first stage of the process, predisposition, is primarily aspirational in nature; during this period of time, a student begins to establish his or her educational and occupational goals, and think about how the two might be related. For instance, a student who aspires to become a lawyer might learn that he or she will need to pursue both college and law school, and hone his or her analytical, reading, writing, public speaking, and logic skills to help prepare for the profession. As such, knowing during the middle school years how one needs to prepare to qualify for a future occupational goal will help students and their parents make the right curricular and other academic choices during high school.

Notably, a vast majority of middle school students - 82% - aspire to attend college (Wimberly & Noeth, 2005). However, given that over eight percent of students drop out of school annually (NCES, 2010), and that only 33% of high school graduates enroll in four-year college (NCES, 2008), a significant gap exists between students' college-going aspirations and their actual attainment outcomes. As such, *something* appears to be getting in the way of students' postsecondary attainment

goals. What takes place in the middle school classroom sheds some important light on this situation. Students who are enrolled in rigorous curriculum during middle school are more likely to earn better grades in high school, and to seek out information about, be more academically prepared for, and apply to four-year colleges than their classmates not enrolled in academically challenging courses during the middle school years (Cabrera & LaNasa, 2000; Wimberly & Noeth, 2005). Unfortunately, most middle school students underestimate the importance of their middle school coursework, and miscalculate what courses they need to take during middle school to qualify for advanced level courses in high school (Wimberly & Noeth, 2005). Moreover, students who cannot identify how their middle school coursework relates to or prepares them for their future are more likely to drop out of school than their peers who proactively make such connections (Rumberger, 1995).

Even though the middle school years play such a central role in students' eventual academic and college-going outcomes, relatively little research focuses on this time during a student's life. The highly important studies by Adelman (1999; 2006), Berkner and Chavez (1997), and Perna and Titus (2005) on students' college preparation and enrollment, for example, all analyze students during and after high school. Among the research that does focus on middle school students, most only study outcomes pertaining to their grades (Lee & Smith, 1993; Phillips, 1997; Sui-Chu & Willms, 1996) or high school graduation (Balfanz, 2009). As such, a real need exists for studies to explore the relationship between the middle school years and students' eventual college qualification, enrollment, and completion outcomes.

Parental Involvement

Research has shown that parental involvement is critical in enabling middle-school students' academic readiness for college. Cabrera and LaNasa (2001), for example, observed that parental involvement during the middle school years translated to increases in children's high school completion and college application and enrollment rates. Among both middle and high school students, parental involvement is positively associated with improved academic (Fan & Chen, 2001; Lee & Croninger, 1994; Simon 2001; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Sui-Chu & Willms, 1996) and college-going (Cabrera & LaNasa, 2001; Stage and Hossler, 1989; Perna and Titus, 2005) outcomes. As such, a number of studies recommend improving inputs of parental involvement to increase student success outcomes (e.g., Cabrera & LaNasa, 2000; Corwin & Tierney, 2007; Lee & Croninger, 1994; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Perna & Titus, 2005). That said, the way in which the concept of parental involvement is defined varies substantially from study to study.

Fan and Chen (2001) conducted a meta-analysis of twenty-five studies on the relationship between parental involvement and student achievement. Noting that the construct has not been clearly defined and appraised in past works, Fan and Chen concluded that the concept of parental involvement could be narrowed down to five categories: 1) parental expectations/aspirations, 2)parental communication with their child about education-related issues, 3) parental supervision of their child at home, 4) parental involvement in school activities, and an 5)"other" group. Fan and Chen combined these five types of parental involvement into one coefficient, and found

that its effect on a child's grades were both positive and significant. Broken down specifically, however, the five types of involvement had varied levels of impact on children's grades, with parental expectations and involvement in school activities having the most significant effects, and with communication about educational-related issues and supervision at home having smaller effects. As such, Fan and Chen's work highlights that some practices of parental involvement seem to be more effective in influencing positive student achievement outcomes than others. This general finding is supported by Simon (2001), who found parental actions relating to their child's non-academic behaviors were negatively associated with student achievement outcomes. Similarly, Perna and Titus (2005) found that parents' efforts to promote their children's participation in extracurricular cultural programs during high school had no effect on their eventual enrollment in college.

Like Fan and Chen (2001), studies by Stage and Hossler (1989) and Lee and Croninger (1994) also emphasize the importance of parents' expectations of their child's educational attainment on students' academic performance and college-going outcomes. In fact, Stage and Hossler (1989) found that parents' aspirations for their child had a stronger influence on students' own aspirations for college than the students' high school grades or experiences. That said, it is difficult to say with any certainty that parents proactively share with their children the expectations they hold for their eventual educational attainment. Cunningham, Erisman, and Looney (2007), for example, found that while 87% of surveyed middle school parents believed that their child would go to college, only 45% had taken any proactive steps to facilitate or encourage their child's college-going outcomes. Similarly, in a separate study,

Catsambis and Garland (1997) determined that even though 91% of surveyed parents of eighth graders expected their child to attend college, only 51% had made any effort to proactively save for such a significant expense.

Sui-Chu and Willms (1996) applied a similar rubric to define parental involvement as Fan and Chen (2001), although they did not include parental expectations within their model. The researchers identified four categories of parental involvement: 1) home discussion, which included parent/child conversations about academic programs or activities, 2) school communication, which focused on both parent and school efforts to communicate with one other about a child's academic and behavioral outcomes, 3) home supervision, which measured the extent to which parents supervise or establish rules about homework and home behaviors, and 4) school participation, a measure of parents' efforts to volunteer at their child's school. They determined that three of the four categories: home discussion, home supervision, and school participation, all had positive, statistically significant impacts on student achievement in math and reading.

Acknowledging that parents' background characteristics often influence the frequency and quality of their involvement, several studies (e.g., Lee & Croninger, 1994; Perna & Titus, 2005; Stage & Hossler, 1989) also incorporated parents' educational attainment levels into their definitions of parental involvement. Stage and Hossler (1989), for example, found that the children of parents with high levels of educational attainment were more likely to earn higher GPAs than their peers whose parents had lesser education levels. Useem (1992), Lareau (1987), Cunningham, Erisman, and Looney (2007), Rowan-Kenyon, Bell, and Perna (2008), and Cabrera,

Terenzini, Springer, Yaeger, Pascarella, and Nora, (1996) found evidence that parents with lower levels of educational attainment displayed behaviors that were less proactive in and less informed about promoting their child's educational outcomes than parents with college degrees. However, because a parent's educational attainment is more of a reflection of his or her background rather than a proactive, ongoing, action or behavior, other studies (e.g. Cabrera & LaNasa, 2000; Phillips, 1997; Shouse, 1994; Sui-Chu & Willms, 1996) incorporate it as a student-level control variable, either as a freestanding factor, or within a composite SES measure.

Working from the assumption that parental practices and behaviors vary across different demographic groups, Perna and Titus (2005) defined parental involvement using both a cultural and social capital lens. Developed by Bourdieu (1986), cultural capital is, in its most essential form, "institutionalized…high status cultural signals (attitudes, preferences, formal knowledge, behaviors, goods, and credentials) used for social and cultural exclusion" (Lamont & Lareau, 1988, p 156). Children from highly resourced family backgrounds might, for example, be more likely to have a readily available understanding of vocabulary words, because their highly educated parents are more likely to use such words in their everyday language at home. Conversely, the children of high school dropouts may not have as regular exposure to such vocabulary and language use, and experience the exclusion to which Lamont and Lareau refer. Perna and Titus (2005) measured cultural capital according to parents' educational attainment levels, their expectations for their child's educational attainment, the language spoken at home, and the child's level of participation in cultural activities.

Social capital, according to Bourdieu (1986), is, "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" (p. 248). In reality, possessing the networks and relationships of or similar to the elite class are typically viewed as more preferable, or having the potential to reap greater benefits. Using another real-world example, the children of college graduates can take advantage of their parents' networks, which often include fellow college graduates and individuals employed within skilled professions. Perna and Titus (2005) measured social capital according to the frequency with which parents discuss academics with their child, the extent to which parents enforce academic-related rules at home, the frequency of parent-initiated interactions with their child's school, and the extent to which parents interact with the parents of their children's friends.

Perna and Titus (2005) found within their cultural capital measure, that only parents' educational attainment levels and expectations for their child's educational attainment had a statistically significant influence on students' college enrollment outcomes. Interestingly, they found that parents' efforts to involve their child in extracurricular cultural activities had no significant impact on children's eventual enrollment in college. Among the study's social capital measures, parents' efforts to discuss academics with their child and with their child's school were both associated with increased outcomes in children's college enrollments. Parents' efforts to volunteer at their child's school were also related to increased college enrollment outcomes. Conversely, the authors found that parents' efforts to acquire knowledge

about their child's education had no association with students' college enrollment outcomes.

An increasing body of literature (e.g. Catsambis & Garland, 1997; Simon, 2001) adheres to Epstein's (2001) parental involvement framework, which identified six specific types of parental involvement: 1) parenting, 2) communicating, 3) volunteering, 4) learning at home, 5) decision making, and 6) collaborating with community. Even though these categories are quite broad, each is associated with specific actions and behaviors (Henderson & Mapp, 2002). Because Epstein provided detailed programs, designs, and practical examples of how schools might implement each form of parental involvement, her model is also becoming increasingly utilized and replicated in academic settings. In spite of the popularity of Epstein's model, this study intentionally does not mirror it because it frames the various forms of parental involvement according to school, and not parental, actions and behaviors. For example, the "parenting" form of involvement is defined as, "help[ing] all families establish home environment to support children as students" (p. 409). Thus, while an excellent model, it does not align with this study's intention to define parental involvement according to parent actions and behaviors, rather than those of the school.

While McClafferty, McDonough, and Nunez (2002) and Corwin and Tierney (2007) make reference to parental involvement in their studies, they provide their readers with a vague understanding of what exactly parental involvement entails. While both studies emphasize the importance of parental involvement in promoting student college-going outcomes, neither provides a clear definition of the concept of

parental involvement. Instead, both make general and loose recommendations that schools encourage family involvement and investment as much as possible. As such, both pieces provide schools and policymakers with a strong sense that involving parents is important, without clearly articulating how to achieve positive parental involvement outcomes. Given findings by Fan and Chen (2001), Perna and Titus (2005), Simon (2001), and Sui-Chu and Willms (1996) that not all forms of parental involvement have an equal, or even positive, impact on children's educational outcomes, it is critical for research to provide a clear and specific definition of the concept of parental involvement, as well as identify within their studies which specific forms of involvement are and are not associated with improved student success.

School Culture of College Preparedness

In addition to parental involvement, increasing attention has been paid to the role schools play in enabling students to be academically prepared for college (Corwin & Tierney, 2007; Horn & Nunez, 2000; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994; Swail, Cabrera, Lee, & Williams, 2005). While research concurs that schools bear a significant influence on students' educational outcomes (e.g., Cabrera & LaNasa, 2000; Cabrera & LaNasa, 2001; Corwin & Tierney, 2007; Lee & Croninger, 1994; Lee & Smith, 1993; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994; Swail, Cabrera, Lee, & Williams, 2005), little agreement appears to exist as to which

school characteristics best promote students' achievement and academic readiness for college. Bryk and Driscoll (1988) assert that "good schools are not defined solely in terms of material resources, programs, and facilities," and that " when the school feels like a community, it is a better place for those who work and study there," (p. 1). This study will draw primarily from two different models exploring the relationship between school culture, which focus on non-material school characteristics, and student academic outcomes: *academic press* (Lee, Smith, & Croninger, 1997; Phillips, 1997; Shouse, 1994) and *culture of college-going* (Corwin & Tierney, 2007; McClafferty, McDonough, & Nunez). It also explores the work of Lee and Croninger (1994) and Lee and Smith (1993 & 1995), which analyzes the impact of *school restructuring* on student outcomes, as well as Madhere and MacIver's (1996) *talent development model*, which combines important elements of the models of school restructuring and the culture of college-going.

It should be noted that the concept of school culture can be quite nebulous, and can mean very different things to different researchers and audiences (Anderson, 1982; Deal & Peterson, 1999; Jerald, 2006; Stolp, 1994). In some cases, school culture is viewed as a shared system of beliefs within a school setting (i.e. Heckman, 1993), while in others, the term is simply considered synonymous with the term "environment" (i.e. McClafferty, McDonough, & Nunez, 2002). Another group of scholars understand school culture as the social structures that shape the actions and behaviors of those within a school setting (i.e. Deal & Peterson, 1990 & 1999). This study considers the concept of culture most closely to this third school of thought, in which "rules and traditions, norms and expectations that seem to permeate

everything: the way people act, how they dress, what they talk or avoid talking about, whether they seek out colleagues help or don't, and how teachers feel about their work or students" (Deal & Peterson, 1999, pp. 2-3). It is important, however, to acknowledge that the study also takes the liberty of building upon this definition by considering the actual actions of teachers and administrators as characteristics of school culture. It also views the concept of school culture through a lens that focuses exclusively on students' academic preparedness for college.

Academic press. According to Shouse (1994), academic press is "the extent to which academically oriented values, goals, and standards serve as the driving force within school society" (p. 8). For Shouse, a school's culture of academic press is embodied through its academic and disciplinary climates, as well as through its teachers' instructional practices. The school's academic climate is reflected through five components: 1) the principal's perception of overall academic climate, 2) student course work requirements, 3) teachers' professional credentials, 4) student course taking, and 5) student perceptions of instructional quality and academic demand. As such, while establishing an effective culture of academic press relies on both actions of the school's leadership and its teachers, it also hinges upon students' perceptions of such actions and practices.

Discipline also plays a central part of Shouse's (1994) model. The disciplinary climate component of academic press is based on four inputs: 1) school policies, 2) student perceptions of disciplinary climate, 3) student perception of how the school responded to their last absence, and 4) teacher perceptions that student tardiness and skipping interfere with their teaching. Again, according to Shouse, a

disciplinary climate is only partially a reflection of the school's actual disciplinary policies; more than that, it is tied to the extent to which members of the school community believe discipline is emphasized and valued in order to promote learning and achievement.

The final third of Shouse's (1994) model focuses on teachers' efforts and instructional practices. To measure these factors, Shouse analyzed teachers' grading criteria, instructional goals, homework policies, response to poor student performance, and time spent outside of school planning and preparing for class, as well as students' perceptions of classroom instructional quality and academic demand. In this category, Shouse placed an added value on rigor and the extent to which teachers set high standards and help their students achieve them. Within all three components of his academic press model, including the disciplinary climate category, academics trump other features of a child's school experience, including any social or co-curricular activities or interactions. It is thus important to note that Shouse's model aligns well with Adelman's (1999; 2006) construct of college preparedness, which similarly places a high value on academic rigor and performance outcomes.

Phillips (1997) similarly found that a culture of academic press was positively associated with student achievement outcomes. Unlike Shouse's (1994) highly comprehensive and extensive model, Phillips only used three factors to define a school's academic press: 1) its teachers' expectations, 2) the proportion of eighth graders enrolled in Algebra, and 3) the amount of homework assigned to students. While all of these inputs were associated with a positive impact on student

achievement and equitable learning, only the amount of homework assigned to students impacted these outcomes at a statistically significant level. As such, this finding pushed back on, to a certain extent, both the value Shouse (1994) placed upon teacher standards and expectations, as well as the findings of Adelman (1999; 2006) and Horn and Nunez (2000) that taking rigorous academic courses, especially in mathematical subjects, were critical to achieving positive academic outcomes.

Lee, Smith, and Croninger (1997) provided a third alternative approach to defining academic press. Adding to Shouse's (1994) emphasis on encouraging rigor, learning, and achievement, as well as Phillips' (1997) focus on homework, Lee, Smith, and Croninger's study also asserted the importance of high student and teacher morale in establishing a culture of academic press. The authors found that both levels of student and teacher morale were highly correlated with factors pertaining to high expectations for learning, achievement, and doing homework. Collectively, they found that their construct of academic press was associated with both improved student achievement and equitable learning outcomes. As such, even though the definitions of academic press vary widely across studies, findings consistently suggest that a school culture promoting academic rigor and achievement can positively influence student success.

Culture of college-going. While the concept of academic press focuses narrowly on academic achievement and rigor, models promoting a culture of college-going (Corwin & Tierney, 2007; McClafferty, McDonough, & Nunez, 2002) place a broader emphasis on students' being informed, prepared, and motivated to go to college. To achieve these outcomes, McClafferty, McDonough, and Nunez (2002)

asserted that schools must incorporate nine principles into their everyday cultures: 1) college talk, 2) clear expectations, 3) information and resources, 4) comprehensive counseling, 5) testing and curriculum, 6) faculty involvement, 7) family involvement, 8) college partnerships, and 9) articulation. Alternatively, Corwin and Tierney's (2007) model took a five-step approach to achieving a college-going culture: 1) academic momentum, 2) an understanding of how college plans develop, 3) a clear mission statement, 4) comprehensive college services, and 5) coordinated and systematic college support.

Information, and access to accurate information, about college plays a central role in both college-going models. When parents have access to accurate information about college and the college choice process, their child's college-going outcomes are often enhanced (King, 1996; Wimberly & Noeth, 2005). Conversely, parents lacking such resources often fail to proactively take critical steps to prepare themselves and their child for his or her college experience (Catsambis & Garland, 1997; Cunningham, Erisman, & Looney, 2007). To remedy these circumstances, the models of college culture encouraged schools to proactively inform both students and their parents about college, the college-going process, and what steps students must achieve to qualify for college. To achieve such outcomes, McClafferty, McDonough, and Nunez (2002) and Corwin and Tierney (2007) suggested schools organize college fairs, informational events, and create chronological checklists of critical tasks students and their parents must complete to stay on the path to college. The model by McClafferty, McDonough, and Nunez (2002), which addresses middle and high school populations, also asserts the importance of articulation agreements between

middle and high schools, so that students can be prepared to transition from one to the other smoothly.

The college-going models also lay claim to the importance of both academic achievement and academic preparedness for college. Schools must, therefore, the models assert, both ensure that students take the courses they need to qualify for admission to college, and also perform well in them. Consequently, the models argued for creating a culture of academic rigor and achievement supported by Adelman (1999; 2006), Lee and Croninger (1994), Phillips (1997), and Shouse (1994). Moreover, as McClafferty, McDonough, and Nunez (2002) note, schools must also inform students of, prepare students for, and encourage students to take college admissions tests, such as the ACT and SAT. Lee (2007) and Lee and Cabrera (2006) found that students from low-SES backgrounds, as well as those whose parents are less involved in their education are less likely to take such standardized tests. As such, a need certainly exists for schools to intervene and ensure that students are prepared for, and participate in such an important college requirement.

Both college-going models also highlight the importance of school counselors to guide students about colleges, necessary requirements, and the college-going process. Within most middle schools, it is unclear if students have someone to advise them about high school and the connection between their course taking patterns and meeting college requirements. During high school, students can typically turn to their counselor for advice on college and the college choice process; however, middle schools often lack a similar source of information from within their personnel

(McClafferty, McDonough, & Nunez, 2002). Wimberly and Noeth (2005) assert that counseling is particularly important in terms of academic advising, since middle school counselors are not typically expected to provide curricular advice pertaining to a student's college-going plans. Moreover, Bryan, Moore-Thomas, Day-Vines, and Holcomb-McCoy (2011), found that students who had interacted with a college counselor by the tenth grade were more likely to apply to college than those who did not have such interactions. The researchers also found that students attending schools with greater numbers of counselors able to provide students with information about college and college requirements were more likely to apply to multiple colleges than those with fewer number of counselors. In separate studies, school counselors have also been found to positively influence students' general academic achievement (i.e., Hadley, 1988; Lee, 1993), standardized test scores (i.e. Carns & Carns, 1991), and career decision-making abilities (Savickas, 1990).

A fourth critical component to both models of college-going is the creation and enhancement of family–school partnerships. Citing the benefits of parental involvement on student outcomes, McClafferty, McDonough, and Nunez (2002) called for schools to promote communication and collaboration between parents and family members with teachers, counselors, and administrators. They also suggest schools facilitate opportunities for parents and family members to interact with college representatives, in an effort to enhance the families' levels of understanding about college and the college-going process.

Madhere and MacIver's (1996) talent development model, designed to promote academic achievement outcomes among students attending under-resourced middle

schools, also calls for the importance of engaging families. In addition to providing essential academic support for students, Madhere and MacIver assert that families also provide cultural learning opportunities to their children. By becoming more culturally empowered, the creators of the talent development model claim that students will build critical competencies and increase their levels of motivation to achieve and persist through school. Such an assertion is supported by the work of Holcomb-McCoy (2007), who noted that students of color, and African American students especially, face specific and unique barriers to achievement during their school years, including "stereotyping, scarcity of positive role models, lack of culturally competent schools, [and] ethnic identity development" (p. 255).

Finally, both college-going culture and talent development models recommend empowering students with information regarding what skills and educational attainment levels they must acquire to achieve their career goals. In their research on the college choice process, Cabrera and LaNasa (2000) and Hossler, Braxton, Coopersmith, (2003) maintained that students must make connections between college and their desired careers in order to successfully proceed along the path to college. This advice is supported by Rumberger (1995), who found that students who cannot identify how their middle school coursework relates to or prepares them for their future are more likely to drop out of school than their peers who effectively make such connections. To this end, students enrolled at schools implementing the talent development model participate in self-assessments and advising sessions to better understand their interests and strengths, and identify high school and college programs, as well as careers, that align well with them. Similarly, McClafferty,

McDonough, and Nunez (2002) suggest that school counselors provide personalized information regarding careers, college, and high school opportunities to students and their families.

School restructuring. While both models of academic press and college-going call for the adaptation of specific practices, policies and cultures, Lee and Croninger (1994) and Lee and Smith (1993; 1995) concluded that schools must undertake efforts to restructure their organizations in order to achieve positive student academic outcomes. Lee and Smith's (1993) restructuring model is based on the concept of a communal, or communitarian, approach to schooling. The communal approach, they argued, steers schools away from a bureaucratic structure, and toward a "shared responsibility for work, shared commitment to a common set of goals, lateral communication and power in decision making, and expectations and behavior framed by greater personalization and individual discretion" (Lee & Smith, 1995, p. 243). The authors identified three specific examples of restructuring practices within middle schools: 1) reduced or eliminated department structure, 2) heterogeneously grouped instruction, and 3) team teaching. They asserted that all three approaches reduced bureaucracies among teachers and administrators, increased students' access to personalized teaching opportunities, and reduced hierarchical tracking or sorting practices.

Similarly, Madhere and MacIver's (1996) talent development model argued that a communal school structure and removal of school tracking practices were essential conditions for promoting achievement outcomes among students enrolled at under-resourced middle schools. To create a communal structure, talent development

schools removed all existing subject-area departments. Doing so eliminated instances of a single subject instructor teaching five to six different groups of students per day, which often resulted in a lack of familiarity and sense of community and accountability among both students and teachers. Instead, with the communal model, a cohort of students was taught by a team of two to three teachers per day.

The talent development model also promoted the removal of student tracking or grouping efforts to achieve improved academic outcomes. To support low-achieving students who were struggling with the added rigor of de-tracked courses, the talent development schools implemented extra help sessions and peer tutoring programs. Such peer tutoring opportunities also prevented the school's highest achieving students from feeling bored or less challenged from the de-tracked course curriculum.

Lee and Smith's research (1993) concluded that both reduced or eliminated departmentalization and team teaching practices were associated with increased, statistically significant academic achievement among middle school students. Moreover, reduced departmentalization practices were also associated with more equitable learning outcomes among students of different SES backgrounds. While within the Lee and Smith (1993) study, heterogeneous grouping had neither a statistically significant effect on achievement or equitable learning, Lee and Croninger (1994) found that even though middle schools that applied heterogeneous grouping had lower average achievement levels, the lesser-resourced students attending such schools disproportionately benefitted in their achievement outcomes from the implementation of such practices.

In a study examining the impacts of implementing restructuring practices within

high schools, Lee and Smith (1995) found that restructured schools experienced both higher student achievement outcomes across history, mathematics, reading, and science subjects, as well as improved learning equity outcomes in all subject areas. In an effort to build upon the work of Lee and Smith (1993; 1995), Phillips (1997) found that middle schools' communitarian climates had either no impact, or in some cases, a negative impact on student achievement and equitable learning outcomes. That said, findings from Lee and Croninger's (1994) and Lee and Smith's (1993; 1995) quantitative research, as well as Madhere and MacIver's (1996) qualitative reports are compelling enough to warrant further exploration of the relationship between school restructuring efforts and student achievement outcomes among a different sample of middle school students.

The Joint Interaction Between Parental Involvement and School Culture

While significant bodies of literature review the impacts of parental involvement (Cabrera & LaNasa, 2001; Catsambis & Beverige, 2001; Catsambis & Garland 1997; Fan & Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Simon, 2001; Stage & Hossler, 1999; Sui-Chu & Willms, 1996) and school culture (Corwin & Tierney, 2007; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994) on student achievement, this study will build upon these works by also quantitatively analyzing the joint interaction of each effect on eighth graders' eventual academic preparedness for college.

Both Lee and Croninger's (1994) and Perna and Titus' (2005) quantitative studies are notable for their collective inclusion of parental involvement and school culture variables in their analysis of student academic outcomes. This study built upon these studies in three specific ways. First, it suggested reframed and redefined constructs of parental involvement and school culture. A summary of these differences in construct definitions is provided in the subsequent chapter. Second, it tested the extent to which both constructs interact with one another to influence student outcomes. Finally, it focused on a different dependent variable – students' academic preparedness for college.

Qualitative works by Corwin and Tierney (2007), McClafferty, McDonough, and Nunez (2002), Madhere and MacIver (1996), Perna (2006), and Rowan-Kenyon, Perna, and Bell (2008) discussed and asserted the importance of the collaboration between home and school to prepare students for college. However, while, all five studies either described or proposed efforts schools take to engage parents in an attempt to promote students' academic or college-going outcomes, only Rowan-Kenyon, Bell, and Perna (2008) explicitly discussed how factors of parental involvement and school culture influence one another. For example, the authors observed that schools experiencing low levels of parental involvement often try to adapt new practices, policies, or events to encourage parent participation. Conversely, several college counselors at highly resourced schools noted that, at times, their services or knowledge were never put to use because parents hired private counselors to guide them and their children through the college-going process. This study aimed to complement such descriptions of the joint interactions between

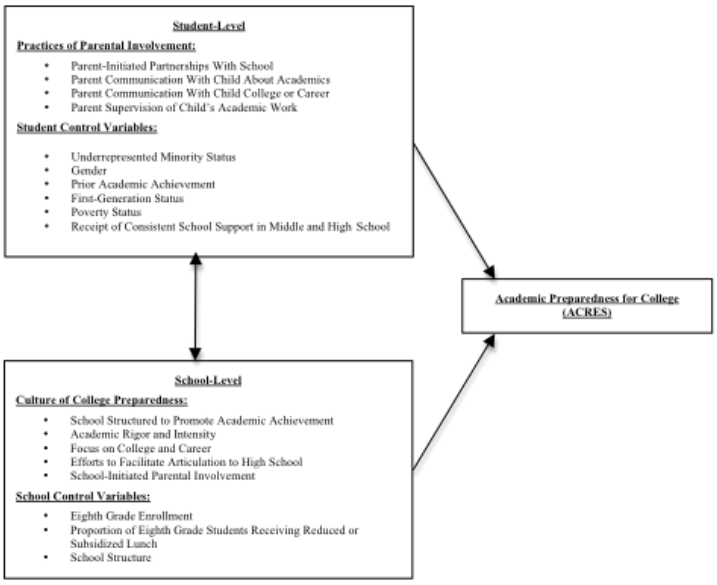
parents and schools by quantifying the extent to which such interactions take place and determining if and to what extent they impact students' academic preparedness for college.

Conceptual Model

Reviewing the extant literature on academic preparedness for college, middle school students, and influences of parental involvement and school culture led me to develop the study's original conceptual model (see Figure 2) on which I relied to address the study's three research questions. The model postulates that students' academic preparedness for college (ACRES), an outcome measured at the twelfth grade, is influenced, through a longitudinal process, by both student and school level factors captured during the middle school years. It specifically illustrates the study's focus on student-level influences in the form of parental involvement and the school-level influences in the form of school culture of college preparedness, and how I generally define each of these constructs, which draw from theories on parental involvement (Catsambis & Beverige, 2001; Catsambis & Garland 1997; Fan & Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Simon, 2001; Stage & Hossler, 1989; Sui-Chu & Willms, 1996), school culture of college preparedness (Corwin & Tierney, 2007; Horn & Nunez, 2000; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994). Moreover, the model displays which control variables I intended to include within my model, at both the student and the school level. Finally, through the positioning of arrows within the model, I indicated to the reader that I believe that students' academic preparedness for college is

influenced by both individual and interactive inputs of parental involvement and school culture of college preparedness. It should be noted that the conceptual model evolved over the course of the study, as I revised and removed variables from the study's models. Figure 1, highlighted in Chapter 1, illustrates the final version of the study's Conceptual Model.

Figure 2: Original Conceptual Model



Chapter 3: Methodology

Research Questions

This study sought to answer three research questions regarding the impact of parental involvement, a school's culture of college preparedness, and the joint interaction of both factors on eighth graders' eventual academic preparedness for college by the time they reach the twelfth grade:

1. To what extent do practices of parental involvement promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?

2. To what extent does a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?

3. To what extent does the joint interaction of practices of parental involvement and a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?

Hypotheses

Based on the conclusions of extant research highlighted in Chapter 2, I developed a series of hypotheses regarding the connections and outcomes I expected to find within this study. Below, I summarize hypotheses articulating the impact of both parental involvement and school culture of college preparedness on outcomes of academic readiness for college among eighth graders. I then discuss if and how I envisioned the joint interaction of parental involvement and a school's culture of college preparedness would influence outcomes of academic preparedness for college among eighth graders.

Parental involvement and students' academic preparedness for college. The works of Fan and Chen (2001), Hoover-Dempsey, Battiato, Walker, Reed,

DeJong, and Jones (2001), Lee and Croninger (1994), Perna and Titus (2005), and Sui-Chu and Willms (1996), all found that forms of parental involvement had positive, statistically significant influences on a variety of student achievement or college-going outcomes. As such, within this study, I similarly anticipated that practices of parental involvement would have a positive, statistically significant impact on all eighth graders' academic preparedness for college by the twelfth grade.

School culture of college preparedness and students' academic preparedness for college. Research by Lee and Smith (1993; 1995), Lee, Smith, and Croninger (1997), and Phillips (1997) found that a school's adaptation of practices, policies, or cultures had a positive, statistically significant impact on students' academic achievement outcomes. As such, within this study, I anticipated that schools exhibiting a culture of academic preparedness for college would similarly have a positive, statistically significant impact on all of its students' eventual academic preparedness for college outcomes.

The joint effect of parental involvement and school culture of college preparedness on students' academic preparedness for college. Finally, I hypothesized that the collective interaction of parental involvement and school culture of college preparedness would impact student achievement outcomes more positively than the individual, separate influences of parental involvement and school culture. This hypothesis was supported by the models of college-going culture (Corwin & Tierney, 2007; McClafferty, McDonough, & Nunez, 2002) and talent development (Madhere & MacIver, 1996), both of which asserted that parental involvement and school cultures focused on student success are collectively necessary

to foster students' academic achievement and college preparedness outcomes. An underlying message within all three models was that joint school and home collaboration produce improved student outcomes.

Source of Data

This research drew from the National Education Longitudinal Study of 1988-1992 (NELS:88-92). Beginning in Academic Year (AY) 1988, the survey measured the characteristics, behaviors, and test scores of a nationally representative group of nearly 25,000 eighth graders from over 1,000 private and public schools (Curtin, Ingels, Wu, & Heuer, 2002). At this time, separate surveys were also collected from these students' parents, two of their middle school teachers, and middle school principal. The National Center for Education Statistics (NCES), which oversaw the survey process, subsequently tracked and surveyed subsamples of original cohort of students, as well as their parents, two high school teachers, and their high school principals again in AY1990, when the students were in tenth grade, and AY1992, when the students were in twelfth grade.

As a part of the survey process, students took cognitive tests in reading, mathematics, science, and social studies. The 1988 cognitive test was used as a benchmark of students' achievement in these academic areas, while test results from 1990 and 1992 were primarily used to measure students' growth and learning in each subject (Curtin, Ingels, Wu, & Heuer, 2002). Students' complete high school transcripts were also collected during the 1992 follow-up survey. These transcripts provide critical information on students' course-taking patterns and grades. The study's dependent variable, Academic Preparedness for College (ACRES), was

calculated using data from the cognitive test results and transcripts gathered during the NELS survey process (Adelman 1999; 2006). For more detailed information on the NELS surveys and their design, see Curtin, Ingels, Wu, and Heuer (2002) and Spencer, Frankel, Ingels, Raskinski, and Tourangeau (1990).

Proposed Constructs and Measures

The study's proposed construct and subconstruct measures were developed from extant literature on students' academic readiness for college (Adelman 1999; 2006), parental involvement (Cabrera & LaNasa, 2001; Catsambis & Beverige, 2001; Catsambis & Garland 1997; Fan & Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Simon, 2001; Stage & Hossler, 1989; Sui-Chu & Willms, 1996) and school culture (Corwin & Tierney, 2007; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Phillips, 1997; Shouse, 1994). Table 1 illustrates in further detail how each construct and subconstruct measure was defined, the NELS survey question(s) to which each aligned, and sources of support within the literature for using each measure.

Later in this chapter, I discuss and illustrate how these proposed construct and subconstruct measures changed over the course of the data cleaning and preparation and composite construction processes.

Table 1
Construct Measures, Definitions, Associated NELS Questions, and Supporting Literature

Construct	Subconstructs	Variables	NELS Survey Question	Supports in the Literature
Academic Preparedness for College (ACRES): A measure of academic inputs (high school GPA, rank, aptitude test scores, curricular intensity and rigor) that reflect students' ability to academically succeed at a four-year college.			ACRES (developed by Adelman, based on inputs from NELS:90-92 surveys)	Adelman (1999; 2006); Cabrera, Burkum & La Nasa (2005); Cabrera, Burkum, La Nasa, & Bibo (in press)
Parental Involvement: The extent to which parents proactively take specific steps to ensure that their child is prepared to academically succeed in college.				
	Parent-Initiated Partnerships with School: The extent to which students' parents proactively reach out to and become involved in conversations and programs focusing on student success and achievement outcomes.	Frequency of parent-initiated conversations with school about child's academic performance	BYP58A	Catsambis & Garland (1997); Fan & Chen (2001)
		Frequency of parent-initiated conversations with school about child's academic program	BYP58B	Catsambis & Garland (1997); Fan & Chen (2001)
		Report of parent attendance and participation in PTA activities	BYP59B&C	Catsambis & Beverige (2001); Catsambis & Garland (1997); Fan & Chen (2001); Rumberger (1995); Sui-Chu & Willms (1996)
	Parent Communication with Child About Academics: The extent to which students' parents discuss with their child his or her schoolwork and plans for high school	Frequency of parent discussions with child about experiences in school	BYP66	Catsambis & Garland (1997); Fan & Chen (2001); Lee & Croninger (1994)

		Frequency of parent discussions with child about plans for high school	BYP67	Catsambis & Garland (1997); Fan & Chen (2001); Lee & Croninger, (1994)
	Parent Communication with Child About College or Career: The extent to which students' parents discuss with their child his or her postsecondary or career plans.	Frequency of parent discussions with child about post- high school plans	BYP68	Catsambis & Garland (1997); Fan & Chen (2001); Lee & Croninger (1994)
	Parent Supervision of Child's Academic Work: The extent to which students' parents help their child with his or her homework.	Frequency of parent assisting child with homework	BYP69	Fan & Chen (2001)
School Culture of College Preparedness: A shared set of purposefully structured actions, rules, and practices, embraced by teachers and administrators, with a goal of preparing students to academically excel in a 4-year college.				
	School Structured to Promote Academic Achievement: A reflection of the school's adaptation of human resources, organizational, and structural practices that have been associated with improved student academic achievement outcomes.	Classroom environment is highly structured within school	BYSC47D	Lee & Croninger (1994); Shouse (1994)
		% of school teachers with at least an MA	BYSC21 ÷ BYSC17	Shouse (1994)
		Reduced departmentalization within school	BYSCORG2	Lee & Smith (1993)
		Team teaching within school	HES27C & HES28C	Lee & Croninger (1994); Lee & Smith (1993)
		Common academic curriculum for all 8th grade students within school	HES23C	Madhere & MacIver (1996)
		Classes organized for group/cooperative learning within school	HES23L2	Madhere & MacIver (1996)

	Academic Rigor & Intensity: A reflection of the school's adaptation of academic standards, expectations, and teaching practices that promote eighth grade student enrollment and success in academically rigorous course work.	% 8th Graders Taking Algebra	BYS67C (aggregated to school level)	Horn & Nunez (2000); Phillips (1997)
		Average amount of homework reported by 8th grade students	BYHOMEWORK	Phillips (1997)
		Teachers at school encourage students to do their best	BYSC47E	Lee & Croninger (1994); Lee, Smith, & Croninger (1997); Shouse (1994)
		Student report - "When I work hard on schoolwork, my teachers praise my effort"	BYS59H (aggregated to school level)	Lee & Croninger (1994)
		School expects students to do homework	BYSC47F	Lee & Croninger (1994); Lee, Smith, & Croninger (1997); Shouse (1994)
		School publicizes & honors student achievement	HES13A	Shouse (1994)
		Students are required to take courses in math	BYSC39B	Shouse (1994)
		School mean of frequency of teachers discussing assignments with students	mean of BYT2_8C & BYT5_8C (aggregated to school level)	Shouse (1994)
		School mean of the time teachers spend planning and preparing for teaching	mean of BYT3_30A & BYT6_30A (aggregated to school level)	Shouse (1994)
		School mean of the time teachers spend grading papers	mean of BYT3_30B & BYT6_30B (aggregated to the school level)	Shouse (1994)
		School mean of frequency of student visits to school counselors to improve their academic work and performance	BYS51C-A (aggregated to school level)	McDonough (1997, 1999); Plank and Jordan (2001)

	Focus on College & Career: A measurement of the time middle school teachers and leaders spend discussing and preparing students for a postsecondary education and/or future career.	Regularity of time spent giving information on careers and career requirements during homeroom/group advising period	HES8E	Corwin & Tierney (2007); Madhere & MacIver (1996); McClafferty, McDonough, & Nunez (2002)
		Proportion of time school guidance counselors spend administering achievement, competency, career interests, or other tests	HES11A	Corwin & Tierney (2007); Madhere & MacIver (1996); McClafferty, McDonough, & Nunez (2002)
	Efforts to Facilitate Articulation to High School: A measurement of the time middle school teachers and leaders spend planning for and preparing students' successful transition to high school.	Middle school students attend regular classes at high school	HES21E	McClafferty, McDonough, & Nunez (2002)
		Middle and high school teachers meet regularly to discuss courses and requirements	HES21K	McClafferty, McDonough, & Nunez (2002)
		Middle and high school administrators meet to discuss articulation and programs	HES21L	McClafferty, McDonough, & Nunez (2002)
		Middle and high school counselors meet	HES21M	McDonough (1997, 1999); Plank and Jordan (2001)
		Frequency of students' meeting with their school counselor to discuss high school and high school programs	BYS51a-A (aggregated to school level)	McDonough (1997, 1999); Plank and Jordan (2001)
	School-Initiated Parental Involvement: A measurement of the extent to which school teachers and leaders proactively reach out to and involve their students' parents in conversations and programs focusing on student success and achievement outcomes.	Frequency of school teachers talking to parents about child's performance	mean of BYT3_31 & BYT6_31 (aggregated to school level)	Shouse (1994)
		Middle school's parents are able to visit high schools while children are still enrolled in the middle grades	HES21G	McClafferty, McDonough, & Nunez (2002)

		% of 8th grade parents who were contacted about their child's academic performance	BYP57A (aggregated to school level)	Catsambis & Garland (1997)
		% of 8th grade parents who were contacted about their child's academic program	BYP57B (aggregated to school level)	Catsambis & Garland (1997)
		% of 8th grade parents who were contacted about their child's high school course selection	BYP57C (aggregated to school level)	Catsambis & Garland (1997)
		% of 8th grade parents who were contacted about their child's high school program placement	BYP57D (aggregated to school level)	Catsambis & Garland (1997)
Student-Level Control Variables		8th grader's underrepresented minority status	RACE-recoded to 0 = White or Asian, 1 = Black, Hispanic, or Native American	Lee & Croninger (1994); Lee& Smith (1993; 1995)
		8th grader's gender	BYS12- recoded to male=0, female =1	Lee & Smith (1993; 1995)
		8th grader's prior academic achievement	BYGRADS	Lee & Croninger (1994); Lee & Smith (1993); Phillips (1997)
		8th graders' first-generation status	calculated using BYS34A & BYS34B (0 = continuing generation; 1 = first-generation)	Stage & Hossler (1989)
		8th grader's poverty status	calculated using BYFAMSIZ & BYFAMINC (0 = not poor, 1 = poor)	Acs & Gallagher (2000); Croninger (1994)
		8th grader's receipt of consistent school support in middle and high school	calculated using BYS59F & F2S7C (0 = other; 1= received consistent support)	
School-Level Control Variables		8th grade enrollment size	G8ENROL	Lee & Croninger (1994)
		Proportion of students on reduced or subsidized lunch	G8LUNCH	Cabrera, Deil-Amen; Prabhu; Terenzini, Lee, & Franklin (2006)
		School structure (K-8 vs. 6-8)	G8TYPE	Lee& Croninger (1994); Lee& Smith (1993)

Dependent variable: Academic Preparedness for College (ACRES). The study's dependent variable is a composite measure of twelfth graders' academic preparedness to succeed in college. Developed by Adelman (1999), ACRES captures students' standardized test score, grade point average (GPA), high school rank, and a measure of the quality and intensity of the high school curriculum in which they were enrolled. The standardized test, the results of which Adelman (1999) found to correlate with both the SAT and ACT, contained reading, vocabulary, writing, and mathematics sections, and was taken by nearly all of the twelfth graders captured in the NELS 1992 survey. The academic intensity measure took into account not only the level of academic rigor of the courses students took in high school, but the quantity of rigorous courses in which a student had enrolled. Adelman assigned a different weight to each of the four measures to calculate a student's ACRES score. ACRES scores, or levels, ranged from 1, which meant that a student was very poorly prepared to succeed in college, to 5, which meant that a student was quite likely to succeed in college. Prior to standardizing the variable, the average ACRES score among students within this study was 2.84.

In two separate studies, Adelman (1999; 2006) found ACRES to be the best pre-college predictor of bachelor's degree attainment among high school graduates. Adelman's results were replicated by Cabrera, Burkum and La Nasa (2005), Cabrera, Burkum, La Nasa, and Bibo (in press), and Swail, Cabrera, Lee, and Williams (2005). The ACRES measure was z-scored so that the average student ACRES levels were set equal to zero, and the coefficients in the study models' results could be interpreted

in terms of their standard deviation from the mean, as well as in terms of their effect size (Cohen, 1988).

Parental involvement. I proposed to define the study's primary independent variable at the student level, parental involvement, as *the extent to which parents proactively take specific steps to ensure that their child is prepared to academically succeed in college.* This definition intentionally differs from those within extant literature on parental involvement (e.g., Catsambis & Beverige, 2001; Catsambis & Garland, 1997; Fan & Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Stage & Hossler, 1989; Simon, 2001; & Sui-Chu & Willms, 1996) in five specific ways.

First, it only takes into account inputs from parent surveys. Unlike the works of Lee and Croninger (1994) and Sui-Chu and Willms (1996), the measure did not incorporate survey responses from students or school administrators regarding parental involvement. This strategy is supported by survey methodologists Todorov (2003) and Tourangeau, Rips, and Rasinski (2000), who conclude that self-reports, or recollections of one's own actions, are more accurate than proxy-reports, or recollections of the actions of others.

Second, the study's measure of parental involvement only incorporated factors that capture parental actions and behaviors. Even though the parental involvement models of Fan and Chen (2001), Stage and Hossler (1989), Perna and Titus (2005), and Lee and Croninger (1994) incorporated parental aspirations or expectations, and found them to have a statistically significant influence on student achievement or college-going outcomes, I intentionally omitted such inputs from my model. Actions

and behaviors are concrete, and can be witnessed and measured by the parent as well as those around them. Conversely, aspirations, attitudes, beliefs, and ideas are not necessarily acted upon, shared with others, or sensed or experienced by others, including a parent's child (Adelman, 1999). This rationale is supported by Cunningham, Erisman, and Looney (2007), who found that while 87% of surveyed middle school parents believed that their child would go to college, only 45% had taken any proactive steps to facilitate or encourage their child's college-going outcomes.

Third, the construct was also limited to only include parents' actions and behaviors that, in my opinion, directly related to their child's academic preparedness for college. Because being academically prepared for college significantly increases a student's chances of graduating high school, applying to college, and successfully attaining a four-year degree (Adelman 1999; Adelman, 2006; Cabrera & LaNasa, 2001; Cabrera, Burkum, & LaNasa, 2005; Cabrera, Burkum, LaNasa, & Bibo, in press; Swail, Cabrera, Lee, & Williams, 2005), I determined that this was an appropriate lens through which to assess practices of parental involvement. As such, this model did not incorporate any parental actions relating to their child's behaviors (discussing behavioral issues with their child, or their child's school), which Simon (2001) found to be negatively associated with student achievement, or extracurricular activities, which Perna and Titus (2005) found to have no statistically significant association with students' college enrollment outcomes.

Fourth, while Lee and Croninger (1994), Perna and Titus (2005), and Stage and Hossler (1989) incorporate parents' educational attainment levels into their

definitions and measures of parental involvement, I viewed this factor as a reflection of parents' socioeconomic backgrounds rather than proactive, ongoing, actions or behaviors to prepare their children for college. As such, I included a separate measure of students' first generation status, which reflected their parents' postsecondary exposure and attainment, within the study's student-level controls.

Finally, this study's model differed from those in Fan and Chen (2001), Perna and Titus (2005), and Sui-Chu and Willms (1996) in that it did not incorporate any school efforts to involve parents in their child's education. I believe that such efforts are the school's doing, and are not explicitly a function of the parent's efforts or actions. As such, I included measures reflecting school-initiated parental involvement within the study's *School Culture of College Preparedness* construct.

I initially proposed that the construct of parental involvement would be specifically measured by four subconstructs, all of which are illustrated in greater detail within Table 1:

Parent-Initiated Partnership with Child's School. The extent to which parents communicate with their child's school about the child's academic performance and academic track is associated with increases in the child's academic achievement (Fan & Chen, 2001). The children of parents who participate in parent-teacher organizations are also more likely to perform better in school than their peers whose parents do not participate in such activities (Fan & Chen, 2001; Rumberger, 1995; Sui-Chu & Willms, 1996). As such, this subconstruct is based on parents' reports on their initiated communication with their child's school about his or her

academic performance, academic track, as well as parents' attendance and participation in the PTA organization affiliated with their child's school.

Parent Communication with Child Regarding Academics. Parents' efforts to communicate with their children about their academic performance and plans have also been found to positively influence children's academic achievement outcomes (Fan & Chen, 2001; Lee & Croninger, 1994). Thus, I proposed that the parent communication measure would rely on parents' reports of how often they speak with their child about his or her school experiences or plans.

Parent Communication with Child Regarding College or Career. Student achievement outcomes are also a function of the extent to which parents speak to their child about his or her postsecondary or career plans (Fan & Chen, 2001; Lee & Croninger, 1994). Cabrera and LaNasa's (2001) research similarly asserted that it is critical for middle school students, with the help of their parents, to develop specific occupational and postsecondary goals in order to make curricular and academic choices and decisions that will qualify and prepare them for such future experiences. As a proxy for parent/child conversations about college and career, I initially proposed that the study would rely on a measure of parents' reports of how often they speak with their child about post-high school plans.

Parental Supervision of Academic Work. Finally, a parent's efforts to assist or supervise his or her child with homework are associated with improvements in the child's academic achievement outcomes (Fan & Chen, 2001). Thus, I proposed that the parental supervision construct would take into account parents' reports of the frequency in which they assist their child with homework.

School culture of college preparedness. I approached the school culture of college preparedness construct, the study's primary independent variable at the school level, as *a shared set of purposefully structured actions, rules, and practices, embraced by teachers and administrators, with a goal of preparing students to academically excel in a 4-year college.* This construct definition is greatly influenced by the models of academic press (Lee, Smith, & Croninger, 1997; Phillips, 1997; Shouse, 1994), college-going culture (Corwin & Tierney, 2007; McClafferty McDonough, & Nunez, 2002), talent development (Madhere & MacIver, 1996), and school restructuring (Lee & Croninger, 1994; Lee and Smith, 1993; Lee & Smith, 1995). Collectively, these works create a comprehensive illustration of theoretical best practices of how school organization and effort can promote positive student achievement outcomes.

I initially proposed that a school's culture of college preparedness would be specifically measured by five subconstructs, all of which are illustrated in greater detail within Table 1:

School Structured to Promote Academic Achievement. A school's adaptation of specific human resources (Shouse, 1994), organizational (Madhere & MacIver, 1996), and structural (Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith & Croninger, 1997; Shouse, 1994) practices are all associated with increases in student achievement outcomes. To reflect the research findings on a school's human resource practices, the I proposed that the subconstruct include the proportion of teachers within the surveyed school who held at least a master's degree. I also proposed to capture the school's adaptation of organizational practices by

measures of its implementation of common curriculum for its eighth graders or established group learning opportunities or classes. Finally, I hypothesized that variables measuring of reduced departmentalization, increased team teaching, and the principal's reports of the extent to which classroom environments within the school are highly structured would reflect the school's structural practices.

Academic Rigor and Intensity. The proposed subconstruct of Academic Rigor and Intensity was primarily based on the concept of academic press, or "the extent to which academically oriented values, goals, and standards serve as the driving force within school society" (Shouse, 1994, p. 8). Within this study, the proposed subconstruct was defined as *a reflection of the school's adaptation of academic standards, expectations, and teaching practices that promote eighth grade student enrollment and success in academically rigorous course work,* which built upon Shouse's definition of academic press by incorporating a clear, desired outcome in the form of improved academic achievement.

In addition to Shouse, the measures selected were informed by the works of Horn and Nunez, (2000), Lee and Croninger (1994), Lee and Smith (1993), Lee, Smith, and Croninger (1997), McDonough (1997, 1999), Phillips (1997), and Plank and Jordan (2001). Specifically, the proposed subconstruct's measures included a general snapshot of rigor and intensity, in the form of the proportion of eighth graders enrolled in Algebra as well as a measure of how much time eighth graders spent on homework in a given week. I proposed that the extent to which a school encouraged student achievement would be measured according to the principal's and students' assessments of how well teachers praised student effort and encourage good work, as

well as a measure of whether or not the school publically recognized student achievement. I hypothesized that school standards would be reflected by evidence of whether students were required to take specific courses in math and by the extent to which the principal perceived a culture of expecting students to do their homework. I proposed that teacher effort to promote student achievement would measured according to the average amount of time teachers within the school reported spending on planning for teaching, grading, and providing feedback on work. Finally, I hypothesized that school counselors' efforts to promote student achievement would be measured according to the frequency of students' meetings with counselors to improve their academic work.

Focus on College and Career. Just as parental involvement research emphasizes the importance of parents helping their children establish specific college and career goals, so too do the school-focused models of college-going culture (Corwin & Tierney, 2007; McClafferty, McDonough, & Nunez, 2002), and talent development (Madhere & MacIver, 1996). I proposed that the *Focus on College and Career* subconstruct would be measured according to the amount of time students were given information about careers and career requirements during their homeroom period and the proportion of time school counselors spent administering achievement, career interest, or competency tests. Unfortunately, no questions within the NELS survey reflected a school's efforts to explicitly inform, prepare, or empower their students about the college-going process. Thus, even though the connection between college and careers is becoming increasingly intertwined (Conley, 2010; EOPCEA,

2009; Murnane & Levy, 1996), such an omission of college-specific measures within the construct is certainly a limitation of this study.

Efforts to Facilitate Articulation to High School. Middle school students often experience great difficulty and challenges as they transition from middle school to high school (Grossman & Cooney, 2009; Holcomb-McCoy, 2007; Reyes, Gillock, Kobus, and Sanchez, 2000). At best, this can result in a period of discomfort and uncertainty for transitioning students; in the worst case, a difficult transition can lead to poor academic performance outcomes or even high school dropout. McClafferty, McDonough, and Nunez's (2002) model of school culture of college-going calls for middle and high schools to work together to facilitate a smooth transition process for students. As such, I proposed that this subconstruct would measure the extent of such articulation efforts based on whether or not middle school students were able to regularly attend high school classes, how frequently middle school students met with their guidance counselor to discuss high school and high school programs, and whether middle and high school teachers, administrators, and counselors met regularly with their counterparts at high schools to discuss courses, requirements, and the articulation process.

School-Initiated Parental Involvement. The models of culture of college-going (Corwin & Tierney, 2007; McClafferty, McDononough, & Nunez, 2002) and talent development (Madhere & MacIver, 1996) emphasize the importance of schools taking proactive steps to include parents in their child's education. Research by Shouse (1994) and Catsambis and Garland (1997) also assert a connection between school-initiated parental involvement and student achievement. As such, I proposed

that efforts by the school to reach out to parents could be measured according to how often representatives of the school contacted parents about their child's academic performance, program, high school course selection, and program placement opportunities. It also took into account whether or not parents were given the opportunity to visit high schools while their child was still enrolled in middle school.

Control variables. I proposed that the study include control variables at both the student and school levels. At the student level, I proposed to control for seven specific measures.

Poverty (POOR): This dummy-coded measure indicates a students' relative income background (0 = not poor, 1 = poor), based on the results of an income-to-needs ratio calculation. I specifically used a students' likely qualification for free or reduced-price lunch as a proxy for their poverty status. In 1988, when the students within this dataset were in the eighth grade, the federal government's free or reduced-price lunch qualification threshold for a family of four was $21,552.50, or 185% of the Federal Poverty Threshold for a family of four (Federal Register, 1988). I wrote syntax, incorporating both family size and income measures to determine a student's relative poverty level. All students whose families earned 185% or less of the Federal Poverty Threshold for their family size would, ostensibly, qualify for free or reduced-price lunch. As such, they were assigned to the measure's "poor" category. See Acs & Gallagher (2000) for a similar approach to creating an income-to-needs ratio.

Underrepresented Minority Status (URM). This dummy-coded variable indicates whether or not students belong to an underrepresented minority group

(RACE-recoded to 0 = White or Asian American, 1 = Black, Hispanic, or Native American).

Gender (FEM). This dummy-coded variable indicates students' self-reported gender (BYS12- recoded to male=0, female =1).

Prior Academic Achievement (GRAD). This continuous variable is a composite developed by the NCES to measure students' self-reported collective grades, from grade six until the time students were surveyed, in English, Math, Social Studies, and Science subjects.

First Generation Status (FGEN). This dummy-coded variable reflects students' parents college-going and completion experience. Students were classified as first generation if their parents had not attended a postsecondary institution; if at least one student's parent had attended or graduated college, he or she was categorized as continuing generation (0 = continuing generation; 1 = first generation). This measure was created using variables reflecting students' mothers' and fathers' educational attainment levels.

Consistency of Support from Middle to High School (CSUP). This dummy-coded variable served as a proxy measure of whether students received consistent support to achieve academically in both their middle and high school environments. In both the eighth and twelfth grade surveys, students were asked to what extent they believed "the teaching is good" at their school. Students were placed in a "received consistent support" category if they indicated that they believed the teaching was good at both their middle and high schools. Conversely, they were placed in an "other" category if they had either inconsistent or consistently negative views of the

teaching at their school (0 = other; 1= received consistent support). As such, this variable attempted to control for what happened in the surveyed students' academic lives between the eighth grade, when the models' input variables were captured, and the twelfth grade, when the study's dependent variable was defined.

At the school level, I proposed to control for three measures.

School's Free or Reduced-Price Lunch Recipients (FLUNCH). This continuous variable takes into account the proportion of students within each school whom, according to the school principal, received free or reduced-price lunch. As such, this measure served as a proxy for the relative proportion of low-income students enrolled at a given school.

School's Structure (STRUC). This dummy-coded variable reflects whether or not a school's grade span resembled a "traditional" middle school structure (grade span of 6-8 7-8, 7-9, or 8-9), or another type of structure (e.g., grade span of K-8, K-12, 4-8, or 8-12). This measure was created using an existing variable within the NELS survey data (0 = other school structure; 1= "traditional" middle school structure).

Eighth Grade Enrollment (ENRL). This continuous variable measures a principal's estimate of the number of eighth grade students enrolled at his or her school.

Cleaning and Preparing Data for Model Testing

The subsequent segments of this section highlight, in chronological order, the steps taken to clean and prepare the study's data for model testing. I then summarize how the dissertation's measures and constructs evolved and changed as a result of this

data cleaning and preparation process. Table 2, which includes all of the study's proposed variables, lists which of these variables were retained, removed, or relocated to newly established subconstructs.

Table 2:
Summary of Proposed Variable Status After Data Cleaning and Removal Process

Construct	Subconstructs	Variables	NELS Survey Question	Supports in the Literature	Status After Data Cleaning and Removal Process
Academic Preparedness for College: A measure of academic inputs (high school GPA, rank, aptitude test scores, curricular intensity and rigor) that reflect students' ability to academically succeed at a four-year college.			ACRES (developed by Adelman, based on inputs from NELS:90-92 surveys)	Adelman (1999; 2006) Cabrera, Burkum & La Nasa (2005); Cabrera, Burkum, La Nasa, Bibo (in press)	Retained as Dependent Variable
Parental Involvement: The extent to which parents proactively take specific steps to ensure that their child is prepared to academically succeed in college.					
	Parent-Initiated Partnerships with School: The extent to which students' parents proactively reach out to and become involved in conversations and programs focusing on student success and achievement outcomes.	Frequency of parent-initiated conversations with school about child's academic performance	BYP58A	Catsambis & Garland (1997); Fan & Chen (2001)	Moved to New Subconstruct: Parent Communication with School About Academics

		Frequency of parent-initiated conversations with school about child's academic program	BYP58B	Catsambis & Garland (1997); Fan & Chen (2001)	Moved to New Subconstruct: Parent Communication with School About Academics
		Report of parent attendance and participation in PTA activities	BYP59B&C	Catsambis & Beverige (2001); Catsambis & Garland (1997); Fan & Chen (2001); Rumberger (1995); Sui-Chu & Willms (1996)	Moved to New Subconstruct: Involvement in Parent-Teacher Organizations
	Parent Communication with Child About Academics: The extent to which students' parents discuss with their child his or her schoolwork and plans for high school	Frequency of parent discussions with child about experiences in school	BYP66	Catsambis & Garland (1997); Fan & Chen (2001); Lee & Croninger (1994)	Moved to New Subconstruct: Parent Communication with Child About Academics, College, or Career
		Frequency of parent discussions with child about plans for high school	BYP67	Catsambis & Garland (1997); Fan & Chen (2001); Lee & Croninger, (1994)	Moved to New Subconstruct: Parent Communication with Child About Academics, College, or Career
	Parent Communication with Child About College or Career: The extent to which students' parents discuss with their child his or her postsecondary or career plans.	Frequency of parent discussions with child about post-high school plans	BYP68	Catsambis & Garland (1997); Fan & Chen (2001); Lee & Croninger (1994)	Moved to New Subconstruct: Parent Communication with Child About Academics, College, or Career

	Parent Supervision of Child's Academic Work: The extent to which students' parents help their child with his or her homework.	Frequency of parent assisting child with homework	BYP69	Fan & Chen (2001)	Removed: Factor Analysis loading of less than .5
School Culture of College Preparedness: A shared set of purposefully structured actions, rules, and practices, embraced by teachers and administrators, with a goal of preparing students to academically excel in a 4-year college.					
	School Structured to Promote Academic Achievement: A reflection of the school's adaptation of human resources, organizational, and structural practices that have been associated with improved student academic achievement outcomes.	Classroom environment is highly structured within school	BYSC47D	Lee & Croninger (1994); Shouse (1994)	Removed: Factor Analysis loading of less than .5
		% of school teachers with at least an MA	BYSC21 ÷ BYSC17	Shouse (1994)	Moved to New Subconstruct: Other Reflections of School Culture
		Reduced departmentalization within school	BYSCORG2	Lee & Smith (1993)	Retained within School Structured to Promote Academic Achievement Subconstruct

		Team teaching within school	HES27C & HES28C	Lee & Croninger (1994); Lee & Smith (1993)	Retained within School Structured to Promote Academic Achievement Subconstruct
		Common academic curriculum for all 8th grade students within school	HES23C	Madhere & MacIver (1996)	Removed: Low Variability
		Classes organized for group/cooperative learning within school	HES23L2	Madhere & MacIver (1996)	Removed: Factor Analysis loading of less than .5
	Academic Rigor & Intensity: A reflection of the school's adaptation of academic standards, expectations, and teaching practices that promote eighth grade student enrollment and success in academically rigorous course work.	% 8th Graders Taking Algebra	BYS67C (aggregated to school level)	Horn & Nunez (2000); Phillips (1997)	Moved to New Subconstruct: Other Reflections of School Culture
		Average amount of homework reported by 8th grade students	BYHOMEWORK	Phillips (1997)	Removed: Factor Analysis loading of less than .5
		Teachers at school encourage students to do their best	BYSC47E	Lee & Croninger (1994); Lee, Smith, & Croninger (1997); Shouse (1994)	Removed: Low Variability
		Student report -"When I work hard on schoolwork, my teachers praise my effort"	BYS59H (aggregated to school level)	Lee & Croninger (1994)	Removed: Factor Analysis loading of less than .5

		School expects students to do homework	BYSC47F	Lee & Croninger (1994); Lee, Smith, & Croninger (1997); Shouse (1994)	Removed: Low Variability
		School publicizes & honors student achievement	HES13A	Shouse (1994)	Removed: Factor Analysis loading of less than .5
		Students are required to take courses in math	BYSC39B	Shouse (1994)	Removed: Low Variability
		School mean of frequency of teachers discussing assignments with students	mean of BYT2_8C & BYT5_8C (aggregated to school level)	Shouse (1994)	Removed: Low Variability
		School mean of the time teachers spend planning and preparing for teaching	mean of BYT3_30A & BYT6_30A (aggregated to school level)	Shouse (1994)	Moved to New Subconstruct: Teacher Time Invested in Academics
		School mean of the time teachers spend grading papers	mean of BYT3_30B & BYT6_30B (aggregated to the school level)	Shouse (1994)	Moved to New Subconstruct: Teacher Time Invested in Academics
		School mean of frequency of student visits to school counselors to improve their academic work and performance	BYS51C-A (aggregated to school level)	McDonough (1997, 1999); Plank and Jordan (2001)	Moved to New Subconstruct: Counselor Communicatio n
	Focus on College & Career: A measurement of the time middle school teachers and leaders spend discussing and preparing students for a postsecondary education and/or future career.	Regularity of time spent giving information on careers and career requirements during homeroom/gro up advising period	HES8E	Corwin & Tierney (2007); Madhere & MacIver (1996); McClafferty, McDonough, & Nunez (2002)	Removed: Over 30% missing cases

		Proportion of time school guidance counselors spend administering achievement, competency, career interests, or other tests	HES11A	Corwin & Tierney (2007); Madhere & MacIver (1996); McClafferty, McDonough, & Nunez (2002)	Removed: Over 30% missing cases
	Efforts to Facilitate Articulation to High School: A measurement of the time middle school teachers and leaders spend planning for and preparing students' successful transition to high school.	Middle school students attend regular classes at high school	HES21E	McClafferty, McDonough, & Nunez (2002)	Removed: Factor Analysis loading of less than .5
		Middle and high school teachers meet regularly to discuss courses and requirements	HES21K	McClafferty, McDonough, & Nunez (2002)	Retained within Efforts to Facilitate Articulation to High School subconstruct
		Middle and high school administrators meet to discuss articulation and programs	HES21L	McClafferty, McDonough, & Nunez (2002)	Retained within Efforts to Facilitate Articulation to High School subconstruct
		Middle and high school counselors meet	HES21M	McDonough (1997, 1999); Plank and Jordan (2001)	Retained within Efforts to Facilitate Articulation to High School subconstruct
		Frequency of students' meeting with their school counselor to discuss high school and high school programs	BYS51a-A (aggregated to school level)	McDonough (1997, 1999); Plank and Jordan (2001)	Moved to New Subconstruct: Counselor Communicatio n

	School-Initiated Parental Involvement: A measurement of the extent to which school teachers and leaders proactively reach out to and involve their students' parents in conversations and programs focusing on student success and achievement outcomes.	Frequency of school teachers talking to parents about child's performance	mean of BYT3_31 & BYT6_31 (aggregated to school level)	Shouse (1994)	Removed: Factor Analysis loading of less than .5
		Middle school's parents are able to visit high schools while children are still enrolled in the middle grades	HES21G	McClafferty, McDonough, & Nunez (2002)	Removed: Factor Analysis loading of less than .5
		% of 8th grade parents who were contacted about their child's academic performance	BYP57A (aggregated to school level)	Catsambis & Garland (1997)	Retained within School-Initiated Parental Involvement Subconstruct
		% of 8th grade parents who were contacted about their child's academic program	BYP57B (aggregated to school level)	Catsambis & Garland (1997)	Retained within School-Initiated Parental Involvement Subconstruct
		% of 8th grade parents who were contacted about their child's high school course selection	BYP57C (aggregated to school level)	Catsambis & Garland (1997)	Retained within School-Initiated Parental Involvement Subconstruct
		% of 8th grade parents who were contacted about their child's high school program placement	BYP57D (aggregated to school level)	Catsambis & Garland (1997)	Retained within School-Initiated Parental Involvement Subconstruct

Student-Level Control Variables		8th grader's underrepresented minority status	RACE-recoded to 0 = White or Asian, 1 = Black, Hispanic, or Native American	Lee & Croninger (1994); Lee& Smith (1993; 1995)	Retained as Student-Level Control Variable
		8th grader's gender (female)	BYS12-recoded to male=0, female =1	Lee & Smith (1993; 1995)	Retained as Student-Level Control Variable
		8th grader's prior academic achievement	BYGRADS	Lee & Croninger (1994); Lee & Smith (1993); Phillips (1997)	Retained as Student-Level Control Variable
		8th graders' first-generation status	calculated using BYS34A & BYS34B (0 = continuing generation; 1 = first-generation)	Stage & Hossler (1989)	Retained as Student-Level Control Variable
		8th grader's poverty status	calculated using BYFAMSIZ & BYFAMINC (0 = not poor, 1 = poor)	Acs & Gallagher (2000); Croninger (1994)	Retained as Student-Level Control Variable
		8th grader's receipt of consistent school support in middle and high school	calculated using BYS59F & F2S7C (0 = other; 1= received consistent support)		Retained as Student-Level Control Variable
School-Level Control Variables		8th grade enrollment size	G8ENROL	Lee & Croninger (1994)	Retained as School-Level Control Variable
		Proportion of students on reduced or subsidized lunch	G8LUNCH	Cabrera, Deil-Amen; Prabhu; Terenzini, Lee, & Franklin (2006)	Retained as School-Level Control Variable
		School structure (K-8 vs. 6-8)	G8TYPE	Lee& Croninger (1994); Lee& Smith (1993)	Removed: High Correlation

Case removal. This study focused on a subsample of the original group of eighth grade students who responded to the NELS survey in AY1988. First, only eighth graders who progressed through middle and high school without dropping out or getting held back were included in the study. This ensured that the study captured the same students from eighth grade through each follow-up survey cycle. Second, I removed cases for which a valid dependent variable (ACRES) value was not available. While I considered multiply imputing values for the ACRES variable, I decided against doing so for two specific reasons. First, because the ACRES values were created by calculating a variety of student input variables, including some to which I did not have access, I was concerned about the statistical software's ability to accurately impute its values. Second, scholars including Von Hippel (2007) explicitly recommend not imputing values for a study's dependent variable because they add "needless noise" (p. 83) to the model's estimates. It is also worthwhile to note that Croninger and Douglas (2005) indicate that within educational institutional research, it is more common to delete cases of missing dependent variables than to impute them. As such, even though removing cases with missing ACRES values was likely a cautious choice, support exists for such a decision within the literature and in practice. Applying these two data filters resulted in a loss of over 19,000 cases, or over two-thirds of the study's initial cohort of AY1988 eighth grade students.

Removal of variables with low variability. I also removed from the model any variables with less than 10% variability. For example, after further exploration, I determined that results for the BYSC39B variable indicated that nearly 99% of all surveyed schools required their eighth grade students to take a year's worth of

coursework in math. Keeping a variable with such insufficient variability would not have added any useful information to the study's model. Additional variables removed from the model due to insufficient variability include: HES23C (Eighth grade students enrolled in a common curriculum), BYSC47E (School principals' assessment of the extent to which teachers encourage students to do their best), BYSC47F (School principals' assessment of the extent to which students are expected to do their homework), and the variable measuring the mean of BYT2_8C & BYT5_8C (Teachers' reports of how much time they spend discussing homework in class).

Handling missing data. I used a multiple imputation approach to address instances of remaining missing data within the analytical sample. When data are missing from a sample, it can incorrectly impact the results of a study's statistical tests (Alison, 2002). Addressing missing data protected the study's internal validity, by ensuring that the study's analysis accurately reflected the respondents within the analytical sample (Croninger & Douglas, 2005; McKnight, McKnight, Sidani & Figueredo, 2007). Multiple imputation was specifically designed to address missing data within large, public-use surveys (Rubin, 1996). This iterative approach uses existing values within the model to estimate a series of potential values for missing data.

Prior to conducting the imputation process, I assessed the extent of missing data for each of the study's variables. While the literature on multiple imputation suggests that the process should not be conducted on variables missing a large amount of data (e.g. McKnight, McKnight, Sidani & Figueredo, 2007), there does not

appear to be a commonly-held threshold on what a large amount of missing data means. Within this study, I determined that variables missing more than one-third of their data should not be included in the imputation process, and should not be included in the model. Two variables within the study's proposed model were missing over one-third of their data. As a result of this decision, I removed these variables (HES8E and HES11A) from the model. These variables measured, respectively, the frequency of time school officials spent giving students information on careers and career requirements during homeroom/group advising period and the proportion of time school guidance counselors spend administering achievement, competency, career interests, or other tests. Removing these variables eliminated the study's proposed *Focus on College and Career* subconstruct, which had been comprised exclusively of the HES8E and HES11A variables.

Following Schafer's (1999) recommendation, I conducted five iterations of imputation, thus producing five separate sets of complete data; each set contained all original non-missing values and a potential imputed value for cases that had been missing. The SPSS statistical software package produced test results for each initial dataset as well as a "pooled" result, which provided mean parameter estimates and associated standard errors across all five datasets. According to McKnight, McKnight, Sidani, and Figueredo (2007), these pooled estimates reflect the model's most accurate results, and were subsequently used when interpreting model results.

For the purposes of this study, I considered multiple imputation to be preferable to other forms of missing data procedures (i.e. listwise, pairwise, mean imputation, single imputation) for three specific reasons. First, it allowed me to

preserve many more cases than a listwise deletion procedure, which would have produced approximately 70% fewer cases (valid n, using listwise deletion = 2,392 cases). A sample size so small would have likely varied significantly from the original sample, and its findings would have likely carried much less statistical power than a larger sample. Second, multiple imputation assumed that data are Missing at Random (MAR), meaning that there is a relationship between missing values and observed values, but not between missing values and other missing values. The results of a Little's test[1] indicated that the data within the study's model were not MCAR ($\chi^2 = 7287.661$, $p \leq .000$). This finding is important, because listwise and pairwise deletion procedures assume that missing data are MCAR; as such, the study's data were not a good fit for either of these statistical approaches. Finally, and perhaps most importantly, multiple imputation provides less biased parameter estimates than listwise, pairwise, and mean and single imputation approaches (Allison, 2002; Croninger & Douglas, 2005).

Factor analysis. As is indicated in Table 1, I hypothesized that more than one variable was needed to capture the essence of most parental involvement and school culture subconstructs. Creating composites allowed me to combine these multiple variables into a single subconstruct measure, and to avoid problems associated with multicollinearity, such as inflated standard errors of coefficients, that would have likely taken place had I kept each subconstruct's variables in the model individually (Shieh & Fouladi, 2003).

[1] I conducted a Little's test to determine if my data might be MAR. Essentially, the Little's test ascertains whether or not data are Missing Completely at Random (MCAR) or not. Data are MCAR when no relationship exists between observed and missing values.

To move forward with the composite construction process, I conducted a principal component analysis to identify how many factors might be underlying the data. This procedure produced factor loadings, which explained to what extent an individual variable contributes to its assigned factor. For the purposes of this study, variables with high loadings (.5 or greater) were considered to sufficiently contribute to a given factor. Conversely, variables with loading values of less than .5 were deemed insufficient in their ability to contribute to, or explain, a given factor. As such, if a variable produced loading values of less than .5 for each factor, it was determined that it did not sufficiently contribute to the entire construct, and was subsequently removed from the model. This rationale is supported by Comrey and Lee (1992), who argued that higher factor loadings equate to a greater proportion of the factor's shared variance with a construct, and indicate greater chances that the factor and construct are truly aligned with one another. Finally, the tests produced new weighted composite variables for each subconstruct, called factor scores, which were directly informed by factor loadings results. In other words, when factor scores are constructed, more weight will be placed on the variables with higher factor loadings than those with lower factor loadings. The study's factor analysis tests were conducted using principal components analysis for its initial extraction, and using VARIMAX rotation to yield orthogonal factors.

Parental involvement variables. Table 3 lists the loadings of the Factor Analysis test conducted on the study's parental involvement variables.[2] These results

[2] I also estimated the reliability of the latent factors using the Coefficient-*H* test (Hancock & Mueller, 2001), which takes into account the loadings comprising each factor. The Coefficient-*H* results of each construct were above .7, providing further support that each latent factor was well appraised by its measures.

suggested that the construction of parental involvement differed from my hypotheses in three specific ways.

First, and perhaps most importantly, the subconstruct measuring parents' supervision of their child's academic work did not belong, according to the test results, within the parental involvement construct. Essentially, this means that this subconstruct, which was represented by a single variable measuring the extent to which parents assisted their child with his or her homework, failed to effectively explain the construct of parental involvement as well as the other subconstructs within the hypothesized model. Because of this finding, I removed the variable, and therefore the subconstruct reflecting parents' supervision of child's academic work, from the study.

Table 3
Exploratory Factor Analysis Loadings of Parental Involvement Variables

Revised Parental Involvement Subconstructs (Label)	Description of Measure	Factor Loading
Parent-Initiated Communication with School About Academics (PICS)		
BYP58A	Parent Contacted School re: Child's Academic Performance	0.903
BYP58B	Parent Contacted School re: Child's Academic Program	0.900
Involvement in Parent-Teacher Organizations (PTO)		
BYP59B	Parent Attended PTA Meetings	0.863
BYP59C	Parent Participated in PTA Activities	0.856
Parent Communication with Child About Academics, College or Career (PCACC)		
BYP66	Parent Talked to Child About School Experiences	0.737
BYP67	Parent Talked to Child About High School Plans	0.884
BYP68	Parent Talked to Child About Post High School Plans	0.856

Second, the Factor Analysis results refuted my hypothesis that the variables measuring parent-initiated conversations with schools about their child's academic performance and parent attendance and participation in parent-teacher organizations fit well together into a singular subconstruct of parent-initiated partnerships with schools. Instead, the analysis suggested the creation of two separate subconstructs: one for the communication measures, and one for the parent-teacher organization measures. Logically, this makes sense; even though the same general key players are involved (school officials and parents), and the same motivations are likely behind parents' actions (improving the child's educational experience and outcomes), the types of parent/school interactions can range from the very specific and small-scale (a mother's conversation with her son's teacher about his academic performance on a math test) or general and macro-scale (a father's attendance at a PTA meeting to address a concern of widespread cheating among the school's students). As a result of the test's findings, I developed two revised subconstructs: *Parent-Initiated Contact With School About Academics (PICS),* which measured the extent to which students' parents proactively discuss their child's academics with school officials, and *Involvement in Parent-Teacher Organizations (PTO),* which reflected the extent to which parents attended or participated in their child's school's Parent-Teacher Organization.

Finally, the Factor Analysis test results also refuted the hypothesis that variables measuring parent/child communications about students' middle and high school academic experiences and plans belonged in a separate subconstruct than those measuring parent/child communications about students' post-high school plans.

Instead, the test results indicated that all parent/child communication variables belonged in a singular subconstruct. This fused subconstruct, *Parent Communication With Child About Academics, College, or Career (PCACC),* measured the extent to which parents discussed with their child his or her schoolwork and plans for high school, college, or career.

School culture variables. Table 4 lists the loadings of the Factor Analysis test conducted on the study's school culture variables.[3] These results suggested that the construction of parental involvement differed from my hypotheses in several important ways.

[3] I also estimated the reliability of the latent factors using the Coefficient-*H* test (Hancock & Mueller, 2001), which takes into account the loadings comprising each factor. The Coefficient-*H* results of each construct exceeded or approached.7, providing further support that each latent factor was well appraised by its measures.

Table 4
Exploratory Factor Analysis Loadings of School Culture Variables

Revised School Culture Subconstructs (Label)	Description of Measure	Factor Loading
School-Initiated Parental Involvement (SIPI)		
BYP57A (Aggregated to School)	% Parents Contacted re: Child's Academic Performance	0.754
BYP57B (Aggregated to School)	% Parents Contacted re: Child's Academic Program	0.831
BYP57C (Aggregated to School)	% Parents Contacted re: Child's High School Course Selection	0.617
BYP57D (Aggregated to School)	% Parents Contacted re: Child's High School Placement	0.687
Counselor Communication (CCOM)		
BYS51C-A (Aggregated to School)	% Students Talked to Counselor re: Academics	0.688
BYS51A-A (Aggregated to School)	% Students Talked to Counselor re: High School Program	0.843
Efforts to Facilitate Articulation to High School (EFA)		
HES21K	Middle & High School Teachers Meet re: Articulation	0.810
HES21L	Middle & High School Administrators Meet re: Articulation	0.836
HES21M	Middle & High School Counselors meet re: Articulation	0.635
Teacher Time Invested in Academics (TIA)		
Mean of BYT3_30A & BYT6_30A (Aggregated to School)	Amount Time Teachers Spent on Planning Class	0.858
Mean of BYT3_30B & BYT6_30B (Aggregated to School)	Amount Time Teachers Spent on Grading Student Work	0.886
School Structured to Promote Academic Achievement (STRUC)		
BYSORG2	Level of Departmentalization in School	0.711
HES27C & HES28C	Team Teaching in 8th Grade	0.731
Other Reflections of School Culture (ORSC)		
BYSC21÷BYSC17	% of School Teachers with Graduate Degree	0.719
BYS67C (Aggregated to School)	% 8th Graders Enrolled in Algebra	0.791

First, the Exploratory Factor Analysis results indicated that eight variables I had originally proposed to include within the study produced factor loadings less than .5, and therefore did not effectively explain the explain the school culture construct. These variables included: BYS59H (proportion of students who believed that teachers praised their effort), HES13A (proportion of eighth grade students rewarded for academic achievement), HES21E (existence of program allowing middle school students to attend local high school classes), HES21G (existence of program allowing middle school parents to visit local high schools), BYSC47D (reflection of school principal's belief that the eighth grade learning environment is structured), HES23L2 (reflection of school principal's belief that classes are organized to promote group/cooperative learning), BYHOMEWORK119 (average amount of homework reported by eighth graders), and the variable measuring the mean of BYT3_31 & BYT6_31 (frequency of school teachers talking to parents about child's performance). Because of these findings, I removed the eight variables from the study.

The Factor Analysis results also suggested three school new culture subconstructs. While I had originally hypothesized that variables focusing on the amount of time teachers invested in planning and preparing for teaching class and grading students' papers belonged within the subconstruct, *Academic Rigor and Intensity,* the Factor Analysis results indicated that the two measures instead fit within a singular subconstruct. As such, I named this subconstruct *Teacher Time Invested in Academics (TIA)* and defined it as *a reflection of the amount of time teachers spent on activities designed to promote student learning*. Similarly, the test results indicated

that variables focusing on student-school counselor interactions belonged together within a singular subconstruct. This finding refutes my initial hypothesis that these two measures belonged together in separate subconstructs (*Efforts to Facilitate Articulation to High School* and *Academic Rigor & Intensity*, respectively). I named this new subconstruct *Counselor Communication (CCOM)*, and defined it as *a reflection of the frequency of student-counselor interactions regarding the student's academic performance and future plans.* Finally, the Factor Analysis results proposed a third new subconstruct, which I named *Other Reflections of School Culture (ORSC)*. This subconstruct includes the variable measuring a school's proportion of teachers with a graduate degree as well as the measure of the proportion of eighth graders enrolled in Algebra. Therefore, this finding refutes my hypothesis that the measure of teachers with graduate degrees belonged within the *School Structured to Promote Academic Achievement* subconstruct and the measure of eighth grade students enrolled in Algebra fit within the *Academic Rigor & Intensity* subconstruct.

The Factor Analysis results suggested notable changes to two of the study's proposed subconstructs. Specifically, the results indicated that only three – those that measured schools' departmentalization and team teaching - effectively measured the *School Structured to Promote Academic Achievement (STRUC)* subconstruct. As a result of these changes, I revised the definition of the subconstruct to: *A reflection of the school's adaptation of structural practices that have been associated with improved student academic achievement outcomes*. The Factor Analysis results also suggested that only three variables – those measuring the extent to which middle and high school teachers, administrators, and counselors meet to discuss articulation –

reflected the *Efforts to Facilitate Articulation to High School (EFA)* subconstruct. I retained the subconstruct's previous definition, *a measurement of the time middle school teachers and leaders spend planning for and preparing students' successful transition to high school*, because I determined that it was still applicable.

Only one of the study's proposed subconstructs – *School-Initiated Parental Involvement (SIPI)*- aligned with the Factor Analysis results. As such, this subconstruct retained variables measuring the extent to which parents were contacted about their child's academic performance, program, high school course selection, and high school placement.

Removal of variables with high levels of multicollinearity. Multilevel models can be affected by the inclusion of redundant variables at either of the two levels of analyses. Using SPSS, I conducted collinearity diagnostics to confirm that each variable across levels 1 and 2 had tolerance levels and variance inflation factors (VIF) falling within acceptable limits (tolerance levels of 0.10 or greater; VIF values of 10 or less) as is recommended by Cohen, Cohen, West, and Aiken (2003). Additionally, I conducted a Pearson's Correlation test to explore the correlations between the proposed model variables. While the collinearity diagnostic tests indicated that all tolerance levels and VIFs fell within acceptable limits, the Pearson's Correlation results identified a high correlation (.671, $p \leq .01$) between two of the study's proposed control variables: School Structure *(STRUC)*, which classified students' schools as having a "traditional" middle school grading structure or an "other" type of structure, and Eighth Grade Enrollment *(ENRL)*. To avoid problems associated with highly correlated variables, such as redundancy or inflated standard

errors of coefficients, I decided to remove one of these variables - School Structure (*STRUC*) – from the model.

Normalizing variables. Because the study's continuous variables needed to reflect a normal distribution, I tested their skewness to determine if, and to what extent, these continuous variables would need to be transformed. Table 5 illustrates the skewness ratios of all of the study's continuous variables, including factor scores. Variables were deemed to require transformation if their skewness ratios were not close to a value of 2 (Croninger, 2010). To conduct the transformation process, I first shifted a variable's values so that they were all greater than 1. I then raised the values to a fractional power. If the transformation process successfully elicited a skewness ratio approaching a value of 2, the measure was then z-scored so that a variable's mean values were set equal to zero, and all other data points referred to their value in terms of standard deviation from the mean.

Table 5
Normalization of Continuous Variables

Variable (Label)	Initial Skewness Ratio	Transformation	Final Skewness Ratio
Parental Involvement Subconstructs			
Parent-Initiated Communication with School About Academics (PICS)	50.05	N/A: Converted to Dummy Variable	
Involvement in Parent-Teacher Organizations (PTO)	14.79	N/A: Converted to Dummy Variables	
Parent Communication with Child About Academics, College or Career (PCACC)	-50.99	*Z*(PCACC+6)**5.3	2.83
Student-Level Controls			
8th grader's prior academic achievement (GRAD)	-18.78	*Z*(GRAD +1)**2.5	2.54
School Culture Subconstructs			
School-Initiated Parental Involvement (SIPI)	9.90	*Z*(SIPI +5)**.75	3.10
Counselor Communication (CCOM)	17.62	*Z*(CCOM +4)**.4	2.60
Efforts to Facilitate Articulation to High School (EFA)	-7.10	*Z*(EFA +4.5)**2.3	2.61
Teacher Time Invested in Academics (TIA)	9.19	*Z*(TIA + 4)**.75	2.88
School Structured to Promote Academic Achievement (STRUC)	24.71	N/A: Converted to Dummy Variables	2.75
Other Reflections of School Culture (ORSC)	8.46	*Z*(ORSC)**.8	2.32
School-Level Controls			
8th grade enrollment size (ENRL)	3.26	*Z*(ENRL+12)**.9	2.52
Proportion of students on reduced or subsidized lunch (FLUNCH)	4.41	*Z*(FLUNCH)**.92	2.19

All but three of the study's continuous variables were successfully transformed using the aforementioned method. Subconstructs of Parent-Initiated Communication with School About Academics *(PICS*), Involvement in Parent-Teacher Organizations (*PTO*)*, and School Structured to Promote Academic Achievement* (*STRUC*) all retained skewness ratios above a value of 7 after the transformation process. As such, it was determined that these subconstructs' statistical properties did not lend themselves to transformation. At the advice of Croninger and Cabrera (A.F. Cabrera & R.G. Croninger, personal communications, June 7, 2011), I converted these subconstructs into the following dummy-coded variables:

- *Parents Contacted School (PICS)* (0= Parents Did not Contact School About their Child's Academic Performance or Program; 1 = Parents Contacted School About their Child's Academic Performance And/Or Program)
- *Moderate Involvement in Parent-Teacher Organizations (PTO-Mod)* (0 = Other Levels of Involvement in Parent-Teacher Organizations; 1 = Moderate Levels of Involvement in Parent-Teacher Organizations)
- *High Involvement in Parent-Teacher Organizations (PTO-High)* (0 = Other Levels of Involvement in Parent-Teacher Organizations; 1 = High Levels of Involvement in Parent-Teacher Organizations)
- *Team Teaching Within Eighth Grade (TTCH)* (0= No Team Teaching Offered in 8th Grade; 1 = Team Teaching Offered in 8th Grade)
- *Departmentalization Within School (DEPT)* (0 = Other Class Structure; 1 = Departmentalized Teaching Structure)

Actual measures and constructs. The study's proposed construct and subconstruct measures changed greatly over the course of the data cleaning and preparation and composite construction processes. The model lost a total of seventeen variables as a result of removing variable with low variability, high levels

of missing data, low Factor Analysis scores, and high levels of multicolinearity. Because of this, and because of how the Exploratory Factor Analysis tests suggested the study's remaining variables interacted with one another to reflect a given measure, the study's subconstructs also evolved significantly. Table 6 lists the measures and constructs used during the study's model testing process, as well as the labels used to represent each variable in the study's equations. Table 7 provides descriptive statistics for all variables used in model testing. Finally, Figure 3 illustrates the study's Conceptual Model proposed for model testing, taking into account its updated subconstructs and measures.

Table 6
Constructs, Measures, and Variables Used During Model Testing

Construct (Label)	Subconstructs (Label)	Variables (Label)	NELS Survey Question	Supports in the Literature
Academic Preparedness for College (ACRES): A measure of academic inputs (high school GPA, rank, aptitude test scores, curricular intensity and rigor) that reflect students' ability to academically succeed at a four-year college.			ACRES (developed by Adelman, based on inputs from NELS:90-92 surveys)	Adelman (1999; 2006) Cabrera, Burkum & La Nasa (2005); Cabrera, Burkum, La Nasa, Bibo (in press)
Parental Involvement: The extent to which parents proactively take specific steps to ensure that their child is prepared to academically succeed in college.				
	Parent-Initiated Communication With School About Academics (PICS): The extent to which students' parents proactively discuss their child's academics with school officials	Parents contacted school about their child's academic performance and/or program	calculated using BYP58A & BYP58B (0= Parents Did not Contact School About their Child's Academic Performance or Program; 1 = Parents Contacted School About their Child's Academic Performance And/Or Program)	Catsambis & Garland (1997); Fan & Chen (2001)

	Involvement in Parent-Teacher Organizations (PTO): The extent to which parents attend or participate in their child's school's Parent-Teacher Organization	Highly Involved in Parent-Teacher Organizations (PTO-High)	Calculated using BYP59B&C (0=all other levels of parent-teacher organization involvement; 1 = high levels of parent-teacher organization involvement)	Catsambis & Beverige (2001); Catsambis & Garland (1997); Fan & Chen (2001); Rumberger (1995); Sui-Chu & Willms (1996)
		Moderately Involved in Parent-Teacher Organizations (PTO-Mod)	Calculated using BYP59B&C (0=all other levels of parent-teacher organization involvement; 1 = moderate levels of parent-teacher organization involvement)	Catsambis & Beverige (2001); Catsambis & Garland (1997); Fan & Chen (2001); Rumberger (1995); Sui-Chu & Willms (1996)
	Parent Communication with Child About Academics, College, or Career (PCACC): The extent to which students' parents discuss with their child his or her schoolwork and plans for high school, college, or career	Frequency of parent discussions with child about experiences in school, high school plans, and post-high school plans	Factor Score comprised of BYP66, 67, 68	Catsambis & Garland (1997); Fan & Chen (2001); Lee & Croninger (1994)

School Culture of College Preparedness: A shared set of purposefully structured actions, rules, and practices, embraced by teachers and administrators, with a goal of preparing students to academically excel in a 4-year college				
	School Structured to Promote Academic Achievement (STRUC): A reflection of the school's adaptation of structural practices that have been associated with improved student academic achievement outcomes.	Departmentalization within school (DEPT)	Calculated using BYSCORG2 (0 = Other Class Structure; 1 = Departmentalized Teaching Structure)	Lee & Smith (1993)
		Team teaching within eighth grade (TTCH)	HES27C & HES28C (0= No Team Teaching Offered in 8th Grade; 1 = Team Teaching Offered in 8th Grade)	Lee & Croninger (1994); Lee & Smith (1993)
	Teacher Time Invested in Academics (TIA): A reflection of the amount of time teachers spent on activities designed to promote student learning	School mean of the time teachers spend planning and preparing for teaching, and grading papers.	Factor score comprised of mean of BYT3_30A & BYT6_30A (aggregated to school level) & mean of BYT3_30B & BYT6_30B (aggregated to school level)	Shouse (1994)

	Counselor Communication (CCOM): A reflection of the frequency of student-counselor interactions regarding the student's academic performance and future plans.	School mean of frequency of student visits to school counselors to improve their academic work and performance and to discuss their high school program	Factor score comprised of BYS51A-A (aggregated to school level) & BYS51C-A (aggregated to school level)	McDonough (1997, 1999); Plank and Jordan (2001)
	Efforts to Facilitate Articulation to High School (EFA): A measurement of the time middle school teachers and leaders spend planning for and preparing students' successful transition to high school.	Middle and high school teachers, administrators, and counselors meet regularly to discuss courses and requirements	Factor score comprised of HES21K, HES21L, & HES21M	McClafferty, McDonough, & Nunez (2002)
	School-Initiated Parental Involvement (SIPI): A measurement of the extent to which school teachers and leaders proactively reach out to and involve their students' parents in conversations and programs focusing on student success and achievement outcomes.	% of 8th grade parents who were contacted about their child's academic performance, program, high school course selection, and high school placement	Factor Score comprised of BYP57A, BYP57B, BYP57C, & BYP57D	Catsambis & Garland (1997)
	Other Reflections of School Culture (ORSC)	% of school teachers with at least an MA & % 8th Graders Taking Algebra	Factor Score Comprised of (BYSC21 ÷ BYSC17) & BYS67C - aggregated to school level	Horn & Nunez (2000); Phillips (1997)Shouse (1994)

Student-Level Control Variables		8th grader's underrepresented minority status (URM)	RACE-recoded to 0 = White or Asian, 1 = Black, Hispanic, or Native American	Lee & Croninger (1994); Lee& Smith (1993; 1995)
		8th grader's gender (FEM)	BYS12- recoded to male=0, female =1	Lee & Smith (1993; 1995)
		8th grader's prior academic achievement (GRAD)	BYGRADS	Lee & Croninger (1994); Lee & Smith (1993); Phillips (1997)
		8th graders' first-generation status (FGEN)	Calculated using BYS34A & BYS34B (0 = continuing generation; 1 = first-generation)	Stage & Hossler (1989)
		8th grader's poverty status (POOR)	Calculated using BYFAMSIZ & BYFAMINC (0 = not poor, 1 = poor)	Acs & Gallagher (2000); Croninger (1994)
		8th grader's receipt of consistent school support in middle and high school (CSUP)	Calculated using BYS59F & F2S7C (0 = other; 1= received consistent support)	
School-Level Control Variables		8th grade enrollment size (ENRL)	G8ENROL	Lee & Croninger (1994)
		Proportion of students on reduced or subsidized lunch (FLUNCH)	G8LUNCH	Cabrera, Deil-Amen; Prabhu; Terenzini, Lee, & Franklin (2006)

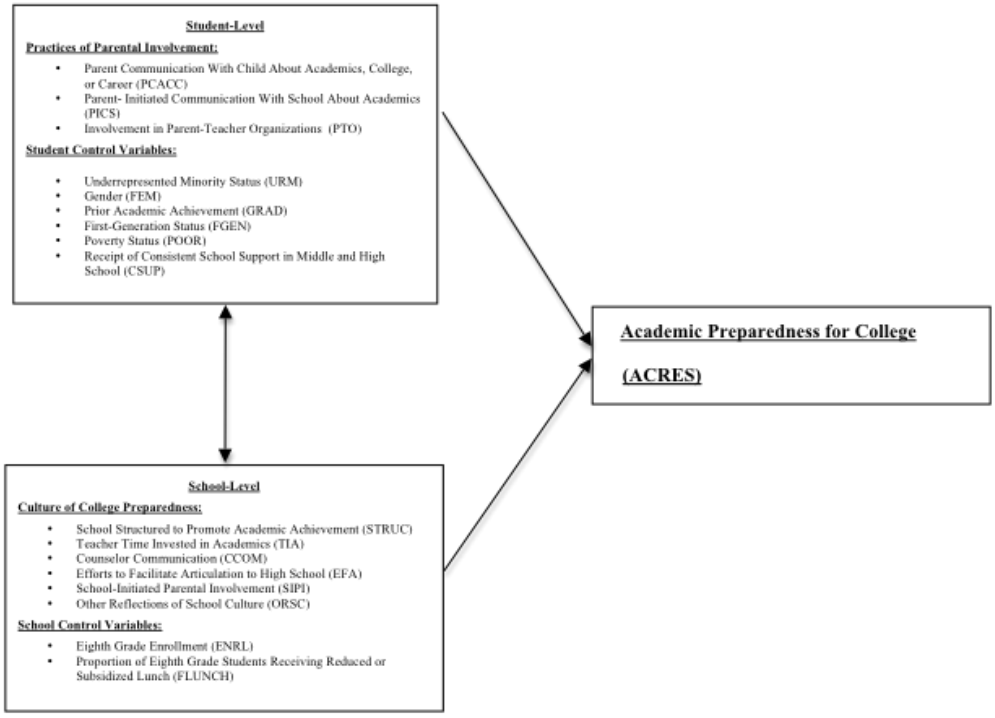
Table 7
Descriptive Statistics, Variables Used During Model Testing (Unweighted)

Dependent Variable (Label)	**Mean**	**Standard Deviation**
Academic Preparedness for College (Z-Scored) (ACRES)	0.08	1.02
Student Variables (Label)		
Parents contacted school about their child's academic performance and/or program (PICS)	0.56	0.50
Highly Involved in Parent-Teacher Organizations (PTO-High)	0.23	0.42
Moderately Involved in Parent-Teacher Organizations (PTO-Mod)	0.23	0.42
Frequency of parent discussions with child about experiences in school, high school plans, and post-high school plans (Z-scored) (PCACC)	-0.04	0.99
8th grader's underrepresented minority status (URM)	0.20	0.40
8th grader's gender (FEM)	0.53	0.50
8th grader's prior academic achievement (GRAD)	0.09	1.02
8th graders' first-generation status (FGEN)	0.37	0.48
8th grader's poverty status (POOR)	0.29	0.45
8th grader's receipt of consistent school support in middle and high school (CSUP)	0.75	0.44
School Variables (Label)		
Departmentalization within school (DEPT)	0.87	0.33
Team teaching within eighth grade (TTCH)	0.38	0.49
School mean of the time teachers spend planning and preparing for teaching, and grading papers. (Z-scored) (TIA)	-0.05	0.97
School mean of frequency of student visits to school counselors to improve their academic work and performance and to discuss their high school program (Z-scored) (CCOM)	0.00	0.96
Middle and high school teachers, administrators, and counselors meet regularly to discuss courses and requirements (Z-scored) (EFA)	0.02	1.00
% of 8th grade parents who were contacted about their child's academic performance, program, high school course selection, and high school placement (Z-scored) (SIPI)	0.07	0.97
% of school teachers with at least an MA & % 8th Graders Taking Algebra (ORSC)	0.00	0.97
8th grade enrollment size (Z-scored) (ENRL)	-0.04	0.97
Proportion of students on reduced or subsidized lunch (Z-scored) (FLUNCH)	-0.08	0.98

Student n = 8219

School n = 947

Figure 3: Conceptual Model Proposed for Model Testing



Use of Multilevel Modeling

I utilized a multilevel model to answer my three research questions. For the purposes of this study, multilevel models were preferable to linear regression models for three specific reasons. First, the multilevel model allowed me to test my hypothesis that eighth graders' academic preparedness for college are influenced by factors at both the individual and school level.

Second, the multilevel model took into account the nested nature of the data (students nested within schools). In doing so, I could fully consider influences coming from both the student and his or her school. Conversely, if I had used a linear regression model, I would have either had to select one unit of analysis, either at the student or the school level. Doing so would have likely resulted in serious errors of ecological fallacies, in which observations about groups are assumed to apply to individuals, or atomistic fallacies, in which observations about individuals are assumed to apply to the groups to which they belong (Hox, 2002; Luke, 2005).

Finally, multilevel modeling allowed me to test the extent to which the study's student level variables interact with, or influence the study's school level variables. This means, that within this study, I was able to explore relationships between factors of parental involvement and school culture. Measuring such cross-level effects is not plausible within linear regression models (Luke, 2005; Raudenbush & Bryk, 2002).

Centering

In the study's multilevel models, I initially group mean centered and left unconstrained the error terms of the four parental involvement constructs (not including student level control variables), so that I could determine which of them

vary across schools. Conversely, I grand mean centered and constrained the error terms of the remaining measures within the model, including student and school level control variables and variables pertaining to school culture of college preparedness.

Weighting Cases

I utilized a student level panel weight *F2TRP1WT,* which applied to students who responded to the 1988, 1990, and 1992 surveys for whom high school transcript data is available, when conducting the study's model testing. Applying weights to the NELS:88-92 dataset was especially important for two specific reasons. First, certain populations of students (i.e. Asian and Hispanic students) were oversampled within the NELS:88-92 survey (Curtin, Ingels, Wu, & Heuer, 2002). Secondly, not all participants provided complete answers to each of the survey's follow-ups in 1990 and 1992. Thus, if I did not apply weights to the data, the study's findings could be skewed to represent the oversampled populations within the survey and to only those participants who provided complete responses to the initial 1988 survey and both of its follow-ups (Stapleton & Thomas, 2008). As is recommended by Thomas, Heck, and Bauer (2005), I normalized the study's weight, by dividing the weight by its mean. Normalized weights both adjust for oversampling within the study, and preserve its sample size (Thomas et al., 2005).

While some statistical software packages (e.g. HLM, Mplus) allow researchers to apply unique weights to both levels of a multilevel model, SPSS software only permits the application of one weight to a multilevel model. Therefore, I was unable to use a school level weight in my analysis. Using a school level weight would have allowed me to similarly ensure that the study's findings were not skewed

to represent the oversampled schools within the survey (Stapleton & Thomas, 2008). To account for the possibility of such skewed results, I applied more stringent p-values ($p \leq .01$) when interpreting all school level variables within the study's model (method suggested by Ronald Heck, personal communication, May 24, 2011).

Model Testing

Table 8 provides an overview of the study's model testing plan. It highlights the purpose of each of the multilevel models I intended to use and identifies the particular questions each model sought to answer.

Table 8
Model Testing Plan

Test	Question Addressed	Purpose
Fully Unconditional Model	To what extent do the academic preparedness for college outcomes of eighth grade students vary across schools within the study?	Examines the extent to which academic preparedness for college varies across schools. A sufficiently high variation confirms the need to conduct a multilevel model.
Random Coefficients Model	To what extent do practices of parental involvement promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?	Answers Research Question #1
	Among eighth grade students, which parental involvement variables impact eventual outcomes of college academic preparedness at different levels across schools within the study?	Identifies which parental involvement variables can be considered for cross-level testing in the Intercepts & Slopes as Outcomes model
Intercepts & Slopes As Outcomes Model	To what extent does a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?	Answers Research Question #2
	To what extent does the joint interaction of practices of parental involvement and a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?	Answers Research Question #3

The subsequent sections provide a general overview of two-level model design, and then detail the specific models I used to answer the study's three research questions.

General Overview of Two-Level Model Design. This study utilized variations of a general two-level model to explore the extent to which student-level (parental involvement) and school-level (school culture of college preparedness) factors influenced eighth grade students' eventual academic preparedness for college. The basic design of a general two-level model, using ACRES as a dependent variable, is as follows:

Student-Level Model: $ACRES_{ij} = \beta_{0j} + \sum_{q=1}^{Q} \beta_{0j} X_{qij} + r_{ij}$

where:
$ACRES_{ij}$ = Individual ACRES scores for student *i* in school *j*
J= Number of Schools
Q= Number of Student Predictors
β_{0j} = The mean value of $ACRES_{ij,}$ across all students in school *j*
β_{qj} = The effect (slope) of the qth student predictor on $ACRES_{ij,}$ in school *j*
X_{qij} = qth student predictor of student *i* in school *j*
r_{ij} = The $ACRES_{ij}$ score error for student *i* in school *j*

School-Level Model: $\beta_{qj} = \gamma_{q0} + \sum_{s=1}^{S} \gamma_{qs} W_{sj} + u_{qj}$

where:
β_{qj}= Student-level coefficients
S= Number of school predictors
Q = Number of student predictors
J = Number of schools
γ_{q0} = The mean value of $ACRES_{ij,}$ across all students, controlling for school level predictors
γ_{qs} = The effect (slope) of the *s*th school predictor on the relationship between $ACRES_{ij}$ and the *q*th student predictor
W_{sj} = *s*th school predictor of school *j*
u_{qj}= School-level random effects for *q*th student predictor

Fully Unconditional Model. The first model within my analysis, a Fully Unconditional Model (FUM), explored the variance of students' ACRES scores across both student and school levels. The formula for the FUM is:

Student-Level Model: $ACRES_{ij} = \beta_{0j} + r_{ij}$

School-Level Model: $\beta_{0j} = \gamma_{00} + u_{0j}$

The results of the FUM also produced estimates of variance components at both the student (σ^2_r) and school (σ^2_{uo}) levels (Luke, 2005). A calculation of the proportion of variance in ACRES scores explained by school-level characteristics ($\sigma^2_{uo} / \sigma^2_{uo} + \sigma^2_r$) produced a value known as an Intraclass Correlation Coefficient (ICC). In the case of this study, an ICC value higher than zero would indicate that something is happening at the middle school level to influence students' eventual academic preparedness for college. The higher the ICC, the greater the proportion of variability in ACRES scores is accounted by school influences. As such, researchers suggest that a sufficiently high ICC can justify the need for using a multilevel model (Luke, 2005; Ma, Ma, & Bradley, 2008). Conversely, Heck, Thomas, and Tabata (2010) argue that "there would be little advantage to conducting a multilevel analysis" (p. 74) if a study's ICC is less than .05, because a very low ICC indicates that a study's group level variables explain very little, if any, of the variation in its dependent variables, and may not add much value to the model. Therefore, I proceeded with the study's multilevel model plan only if the ICC results were greater than .05.

Random Coefficients Model (Research Question 1). Next, I tested a Random Coefficients model that examined the role of parental involvement on academic preparedness for college. As such, it provided an initial answer to the study's first research question: "To what extent do practices of parental involvement promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?" The formula used for this Random Coefficients model is:

Student-Level Model:

$$ACRES_{ij} = \beta_{0j} + \beta_{1j}*(PCACC_{ij}) + \beta_{2j}*(PICS_{ij}) + \beta_{3j}*(PTO\text{-}High_{ij}) + \beta_{4j}*(PTO\text{-}Mod_{ij}) + \beta_{5j}*(POOR_{ij}) + \beta_{6j}*(URM_{ij}) + \beta_{7j}*(FGEN_{ij}) + \beta_{8j}*(FEM_{ij}) + \beta_{9j}*(GRAD_{ij}) + \beta_{10j}*(CSUP_{ij}) + r_{ij}$$

School-Level Model:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + u_{2j}$$
$$\beta_{3j} = \gamma_{30} + u_{3j}$$
$$\beta_{4j} = \gamma_{40} + u_{4j}$$
$$\beta_{5j} = \gamma_{50}$$
$$\beta_{6j} = \gamma_{60}$$
$$\beta_{7j} = \gamma_{70}$$
$$\beta_{8j} = \gamma_{80}$$
$$\beta_{9j} = \gamma_{90}$$
$$\beta_{10j} = \gamma_{100}$$

The coefficients for the model's fixed effects will indicate which student-level variables have a statistically significant impact on students' ACRES levels. A positive, statistically significant coefficient would represent a student-level variable that, on average, increases students' ACRES levels. Conversely, a negative, statistically significant coefficient would represent a student-level variable that, on average, negatively impacts students' ACRES levels.

The Random Coefficients model also assumed that at least one student-level measure randomly varied across schools. In the case of this study, I hypothesized that the effects of the four measures of parental involvement *(PCACC, PICS, PTO-High, & PTO-Mod)* varied across schools at a statistically significant level. To allow for this hypothetical variation of parental involvement across schools to be tested, I initially group mean centered the four variables and left their error terms unconstrained. If the model's variance components (u_{qj}) were statistically significant, it would confirm that the effects of parental involvement varied across schools within the study.

Within the Random Coefficients model, I used scaled deviance tests to determine model fit, and to decide if it made sense to remove variables that did not have a statistically significant impact on the dependent variable from the model. The formula for scaled deviance tests is (R.H. Heck, personal communication, May 31, 2011):

$$\chi^2 = -2 \text{ [(log-likelihood for bigger model) - (log likelihood for smaller model)]}$$

According to Heck, when comparing models that differ by one degree of freedom, a "significant improvement" (R. H. Heck, personal communication, May 31, 2011) in model fit is associated with a χ^2 value of 3.84 or greater. As such, prior to removing a single variable, which was not deemed to have a statistically significant impact on the study's dependent variable, I subtracted the -2 log-likelihood value for the model without that variable from the -2 log likelihood value for the model with that given variable. If the equation produced a value greater than 3.84, I concluded

that the model was significantly improved as a result of the variable's removal, and proceeded with testing the model without the variable. Conversely, if the equation produced a value less than 3.84, I concluded that the model was not significantly improved as a result of the variable's removal, and proceeded with testing the model with the variable. I did not conduct scaled deviance tests of any variable with a statistically significant random effect, even if that variable had no statistically significant fixed effects (A.F. Cabrera & R.G. Croninger, personal communication, June 7, 2010).

Intercepts and Slopes as Outcomes Model (Research Questions 2 and 3). To answer the study's second and third research questions, I conducted an Intercepts and Slopes as Outcomes Model. This model included the fixed and random effects student-level measures found to be statistically significant in the previous model, and adds to them the study's school-level school culture and school control variables. As such, it identified the school-level variables that had a statistically significant impact on students' ACRES levels. In doing so, it identified which subconstructs of a school's culture of college preparedness promote (or negate, if the coefficient is negative) the average chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade.

I applied more stringent p-values ($p \leq .01$) when interpreting all school level variables within the study's model (method suggested by Ronald Heck, personal communication, May 24, 2011). I again used scaled deviance tests to determine model fit and identify for removal variables that eliminate variables that did not significantly improve the model. If the model's variance components (u_{qj}) were

statistically significant, it would also allow me to test for cross-level interaction effects in the study's final model to explore the variability in the parental involvement – ACRES slope across schools (Heck, Thomas, & Tabata, 2010).

The Intercepts and Slopes as Outcomes Model also allowed me to test for cross-level interaction effects between all parental involvement variables found to vary significantly across schools and all school level predictors found to have a statistically significant influence on students' levels of academic preparedness for college. In doing so, this model tested the hypothesis embedded in the study's third research question, "To what extent does the joint interaction of practices of parental involvement and a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?" that both parental encouragement and school culture interact jointly in impacting a students' academic preparedness for college. In order to explore the cross-level effects associated with this research question using SPSS software, I needed to incorporate interaction terms into my final model (Heck, Thomas, & Tabata, 2010). The proposed formula for this model is:

Student-Level Model:

$$ACRES_{ij} = \beta_{0j} + \beta_{1j}*(PCACC_{ij}) + \beta_{2j}*(PICS_{ij}) + \beta_{3j}*(PTO\text{-}High_{ij}) + \beta_{4j}*(PTO\text{-}Mod_{ij}) + \beta_{5j}*(POOR_{ij}) + \beta_{6j}*(URM_{ij}) + \beta_{7j}*(FGEN_{ij}) + \beta_{8j}*(FEM_{ij}) + \beta_{9j}*(GRAD_{ij}) + \beta_{10j}*(CSUP_{ij}) + r_{ij}$$

School-Level Model:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}*(ORSC_j) + \gamma_{02}*(SIPI_j) + \gamma_{03}*(CCOM_j) + \gamma_{04}*(EFA_j) + \gamma_{05}*(TIA_j) + \gamma_{06}*(DEPT_j) + \gamma_{07}*(TTCH_j) + \gamma_{08}*(ENRL_j) + \gamma_{09}*(FLUNCH_j) + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}*(ORSC_j) + \gamma_{12}*(SIPI_j) + \gamma_{13}*(CCOM_j) + \gamma_{14}*(EFA_j) + \gamma_{15}*(TIA_j) + \gamma_{16}*(DEPT_j) + \gamma_{17}*(TTCH_j) + \gamma_{18}*(ENRL_j) + \gamma_{19}*(FLUNCH_j) + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}*(ORSC_j) + \gamma_{22}*(SIPI_j) + \gamma_{23}*(CCOM_j) + \gamma_{24}*(EFA_j) + \gamma_{25}*(TIA_j) + \gamma_{26}*(DEPT_j) + \gamma_{27}*(TTCH_j) + \gamma_{28}*(ENRL_j) + \gamma_{29}*(FLUNCH_j) + u_{2j}$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31}*(ORSC_j) + \gamma_{32}*(SIPI_j) + \gamma_{33}*(CCOM_j) + \gamma_{34}*(EFA_j) + \gamma_{35}*(TIA_j) + \gamma_{36}*(DEPT_j) + \gamma_{37}*(TTCH_j) + \gamma_{38}*(ENRL_j) + \gamma_{39}*(FLUNCH_j) + u_{3j}$$

$$\beta_{4j} = \gamma_{40} + \gamma_{41}*(ORSC_j) + \gamma_{42}*(SIPI_j) + \gamma_{43}*(CCOM_j) + \gamma_{44}*(EFA_j) + \gamma_{45}*(TIA_j) + \gamma_{46}*(DEPT_j) + \gamma_{47}*(TTCH_j) + \gamma_{48}*(ENRL_j) + \gamma_{49}*(FLUNCH_j) + u_{4j}$$

$$\beta_{5j} = \gamma_{50}$$
$$\beta_{6j} = \gamma_{60}$$
$$\beta_{7j} = \gamma_{70}$$
$$\beta_{8j} = \gamma_{80}$$
$$\beta_{9j} = \gamma_{90}$$
$$\beta_{10j} = \gamma_{10\,0}$$

The coefficients associated with the interaction terms would indicate the extent to which parent/school interactions impacted students' ACRES levels above and beyond the individual inputs of parental involvement and school culture. Following Heck's suggestion to apply more stringent p-values to assess the statistical significance of any school level variable (R.H. Heck, personal communication, May 24, 2011), I removed any cross-level interaction term with a p-value less than or equal to .01 from the model. If no cross-level interaction terms associated with a particular parental involvement variable were kept within the model, I retested the model using a grand mean centered and constrained the error terms of the given variable.

Chapter 4: Results

This chapter presents the results from the study's three research questions. These questions sought to explore the impact of parental involvement, a school's culture of college preparedness, and the joint interaction of both factors on eighth graders' eventual academic preparedness for college by the time they reach the twelfth grade:

1. To what extent do practices of parental involvement promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?

2. To what extent does a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?

3. To what extent does the joint interaction of practices of parental involvement and a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?

The chapter is organized according to the two models conducted to answer the study's research questions. Within these sections, I summarize my hypotheses for each research question and discuss the model's results, and how those results answer the study's research questions. At the end of the chapter, I provide and discuss a final model, which pulls together the results of the study's analyses. In Chapter 5, I will interpret the meaning of these results, to what extent the results align with extant literature, and how they potentially inform both policy and practice.

Reporting and Interpreting the Models' Results

The tables within this chapter will report each model's results in two formats. First, equation results will be reported using the standardized ACRES measure (z-scored) as the dependent variable. The reported coefficients in these sections can be

interpreted in terms of their standard deviation from the mean. In this format, coefficients also reflect effect sizes, which capture the strength of the relationship between two variables (Cohen, 1988). In the second format, equation results will be reported using the original, non-standardized ACRES measures as the dependent variable. In these tables, the reported coefficients can be interpreted in terms of relative change in actual ACRES scores (scores range from 1- not academically prepared to college to 5 – highly academically prepared for college).

It should be noted that because the study's dependent variable (ACRES) is an ordinal variable, the study should have applied a series of hierarchical models for ordinal data to answer its research questions (Raudenbush & Bryk, 2002). However, doing so was not possible because the SPSS statistical software package does not have the capacity to conduct this type of modeling (Thomas, Heck, & Tabata, 2010). As such, the models' coefficients may underestimate the relationships between ACRES and inputs of parental involvement and school culture of college preparedness. This is certainly a limitation of this study, and will be acknowledged as such in the Limitations section of Chapter 5.

Results from the Fully Unconditional Model

The first model within my analysis, a Fully Unconditional Model (FUM), explored the variance of students' ACRES scores across both student and school levels. The results of the FUM allowed me to calculate the proportion of variance in ACRES scores explained by school-level characteristics. This specific calculation, known as the Intraclass Correlation Coefficient (ICC), can be used to justify the need for using a multilevel model (Luke, 2005; Ma, Ma, & Bradley, 2008). A relatively

low ICC would indicate that little, if any, school characteristics influence variation in students' ACRES scores. Conversely, a moderate to high ICC implies that certain inputs at the school-level help to explain the variation in students' ACRES scores. Because I hypothesized that school-level inputs influenced students' ACRES scores, I believed that the Fully Unconditional Model would produce an ICC that was at least moderate in size.

Table 9 provides the result of the study's Fully Unconditional Model. The Intraclass Correlation Coefficient (ICC) estimate was .2281, indicating that 22.81% of the variance in students' academic readiness for college occured between schools. This finding was statistically significant ($p \leq 0.001$); Luke (2005) refers to ICCs within this value range to be moderately high. The ICC result confirms that inputs at the middle school level influence students' academic readiness for college. As such, it justified the need to incorporate school-level inputs in multilevel models to answer the study's research questions.

Table 9
Fully Unconditional Model

	ACRES (Standardized)	ACRES (Original)
Fixed Effect	*Coefficient (se)*	*Coefficient (se)*
Average ACRES scores across schools, γ_{00}	-0.05* (0.02)	2.84*** (0.03)
Random Effect	*Variance Component*	*Variance Component*
School Level Variance Component, $\sigma^2_{u_0}$	0.305***	0.594***
Student Level Variance Component (Residual), σ^2_r	1.03***	2.01***

*p≤ .05, ** p≤ .01, *** p ≤ .001.

Because nearly eighty percent (77.2%) of variance in students' academic readiness for college can be attributed to factors other than the middle school, the ICC result also provided support for exploring which non-school factors so heavily impacted their ACRES outcomes. This study explores such factors, namely in the form of parental involvement and student control variables, in its first model.

Results from the Random Coefficients Model (Research Question 1)

I next tested a Random Coefficients model that examined the role of parental involvement inputs on academic preparedness for college. As such, it provided an initial answer to the study's first research question: "To what extent do practices of parental involvement promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?" I had originally hypothesized that all four forms of parental involvement included in the model *(PCACC, PICS, PTO-High, & PTO-Mod)* would have a positive, statistically significant impact on eighth graders' academic preparedness for college by the twelfth grade.

Within the Random Coefficients model, I used scaled deviance tests to determine model fit, and to decide if it made sense to remove variables that did not have a statistically significant impact on the dependent variable from the model (see Chapter 3 for detailed description of the process). The scaled deviance test results indicated that the model would be significantly improved with the removal of the Underrepresented Minority Status - *URM* (χ^2= 3.89) variable. As a result, I removed *URM* from the model. It should be noted that I did not conduct scaled deviance tests of any variable with a statistically significant random effect, even if that variable had

no statistically significant fixed effects (A.F. Cabrera & R.G. Croninger, personal communication, June 7, 2010).

Table 10 illustrates the output from the Random Coefficients model. Later in this chapter's Final Model section, I discuss how these findings evolved over the course of the analytical process.

Table 10
Random Coefficients Model

	ACRES (Standardized)	ACRES (Original)
Fixed Effect	*Coefficient (se)*	*Coefficient (se)*
Average ACRES Scores Across Schools, γ_{00}	-0.03 (0.02)	2.87*** (0.02)
Parent Communication with Child About Academics, College or Career, (PCACC) γ_{10}	-0.03 (0.01)	-0.04 (0.02)
Parent-Initiated Communication with School About Academics (PICS), γ_{20}	-0.06* (0.03)	-0.08* (0.04)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High), γ_{30}	0.06 (0.04)	0.08 (0.05)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod), γ_{40}	0.04 (0.03)	0.05 (0.04)
8th Grader's Poverty Status (POOR), γ_{50}	-0.13*** (0.03)	-0.18*** (0.04)
8th Graders' First-Generation Status (FGEN), γ_{70}	-0.28 (0.11)	-0.39 (0.16)
8th Grader's Gender (FEM), γ_{80}	0.14*** (0.02)	0.19*** (0.03)
8th Grader's Prior Academic Achievement (GRAD), γ_{90}	0.59*** (0.02)	0.83*** (0.03)
8th Grader's Receipt of Consistent School Support in Middle and High School (CSUP), $\gamma_{10\,0}$	0.00 (0.13)	0.01 (0.18)
Random Effect	*Variance Component*	*Variance Component*
School Level (Intercept), u_{0i}	0.15***	0.30***
Student Level (Residual), r_{ij}	0.40***	0.79***
Parent Communication with Child About Academics, College or Career (PCACC)-ACRES Slope, u_{1j}	0.07***	0.14***
Parent-Initiated Communication with School About Academics (PICS)-ACRES Slope, u_{2j}	0.11***	0.22***
High Levels of Involvement in Parent-Teacher Organizations (PTO-High)- ACRES Slope, u_{3j}	0.24***	0.47***
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod)-ACRES Slope, u_{4j}	0.14***	0.28***

Note: unweighted number of students is 8219 and the unweighted number of middle schools is 947
*p≤ .05, ** p≤ .01, *** p ≤ .001.

Before interpreting the model's estimates, I compared the variance components of the Random Coefficients and Fully Unconditional models to determine the extent to which adding student-level variables reduced the variance estimates (R^2 estimates) within and across-schools (Thomas, Heck, & Tabata, 2010). I first conducted the following equation to determine the proportion of variance in ACRES levels within schools explained by the model's student-level variables:

$$\frac{(\sigma^2_{rM1} - \sigma^2_{rM2})}{\sigma^2_{rM1}}$$

In this equation, σ^2_{rM1} represents the residual from the FUM and σ^2_{rM2} represents the residual from the Random Coefficients model. By using the equation to compare the estimation of the two models' variance components, I determined that the Random Coefficients model explained 61.2% of the student variability in ACRES levels within schools. Essentially, this means that over half of the variation in students' academic preparedness for college within a given school included in the study can be attributed to differences in the parental involvement and student-level control variables included within the Random Coefficients model.

Next, I conducted a similar equation to determine the proportion of variance in ACRES levels across schools explained by the model's student-level variables:

$$\frac{(\sigma^2_{uM1} - \sigma^2_{uM2})}{\sigma^2_{uM1}}$$

In this equation, σ^2_{uM1} represents the intercept variance component from the FUM and σ^2_{uM2} represents the intercept variance component from the Random Coefficients model. The equation's result indicated that the student-level variables contained

within the model effectively explained 50.8% of the variation in student ACRES levels across schools within the study. As such, the findings of both of these equations confirm that some, if not all, of the parental involvement and student-level control variables within the model had an important and sizeable impact on students' academic preparedness for. To further explore the extent to which each of the student-level variables influenced student ACRES levels, I conducted an analysis of the fixed effect estimates within the Random Coefficients model.

Influences of parental involvement variables on students' academic preparedness for college.

Parent Communication With Child About Academics, College, or Career (PCACC). According to this model's results, the frequency in which parents communicate with their child about academics, college, or career had, on average, no significant impact on their child's eventual academic preparedness for college. This finding contradicted the study's hypothesis that increased levels of parental communication with children about academics, college, or careers would positively affect children's eventual academic preparedness for college.

Parent-Initiated Communication with School About Child's Academics (PICS). The model's findings indicated that a standard deviation increase in parents' communication with their child's school about the child's academic performance and academic track is associated with an average decrease of .06 of a standard deviation in the child's eventual academic preparedness for college ($p \leq .05$). This finding similarly negated the study's hypothesis that such parental inputs would positively influence their child's ACRES levels. While the effect of parent initiated

communication with a child's school about academics on the child's eventual ACRES levels is significant, the magnitude of the effect was small, according to Cohen's (1988) classification of effect sizes.

Parent Involvement in Parent-Teacher Organizations (PTO). Within this study's sample, students' ACRES levels were not significantly impacted, on average, as a result of having parents whom were highly (*PTO-High*) or moderately (*PTO-Mod*) involved in the school parent-teacher organization. Thus, this finding negated the study's original hypothesis that parent-teacher organization involvement, and especially high levels of involvement, would increase children's academic preparedness for college.

Influences of student-level control variables on students' academic preparedness for college. Three of the study's student-level control variables had a statistically significant effect on students' eventual ACRES levels. First, and unsurprisingly, a standard deviation increase in students' previous academic grades (*GRAD*) were associated with, on average, an increase in eventual ACRES levels by .59 of a standard deviation ($p \leq .001$). According to Cohen (1988), the effect of previous grades on ACRES levels is large. Indeed, within this model, students' prior grades had the greatest effect on their eventual academic readiness for college.

Female students also tended to exhibit levels of academic preparedness for college that were .14 of a standard deviation higher than their male peers ($p \leq .001$). The model also indicated similar levels of disparity in academic preparedness for college among students of differing economic backgrounds. Students from low-

income families *(POOR)* tended to earn ACRES levels that were .13 of a standard deviation less than their wealthier counterparts ($p \leq .001$).

When controlling for other variables in this model, neither students' receipt of consistent academic support during middle and high school (*CSUP*) nor their first-generation status *(FGEN)* had a statistically significant impact on their eventual ACRES levels. However, because scaled deviance tests indicated that the model would be significantly weakened if either variable was removed (*CSUP* χ^2= -25.76; *FGEN* χ^2= -260.93), both were retained in the Random Coefficients Model, and in the study's subsequent models.

Analysis of random effects. The Random Coefficients model also informed me if, and to what extent, the effects of the four measures of parental involvement varied across schools at a statistically significant level (random effects). The model's results indicated that all four parental involvement variables *(PCACC, PICS, PTO-High, & PTO-Mod)* varied at a statistically significant level across schools ($p \leq .001$). This means that student ACRES levels were influenced more strongly by the parental involvement measures at some schools more than others. It also meant that, at some schools within the study, some or all of the four parental involvement variables had a statistically significant impact on students' eventual ACRES scores. This finding was especially interesting, given that the model's fixed effects reported no average influences of the study's *PCACC* and *PTO* variables on students' eventual ACRES scores. As such, I estimated a new model, the Intercepts and Slopes as Outcomes Model, to explore if the interaction between the study's variables of parental

involvement and school culture might be contributing to these differences in student ACRES levels at certain schools.

Results from the Intercepts and Slopes as Outcomes Model (Research Questions 2 & 3)[4]

The Intercepts and Slopes as Outcomes Model built upon the Random Coefficients model by adding variables measuring a school's culture of college preparedness. In doing so, the model examined the influence of school culture inputs on students' academic preparedness for college, and provided an initial answer to the study's second research question: "To what extent does a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?" I originally hypothesized that the seven manifestations of school culture included in the model *(ORSC, SIPI, CCOM, EFA, TIA, DEPT,* and *TTCH)* would have a positive, statistically significant impact on eighth graders' academic preparedness for college by the twelfth grade.

The Intercepts and Slopes as Outcomes model also explored the extent to which the study's parental involvement and school culture variables jointly interacted to influence student ACRES levels. As such, it answered the study's third research question, "To what extent does the joint interaction of practices of parental involvement and a school's culture of college preparedness promote the chances that eighth grade students will be academically prepared to succeed in college by the time they reach the twelfth grade?" I had originally hypothesized that interactions between

[4] Per the suggestion of Ronald Heck, I applied more stringent p-values ($p \leq .01$) when interpreting all interaction terms within the study's model (personal communication, May 24, 2011). By doing so, I aimed to account for the possibility of skewed coefficients as a result of not being able to apply a school-level weight to my models. A more detailed discussion of this rationale is provided in Chapter 3, "Weighting Cases."

parental involvement and school culture would positively impact students' academic preparedness for college.

I again used scaled deviance tests to determine model fit, and to decide if it made sense to remove any school-level variables that did not have a statistically significant impact on ACRES levels (see Chapter 3 for detailed description of the process). The scaled deviance test results indicated that the model would be significantly improved with the removal of the Teacher Time Invested in Academics (*TIA* χ^2= 5.37) and School Enrollment (*ENR* χ^2= 5.43) variables. As a result, I removed both *TIA* and *ENR* variables from the model. Table 11 illustrates the cross-level interaction output from the final Intercepts and Slopes as Outcomes Model.

Table 11
Intercepts and Slopes as Outcomes Model

	ACRES (Standardized)	ACRES (Original)
Fixed Effect	*Coefficient (se)*	*Coefficient (se)*
Average ACRES Scores Across Schools, γ_{00}	-0.02 (0.02)	2.89*** (0.02)
Parent Communication with Child About Academics, College or Career, (PCACC) γ_{10}	-0.03* (0.01)	-0.04* (0.02)
Parent-Initiated Communication with School About Academics (PICS), γ_{20}	-0.06* (0.03)	-0.09* (0.04)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High), γ_{30}	0.06 (0.03)	0.08 (0.05)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod), γ_{40}	0.03 (0.03)	0.05 (0.04)
8th Grader's Poverty Status (POOR), γ_{50}	-0.20*** (0.03)	-0.28*** (0.04)
8th Graders' First-Generation Status (FGEN), γ_{70}	-0.28* (0.08)	-0.39* (0.10)
8th Grader's Gender (FEM), γ_{80}	0.13*** (0.02)	0.18*** (0.03)
8th Grader's Prior Academic Achievement (GRAD), γ_{90}	0.58*** (0.02)	0.82*** (0.02)
8th Grader's Receipt of Consistent School Support in Middle and High School (CSUP), $\gamma_{10\,0}$	0.00 (0.13)	0.01 (0.18)
School-Level Variables		
Other Reflections of School Culture (ORSC), γ_{01}	0.09*** (0.01)	0.12***(0.02)
School-Initiated Parental Involvement (SIPI) γ_{02}	0.03 (0.01)	0.04 (0.02)
Counselor Communication (CCOM), γ_{03}	-0.02 (0.02)	-0.04 (0.07)
Efforts to Facilitate Articulation to High School (EFA), γ_{04}	-0.03 (0.05)	-0.04 (0.08)
Departmentalization Within School (DEPT), γ_{06}	0.07 (0.06)	0.09 (0.08)
Team Teaching Within Eighth Grade (TTCH), γ_{07}	0.01 (0.05)	0.02 (0.08)
Proportion of School's Students Receiving Free or Reduced Price Lunch(FRP), γ_{09}	-0.08***(0.02)	-0.11***(0.03)
Cross-Level Interaction Variables		
Parent Communication with Child About Academics, College or Career (PCACC) *Other Reflections of School Culture (ORSC)	0.00 (0.01)	0.00 (0.03)
Parent-Initiated Communication with School About Academics (PICS) *Other Reflections of School Culture (ORSC)	-0.00 (0.03)	-0.00 (0.04)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High) *Other Reflections of School Culture (ORSC)	0.03 (0.03)	0.04 (0.05)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod) *Other Reflections of School Culture (ORSC)	0.01 (0.03)	0.01 (0.04)
Parent Communication with Child About Academics, College or Career (PCACC) *School-Initiated Parental Involvement (SIPI)	0.00 (0.02)	0.00 (0.02)
Parent-Initiated Communication with School About Academics (PICS) *School-Initiated Parental Involvement (SIPI)	-0.00 (0.03)	-0.00 (0.04)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High) *School-Initiated Parental Involvement (SIPI)	0.02 (0.04)	0.03 (0.05)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod) *School-Initiated Parental Involvement (SIPI)	0.01 (0.03)	0.02 (0.04)
Parent Communication with Child About Academics, College or Career (PCACC) *Counselor Communication (CCOM)	-0.00 (0.01)	-0.00 (0.02)
Parent-Initiated Communication with School About Academics (PICS) * Counselor Communication (CCOM)	0.01 (0.03)	0.02 (0.04)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High) *Counselor Communication (CCOM)	-0.08 (0.04)	-0.12 (0.05)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod) *Counselor Communication (CCOM)	-0.00 (0.03)	-0.00 (0.04)
Parent Communication with Child About Academics, College or Career (PCACC) *Efforts to Facilitate Articulation to High School (EFA)	0.01 (0.02)	0.02 (0.02)
Parent-Initiated Communication with School About Academics (PICS) * Efforts to Facilitate Articulation to High School (EFA)	-0.02 (0.04)	-0.02 (0.05)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High) * Efforts to Facilitate Articulation to High School (EFA)	0.04 (0.04)	0.05 (0.06)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod) *Efforts to Facilitate Articulation to High School (EFA)	0.07 (0.05)	0.10 (0.07)
Parent Communication with Child About Academics, College or Career (PCACC) * Departmentalization Within School (DEPT)	0.02 (0.04)	0.02 (0.06)
Parent-Initiated Communication with School About Academics (PICS) * Departmentalization Within School (DEPT)	0.02 (0.07)	0.03 (0.10)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High) * Departmentalization Within School (DEPT)	-0.04 (0.11)	-0.05 (0.15)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod) *Departmentalization Within School (DEPT)	-0.04 (0.09)	-0.06 (0.12)
Parent Communication with Child About Academics, College or Career (PCACC) * Team Teaching Within Eighth Grade (TTCH)	0.00 (0.03)	0.00 (0.05)
Parent-Initiated Communication with School About Academics (PICS) * Team Teaching Within Eighth Grade (TTCH)	-0.06 (0.06)	-0.08 (0.08)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High) * Team Teaching Within Eighth Grade (TTCH)	0.06 (0.08)	0.08 (0.11)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod) * Team Teaching Within Eighth Grade (TTCH)	0.08 (0.13)	0.11 (0.18)
Random Effect	*Variance Component*	*Variance Component*
School Level (Intercept), u_{0j}	0.13***	0.26***
Student Level (Residual), r_{ij}	0.39***	0.77***
Parent Communication with Child About Academics, College or Career (PCACC)-ACRES Slope, u_{1j}	0.07***	0.13***
Parent-Initiated Communication with School About Academics (PICS)-ACRES Slope, u_{2j}	0.11***	0.21***
High Levels of Involvement in Parent-Teacher Organizations (PTO-High)- ACRES Slope, u_{3j}	0.22***	0.45***
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod)-ACRES Slope, u_{4j}	0.15***	0.29***

Note: unweighted number of students is 8219 and the unweighted number of middle schools is 947

*p≤ .05, ** p≤ .01, *** p ≤ .001.

Influences of school culture on students' academic preparedness for college[5] .

Other Reflections of School Culture (ORSC). Results indicated that a standard deviation increase in the composite measure encompassing the proportion of school teachers with master's degrees and the proportion of a school's eighth graders enrolled in algebra was associated with an average .09 of a standard deviation increase in the school's students' ACRES levels ($p \leq .001$). As such, this finding aligned with the study's hypotheses that a school's investments in hiring teachers with advanced degrees and in increasing student enrollments in challenging mathematics courses would positively influence student preparedness outcomes. That said, according to Cohen's (1988) classification of effect sizes, the effect of *ORSC* on student ACRES scores is small.

School-Initiated Parental Involvement (SIPI). The model's findings indicated that increases in school's efforts to involve parents in students' education had no statistically significant influences, on average, on their child's eventual academic preparedness for college. This countered the study's original hypothesis that the extent to which school teachers and leaders proactively reach out to and involve their students' parents in conversations and programs focusing on student success and achievement outcomes can positively influence students' eventual levels of academic preparedness for college.

5 Per the suggestion of Ronald Heck, I applied more stringent p-values ($p \leq .01$) when interpreting all school level variables within the study's model (R. H. Heck, personal communication, May 24, 2011). By doing so, I aimed to account for the possibility of skewed coefficients as a result of not being able to apply a school-level weight to my models. A more detailed discussion of this rationale is provided in Chapter 3, "Weighting Cases."

Counselor Communication(CCOM). Frequency of student-counselor interactions within their school had no significant effects, on average, on a student's levels of academic preparedness for college. This finding negates the study's original hypothesis that students enrolled at schools with higher frequencies of student-counselor interactions would demonstrate increased ACRES levels.

Efforts to Facilitate Articulation to High School (EFA). Within this model, students' ACRES levels were also unaffected, on average, by the amount of time their middle school teachers and administrators spent planning for and preparing students' transition to high school. I had originally hypothesized that efforts to establish articulation agreements in promoting students' smooth transition to high school and eventual preparedness for college would positively influence eighth graders' eventual academic preparedness for college.

School Structured to Promote Academic Achievement (STRUC). Both of the study's measures of school structure – school departmentalization (*DEPT*) and team teaching within the eighth grade (*TTCH*) – were found to have no statistically significant impact, on average, on student ACRES levels. I had expected school departmentalization to be associated with either a negative or non-significant impact on ACRES outcomes, and team teaching to be associated with a positive impact on ACRES outcomes.

Influences of school-level control variables on students' academic preparedness for college. The model's results indicated that a standard deviation increase in the proportion of a school's students who qualify for free or reduced-price lunch (*FLUNCH*) was associated with an average decline in its students' ACRES

levels by .08 of a standard deviation ($p \leq .001$). Thus, this model suggested that poverty impacted both individuals experiencing it directly (student-level impact) and indirectly (school-level impact). That said, because the effect size of the *FLUNCH* coefficient was small (Cohen, 1988), it seems that students' ACRES levels were impacted at a relatively small magnitude by the levels of poverty at their schools.

Influences of cross-level interactions on students' academic preparedness for college. The Intercepts and Slopes as Outcomes Model results indicated that none of the parental involvement and school-level variables interacted at a statistically significant level to influence student ACRES levels. As such, it refuted my hypothesis that interactions between parental involvement and school culture would positively impact students' academic preparedness for college.

Final Model[67]

Because no statistically significant interactions were found between parental involvement measures and school-level variables, Croninger and Cabrera (A.F. Cabrera & R.G. Croninger, personal communication, June 7, 2011), recommended

[6] Per the recommendation of Croninger (R.G. Croninger, personal communication, June 7, 2011), I also tested the Final Model using a normalized school-level weight (BYADMWT) instead of the normalized student-level weight (F2TRP1WT). Appendix 1 shows the results of this version of the model. As indicated in the Table, the results differed from the study's Final Model in seven ways. First, the *PCACC*, *PICS*, and *FEM* variables lost their statistical significance in this model. Second, the *CSUP*, *SIPI*, and *DEPT* variables gained statistical significance in this model. Finally, the level of statistical significance for the *FGEN* variable increased within this model. Such variation in findings is certainly a limitation of this study. As a result, I would encourage future scholars to conduct similar models again using statistical software that can accommodate both student and school-level weights in its analyses.

[7] Per the recommendation of Croninger (R.G. Croninger, personal communication, June 7, 2011), I also compared the results of the Final Model's findings, which reflected the "pooled" results of multiply imputed data, with the findings of the same tests on the study's original data. Appendix 2 shows the results of this version of the model. As indicated in the Table, the results differed from the study's Final Model in five ways. First, three variables gained statistical significance in this model: *PTO-High*, *CSUP*, and *SIPI*. Additionally, the *FEM* variable lost its statistical significance in this model. Finally, the level of statistical significance of the *PCACC* variable increased within this model. Again, such variations in findings are a limitation to the study, and call into question the accuracy with which the statistical software imputed the study's missing data.

that I re-test a Random Coefficients Model with both student and school level measures, and with no cross-level interaction terms, to provide final answers to the study's first two research questions. Table 12 highlights the findings from this Final Model.

Table 12
Final Model

	ACRES (Standardized)	ACRES (Original)
Fixed Effect	*Coefficient (se)*	*Coefficient (se)*
Average ACRES Scores Across Schools, γ_{00}	-0.02 (0.02)	2.89***(0.02)
Student-Level Variables		
Parent Communication with Child About Academics, College or Career, (PCACC) γ_{10}	-0.03* (0.01)	-0.04* (0.02)
Parent-Initiated Communication with School About Academics (PICS), γ_{20}	-0.06* (0.03)	-0.09* (0.04)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High), γ_{30}	0.06 (0.03)	0.08 (0.05)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod), γ_{40}	0.03 (0.03)	0.05 (0.04)
8th Grader's Poverty Status (POOR), γ_{50}	-0.20*** (0.03)	-0.28*** (0.04)
8th Graders' First-Generation Status (FGEN), γ_{70}	-0.28* (0.08)	-0.39* (0.11)
8th Grader's Gender (FEM), γ_{80}	0.12***(0.02)	0.18***(0.03)
8th Grader's Prior Academic Achievement (GRAD), γ_{90}	0.58***(0.02)	0.81***(0.02)
8th Grader's Receipt of Consistent School Support in Middle and High School (CSUP), $\gamma_{10\,0}$	0.00 (0.13)	0.01 (0.18)
School-Level Variables		
Other Reflections of School Culture (ORSC), γ_{01}	0.09***(0.02)	0.12***(0.02)
School-Initiated Parental Involvement (SIPI) γ_{02}	0.03 (0.01)	0.04 (0.02)
Counselor Communication (CCOM), γ_{03}	-0.03 (0.02)	-0.04 (0.02)
Efforts to Facilitate Articulation to High School (EFA), γ_{04}	-0.03 (0.05)	-0.04 (0.08)
Departmentalization Within School (DEPT), γ_{06}	0.07 (0.06)	0.09 (0.08)
Team Teaching Within Eighth Grade (TTCH), γ_{07}	0.01 (0.05)	0.02 (0.08)
Proportion of School's Students Receiving Free or Reduced Price Lunch(FRP), γ_{09}	-0.08***(0.02)	-0.11***(0.03)

Random Effect	*Variance Component*
School Level (Intercept), u_{0i}	0.13***
Student Level (Residual), r_{ij}	0.39***
Parent Communication with Child About Academics, College or Career (PCACC)-ACRES Slope, u_{1j}	0.07***
Parent-Initiated Communication with School About Academics (PICS)-ACRES Slope, u_{2j}	0.11***
High Levels of Involvement in Parent-Teacher Organizations (PTO-High)-ACRES Slope, u_{3j}	0.23***
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod)-ACRES Slope, u_{4j}	0.15***

Note: unweighted number of students is 8219 and the unweighted number of middle schools is 947
*p≤ .05, ** p≤ .01, *** p ≤ .001.

Determining model fit.

I conducted scaled deviance tests to confirm that the model fit of the Final Model was improved over the Intercepts and Slopes as Outcomes Model. The equation for scaled deviance tests is:

$$\chi^2 = -2 [(\text{log-likelihood for bigger model}) - (\text{log likelihood for smaller model})]$$

The Intercepts and Slopes as Outcomes Model, which had 47 parameters, was larger than the Final Model, which had 23 parameters. When comparing models that differ by twenty-four degrees of freedom, a significant improvement in model fit is associated with a χ^2 value of 36.42 ($p \leq .05$). The difference between the -2 log-likelihood value for the Intercepts and Slopes as Outcomes Model (19632.54) and Final Model (19539.66) equaled 92.88. Thus, the scaled deviance test results confirmed that the model fit was significantly improved within the study's Final Model over the Intercepts and Slopes as Outcomes Model.

Final analysis: influences of parental involvement on students' academic preparedness for college (Research Question 1). The findings below highlight the extent to which the study's parental involvement measures impacted students' eventual ACRES levels.

Parent Communication With Child About Academics, College, or Career (PCACC). The Final Model's results indicated that the frequency of which parents communicate with their child about academics, college, or career had, on average, a small, negative on students' ACRES levels. A standard deviation increase in the frequency in which parents communicated with their eighth grader about academics, college, or career was associated with .03 of a standard deviation decrease in the

child's eventual ACRES levels ($p \leq .05$). Thus even though the effect size of this relationship is trivial (Cohen, 1988), this finding refuted my hypothesis that increased levels of parental communication with children about academics, college, or careers would positively affect children's eventual ACRES scores.

Parent Initiated Communication with School About Child's Academics (PICS). Within the Final Model, a standard deviation increase in the frequency of parent communication with their child's school about the child's academics was associated with an average of a .06 of a standard deviation decline in eventual ACRES levels($p \leq .05$). Again, while this relationship is trivial at best (Cohen, 1988), it negated the study's hypothesis that such parental inputs would positively influence their child's ACRES levels.

Parent Involvement in Parent-Teacher Organizations (PTO). Parents' involvement in parent-teacher organizations (*PTO-High*; *PTO-Mod*) had no statistically significant impact, on average, on their eighth graders' eventual levels of academic preparedness for college. This finding negates the study's original hypothesis that parent-teacher organization involvement, and especially high levels of involvement, would increase children's academic preparedness for college.

Final analysis: influences of student-level control variables on students' academic preparedness for college. Few changes to the estimates and significance levels of the study's student-level control variables appeared between the Final Model and the study's earlier Random Coefficients Model. Within the Final Model, four student-level control variables were found to have a statistically significant effect, on average, on students' eventual ACRES levels. First, a standard deviation increase in

students' previous academic grades (*GRAD*) were associated with, on average, an increase in eventual ACRES levels by .58 of a standard deviation ($p \leq .001$). This is a strong effect (Cohen, 1988), and within the Final Model, students' prior grades had the greatest impact on their eventual academic readiness for college. Female students exhibited levels of academic preparedness for college that were .12 of a standard deviation higher than their male peers ($p \leq .001$).

Poor students (*POOR*) exhibited ACRES levels that were .20 of a standard deviation lower than wealthier peers ($p \leq .001$). Cohen (1988) classifies this as a small effect. Finally, first-generation students (*FGEN*) within the study's sample tended to earn ACRES scores .28 of a standard deviation lower than peers who had at least one parent with college-going experience ($p \leq .05$). Indeed, within this Final Model, being a first-generation student had the greatest negative impact on eventual ACRES levels. Cohen (1988) classifies the magnitude of the FGEN-ACRES relationship as moderate in size. The remaining student-level control variable, measuring the eighth graders' receipt of consistent school support in both middle and high school (*CSUP*), again failed to have a statistically significant impact on student ACRES levels.

Final analysis: influences of school culture on students' academic preparedness for college (Research Question 2). The findings below highlight the extent to which the study's school culture measures impact students' eventual ACRES levels, with no random effects included in the model. Few changes to the estimates and significance levels of the study's school culture variables appeared

between the Final Model and the study's earlier Intercepts and Slopes as Outcomes Model.

Other Reflections of School Culture (ORSC). In the Final Model, the *ORSC* measure, which reflected the proportion of school teachers with master's degrees and the proportion of a school's eighth graders enrolled in algebra, was again the only school culture of college preparedness variable that impacted student ACRES outcomes. A standard deviation increase in *ORSC* was associated with an average of .09 of a standard deviation increase in the school's students' ACRES levels ($p \leq$ .001). As such, although the effect size of the *ORSC*-ACRES relationship was small (Cohen, 1988), this finding aligned with the study's hypotheses that a school's investments in hiring teachers with advanced degrees and in increasing student enrollments in challenging mathematics courses would positively influence student preparedness outcomes.

School-Initiated Parental Involvement (SIPI). The model's findings again indicated that increases in school's efforts to involve parents in students' education had no statistically significant influences, on average, on their child's eventual academic preparedness for college. As such, this finding refuted the study's original hypothesis that the extent to which school teachers and leaders proactively reach out to and involve their students' parents in conversations and programs focusing on student success and achievement outcomes positively influenced students' eventual levels of academic preparedness for college.

Counselor Communication (CCOM). The Final Model again indicated that students' levels of academic preparedness for college were not influenced, on

average, by the frequency of student-counselor interactions within their school. Thus, this finding negated the study's original hypothesis that students enrolled at schools with higher frequencies of student-counselor interactions would demonstrate increased ACRES levels.

Efforts to Facilitate Articulation to High School (EFA). Students' ACRES levels were again unaffected, on average, by the amount of time their middle school teachers and administrators spent facilitating students' successful transition to high school. This finding refuted my hypothesis that students who attended schools at which efforts were made to ensure smooth articulation to high school would experience a boost to their eventual levels of academic preparedness for college.

School Structured to Promote Academic Achievement (STRUC). Again, both of the study's measures of school structure – school departmentalization (*DEPT*) and team teaching within the eighth grade (*TTCH*) – were found to have no statistically significant impact, on average, on ACRES. While this finding supported my original hypothesis that departmentalization would have either a negative or non-significant impact on students' ACRES scores, it refuted my hypothesis that team teaching would have a positive impact on student ACRES levels.

Final analysis: influences of school-level control variables on students' academic preparedness for college. The Final Model's results indicated that a standard deviation increase in the proportion of a school's students who qualify for free or reduced-price lunch (*FLUNCH*) was associated with an average decline in its students' ACRES levels by.08 of a standard deviation ($p \leq .01$). Thus, this finding

supported my hypothesis that students' eventual academic preparedness for college would be negatively impacted by higher levels of within-school poverty.

Summary

First and foremost, the study's models supported my foundational hypothesis that the middle school years play a critical role in preparing students for college. That said, the impacts of both parental involvement and school culture, at the middle school level, appear to have, on average, a very trivial influence on eighth graders' eventual levels of academic readiness for college. However, the models' random coefficients results indicated that, at some schools within the study, some or all of the four parental involvement variables had a statistically significant impact on students' eventual ACRES scores. As such, the influence of parental involvement measures certainly cannot be written off completely. Though students' academic preparedness for college varied significantly across schools within this study, the interaction between parental involvement and school culture played a negligible role in that variation. Instead, it seems that students' middle school grades had the most positive influences on ACRES scores, and student poverty levels and first generation status were associated with the most negative impacts on students' academic preparedness for college.

The next chapter will discuss the study's major findings in greater detail, as they relate to each of the three research questions, and evaluate if and how the findings align with the study's hypotheses. Chapter 5 will also provide an assessment of how the study's findings can contribute to future scholarship and policy, as well as an analysis of the study's major limitations.

Chapter 5: Conclusion

Introduction

This chapter will discuss the study's major findings in greater detail as they relate to each of the three research questions, and evaluate if and how the findings align with the study's hypotheses. It will also frame the findings in terms of the current literature pertaining to parental involvement, school culture, and their joint interaction during students' middle school years. The chapter will also provide an assessment of how the study's findings can contribute to future scholarship and policy, as well as an analysis of the study's major limitations. Unless otherwise stated, findings discussed pertain to those from study's Final Model.

Review of the Problem

In a 2009 joint address to Congress, President Barack Obama proposed a highly ambitious plan to grow the proportion of American college graduates by 50% by the year 2020 (Office of the Press Secretary, 2010). Given that nearly half of eighth grade students are not academically prepared for college by the time they reach the twelfth grade (Cabrera & LaNasa, 2001), it is clear that much work needs to be done to promote students' academic readiness for college in order to achieve the President's goal. When students are academically prepared for college, they are more likely to complete high school, and apply to, enroll in, and successfully complete a four-year degree (Adelman, 1999; Adelman, 2006; Cabrera, Burkum, & LaNasa, 2005; Cabrera & LaNasa, 2001; Swail, Cabrera, Lee, & Williams, 2005). As such, this study aimed to identify the extent to which practices of parental involvement, aspects of middle school culture, and the joint interaction of both factors, influenced eighth grade students' eventual levels of academic preparedness for college.

Summary of Methods

This quantitative study utilized a multilevel model design using data from the National Education Longitudinal Study of 1988-1992 (NELS:88-92). The NELS survey was designed to measure the characteristics, behaviors, and test scores of a nationally representative group of nearly 25,000 eighth graders from over 1,000 private and public schools (Curtin, Ingels, Wu, & Heuer, 2002). It tracked these students through high school and college, and also gathered critical information from students' parents, teachers, and school administrators.

I cleaned survey data, eliminating cases of students whom were either held back or dropped out of middle or high school, and for whom a valid dependent variable was unavailable. Variables were removed from the study if they were determined to have an excess of missing cases, or if they violated multicollinearity diagnostic tests. I used a multiple imputation approach to address instances of remaining missing data within the analytical sample. The final sample for the study was comprised of 8,219 students from 947 schools.

The study's subconstruct variables were created via Factor Analysis tests, using principal components analysis and VARIMAX rotation. All continuous measures within the study were transformed to ensure normal distribution.

This study utilized variations of a general two-level model to explore the extent to which student-level (parental involvement) and school-level (school culture of college preparedness) factors influence students' eventual academic preparedness for college to answer its three research questions. These models took into account the nested nature of the data; namely, students nested within middle schools. Multilevel

modeling also allowed me to test the extent to which the study's student level variables interact with, or influence the study's school level variables.

Research Question 1: The Role of Parental Involvement on Middle Schoolers' Eventual Academic Preparedness for College

Developing parental involvement measures. The study's first research question was designed to explore the extent to which factors of parental involvement influenced eighth graders' eventual academic preparedness for college. I used a principal component analysis to explore the extent to which variables individually or collectively explained the study's proposed parental involvement subconstructs. Based on the results of this analysis, I created four composite variables: Parent Communication With Child About Academics, College, or Career *(PCACC),* which measures the extent to which parents discuss with their child his or her schoolwork and plans for high school, college, or career, two Involvement in Parent-Teacher Organizations *(PTO)* measures, which reflected if parents attend or participate in their child's school's Parent-Teacher Organization at high *(PTO-High)* or moderate *(PTO-Mod)* levels, and, Parent-Initiated Contact With School About Academics *(PICS),* which measured the extent to which students' parents proactively discuss their child's academics with school officials. Collectively, I believed that these four measures, *PCACC*, *PTO-High*, *PTO-Mod,* and, *PICS* captured the essence of the study's parental involvement subconstruct.

Summary of findings. Nearly eighty percent (77.2%) of variance in students' academic readiness for college was attributed to factors beyond the middle school. As such, this finding from the Fully Unconditional Model's Intraclass Correlation

Coefficient (ICC) provided some initial support that factors from a students' home life explained a proportion of their varying levels of academic readiness for college.

In spite of this initial promise, the study's fixed effects results indicated that increases in parental communication with their children about academics, college, and career were associated, on average, with small decreases in the eighth graders' eventual academic preparedness for college. A standard deviation increase in the frequency in which parents communicated with their eighth grader about academics, college, or career was associated with .03 of a standard deviation decrease in the child's eventual ACRES levels ($p \leq .05$).

Similarly, the study found that parents' increased efforts to communicate with their eighth graders' school about the child's academic performance and academic track had, on average, a small, negative impact on the child's eventual ACRES levels. A standard deviation increase in the frequency of parent communication with their child's school about the child's academics was associated with a .06 of a standard deviation decline in eventual ACRES levels ($p \leq .05$). The study's remaining two parental involvement measures concluded that parents' involvement in parent-teacher organizations had no significant impact, on average, on their eighth graders' eventual academic preparedness for college.

The study's models' random effects results, however, paint a slightly more complex picture. These resulted indicated that, at some schools within the study, some or all of the four parental involvement variables had a statistically significant impact on students' eventual ACRES scores. While I was unable to determine whether these significant effects were mostly positive or negative, it certainly

supports the notion that parental involvement indeed plays an important role in preparing students to be academically prepared for college.

Alignment of findings to hypotheses. The fixed effects results within the study's models countered three of the study's hypotheses. First, I had hypothesized that increases in conversations between parents and their eighth graders would positively impact the students' eventual levels of academic preparedness for college. This hypothesis had been based on literature, which found that increases in parent-child conversations about academics were associated with improvements in the child's student achievement (Fan & Chen, 2001; Lee & Croninger, 1994) and college preparedness (Cabrera & LaNasa, 2001) outcomes. Second, I hypothesized that increases in parents' communication with their eighth grader's school about his or her academics would be associated with increases in the child's eventual academic preparedness for college. This hypothesis had been based on the work of Catsambis and Garland (1997) and Fan and Chen (2001), both of which found that increases in parental communication about academics were associated with increases in children's academic achievement levels. Finally, the findings negated the study's original hypothesis that parent-teacher organization involvement, and especially high levels of involvement, would increase children's academic preparedness for college. Such a hypothesis was based on previous studies (Fan & Chen, 2001; Rumberger, 1995; Sui-Chu & Willms, 1996), which found that involvement in parent-teacher organizations were associated with increases in children's academic performance outcomes.

The random effects results of the models' findings muddy the waters a bit, however. Because, they indicate that, at some schools within the study, some or all of

the four parental involvement variables had a statistically significant impact on students' eventual ACRES scores, my hypotheses, as well as the findings of the parental involvement research on which my model was informed, may not be as off the mark as the study's fixed effects indicate. That said, because I was unable to determine the extent to which certain parental involvement factors influenced student ACRES levels at a subsection of the study's schools, I cannot make any definitive conclusions about the four factors' impact on middle schoolers' eventual academic preparedness for college.

Discussion. The study's findings call into question the specific role parental involvement, defined by the *PCACC, PICS*, and *PTO-High* and *PTO-Mod* measures, plays in middle schoolers' eventual academic preparedness for college. While past research concluded that parental involvement is positively associated with improved student academic achievement (Fan & Chen, 2001; Lee & Croninger, 1994; Simon 2001; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Sui-Chu & Willms, 1996) and college-going outcomes (Cabrera & LaNasa, 2001; Stage and Hossler, 1989; Perna & Titus, 2005), this study's findings indicate that the reach and scope of the positive impacts of parental involvement during middle school cannot conclusively be extended to academic preparedness for college.

Just because the forms of parental involvement defined within this study were not found to promote ACRES levels does not mean that other forms of parental influence have a similarly benign influence on middle schoolers' academic preparedness for college. For example, past works by Cabrera and LaNasa (2001), Fan and Chen (2001), Stage and Hossler (1989), Perna and Titus (2005), and Lee and

Croninger (1994), all found parental expectations of the child's achievement or college-going abilities to have a significant impact on the child's achievement or college-going outcomes. I would have also preferred to include in my construct variables pertaining to parents' knowledge about college and the college-going process (Cabrera & LaNasa, 2001; Ikenberry & Hartle, 1998; King, 1996; Lareau, 1987; Lohfink & Paulsen, 2005; McDonough, 1997; Plank & Jordan, 2001; Useem, 1992; Wimberly & Noeth, 2005), their efforts to prepare for their child's college experience (Catsambis & Garland, 1997; Cunningham, Erisman, & Looney, 2007), and the extent to which parents spoke to their children specifically about college or careers (Corwin& Tierney, 2007; McClafferty, McDonough, & Nunez, 2002; Stage & Hossler, 1989). However, none of the aforementioned variables were addressed within the NELS 1988 parents survey.

Additionally, while the four measures of parental involvement utilized within this study (*PCACC, PICS, PTO-High,* and *PTO-Mod)* reflect the frequency of various parental actions, they do not capture the quality of parents' investments in those actions. For example, while the study's *PCACC* variable reflects how often parents spoke to their eighth grader about college, career, and academics, it provides no assessment on whether or not those conversations were based on accurate information or fallacies about school, college, and career, or whether they were encouraging or discouraging in nature. As such, while this study concludes that the frequency of specific parental involvement actions bears no influence on middle schoolers' eventual academic preparedness for college, it cannot comment on whether the quality of those actions impacts students' future ACRES levels.

Finally, while this study concluded that certain forms of parental involvement during the middle school years bear no weight on students' eventual academic preparedness for college, it cannot comment on the extent to which the same forms of parental involvement, exercised during students' high school years, would impact students' ACRES levels. I would certainly encourage future researchers to explore this ACRES/parental involvement during high school relationship.

Research Question 2: The Role of the Middle School Culture on Students' Eventual Academic Preparedness for College

Developing school culture of college preparedness measures. The study's second research question was designed to explore the extent to which specific factors of middle school culture influenced eighth graders' eventual academic preparedness for college. Using a principal component analysis to explore the extent to which variables individually or collectively explained the study's proposed school culture of college preparedness subconstruct, I created five composite variables: 1) *Teacher Time Invested in Academics (TIA)*, which reflected the amount of time teachers spent on activities designed to promote student learning, *2) Counselor Communication (CCOM)*, which captured the frequency of student-counselor interactions regarding the student's academic performance and future plans, *3) Other Reflections of School Culture (ORSC)*, which measured a school's proportion of teachers with a graduate degree as well as the proportion of eighth graders enrolled in Algebra, 4) *Efforts to Facilitate Articulation to High School (EFA),* which measured the time middle school teachers and leaders spent planning for and preparing students' successful transition to high school, and 5) *School-Initiated Parental Involvement (SIPI),* which measured the extent to which parents were contacted about their child's academic performance,

program, high school course selection, and high school placement. I then created two dummy variables, *Team Teaching Within Eighth Grade (TTCH)* and *Departmentalization Within School (DEPT).* Collectively, I believed that these seven measures, *TIA, ORSC, CCOM, EFA, SIPI, TTCH,* and, *DEPT,* captured the essence of the study's school culture of college preparedness subconstruct.

Summary of findings. Of all the school culture measures, only one, *Other Reflections of School Culture (ORSC),* had a statistically significant impact on ACRES levels. A standard deviation increase in *ORSC* was associated with a .09 of a standard deviation increase in the school's students' ACRES levels ($p \leq .001$). As such, although the effect size of the *ORSC*-ACRES relationship is small (Cohen, 1988), this finding suggests that increases in the proportion of a middle school's teachers with graduate degrees and its proportion of eighth graders enrolled in Algebra can positively impact its students' eventual levels of academic preparedness for college. None of the study's remaining six measures of school culture of college preparedness (*TIA, CCOM, EFA, SIPI, TTCH,* and, *DEPT*) had a statistically significant impact on students' eventual ACRES levels.

Alignment of findings to hypotheses. The study's finding that increases in *Other Reflections of School Culture (ORSC)* were associated with increases in students' ACRES levels aligned with the study's hypotheses that a school's investments in hiring teachers with advanced degrees and in increasing student enrollments in challenging mathematics courses would positively influence eighth graders' eventual academic preparedness for college. This hypothesis had been based on the work of Shouse (1994), who argued that teachers' professional credentials positively

influenced their students' academic outcomes, as well as the research by Horn and Nunez (2000) and Shouse (1994), who asserted that increased student enrollments of academically rigorous mathematics courses were associated with corresponding increases in student academic performance.

The study's findings that none of the six remaining variables reflecting school culture of college preparedness (*TIA, CCOM, EFA, SIPI, TTCH,* and, *DEPT*) had a statistically significant impact on students' eventual ACRES levels countered my hypotheses regarding each of these measures. First, based on Shouse's (1994) theory of Academic Press, which concluded that factors including the amount of time teachers devote to grading and preparing to teach were positively associated with student achievement, I hypothesized that increases in *Teacher Time Invested in Academics (TIA)* would be associated with increases in students' eventual ACRES levels. However, the *TIA*-ACRES relationship was not statistically significant, and scaled deviance tests suggested that the study's model fit would improve by removing the *TIA* measure.

The study's findings also countered my hypothesis that increases in the frequency of student-counselor interactions *(CCOM*) would be associated with increases in students' eventual academic preparedness for college. This hypothesis had been based on research that found that interactions with school counselors were associated with increases in student academic achievement (Hadley, 1988; Lee, 1993), standardized test scores (i.e. Carns & Carns, 1991), and college-going plans (Bryan, Moore-Thomas, Day-Vines, & Holcomb-McCoy, 2011).

Based on McClafferty, McDonough, and Nunez's (2002) model of College-Going Culture, which asserted the importance of effectively established articulation agreements in promoting students' smooth transition to high school and eventual preparedness for college, I hypothesized that increases in the amount of time middle school teachers and administrators spent planning for and preparing students' successful transition to high school would be associated with increases in their students' ACRES levels. The study found, however, no relationship between the *EFA* and ACRES measures.

The study's findings also negated my hypothesis that increases in a school's efforts to contact parents about their child's academic performance, program, high school course selection, and high school placement *(SIPI)* would be associated with increased student academic preparedness for college. I had formulated this hypothesis based on the work of Catstambis and Garland (1997), who found a significant connection between school-initiated parental involvement and student achievement.

Finally, the study's results indicated that neither measure I used to capture a school's structure – *DEPT* and *TTCH* – had a significant impact on students' ACRES levels. Based on the work of Lee and Smith (1993), I had hypothesized that students attending middle schools with a departmentalized *(DEPT)* structure would earn lower ACRES scores than their peers who attended schools with reduced levels of departmentalization. Additionally, because Lee and Smith (1993) also found improvements in student achievement at schools with implemented team teaching practices, I hypothesized that increases in team teaching practices within the eighth

grade *(TTCH)* would be associated with increases in students' ACRES levels. However, both of these hypotheses were refuted.

Discussion. A wide body of literature (e.g. Corwin & Tierney, 2007; Horn & Nunez, 2000; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Perna & Titus, 2005; Phillips, 1997; Shouse, 1994) has highlighted the important role school culture and characteristics play in promoting student achievement and college-going outcomes. This study, however, suggests that, among middle schoolers, the influence of school culture on eventual academic preparedness for college is trivial at best.

I believe that it is important to refrain from making grand or sweeping generalizations from this study's findings about the influence of school culture on student outcomes for four specific reasons. First, and perhaps most importantly, I believe that the survey questions used to create the study's school culture of college going subconstructs were limited in two critical areas. First, in my opinion, a number of the NELS:88-92 survey questions for school principals and teachers were designed in a way that encouraged socially desirable responses. According to Tourangeau, Rips, and Rasinski (2000), the concept of social desirability within the world of survey response refers to a respondent's need to "represent oneself in a favorable light" (p. 5). For example, 93% of all school principal respondents either agreed or strongly agreed with the statement: "Teachers at this school encourage students to do their best," (NELS Base Year Principal Survey, 1988). Similarly, 93% of all teachers responding to the survey indicated that they regularly reviewed students' homework

in class with them. While it is impossible to say definitively that a proportion of teacher and principal's provided socially desirable answers to the NELS survey questions, the prevalence of "appropriate" or "correct" answers among some of the survey responses led me to believe that the results may have been influenced by social desirability. Additionally, Kiesler and Sproull (1986) concluded that respondents are more likely to provide socially desirable answers to paper surveys, like the NELS:88 survey, than electronic surveys. The chapter's Implications for Policy and Practice section will discuss in further detail how future school survey efforts should keep in mind and proactively combat the risk of socially desirable response.

Second, I believe that the NELS principal and teacher surveys were especially designed in a manner that would promote satisficing, a practice in which survey respondents decide to provide an easy or quick answer instead of an accurate answer. Krosnick, Narayan, and Smith (1996) describe satisficing as, "omitting the retrieval and judgment steps from the response process altogether…respondents may interpret each question only superficially and select what they believe will *appear* to the interviewer and/or researcher to be a reasonable answer…us[ing] cues in the question itself to identify a response that seems easily defensible with little thought" (p. 31). According to Krosnick and colleagues (1996) and Tourangeau, Rips, and Rasinski (2000), survey respondents are most likely to practice satisficing when they feel that a survey is too long, or burdensome, or its answers are too difficult to recall. The NELS teachers survey which has over 60 multi-part questions, in which teachers are asked to recall information on as many as thirty-two students, may indeed have been

viewed as too burdensome or lengthy by its respondents. While I can speculate based on relevant survey methodology research that the NELS teacher and principal surveys likely elicited practices of satisficing among a significant number of its respondents, it is impossible to draw this conclusion with any certainty. Nonetheless, the potential risk of satisficing is certainly a limitation of the study, and I will discuss in the chapter's Implications for Policy and Practice section how future school survey efforts can attempt to avoid satisficing among survey respondents.

While certainly wide-ranging, the study's school culture of college preparedness construct was by no means all-inclusive. Because the NELS principal, teacher, and student surveys did not address several critical characteristics related to a school's culture of college preparedness, I was obliged to omit from the study concepts of school culture that I believe were worthy of exploration. First, the surveys did not include variables regarding teachers' grading criteria and instructional goals, both of which Shouse (1994) asserted are closely tied to a school's culture of Academic Press. Similarly, the eighth grade survey did not measure the extent to which teachers report taking collective responsibility for students' learning, a key factor of Lee and Smith's (1993; 1995) models of communally organized schools. Perhaps most importantly, none of the eighth grade surveys made any reference to college within their questions. As such, I was unable to measure the extent to which schools encourage, inform, or make explicit efforts to prepare their students for college and the college-going experience (Corwin & Tierney, 2007; McClafferty, McDonough, & Nunez, 2002). Given this, I believe there is still ample opportunity

for future researchers to explore the extent to which additional measures of middle school culture may predict students' eventual academic readiness for college.

Noteworthy is the fact that the seven subconstructs of school culture utilized within this study (*TIA, ORSC, CCOM, EFA, SIPI, TTCH,* and, *DEPT)* only captured the frequency of teacher, administrator, and counselor actions, rather than the quality of those actions. For example, the study's *CCOM* measure is based exclusively on survey questions that reflected the frequency of student-counselor meetings. As such, the *CCOM* measure did not differentiate between informative, encouraging, and timely meetings, and those in which students may have been discouraged from pursuing a path to college. The *TIA, EFA,* and *SIPI* measures are similarly comprised of measures reflecting the frequency of certain school actions or practices, rather than their quality. Thus, while the study can conclude that the frequency of *Teacher Time Invested in Academics (TIA), Efforts to Facilitate Articulation to High School (EFA), School-Initiated Parental Involvement (SIPI),* and *Counselor Communication (CCOM)* had no statistical influence on middle schoolers' eventual academic preparedness for college, it cannot conclude on whether the quality of those actions or practices impacts students' future ACRES levels.

Finally, I also encourage readers to refrain from generalizing the study's school culture findings to a population beyond middle school students. Quite a few other quantitative studies (e.g. Adelman, 1999 & 2006; Lee & Smith, 1993; Lee, Smith, & Croninger, 1997; Shouse, 1994) have found that high school characteristics can significantly impact students' academic achievement outcomes. As such, I would

encourage future researchers to explore the relationships between high school culture measures and students' academic readiness for college.

Research Question 3: The Joint Influence of Parents and Middle School Culture on Eighth Graders' Eventual Academic Preparedness for College

Summary of findings. The study's Intercepts and Slopes as Outcomes Model included interaction terms indicated the extent to which parent/school interactions impacted students' ACRES levels above and beyond the individual inputs of parental involvement and school culture. The model included an interaction term pairing each of the four parental involvement variables (*PCACC, PTO-High, PTO-Mod,* and, *PICS*), with each of the seven school culture variables (*TIA, ORSC, CCOM, EFA, SIPI, TTCH,* and, *DEPT*), for a total of 28 interaction terms. None of these 28 terms capturing interactions between parental involvement and school culture variables was statistically significant, though. As such, I concluded that, among students within the study, no factors of parental involvement interacted with factors of middle school culture to influence eighth grade students' eventual ACRES levels above and beyond the individual measures of parental involvement and school culture of college preparedness.

Alignment of findings to hypotheses. The study's findings countered my hypotheses related to research question 3. Informed by the models of college-going culture (Corwin & Tierney, 2007; McClafferty, McDonough, & Nunez, 2002) and talent development (Madhere & MacIver, 1996), both of which asserted that parental involvement and school cultures focused on student success are collectively necessary to foster students' academic achievement and college preparedness outcomes, I had

hypothesized that the interaction of parental involvement and school culture variables would produce improved student ACRES scores.

Discussion. This study's findings failed to replicate those from past qualitative research (Corwin & Tierney, 2007; Madhere & MacIver, 1996; McClafferty et al., 2002), which asserted that schools and parents must jointly interact to ensure students' successful academic and college-going outcomes. Instead, it found no statistically significant interactions between parental involvement and school culture measures. As such, I concluded that no interactions between parental involvement and school measures, as they are defined within this study, influenced student ACRES' levels above and beyond the individual measures of parental involvement and school culture.

It is once again important to note that the findings pertaining to research question 3 can only speak to the interactions, or lack thereof, between the parental involvement and school culture variables measured within this study. As I indicated in earlier sections of this chapter, I encourage fellow researchers to broaden or edit the parental involvement and school culture constructs I have created, and explore the extent to which any revisions to them change the impact each factor has on middle schoolers' eventual academic preparedness for college.

It is also important to remind the reader that this conclusion can only apply to middle school student populations. While Perna and Titus (2005), conducted a multilevel model to explore the extent to which parental involvement and school culture influenced high school students' college-going outcomes, they did not conduct an analysis of the joint interaction of these two measures. As such, there is

ample opportunity to conduct such a cross-level analysis using high school student data.

Primary Conclusions

Middle school matters. First and foremost, this study joins a small, but growing body of research (Balfanz, 2009; Balfanz, Herzog, & MacIver, 2007; Cabrera & LaNasa, 2000; Camblin, 2003; Hossler, Braxton, & Coopersmith, 2003; Rumberger, 1995; Wimberly & Noeth, 2005) that concludes that the middle school years play a critical role in preparing students for college. Specifically, students' middle school grades were significantly associated with their eventual levels of academic readiness for college. Indeed these academic grades had a strong effect (Cohen, 1988) on ACRES levels. In fact, a standard deviation increase in middle schoolers' grades was associated with over a half of a standard deviation increase in students ACRES scores (.81 score points) ($p \leq .001$). This then means that teachers, administrators, parents, and students must realize the important weight students' academic work in middle school bears on their future success and preparedness for college.

Parental involvement and middle school culture of college preparedness have, on average, a trivial effect on eighth graders' eventual academic preparedness for college. However, at some schools within the study, some or all of the four parental involvement variables had a statistically significant impact on students' eventual ACRES scores. While the middle school years have an important influence on students' eventual academic preparedness for college, it seems that parental involvement and school culture, as they are measured within this study,

seem to have a trivial impact, on average, on eighth graders' eventual ACRES levels. Of all of the study's parental involvement and school culture measures, only one, Other Reflections of School Culture *(ORSC),* had a small but statistically significant positive impact, on average, on ACRES levels. Two, Parent Communication With Child About Academics, College, or Career *(PCACC*) and Parent Initiated Communication with School About Child's Academics *(PICS),* had a small, negative impact, on average, on eighth graders' eventual levels of academic preparedness for college. These findings are disappointing to those of us who believe in the power of parents and schools to positively influence student outcomes. However, the study's model's random effects indicate that parent involvement significantly impacted the ACRES levels of students attending a subsection of schools within the study. As such, more research is warranted to further explore the exact relationship between factors of parental involvement and middle schoolers' eventual levels of academic preparedness for college.

The negative effect of poverty and first generation status. Being a first generation student had the greatest negative impact on students' eventual academic preparedness for college. As Lohfink and Paulsen (2005) incisively note, first generation students lack "the intergenerational benefits of information about college" (p. 409) that make it especially difficult for them to navigate the college-going process. As such, Bui (2005) argues "because the parents of first generation students do not have any college experience, their children need intervention earlier than high school to develop aspirations for higher education" (p. 204).

Poverty also has a negative direct and indirect impact on students' eventual academic readiness for college. Poor middle schoolers students earned ACRES scores .20 of a standard deviation lower than their wealthier peers ($p \leq .001$). Additionally, regardless of their own family income level, students who attended schools with higher proportions of poor students tended to earn slightly lower ACRES scores than peers who attended schools with a wealthier student population.

While school leaders and education policymakers cannot directly change a student's poverty or first generation status, they can invest extra effort and funding to provide poor and first generation students with additional supports, programs, and services that can effectively improve their academic preparedness for college. They should also be aware that first generation students are more likely to come from low-income backgrounds (Nunez & Carroll, 1998). As such, these students face the barriers of having parents with limited first-hand knowledge about college, as well as limited financial resources.

Limitations

This study has several notable limitations that should be considered when interpreting its results. These limitations fall within three general categories. The first category of limitations pertains to drawbacks with the source of the study's data, the NELS 88:1992 survey. The second category of limitations deals with the methodological shortcomings of SPSS, the statistical software package utilized to conduct the data analysis. The final category of limitations pertains to methodological choices I made while conducting my analysis.

Data source limitations. First, as I discussed in earlier sections of this chapter, I believe that the design of many of the NELS survey questions constrained my ability

to fully explore the impact of parental involvement and school culture on student academic preparedness for college. Many of the questions focused on measuring the frequency of principals', teachers', parents' and students' actions, rather than the quality of those actions or practices. As such, it is difficult to definitively conclude that a given parental involvement or school culture practice has no influence on students' ACRES scores, when I cannot factor into the equation the quality of these practices. Additionally, I believe that they surveys and survey questions were designed in a way that unintentionally promoted behaviors of satisficing and providing socially desirable answers among its respondents. While it is certainly understandable that respondents would want to paint themselves in the best possible light, survey designers should make every possible effort to avoid crafting questions that have a clear right and wrong answer, to avoid creating a measure that is too biased to inform research. Additionally, survey designers should take great pains to avoid creating a survey that is too burdensome for its respondents to complete. Otherwise, they risk gathering inaccurate responses from individuals eager to speed through the survey taking process (Tourangeau, Rips, & Rasinski, 2000).

Next, because the data on middle school students were collected over twenty years ago, it can understandably be viewed as out of date. Since that time, several critical technological, policy, and demographic evolutions have taken place that have likely significantly influenced students' experiences at both home and school. In the late 1980s, for example, most schools had just one computer per every nineteen students (Anderson & Ronnkvist, 1999) and no access to the Internet. From that time, computer and Internet access have significantly increased within students'

school and home settings (Anderson & Ronnkvist, 1999; Kominski & Newburger, 1999), affording opportunities to independently explore academic coursework and information about college and career.

Since the late 1980s, aggregate per-pupil expenditures from federal, state, and local government sources have increased by almost $3,000 in constant dollars (NCES, 2010a). As such, schools, in theory, now have more money to spend on programs and policies to benefit student achievement and college-going outcomes. In recent years, both federal and state education policies have also pivoted toward promoting accountability through testing, student data collection, and benchmarking (Linn, Baker, & Betebenner, 2002), which has influenced changes to school curriculum and academic practices.

Over the past several decades, the demographics in the United States have shifted to reflect a significant increase of children from minority backgrounds (Johnson, Kominski, Smith, & Tillman, 2005; McCloyd, 1998; U.S. Census Bureau, 2009). During the past ten years, while the population of Caucasians in America has grown by just over two percent, the Black and Hispanic populations have grown by over nine and thirty-five percent, respectively (Johnson & Kasarda, 2011). Such demographic changes are especially relevant to this study because students from these fastest-growing populations are more likely to come from low-income backgrounds (Caps, Fix, Murry, Ost, Passel, Herwantoro, 2005; McCloyd, 1998), and therefore are more likely to face added barriers to becoming academically prepared for college (Cabrera & LaNasa, 2001).

In spite of the fact that the NELS: 88-92 study is dated, it is the only national longitudinal dataset that follows students from middle school into college. Moreover, it gathered inputs from students' parents, teachers and school principals, as well as their school transcripts, which allowed me to effectively capture the constructs of parental involvement, school culture of college preparedness, and student academic readiness for college. Notwithstanding NELS' strengths, future works analyzing the relationship between students' middle school years and their college preparedness outcomes would certainly benefit from a more recent iteration of this NELS survey.

As I discussed in earlier sections of this chapter, the study is also limited by omitted variables within the parental involvement and school culture constructs. Specifically, I believe the study would have benefitted from including variables that capture parents' knowledge about college and the college-going process, teachers' grading criteria and instructional goals, teachers' collective responsibility for students' learning, and, most importantly, school efforts to specifically prepare their students for and inform their students about college and the college-going process.

Statistical software limitations. While the SPSS Statistical Software package has certainly made great advances in its ability to conduct multilevel models, it is still limited in three important ways that may have negatively impacted my research. Even though the study's dependent variable (ACRES) was an ordinal variable, I was unable to conduct a series of hierarchical models for ordinal data, because the SPSS package does not have the capabilities to do so (Thomas, Heck, & Tabata, 2010). As such, the models' coefficients may underestimate the relationships between ACRES and inputs of parental involvement and school culture of college preparedness.

Second, while multilevel models are traditionally conducted while applying multiple weights (e.g. a student-level and school-level weight), the SPSS software package only allows researchers to utilize a single weight during the analysis process (Thomas, Heck, & Tabata, 2010). This limitation has the potential to underestimate the models' coefficients (R. Heck, personal communication, May 24, 2010). To support this, a comparison of the study's Final Model using a school-level weight was different in seven key ways from the Final Model's results conducted using a student-level weight (See Appendix 1). This suggests that this particular study's findings may have been negatively impacted by the omission of the second weight during the analytical process.

Finally, while researchers increasingly recommend the use of Multiple Imputation to address missing data (e.g. McKnight, McKnight, Sidani & Figueredo, 2007; Rubin, 1996), it is unclear if SPSS effectively imputed values for some of the study's variables. To further explore this potential limitation, I tested the Final Model using original and pooled, imputed data. The statistical significance levels of five coefficients *(PTO-High, CSUP, FEM, PCACC,* and *SIPI*) differed across the original and pooled data models (See Appendix 2). This suggests that the SPSS software package may not have correctly imputed values for these four variables. Thus, until a more accurate imputation process is developed, I recommend that future scholars conduct similar analyses to identify potential imputation errors.

Methodological limitations. Unlike the student population nationwide, the study's sample included no students who dropped out from middle or high school, and no students who repeated grades or were left back. In other words, the dataset

reflected a sample with perfect middle and high school retention and on-time graduation rates. Even though including these students ensured that the study captured the same group of individuals from eighth grade through each follow-up survey cycle, it may have potentially limited the study's generalizability and biased the study's findings by not taking into account the experiences of students who fail to successfully make it through the educational system. Nonetheless, I felt compelled to omit dropouts and repeaters from the study so that I could ensure that the study captured the same students from eighth grade through each follow-up survey cycle.

Implications for Scholarship

This study contributed to extant research in five important ways. While past research has focused on middle school students (Balfanz, 2009; Balfanz, Herzog, & MacIver, 2007; Cabrera & LaNasa, 2000; Camblin, 2003; Hossler, Braxton, & Coopersmith, 2003; Rumberger, 1995; Wimberly & Noeth, 2005), as well as on the individual impacts of parental involvement (Cabrera & LaNasa, 2001; Catsambis & Beverige, 2001; Catsambis & Garland 1997; Fan & Chen, 2001; Lee & Croninger, 1994; Perna & Titus, 2005; Simon, 2001; Stage & Hossler, 1989; Sui-Chu & Willms, 1996), or school culture (Corwin & Tierney, 2007; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Perna & Titus, 2005; Phillips, 1997; Shouse, 1994) on student outcomes, this study built extant literature by addressing these factors collectively. Additionally, it specifically built upon the work of Perna and Titus (2005) by exploring the interaction of parental involvement and school culture on student outcomes.

Second, the study applied redefined constructs of parental involvement and school culture that clearly focused on outcomes of student's academic preparedness for college. These strategic approaches contributed to the study's unique scope and structure, as well as its ability to address specific gaps within current scholarship on factors influencing student success outcomes.

Third, even though studies broadly assert that students must begin to prepare for college as early as the seventh grade (Cabrera & LaNasa, 2000; Hossler, Braxton, & Coopersmith, 2003), a plethora of college access research focuses on students during their high school years (e.g., Adelman, 1999; Adelman, 2006; Berkner & Chavez, 1997; Perna & Titus, 2005; Shouse, 1994; Stage & Hossler, 1989). Waiting to study students until they reach high school is a limited approach; Balfanz (2009) and Balfanz, Herzog, and MacIver (2007) found that low-income students' middle school experiences significantly influenced their high school graduation outcomes. Rumberger (1995) also drew important attention to the nation's middle school dropout crisis; half of the Latino males who dropped out of the American public school system during Academic Year 1987, for example, did so before their freshman year of high school. For this group of students, then, any college access or intervention programs offered during high school are simply too late. As such, this study built upon the small but important work of research focusing on the role middle schools play in students' college-going process (e.g. Cabrera & LaNasa, 2000; Hossler, Braxton, & Coopersmith, 2003).

Fourth, this study also built upon research that viewed students through the lens of their academic preparedness for college. Adelman (1999; 2006), Cabrera,

Burkum, and LaNasa, (2005), Cabrera, Burkum, LaNasa, and Bibo (in press), Cabrera and LaNasa, (2001), and Swail, Cabrera, Lee, and Williams (2005) all found students' academic preparedness for college to be the best pre-college predictor of their eventual degree completion at a four-year institution. Indeed these researchers all concluded that the academic preparedness for college measure (ACRES) better captures students' ability to succeed in the long-term than both singular measures of student achievement, such as grades or standardized test scores, or students' admission into college. As such, by using this ACRES measure as its dependent variable, this study aimed to draw scholars' attention to the strength of this measure, and encourage them to use it in lieu of singular academic or college admissions outcomes in future works.

Finally, while a significant number of studies suggest that either school culture (e.g. Corwin & Tierney, 2007; Horn & Nunez, 2000; Lee & Croninger, 1994; Lee & Smith, 1993; Lee & Smith, 1995; Lee, Smith, & Croninger, 1997; Madhere & MacIver, 1996; McClafferty, McDonough, & Nunez, 2002; Perna & Titus, 2005; Phillips, 1997; Shouse, 1994) and parental involvement (Cabrera & LaNasa, 2001; Fan & Chen, 2001; Perna &Titus, 2005; Stage and Hossler, 1989) positively influence student outcomes, the study's findings suggest that parental involvement and school culture have a trivial influence, on average, on middle schoolers' eventual academic preparedness for college. As such, it suggests that the reach and scope of the positive impacts of parental involvement and school culture during middle school may be limited.

Implications for Policy and Practice

This research is also designed to inform policymakers and educators trying to improve successful college preparedness and completion rates. As such, the work is quite timely, given efforts by the College Board (2010), Lumina Foundation (2010), and Obama administration (Office of the Press Secretary, 2010) to significantly increase the number of American college graduates within the next ten to fifteen years. 80% of eighth grade students aspire to attend college (Wimberly & Noeth, 2005), but only 33% of high school graduates enroll in a four-year college (NCES, 2008). While there is a sincere interest among the country's children to pursue a postsecondary education, something clearly gets in the way of them achieving these goals. Based on the findings of this study, I propose six key takeaway points for education policymakers and practitioners.

First, to achieve their goals of increasing students' successful preparation for and completion of college, policymakers should focus additional legislation and investments on improving students' middle school years. The Success in the Middle Act, co-sponsored by Senator Jack Reed (D-RI) and Representative Raúl Grijalva (D-AZ), proposes to allocate $1 billion annually in grants to states to improve middle schoolers' academic preparedness for high school and college. The legislation specifically calls for states to establish early-warning systems to identify middle schoolers at risk of dropping out or being underprepared for high school curricula. Grants would be targeted directly to schools with high proportions of students deemed at-risk for failure or dropout, who do not earn proficient scores on state assessments and tests, and who enroll in high schools with low graduation rates

(Library of Congress, 2009). The Success in the Middle Act also proposes to allocate funds toward advancing academic research that will identify best practices for preparing and enabling students to succeed academically through middle school and beyond (Library of Congress, 2009). In late 2009, The Success in the Middle Act was referred to the Senate Committee on Health, Education, Labor, and Pensions (HELP Committee), where no further action on the legislation has been taken (Library of Congress, 2009). However, the impending reauthorization of the Elementary and Secondary Education Act provides an excellent opportunity for the HELP Committee's leadership to incorporate all or some of the Success in the Middle Act into the larger body of legislation.

Second, future education legislation should consider requiring states and local education agencies to track student achievement outcomes by first generation status in addition to race/ethnicity and income. As the findings of this study indicated, coming from a first generation background had the greatest negative impact on middle school students' eventual academic preparedness for college. As such, tracking the achievement and academic progression of first generation students would allow policymakers, school administrators, and teachers to gain a better understanding of how first generation students specifically are performing within schools as compared to their peers. By requiring targeted tracking of first generation students, legislators would likely also indirectly improve services and support systems designed to help these students succeed in school and college.

Third, this study draws attention to the antiquity of the recent national longitudinal data system tracking American middle schoolers through college. The

nation, its students, and its schools have evolved considerably since 1988, and many of these important changes are not captured within the NELS 88:92 survey. To address this absence of current data, Congress should authorize funds to allow the National Center for Education Statistics to create a longitudinal survey tracking students from middle school, if not earlier, through college.

Fourth, as I suggested in the chapter's Limitations section, this survey should incorporate an improved design and improved measures in order to decrease respondents' propensities to exhibit behaviors of satisficing or providing socially desirable answers to survey questions. To achieve this, survey designers should significantly reduce the number of questions posed to teachers and principals, in an effort to ease their perceived burden of completing the survey. Designers should also implement an electronic survey, given researchers' findings that survey respondents are more likely to provide inaccurate, socially desirable responses to paper, rather than electronic surveys (Kiesler & Sproull, 1986). Finally, future iterations of the NELS survey should incorporate survey questions that gather critical information on the quality, rather than the frequency, of respondents' actions. A number of qualitative studies (e.g. McClafferty, McDonough, & Nunez, 2002, Madhere & MacIver, 2004, and Corwin & Tierney, 2007) provide detailed descriptions of the aspects of school culture and school and parent interaction that they have found to be associated with improved student college preparation and enrollment. Surveys could, with reasonable ease, craft questions for students, teachers, parents, principals, and counselors, which address each of McClafferty, McDonough, and Nunez's (2002) nine elements of a college-going culture. For example, to capture the researchers'

College Talk component, parents, teachers, and principals could be asked how regularly they encouraged a student to pursue college, and to assess the extent to which they seemed enthusiastic or positive during these conversations. Conversely, students could be also asked how often their parents, teachers, and principals encouraged them to pursue college, as well as the extent to which they felt this support was genuine and enthusiastic in nature. With the addition of such questions, researchers will have a richer, more informative body of responses to explore.

Fifth, this study can also provide important justification in support of the preservation or growth of Title I funds. Within the current No Child Left Behind Act, The Title I grant program, allocated $14.49 Billion by Congress in FY10, aims to ensure that students enrolled at schools with high proportions of low-income populations meet state academic achievement standards (U.S. Department of Education, 2004). This study concluded that poor students were significantly less likely than their peers to be academically prepared for college by the twelfth grade. As such, even though school leaders and education policymakers do not have the power to change a student's poverty status, they can and should invest extra effort and funding to provide poor students with additional supports and access to programs and services that can effectively improve their academic preparedness for college.

Finally, the study has important implications for teacher, parent, and student education programs. Teachers, parents, and students must be informed that the middle grades play a critical role in preparing students for college. College preparation must begin before high school, especially among populations of low-income and first generation students, who face added barriers to becoming

academically prepared for college. Unfortunately, research indicates that low-income and first generation students do not make a connection between their middle school education and college preparation (e.g. Bibo, 2010), and that parents from low socioeconomic backgrounds were less informed about the college-going process, and displayed less behaviors relating to their child's education than parents with higher income and education levels (e.g. Cabrera, Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996; Rowan-Kenyon, Bell, & Perna, 2008). As such, teacher education curricula and programs should emphasize, repeatedly, the important connection between middle school and college. Additionally, middle school teachers should receive professional development and training on the college going process, and how the middle grades are connected to college preparation. Teachers should be encouraged to share this information with their students and parents, and to incorporate this message into their curricula and parent-teacher conference materials. Parent and student education programs, such as those funded by the No Child Left Behind Act's Parent Information and Resource Center programs (U.S. Department of Education, 2004), should also incorporate information on the connection between the middle school grades and college into their content.

Recommendations for Future Research

As researchers continue to examine the relationship between the middle school years, parental involvement, school culture, and students' academic preparedness for college, I would encourage them to consider four specific areas of research. First, even though this study's Fully Unconditional Model indicated that 77.2% of variance in eighth graders' eventual academic readiness for college can be attributed to factors other than the middle school, it is unclear if this study included

and examined all of these non-school factors. Cabrera and LaNasa (2000) provide an excellent review of the factors that play a central role in influencing students' pathways to college. Unfortunately, because the NELS88:92 dataset did not incorporate measures capturing some of these important factors, which include parents' knowledge about college and the college-going process, parents' expectations regarding their child's postsecondary attainment, and their predispositions to saving for their child's college education, I was unable to incorporate them into the study's parental involvement subconstruct. As such, I would urge scholars to explore the extent to which alternate forms of parental involvement, such as those suggested by Cabrera and LaNasa (2000), explain differences in middle schoolers' academic preparedness for college.

Second, I recommend that scholars conduct parallel Structural Equation Models (SEM) to simultaneously explore the relationships between both parental involvement and school culture on middle schoolers' eventual academic preparedness for college. SEM allows researchers to simultaneously test the patterns and relationships that link together conceptually driven constructs in explaining a given outcome (Byrne, 2006; Hall, 2009). Through this type of modeling approach, a researcher would be able to better understand the extent to which individual parent and school influences impact each other, and the extent to which they may indirectly impact students' ACRES scores.

Third, given the important role middle schoolers' previous grades had in predicting their eventual ACRES scores, I believe it is important to conduct more research to identify factors that influence middle schoolers' grades. Finally, given

that the study's "Other Reflections of School Culture" is comprised of two different factors, more research should be conducted to determine if the measure's teacher qualification component, its component measuring the proportion of eighth graders enrolled in Algebra component, or the collective impact of both factors influenced ACRES scores.

Appendices

Appendix 1
Final Model Results Using School-Level Weight

	ACRES (Standardized)	ACRES (Original)
Fixed Effect	*Coefficient (se)*	*Coefficient (se)*
Average ACRES Scores Across Schools, γ_{00}	-0.02(0.02)	2.88***(0.03)
Student-Level Variables		
Parent Communication with Child About Academics, College or Career, (PCACC) γ_{10}	-0.03 (0.02)	-0.04 (0.02)
Parent-Initiated Communication with School About Academics (PICS), γ_{20}	-0.04 (0.03)	-0.06 (0.04)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High), γ_{30}	0.07(0.04)	0.10 (0.05)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod), γ_{40}	-0.01(0.03)	-0.02(0.05)
8th Grader's Poverty Status (POOR), γ_{50}	-0.16***(0.02)	-0.23***(0.03)
8th Graders' First-Generation Status (FGEN), γ_{70}	-0.23***(0.02)	-0.31***(0.03)
8th Grader's Gender (FEM), γ_{80}	0.04(0.02)	0.05(0.03)
8th Grader's Prior Academic Achievement (GRAD), γ_{90}	0.60***(0.01)	0.84***(0.01)
8th Grader's Receipt of Consistent School Support in Middle and High School (CSUP), γ_{100}	0.15*** (0.02)	0.22 ***(0.03)
School-Level Variables		
Other Reflections of School Culture (ORSC), γ_{01}	0.05***(0.02)	0.08***(0.03)
School-Initiated Parental Involvement (SIPI) γ_{02}	0.05*** (0.02)	0.07*** (0.02)
Counselor Communication (CCOM), γ_{03}	0.02 (0.02)	0.03 (0.03)
Efforts to Facilitate Articulation to High School (EFA), γ_{04}	0.00 (0.02)	0.01 (0.02)
Departmentalization Within School (DEPT), γ_{06}	0.12* (0.05)	0.17* (0.07)
Team Teaching Within Eighth Grade (TTCH), γ_{07}	0.04 (0.04)	0.06 (0.06)
Proportion of School's Students Receiving Free or Reduced Price Lunch(FRP), γ_{09}	-0.10***(0.02)	-0.13***(0.03)

*p≤ .05, ** p≤ .01, *** p ≤ .001.

Appendix 2
Final Model Results Using Original Data

	ACRES (Standardized)	ACRES (Original)
Fixed Effect	*Coefficient (se)*	*Coefficient (se)*
Average ACRES Scores Across Schools, γ_{00}	-0.02(0.02)	2.88***(0.03)
Student-Level Variables		
Parent Communication with Child About Academics, College or Career, (PCACC) γ_{10}	-0.04** (0.01)	-0.06** (0.02)
Parent-Initiated Communication with School About Academics (PICS), γ_{20}	-0.07* (0.03)	-0.09* (0.04)
High Levels of Involvement in Parent-Teacher Organizations (PTO-High), γ_{30}	0.08*(0.04)	0.11*(0.05)
Moderate Involvement in Parent-Teacher Organizations (PTO-Mod), γ_{40}	-0.01(0.03)	-0.01(0.04)
8th Grader's Poverty Status (POOR), γ_{50}	-0.21***(0.02)	-0.29***(0.03)
8th Graders' First-Generation Status (FGEN), γ_{70}	-0.29***(0.02)	-0.41**(0.03)
8th Grader's Gender (FEM), γ_{80}	0.02(0.02)	0.02(0.03)
8th Grader's Prior Academic Achievement (GRAD), γ_{90}	0.57***(0.01)	0.80***(0.01)
8th Grader's Receipt of Consistent School Support in Middle and High School (CSUP), $\gamma_{10\,0}$	0.17*** (0.02)	0.23 ***(0.03)
School-Level Variables		
Other Reflections of School Culture (ORSC), γ_{01}	0.06***(0.02)	0.08***(0.02)
School-Initiated Parental Involvement (SIPI) γ_{02}	0.05*** (0.01)	0.07*** (0.02)
Counselor Communication (CCOM), γ_{03}	0.01 (0.02)	0.02 (0.03)
Efforts to Facilitate Articulation to High School (EFA), γ_{04}	0.01 (0.02)	0.02 (0.03)
Departmentalization Within School (DEPT), γ_{06}	0.08 (0.06)	0.12 (0.08)
Team Teaching Within Eighth Grade (TTCH), γ_{07}	0.05 (0.04)	0.06 (0.06)
Proportion of School's Students Receiving Free or Reduced Price Lunch(FRP), γ_{09}	-0.09***(0.02)	-0.12***(0.03)

*p≤ .05, ** p≤ .01, *** p ≤ .001.

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