ASSESSING THE LINKS BETWEEN
EMOTIONAL AND BEHAVIORAL SCHOOL ENGAGEMENT AND
ACADEMIC OUTCOMES AMONG HIGH SCHOOL STUDENTS

A Thesis in
Human Development and Family Studies and Demography

by
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Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

May 2003
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ABSTRACT

In this research investigation I examined the relationship between emotional and behavioral school engagement and academic performance among high school students. This study also investigated the association between emotional and behavioral school engagement across high school.

Data from three waves of the National Educational Longitudinal Study:1988 (n = 11,629) were used to examine two specific, fundamental questions. First, how do students’ emotional and behavioral school engagement predict their grades (i.e., GPA) and standardized test scores in reading and math? Second, to what extent is the association between emotional and behavioral school engagement reciprocal?

In cross-sectional analyses, emotional and behavioral school engagement were significantly associated with current or short term academic outcomes. In longitudinal analyses, only behavioral school engagement had effects on long term academic outcomes, over and above the effects of prior academic performance and social demographic characteristics.

There was little evidence that emotional and behavioral school engagement were associated through a reciprocal relationship. Previous academic performance was by and large, the consistent predictor of emotional and behavioral school engagement.

The findings are discussed in the context of their contribution to the development of a comprehensive conceptual framework for school engagement.
In addition, the potential implications of these results for education policy and practice are also considered.
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ACKNOWLEDGEMENTS

The path toward my doctoral degree would not have been possible without the support and guidance of many very special people. I have been blessed with two truly inspiring and wonderful mentors. I want to thank my mentor and advisor Dr. Linda Burton whose guidance and encouragement has been a great source of strength and support for me. She has always believed in my abilities and given me many opportunities to let my knowledge and skills develop and mature; and I am grateful for her steadfast faith in me. I am also truly thankful for the kindness and generosity she has extended to my family throughout the years.

I also extend my deep thanks and gratitude to my mentor and advisor Dr. Nancy Darling. I am fortunate to have had the benefit of her knowledge and insights throughout my work, and I am all the better for it. She has shown me how reflecting on experiences of our own families can be a wonderful way to view and understand human development.

And I thank the additional members of my dissertation committee, Drs. George Farkas, Suet-ling Pong, and Sean Reardon for their scholarly insights and enthusiastic support of my dissertation research.

I would have never gotten by without the help of the program support staff in Human Development and Family Studies, especially Mary Jo Spicer, Dee Frisque, Stephanie Ebeling, Tracy Shutica Ray, and Sharon Childs. In addition, I want to acknowledge my friends and colleagues on the Three City Study project whose support and friendship has meant a great deal to me.

To my longtime friends, Tasha and Eric Snyder, thank you so much for all times that you welcomed me into your home – my home away from home. You really helped
bridge the miles between State College and Washington, D.C.

I thank my family and friends in California for all their encouragement. Central Pennsylvania is a long way from the sunny left coast, but we have still managed to stay close.

Lastly, I dedicate this work to my loving wife, Mae and our wonderful son, Julian. Words can not adequately express my gratitude for the many sacrifices they have borne to help me complete my graduate education. As this part of our journey ends, it is fitting that a new one begins with a new addition to our family. I love you – my “partners forever”.
To spell out the obvious is often to call it in question.

Eric Hoffer (1902 – 1983)
American Philosopher
CHAPTER I
REVIEW OF THE LITERATURE

Introduction
This chapter surveys the empirical research literature on school engagement and its relevance for high school academic outcomes. The first section briefly discusses a broad conceptualization of school engagement in general and how it has been defined. In this section, I also introduce how school engagement was conceptualized and operationalized in this study in terms of emotional school engagement and behavioral school engagement. Section two focuses specifically on the construct of emotional school engagement and reviews empirical evidence of its influence on academic performance. The third section introduces the construct of behavioral school engagement and discusses the empirical evidence linking it to academic performance. The final section of this chapter presents the research hypotheses that were tested.

From a practical and theoretical standpoint, school engagement in general is an important ingredient for learning and academic success. Students are more likely to perform well in school if they feel a genuine sense of interest in schoolwork, participate fully in class and school activities, and attend to the daily tasks and responsibilities of learning (Csikszentmihalyi & Schneider, 2000; Newmann, 1991; Newmann, Wehlage, & Lamborn, 1992; Steinberg, Brown, & Dornbusch, 1996). Recently, education researchers, school administrators, and
policymakers have become more interested in school engagement because school reform initiatives have recognized that promoting student school engagement is one of the key strategies for improving students’ academic performance (Carnegie Council on Adolescent Development, 1989). Although fostering student school engagement was one of the key recommendations made by the Carnegie Council (1989), most of the relevant research has focused on how changes such as class size reductions and administrative changes impact academic performance and student engagement. There have been comparatively fewer studies of the specific influence of school engagement on academic performance per se.

School engagement defined

A broad conceptual definition describes school engagement as, “[a] student’s psychological investment in and effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote” (Newmann et al., 1992). The definition provided by Newmann and his colleagues (1992), emphasizes the emotional and psychological investment that students commit to acquiring knowledge, learning subject matter, and mastering academic skills. They go on to describe their concept of school engagement as the “student’s inner quality of concentration and effort to learn,” which should be viewed in terms of a “continuum from less to more engagement,” rather than as a “dichotomous state of being either engaged or unengaged” in school and learning.
This definition focuses on the qualities and characteristics of school engagement that are less readily observable than factors such as classroom attendance and classroom participation. Indeed, Newmann argues that behavioral forms of engagement are misleading because students can go through the motions of schooling—such as attending class and turning in assignments, and still appear relatively engaged in school without feeling a more internal sense of intrinsic interest in learning.

Predictors of school engagement

Another way to understand this conceptualization of school engagement is to consider its determinants. Newmann et al., (1992) argue that this brand of school engagement is a function of three key factors. The first are students’ Need for competence, or their desire to be able to perform academic tasks with confidence and proficiency. Second is the notion of School membership, which is students’ perceptions that they are a part of the school community, are treated fairly, receive support from peers and teachers, and possess a clear sense of purpose for being in school. And third, school engagement is influenced by Authentic work, which are students’ perceptions that school is relevant to them and that they are learning topics and subjects with real substance and applicability for their future. Each of these factors are believed to promote greater active involvement, commitment, and effort toward learning. However, with the exception of some qualitative evidence, the authors concede that these concepts have not been firmly operationalized in terms of having available well-
established measures.

Newmann and his colleagues (1990, 1992) have attempted to develop a comprehensive conceptual framework for understanding school engagement that emphasizes the emotional and psychological characteristics that motivate students to extend greater effort and investment in learning.

However, the model does not explicitly connect the emotional investment and interest toward learning with the practical efforts and behaviors such as school attendance, class participation, and assignment completion. And while it is clearly important for students to feel a genuine sense of interest and commitment to learning, I argue the case in this investigation that school engagement behaviors and efforts are an integral aspect of the larger concept of school engagement. Thus far, the empirical literature on school engagement has been finely divided into studies that focus primarily on emotional or psychological school engagement (Marks, 2000; McNeely, Nonnemaker, & Blum, 2002; Newmann et al., 1992; Schlosser, 1992), and studies that focus on the effects of behavioral school engagement on academic outcomes (Connell, Halpern-Felsher, Clifford, Crichlow, & Usinger, 1995; Finn, 1993; Finn & Rock, 1997; Lee & Smith, 1993, 1995; Steinberg & Avenevoli, 1998; Steinberg et al., 1996).

**Conceptual framework of this study**

This study hopes to contribute new information to the school engagement literature by examining the concurrent effects of both the emotional and behavioral components of school engagement on academic outcomes during
high school, and assess whether these effects are mutually salient, or whether one form of engagement is more effective than the other. Moreover, this study hope to better our understanding of the association between emotional and behavioral school engagement, and whether they are mutually predictive of one another.

Therefore in this study, the general concept of school engagement is defined in terms of a continuum upon which both the emotional and behavioral components of school engagement vary and covary. Emotional school engagement is defined as students’ emotional and psychological sense of connectedness or bonding to teachers and school. Behavioral school engagement is defined as the everyday practical efforts and behaviors that students apply to learning, such as attending class regularly and class preparedness, completing homework assignments, and participating positively in class. So for instance, in terms of this bi-dimensional continuum, some students may be high in behavioral engagement, but still feel low levels of emotional school engagement. Other students may exhibit high levels of both emotional and behavioral engagement in school; whereas others might display low levels of both forms of engagement. By modeling both forms of engagement, this investigation hopes to illustrate how covariation between emotional and behavioral school engagement predicts differences in academic outcomes.

Another reason to examine both the emotional and behavioral aspects of
school engagement is that attitudes and behaviors toward school can be contradictory; and that this dialectic can have profound implications for students’ school performance. An argument offered by Mickelson (Mickelson, 1990), suggests that an attitude-behavior paradox operates among socio-economically disadvantaged African-American adolescents. On one hand, these students tend to express positive attitudes toward learning and school in general, reflecting an ideological acceptance of the importance of education. On the other hand, the material and educational disadvantages that these students face also engender attitudes or beliefs that in spite of any academic credentials they may obtain, racial discrimination will ultimately limit their future social and economic opportunities. Mickelson (1990) argues that these concrete beliefs ultimately override positive attitudes toward education, and are a primary reason why low-income, African-American adolescents expend less effort and energy toward academic achievement.

There is some debate about the generality of Mickelson’s theory and conclusions as far as explaining the persistent achievement gap that exists between low-income minority students, and middle-class White and Asian students. However, the multi-dimensional nature of students’ attitudes, feelings, and behaviors about school is a key underlying issue that this study will explore.

Most researchers would agree with Mickelson (1990) that positive attitudes toward school alone would lead to positive academic outcomes. Positive attitudes or beliefs need to complemented with basic effort and
commitment to schoolwork. However, Mickelson’s focus is on explaining the educational mechanisms operating within a specific group of students (i.e., low-income African-American adolescents). From the perspective this study, it is worthwhile to investigate the multidimensional nature of school engagement and whether emotional and behavioral school engagement operate in complementary or contradictory ways among a general population of high school students. The interplay between students’ attitudes and behaviors toward education is complex, and unraveling this complexity is vital to helping us understand how differences in the association between attitudes and behaviors toward school may contribute to differences in academic performance.

Emotional school engagement

In this study, emotional school engagement is defined as a student’s sense of emotional connectedness to school and to teachers (McNeely et al., 2002; Newmann et al., 1992). Emotional connectedness to school reflects a student’s sense of integration and incorporation into the school environment, as well as their feelings of connection to and acceptance by teachers and peers. Students who feel connected and integrated in school are expected to be engaged in learning, and less likely to be disengaged, isolated, and alienated from the school environment.

Newmann et al., (1992) argued that a key determinant of emotional engagement and psychological investment in school is based upon students’
sense of school membership or the degree to which they feel integrated and assimilated into the school environment. When students feel that they are part of the school community through positive relationships with teachers and peers, that teachers care about them and their education, and that they have a clear purpose for being in school, it fosters an emotional bond or feeling of connectedness to school. In this way, school connectedness reflects the emotional bond or engagement with school helps students feel acknowledged, supported, appreciated, and accepted by teachers and other students. Moreover, a positive student-teacher relationship in which teachers convey support and concern for students’ academic development, is also vital to promoting students’ sense of emotional connectedness to school.

Some empirical evidence has suggested that school connectedness is associated with avoiding negative health outcomes such as smoking, drinking, and sexual intercourse among adolescents. A recent study using data from the National Longitudinal Study of Adolescent Health found that students who felt a greater sense of connection to teachers and who were more engaged in school overall, were less likely to initiate negative health behaviors (McNeely et al., 2002). However, the findings pointed to primarily to a correlational relationship between school connectedness and low risk behaviors. One of the drawbacks of the study was that actual measures of student/teacher behaviors and exchanges were absent from the analysis. As a result, we do not know what schools and teachers specifically did in their interactions with students that promoted a sense
Qualitative studies of emotional engagement

While there have been few attempts to assess school connectedness in relation to emotional school engagement, some qualitative studies have linked the nature of student-teacher relationships with students’ views on school and learning. These studies illustrate how students’ experiences with teachers and administrators can influence their feelings about school (Cothran & Ennis, 2000; O’Connor, 1999; Schlosser, 1992; Yair, 2000). Not surprisingly, students become easily disengaged from learning when teachers displayed little enthusiasm for the subject matter or rarely use new or creative ways to teach students. For example, students often disengaged from school when teachers only lectured to classes and provided few opportunities for class discussion and interaction. One student described this way of teaching in the following way:

Mostly they’re [classes] just the teacher talking for a long time and expecting you to understand everything they said just exactly [student’s emphasis] the way she said it. That’s really all (Schlosser, 1992, p. 133).

These problems are compounded when teachers cannot or are unwilling to establish a positive connection with students. Newmann et al., (1992) observed classrooms where teachers lectured for 10 or 15 minutes and then instructed students to read their textbooks on their own, and answer the questions at the end of a section or chapter of the book. This style of teaching
rarely allowed students and teachers to interact in ways that promoted a meaningful sense of connectedness with teachers and engagement in learning. As a result, students had little interest in schoolwork and feel little motivation to do well in school.

In contrast, students feel a strong sense of school connectedness when it is based upon a positive student-teacher relationship. When teachers can appeal to the academic interests of students and convey a genuine interest in their desire to learn, the positive student-teacher relationship that emerges becomes an important basis for feeling connected to school, and the primary motivation to learn and expend effort on schoolwork (Ford & III, 1996; Schlosser, 1992; Yair, 2000).

In spite of these findings, there is still a lot we do not know about emotional school engagement. The most significant gap is the lack of specific evidence linking emotional school engagement or connectedness to academic performance such as grades and test scores – particularly based on quantitative evidence from survey data of high school students. For example, is emotional school engagement more closely associated with classroom performance (i.e., grades) or standardized test scores? Are there differences between boys and girls in feelings of emotional school engagement? And are these differences associated with differences in how boys and girls perform in school?

In addition, there is no definitive consensus within the empirical literature on how to best define and operationalize emotional school engagement. For
example, while emotional school engagement is defined in terms of student-teacher connectedness in this investigation, one could equally argue that emotional school engagement can also be defined in terms of connectedness to the school environment, or the degree to which a student feels a sense of intrinsic interest in learning, or the extent to which a student feels a sense of purpose or fulfillment through school and education.

Behavioral school engagement

Behavioral school engagement refers to the actions and practices that students direct toward school and learning such as school attendance, class participation, and assignment completion (Connell et al., 1995; Lee & Smith, 1993; Steinberg et al., 1996). Behavioral school engagement also reflects students’ efforts directed toward schoolwork and the degree to which they fulfill the basic responsibilities and duties that are required by teachers and parents in order for students to make adequate progress in school.

A majority of the existing research on school engagement has used behavioral school engagement as the primary construct for engagement because behavioral engagement is more readily observed in terms of behaviors such as school attendance, classroom participation, school preparedness, academic effort, and homework completion (Finn, 1993; Finn & Rock, 1997; Lee & Smith, 1993, 1995; Marks, 2000; Yair, 2000). For the most part, behavioral school engagement has been positively associated with academic performance. Students who are
more behaviorally engaged in school and classwork generally get better grades in class and perform better on standardized tests.

Yet, there are relatively few empirical studies that have explicitly examined the predictors behavioral school engagement. Studies in which behavioral school engagement was an outcome variable, have provided some indication of the factors that may predict behavioral involvement in school. For example, behavioral involvement and engagement in school was predicted by positive relationships with teachers and parents (Connell et al., 1995; Lee & Smith, 1993; Newmann et al., 1992; Skinner & Belmont, 1993; Skinner, Wellborn, & Connell, 1990; Steinberg, Elmen, & Mounts, 1989). When students received high levels support and encouragement from the teachers and parents, they responded by being more involved in school and expended better efforts in the classroom.

Behavioral school engagement has also been associated with intellectual ability in that students with strong academic skills tend to be more engaged in school and apply more effort to do well in class (Steinberg et al., 1996). These students also have high goals and expectations toward school performance which drives higher levels of behavioral engagement in school (Eccles, Wigfield, & Schiefel, 1998; Wentzel, 1999).

School characteristics and behavioral school engagement

Lastly, schools and the organizational structure of schools has been credited with influencing behavioral school engagement (Finn & Voelkl, 1993;
Lee & Smith, 1993, 1995; Lee, Smith, & Croninger, 1997). Studies of organizational and structural school reforms indicate that schools with less traditional or departmental structures were better at fostering student behavioral engagement. The communally-oriented structure of these schools which emphasized greater teacher-student collaboration in determining lesson plans, and more class discussion, was credited with encouraging students’ engagement and involvement in learning.

A positive link between behavioral school engagement and academic performance has been documented in two studies investigating the effects of school reform on student performance using data from the NELS:88 survey. In one study, a cross-sectional analysis of eighth graders compared restructured schools with non-restructured or traditionally bureaucratic schools (Lee & Smith, 1993). The investigators found that students in restructured schools were generally more behaviorally engaged in school than students in non-restructured schools. That is, students had better classroom attendance, were more likely to complete their homework, and participated more actively in class in schools that had undergone some reorganization or reforms, such as class size reductions and less departmentalization. Better behavioral engagement was in turn associated with better academic performance by students in restructured schools. However, this study used cross-sectional data only from 8th grade students, so it cannot speak to whether the association between behavioral school engagement and academic performance persisted over time.
In a follow-up study, Lee and her colleagues (1997) examined the effects of school restructuring and reform over time in high school. Specific aspects of school restructuring and reorganization were related to better performance in math and science for both low-SES and high-SES students in restructured schools. Most notably, improvements in science grades were directly related to restructured schools with a challenging and engaging course curriculum. Improvements in student engagement were related to restructured schools that emphasized personalized school environments and greater teacher accountability for teaching.

It is important to note that school engagement (i.e., behavioral school engagement) was not the explicit topic of interest in either of these two studies. That is to say, school engagement was not the primary independent or dependent variable of interest. While school reform and restructuring are important issues in their own right, these studies noted that even modest school reforms are taking place in a small handful of schools and districts in this country; and that comparatively few students will experience comprehensive school reforms. Nevertheless, school engagement remains an important issue particularly in terms of its impact on school outcomes for students in all types of schools.

There is also evidence of the positive association between behavioral school engagement and academic performance among low-income minority adolescents who were at higher risk for academic failure. In predominantly low-
income, high minority concentrated schools, the students who were more engaged in school had better grades and were less likely to drop out of school than students who were less engaged (Finn, 1993; Finn & Rock, 1997). As a result, Finn asserts that behavioral school engagement is a protective factor against the risk of academic failure and dropping out of school among socio-economically and educationally at-risk student populations.

Another study investigated the pattern of behavioral school engagement in math and social studies classes across elementary, middle, and high schools (Marks, 2000). A rather consistent pattern emerged which showed that behavioral engagement in school decreases as grade level increases. Girls were more likely to be engaged in school than boys, and high schoolers were more engaged in math than in social studies. Although behavioral school engagement was investigated at different grade levels, the data was not longitudinal in nature (i.e., separate elementary, middle, and high schools were sampled). And the schools sampled had all undergone some form of schoolwide restructuring, so these results were less generalizable to all schools because on a relative handful of schools have experienced administrative or instructional reforms.

James Connell and his colleagues have developed a self-systems process model that traces the links between interpersonal relationships, school engagement, and academic performance (Connell, Beale-Spencer, & Aber, 1994; Connell et al., 1995). A self-systems model suggests that when students perceive and receive positive support and involvement from key adults, such as parents
and teachers, they are more engaged in school and more motivated to do well academically. Academic success in turn encourages the support of adults which helps reinforce students’ behavioral engagement in school. The self-systems framework has highlighted the important role that adults—namely parents and teachers, play in shaping adolescents’ views toward school in general and school engagement in particular.

**Summary**

Empirical investigations of emotional and behavioral school engagement have been able to demonstrate how each is linked to school outcomes. Studies on the effects of emotional school engagement suggest that psychological and emotional factors related to a sense of belongingness in school and connectedness with teachers helps students feel an intrinsic sense of engagement toward learning and bonding with school. An emotional bond with teachers and a sense of connectedness toward school is forged when students feel a genuine sense of purpose toward education, and are appreciated and recognized by teachers, and believe that they are a part of the school community.

Studies have found even more evidence of the link between behavioral school engagement and school outcomes. Good grades, higher test scores, and better school completion were associated with the extent to which students attended school regularly, participated in class, and completed their assignments as required. Behavioral engagement in school is also a function of how schools are organized and the extent to which they can provide the context and
atmosphere within the classroom that draws out the involvement and participation of students in their learning.

While these studies have documented the association between emotional and behavioral school engagement and academic performance, few investigations have examined both the emotional and behavioral dimensions of school engagement concurrently in a longitudinal study. Exploring the bi-dimensional nature of school engagement is warranted because how students feel about school and their teachers is not always consistent with how they may perform in school. In addition, we do not know how the association and covariation between emotional and behavioral school engagement impacts students' academic outcomes.
CHAPTER II
RESEARCH QUESTIONS AND HYPOTHESES

Introduction

This chapter provides an overview of this investigation including the main research objectives and questions that were addressed, the guiding theoretical frameworks, and relevant research hypotheses. The chapter closes with remarks on the significance of the study and its potential to contribute new information to the literature on school engagement during high school.

Emotional and behavioral school engagement and academic performance

The first objective of this research was to investigate the effect of emotional and behavioral school engagement on school outcomes, and posed a basic question: How does emotional and behavioral school engagement predict students’ GPA and standardized test scores in reading and math?

Few studies have examined the effects of both emotional and behavioral school engagement on academic performance simultaneously. This oversight stems in part from the lack of a conceptual or theoretical framework that articulates the association between the emotional and behavioral dimensions of school engagement. I explored the effects of emotional and behavioral school engagement on two different indicators of academic performance (i.e., GPA and standardized test scores). The first research question was divided into two parts and which addressed, (a) the extent to which emotional and behavioral school
engagement predicted students’ academic performance; and (b) whether emotional and behavioral school engagement differed in how they predicted students’ performance in the classroom and on standardized tests.

Grade point averages and standardized test scores are different indicators of learning and academic performance. On the one hand, standardized test scores are objective single point-in-time assessments of a student’s cumulative skills and abilities in a given subject such as math or reading. Grades and grade point averages on the other hand, are proximal measures of learning that represent the ongoing efforts that students commit to education such as completing homework assignments, taking tests and quizzes, writing papers, and executing class projects. Using GPA and test scores as primary outcome variables, this study had the opportunity to assess whether emotional and behavioral school engagement had differential effects on academic outcomes that reflected different modes of learning.

The extent to which emotional and behavioral school engagement predicts classroom grades and standardized test scores depends in part upon, where students on a continuum of low to high emotional and behavioral school engagement. For example, students with strong academic abilities can obtain high scores on objective standardized tests of reading or math ability and still exhibit low emotional or behavioral engagement in school. Their low school engagement may also contribute to low school grades and poor classroom performance.
On the other hand, students with average or below average academic skills may not score highly on standardized tests. However, they can still get good classroom grades if they extend a great deal of emotional and behavioral engagement in classwork. In order to disentangle the effects of achievement and school engagement this study controlled for prior school performance in order to accurately assess and obtain unbiased estimates of the effects of emotional and behavioral school engagement on academic outcomes.

In sum, the first research question explored whether emotional and behavioral school engagement mattered for academic performance; and involved three specific analyses. The first analysis investigated the concurrent effects of emotional and behavioral school engagement on grades and standardized test scores in the 8th, 10th, and 12th grades.

The second analysis examined single year lagged effects of emotional and behavioral school engagement on grades and test scores between the 8th and 10th grade, and between 10th and 12th grades. This analysis was designed to investigate whether prior levels of emotional or behavioral school engagement predicted subsequent levels of academic performance.

The third analysis estimated the cumulative effect of 8th, 10th, and 12th grade school engagement on 12th grade grades and test scores in the 12th grade. For each of these three procedures, emotional school engagement and behavioral school engagement were investigated separately in terms of predicting students’ GPA and test scores in high school.
The Association between emotional and behavioral engagement over time

The second research question focused on the association between emotional and behavioral school engagement, and addressed the following question: Does prior school engagement predict subsequent school engagement? This question focused on how emotional and behavioral school engagement were correlated, and whether both dimensions of school engagement were associated by a reciprocal relationship.

Most studies of school engagement have been cross-sectional investigations that have looked at the effect of behavioral school engagement on academic performance at a single point in time (For an exception see Marks, 2000; Lee et al., 1995, 1997). Few attempts have been made to use longitudinal data to examine the association between emotional and behavioral school engagement at two or more points in time. As a result, we know little about the temporal association between emotional and behavioral school engagement. If emotional school engagement is stable throughout high school, is behavioral school engagement also stable? If not, how do the two dimensions of school engagement covary during high school?

The relationship between emotional and behavioral school engagement can be viewed from three different perspectives. One view might posit that students who feel connected to teachers, peers, and the overall school environment would be more likely to attend classes regularly, complete their
homework, and participate in class—in response to the positive relationship they have with their teacher. In short, behaviors follow attitudes. On the other hand, another view would suggest attitudes follow behaviors, and that students who are behaviorally engaged and involved in school will feel more connected or emotionally engaged in school. A third view would posit that emotional and behavioral school engagement are not closely associated and that a reciprocal relationship between the two is either negligible or non-existent.

The second research question was divided into two parts and explored two specific issues: (a) What is the correlation between emotional and behavioral school engagement at each grade level and over time?; and (b) what is the extent to which prior emotional school engagement predicts subsequent behavioral engagement?; and the extent to which prior behavioral school engagement predicts subsequent emotional school engagement?

The first objective of question two was to investigate the normative patterns of emotional and behavioral school engagement by estimating the mean levels of emotional and behavioral school engagement in the 8th, 10th, and 12th grades. This procedure also examined the correlation between emotional and behavioral school engagement at each of the three assessment periods, and assessed how the association between emotional and behavioral school engagement covaried over time.

The final objective under question explored whether a reciprocal association existed between emotional and behavioral school engagement. More
specifically, did emotional school engagement in the 8th grade predict behavioral engagement in the 10th grade – and vice versa? And, did 10th grade behavioral school engagement predict 12th grade emotional school engagement? Single-year lagged effects of prior emotional school engagement on subsequent behavioral engagement were estimated – as were the effects of prior behavioral school engagement on subsequent emotional school engagement. In addition, cumulative or additive effects of 8th and 10th prior school engagement on 12th grade school engagement were also estimated. The association between emotional and behavioral school engagement was also expected to be associated with other factors apart from school engagement. So the effects of sociodemographic and background characteristics as well as prior school achievement were also estimated as control variables.

The second part of question two addressed whether students’ sense of emotional connectedness to school predicted subsequent behavioral involvement in school. Conversely, it examined whether completing homework, attending school, and participating in classes affected students’ emotional bond with teachers and the school environment. Understanding the direction of the relationship between emotional and behavioral school engagement has important practical implications for teaching and student-teacher relationships. If emotional school engagement was a significant predictor of students’ behavioral involvement in school, teachers and administrators may need to focus first on promoting positive student-teacher relationships insofar as creating a
context for positive engagement in school. However, if the opposite is true, and
behavioral school engagement predicts students’ sense of emotional
connectedness and engagement in school, teachers and administrators would do
better to focus on strategies that promote students’ participation in class, school
attendance, and completing homework assignments in order to foster positive
academic performance.

To date, there are no empirical investigations of the relationship between
emotional and behavioral school engagement, and the extent to which they are
reciprocally associated. This study hopes to contribute new information about
how students’ perceptions of and relationships with teachers are associated with
the work and effort they directed toward learning activities.

Theoretical Framework and Research Hypotheses

This investigation examined the links between emotional and behavioral
school engagement and academic performance using a social learning theoretical
framework (Bandura, 1989). Social learning theory posits that learning and
behavioral development are influenced by two distinct but related factors. First,
in order to learn a certain behavior, an individual must be exposed to the
behavior and observe it being executed. Second, an individual must also be
motivated to learn and execute the behavior which he has observed. And third,
in order to become proficient at a given behavior, an individual must practice or
execute the behavior any given number of times in order to learn and/or master
a skill or behavior. For example, in order for a child to play the piano, the child must be exposed to the piano playing behaviors—typically through music lessons and regular practice sessions. In addition, in order for the child to play the piano proficiently she must also be motivated and interested enough to practice playing the piano. In short, learning is a function of exposure to relevant behaviors, and the motivation to learn and enact the observed behaviors.

I conceptualized the relationship between emotional and behavioral school engagement within a social learning framework. For example, in order for students to learn and perform adequately in school, they must be at school and be involved in the behaviors and practices of learning (i.e., behavioral school engagement). In addition, academic performance is also influenced by a motivation and desire to attend class and engage in the day-to-day duties and actions that constitute the process of learning. In other words, a student has to feel a level of interest and connection to school that is sufficient enough to motivate them to attend school and engage in learning.

This study tested the hypotheses that, (a) behavioral school engagement predicts academic outcomes (i.e., GPA and test scores), (b) emotional school engagement predicts academic outcomes, and (c) emotional school engagement enhances the impact of behavioral school engagement on academic performance.

Research Questions and Plan of Analysis

This section presents the two main research questions for this study. Brief
descriptions outlining the analytic procedures for each research question are also presented.

Research question 1

1. How does emotional school engagement and behavioral school engagement predict students’ overall GPA and standardized test scores in reading and math in the 8th grade, 10th grade, and 12th grade?

Correlation and HLM analyses were used to estimate the effects of emotional and behavioral school engagement on students’ GPA and test scores. Indicators for gender, race/ethnicity, and family socioeconomic status were included in the analyses in order to control for individual and family characteristics that may contribute to differences that may (or may not) be correlated with the effects of emotional and behavioral school engagement on academic outcomes. Figure 1 presents a path diagram illustrating the specific pathways between emotional and behavioral school engagement and academic outcomes that were estimated for research question 1.

The first set of analyses under question one assessed the concurrent associations between emotional and behavioral school engagement and academic performance in 8th, 10th, and 12th grade. Three separate HLM regression models estimated the effects of emotional and behavioral school engagement on GPA, math and reading test scores for 8th, 10th, and 12th grade respectively. In addition, social demographic controls were included for each of the separate models. The first set of analyses were designed to determine whether emotional and
behavioral school engagement predict GPA and test scores by grade level.

1.1. Does prior emotional and behavioral school engagement predict GPA and standardized test scores in the 10th and 12th grades?

The second subset of analyses under research question 1 estimated, (a) single year lagged effects of prior emotional school engagement and behavioral school engagement on subsequent grades and test scores\(^1\), and (b) the cumulative effects of 8th, 10th, and 12th grade emotional and behavioral school engagement on 12th grade academic performance. For single-year lagged effects, one set of analyses estimated the effects of 8th grade emotional and behavioral school engagement on 10th grade academic outcomes, and controlled for 8th grade academic performance and socio-demographic characteristics. The second set generated estimates of the effects of 10th grade school engagement on 12th grade outcomes. The third set of analyses produced estimates of 8th, 10th, and 12th school engagement effects on 12th grade academic outcomes with controls for 8th grade GPA and demographic characteristics. The results from question one were designed to provide answers as to how emotional and behavioral school engagement mattered for academic performance, both at a single point in time and in the latter periods of high school.

The estimates derived from the lagged-effects models provided answers to two separate, but key issues. First, the lagged-effects models controlled for

\(^1\) Tenth grade GPA data were not available. Therefore, single year lagged effects of emotional and behavioral school engagement will only be estimated for reading and math test scores.
previous academic performance and therefore allowed me to examine the effect of emotional and behavioral school engagement on changes in academic outcomes between 8th and 10th, and 10th and 12th grades. Second, estimates from the lagged-effects models provides estimates of whether emotional and behavioral school engagement mediated the effect of previous academic outcomes on subsequent achievement.

Why would we expect emotional and behavioral school engagement to have any impact on students’ later academic achievement? If the cross-sectional analyses were to show that emotional and behavioral school engagement were associated with concurrent academic outcomes within grade levels, then a logical follow-up question is whether there any potential spill-over effects of prior emotional and behavioral school engagement on subsequent achievement outcomes. In fact, it is reasonable to postulate that if a student’s level of emotional and behavioral school engagement helped her get good grades in 8th grade, she may try to maintain her level of school engagement in order to do well in 10th grade.

However, in order to properly estimate the effects of prior school engagement on school outcomes, I had to control for prior achievement in order to rule out confounding effects between prior school engagement and achievement on later academic outcomes. By controlling for previous academic performance (i.e., GPA and test scores), the parameter estimates of the effects of school engagement and prior school performance reflected the degree of change
in the outcome variable associated with the effect of the independent variables and the controls for prior achievement. This is because the independent variables in the lagged models represent the effects of prior school engagement and prior academic achievement on a subsequent academic outcome. Therefore, the outcome variables reflect the amount of change in the grades or test scores that is associated with prior emotional and behavioral school engagement, as well as prior school achievement.

Research question 2

2. What is the nature of the relationship between emotional and behavioral school engagement among high school students? And how does this association operate over time?

2.1. What is the correlation between emotional and behavioral school engagement across 8th grade, 10th grade, and 12th grade?

2.2. To what extent is the relationship emotional and behavioral school engagement reciprocal during high school?

The second research question focused on the association between emotional and behavioral school engagement within and across grade levels. Figure 2 presents a path diagram illustrating the associations between emotional and behavioral school engagement that will be estimated. The analyses examined the correlation between emotional and behavioral school engagement at each grade level, and the extent to which emotional school engagement predicts behavioral school engagement, and how behavioral school engagement
predicts emotional school engagement. This set of analyses also provide approximations of the stability of emotional and behavioral school engagement, as well as the strength of the association between them across high school.

Question 2.1 investigated the concurrent relationship between emotional and behavioral school engagement at each of the three assessment periods. Estimates of the correlation emotional and behavioral school engagement at each grade level were generated for 8th, 10th, and 12th grades in order to assess how the association varies across high school. Control variables were included in the analyses to assess whether individual and sociodemographic characteristics contribute to differences in the covariation between emotional and behavioral school engagement.

Question 2.2 investigated the extent to which emotional and behavioral school engagement predicted one another in terms of a reciprocal association. Correlation and regression analyses estimated the effect of prior emotional school engagement on subsequent behavioral school engagement – and vice versa. For instance, 8th grade emotional school engagement was regressed on 10th grade behavioral school engagement to assess whether students’ sense of connectedness to school in the 8th grade predicted their participation in school at 10th grade. A similar regression model was tested to see whether students’ participation in school during the 8th grade had an effect on feeling connected to school in the 10th grade. Similar models estimated the effects between emotional and behavioral school engagement in the 10th and 12th grade. That is, 10th grade
emotional school engagement was regressed on 12th grade behavioral school engagement; and 10th grade behavioral school engagement was regressed on 12th grade emotional school engagement.

The final subset of analyses assessed the cumulative effects of 8th and 10th school engagement on 12th grade engagement. More specifically, 8th, 10th, and 12th grade emotional school engagement was used to predict 12th grade behavioral school engagement. Conversely, 8th and 10th grade behavioral school engagement was regressed on 12th grade emotional school engagement in order to determine whether students’ participation in class during 8th and 10th grade predicted their sense of connectedness to teachers in the 12th grade. In sum, the second set of research questions investigated the reciprocal relationship between emotional and behavioral school engagement; and whether feeling connected to teachers predicted students’ behavioral involvement in school; and whether being involved in school predicted students’ feelings of connectedness to teachers.
CHAPTER III

METHODS

Research Design

This study utilized data from the National Educational Longitudinal Study 1988 (NELS: 88), conducted by the National Center for Education Statistics (NCES). The NELS:88 database is a nationally representative cohort survey of approximately 26,000 eighth graders beginning in 1988; with three follow-up interviews conducted at two year intervals through 2000. The survey is a stratified random sample of school-going adolescents from public and private schools across the country. The base-year sample drew upon approximately 800 public schools and 200 private (parochial and non-parochial) schools. A complete roster of eighth grade students was generated from the sampled schools and approximately 3 to 24 eighth graders from each school were selected at random to participate in the study. After the initial sample was determined, the remaining students on the eighth grade roster were grouped by race and approximately 2 to 3 Asian and Hispanic students per school were randomly selected to generate an oversample of students from these two racial groups.

Participants and Sample

The analyses drew upon information from three waves of the NELS dataset: a) the 1988 8th grade base year assessment, b) the 1990 10th grade follow-up, and c) the 1992 12th grade follow-up. Respondents who were not included in
the base year assessment and later added to the 10th grade follow-up were
omitted. The sample was limited to students who responded to the first three
waves of data collection, with complete reading and math standardized test
scores, 8th and 12th grade cumulative GPA reports, and that responded to both
emotional and behavioral school engagement items. These selection criteria
yield a sample size of n = 11,629. (See Table 1 for descriptive statistics of the
sample characteristics).

Outcome Variables

Classroom performance

Classroom performance was assessed using measures of overall grade
point averages in 8th and 12th grade. Eighth grade (base year) GPA was a
composite variable created by NCES using students’ self-reports of grades in
four subjects (English, mathematics, science, and social studies). For each subject
students responded to a five point scale (mostly As = 4, Bs = 3, Cs = 2, Ds = 1,
mostly below D = .5). The GPA measure was computed by taking the mean of all
non-missing values of these four (i.e., English, math, science, and social studies)
variables equally weighted (National Center for Education Statistics, 1994). The
twelfth grade assessment measured cumulative GPA for the last year the student
was enrolled in school, up to and including the fall semester of 12th grade.

Academic performance

Standardized test scores in reading and mathematics were used as
objective assessments of students’ academic performance. Although GPA is also
a measure of academic performance, it is sensitive to variations in the types of academic and non-academic courses taken by students at different high schools. Item Response Theory (IRT) Estimated Number Right scores for reading and math will be used as standardized tests of academic performance. These scores reflect the number of estimated number of correct answers a student would have achieved had they answered all of the items. An IRT-based estimate is the probability of a correct answer, given a person’s demonstrated ability on the parameters of the item, summed over all test items. Math and reading IRT test scores are standardized to a mean of 50 and a standard deviation of 10 (See Appendix H in National Center for Education Statistics, 1994 for details).

Independent Variables

Emotional school engagement

Emotional school engagement scores were derived from six items measuring students’ assessments of their sense of connectedness or bonding with teachers at 8th, 10th, and 12th grade. For 8th and 10th grade a total of six items were used to create the composite score of emotional school engagement. However, three of those items were unavailable in the 12th grade assessment. For each year the items were summed and standardized with a higher score indicating higher feelings of emotional school engagement; and negative items were reverse scored. Standardized scores for emotional and behavioral school engagement were used for all analyses. Cronbach’s Alpha for 8th grade emotional school engagement was .79 (See Appendix A for a list of the items and alpha
Behavioral school engagement (8th, 10th, and 12th grade) was measured using teacher reports of students’ participation and involvement in class. Four items assessed how often the student completed homework, was tardy, absent, and inattentive in class. The items were summed and standardized with higher scores indicating positive behavioral school engagement. Cronbach’s Alpha for 8th grade behavioral school engagement was .66 (See Appendix A for a list of the items and alpha reliabilities for 10th and 12th grade).

Student-level control variables

Differences in student characteristics were expected to contribute to differences in the association between emotional and behavioral school engagement and academic performance. Sociodemographic variables for gender, ethnicity (i.e., African-American, Hispanic, Asian, Native American, and White), and family socioeconomic status were used as control variables. The family SES variable was computed using indicators of parental education (mothers and fathers), parental occupational prestige, and family income based on the data obtained at the baseline assessment (i.e., 8th grade) (National Center for Education Statistics, 1994).

Plan of Analysis

My investigation focused specifically on predicting and explaining the degree of within-school variance in the effects of emotional and behavioral
school engagement on academic performance. A two-level HLM model was estimated, wherein the Level 1 model represented within-school differences and the Level 2 model represented between-school differences. Because this project focuses solely on within-school differences, I used HLM to adjust for shared variance at the school level, but did not model between-school differences. The level 2 model included the individual level parameters and social demographic characteristics.

The first research question investigated the extent to which emotional and behavioral school engagement predict students’ GPA in 8th and 12th grade; and reading and math test scores in 8th, 10th, and 12th grade. The first set of analyses estimated the concurrent associations between emotional and behavioral school engagement and academic outcomes for each of the three grade levels. In addition, interaction terms between concurrent emotional and behavioral school engagement were created and separate models estimated whether interactions between both dimensions of school engagement contributed to school outcomes at each of the three grade levels. The second set of analyses consisted of lagged models that estimated the effect of emotional and behavioral school engagement on subsequent academic outcomes.

The second research question investigated the association between emotional school engagement and behavioral school engagement, and the extent to which the two dimensions of school engagement predicted one another. The analyses were divided into two parts. In part 1, two sets of analyses estimated
the lagged effects of 8th grade (emotional/behavioral) school engagement on 10th grade (emotional/behavioral) engagement; and 10th grade school engagement on 12th grade school engagement. In part 2, a final model estimated the effects of 8th and 10th engagement on 12th grade (emotional/behavioral) school engagement.
This chapter presents results of models that estimate the relationship between emotional and behavioral school engagement and academic outcomes based upon the research questions and hypotheses presented in chapter two. It is divided into five sections. The first section presents descriptive statistics for the primary independent and dependent variables. The second section presents results of the preliminary HLM models that establish the amount of within and between-school variance in the main dependent variables. The third section presents results on the concurrent relationship between emotional and behavioral school engagement and academic outcomes in the 8th, 10th, and 12th grades. The fourth section presents results of the lagged effects of emotional and behavioral school engagement on academic outcomes. And the fifth section presents results that addresses the second research question about the nature of the relationship between emotional and behavioral school engagement.

**Descriptive Statistics**

Means and standard deviations

Table 2 presents means and standard deviations for the primary independent and dependent variables across 8th, 10th, and 12th grade. The estimates for emotional and behavioral school engagement are the
unstandardized means based on the composite scores for each variable. Emotional school engagement scores differed significantly between 8\textsuperscript{th} and 10\textsuperscript{th}; and 10\textsuperscript{th} and 12\textsuperscript{th} grades. The large drop in emotional school engagement between 10\textsuperscript{th} and 12\textsuperscript{th} grade is the result of problems in measurement. Of the six items used to measure emotional school engagement in 8\textsuperscript{th} and 10\textsuperscript{th} grade, three were unavailable in the 12\textsuperscript{th} grade assessment. Standardized means scores for emotional and behavioral school engagement were used in all of the HLM analyses. Mean scores for teacher reports of students’ behavioral school engagement also differed significantly between each grade level. Although the mean behavioral school engagement score dropped somewhat between 8\textsuperscript{th} and 10\textsuperscript{th} grade, there was a slight but significant increase between 10\textsuperscript{th} and 12\textsuperscript{th} grade. In general however, there was little variability in emotional and behavioral school engagement across the periods of assessment.

Standardized test scores for both math and reading increased from 8\textsuperscript{th} to 12\textsuperscript{th} grade, with math scores generally higher than reading scores. The steady increase in scores was anticipated as an indication that on average students were learning more and adding to their cumulative knowledge in these subject areas. Mean differences in reading scores were significant at 8\textsuperscript{th} grade, \( t(11,628) = 356.017, p < .001 \); 10\textsuperscript{th} grade, \( t(10,574), p < .001 \); and 12\textsuperscript{th} grade, \( t(6,556) = 329.274, p < .001 \). Mean differences in math test scores also differed significantly by grade level: 8\textsuperscript{th} grade, \( t(11,628) = 343.770, p < .001 \); 10\textsuperscript{th} grade, \( t(10,574) = 344.995, p < .001 \); 12\textsuperscript{th} grade, \( t(6,556) = 335.838, p < .001 \). On the other hand, classroom
performance as measured by GPA declined and differed significantly between 8th to 12th grade, $t(6,556) = 297.621, p < .001.$

**Bivariate correlations**

Table 3 presents bivariate correlations between emotional and behavioral school engagement scores and academic outcomes for 8th, 10th, and 12th grade. In general, the correlations between school engagement and school outcomes were only weak to modest in size across all grades. For example, the correlation between 8th and 10th grade emotional engagement was modest at .39 ($p < .001$), which increased to only .41 ($p < .001$) between 10th and 12th grade. The correlations for behavioral school engagement scores were also generally weak. For example, the correlation between 8th and 10th behavioral school engagement was .26 ($p < .001$), which declined to .23 ($p < .001$) for the 8th and 12th grade correlation.

The low correlation between repeated measures of behavioral school engagement may be associated with two factors. First, behavioral school engagement scores were derived from different teachers in each of the three years of assessment. In addition, the teachers who provided engagement scores taught different subjects (i.e., English, math, science, and social science). And it is possible that variation from year to year in teachers assessments may be associated with differences in the level of participation and prepared required for different types of classes. Secondly, some variation would be expected with respective to the different approaches toward teaching. Some teachers who may
have relied primarily on lecturing to classes which could lower teachers’ observations of behavioral engagement than teachers relied on teaching strategies that elicited more involvement and participation in class. The issue of measurement with respect to school engagement will discussed further in the discussion chapter.

The correlation between emotional and behavioral school engagement was also weak at each grade level. For example, correlation between emotional and behavioral school engagement was (.18) at 10th grade, which dropped to (.12) at 12th grade. These results suggest that emotional and behavioral school engagement are separate and distinct conceptual phenomena, despite any theoretical notions that they may be related.

With respect to classroom performance, behavioral school engagement and GPA was higher than the correlation for emotional school engagement. For example, at each grade level the correlation between emotional school engagement and 8th grade GPA is (.24), while the same association was (.40) for behavioral school engagement. At 12th grade similar results show that the correlation with GPA was only (.14) for emotional school engagement, the association between GPA and behavioral school engagement was (.25).

The correlations between school engagement and standardized test scores in math and reading were also weak to modest in magnitude. For example, the correlation between 8th emotional school engagement and 8th grade reading test scores was (.12), and (.26) for behavioral school engagement. The correlation for
8th grade math test scores was (.14) for emotional school engagement and (.27) for behavioral school engagement. The gap emotional and behavioral school engagement narrowed at the 12th grade assessments. More specifically, the correlation between 12th grade behavioral school engagement and 12th reading test scores was (.17), and (.14) for emotional school engagement. Similarly, the correlation between 12th grade math test scores and emotional school engagement was (.22) and (.23) for behavioral school engagement.

In addition, there was evidence of slight trends in the correlation between engagement and standardized test scores across grades. For example, the correlation between emotional school engagement and reading scores increased slightly from (.12) in 8th grade to (.20) in 12th grade. Whereas the same correlation between reading test scores and behavioral school engagement declined from (.26) in 8th grade to (.19) in 12th grade. The same pattern was observed for math test scores. The correlation between emotional school engagement and math rose slightly from (.14) in 8th grade to (.22) in 12th grade; whereas the correlation for behavioral school engagement declined from (.27) in 8th grade to (.23) in 12th grade. These patterns suggest initially that students’ performance on standardized test scores may have coincided more closely with changes in students’ relationship with teachers, than with changes in the level of behavioral involvement in school.
Overview of Analyses

The analyses were divided into two parts in conjunction with the two main research questions that guided this investigation. The first set of analyses addressed research question one: How do emotional and behavioral school engagement influence grades and standardized test scores? Here, I estimated cross-sectional effects of emotional and behavioral school engagement on school outcomes within each grade level. Next, I conducted longitudinal analyses to estimate lagged effects between grade levels to assess how emotional and behavioral school engagement predicted academic outcomes in subsequent grades. The analyses nested students within schools to account for between-school differences in academic outcomes; and controlled for individual backgrounds characteristics, namely gender, family socioeconomic status, and race/ethnicity.

The second set of analyses addressed research question two: What is the association between emotional and behavioral school engagement? Here, I examined how emotional and behavioral school engagement predicted each over time, controlling for social background characteristics, as well previous classroom performance.

Preliminary HLMs

The first step in estimating hierarchical linear models is to estimate the amount of total variance in the dependent variables that is within and between-schools. Table 4 presents the within and between-school variance components
for GPA, reading IRT test scores, and math IRT test scores in 8th, 10th, and 12th grades.

In general, the total amount of variance in academic outcomes was observed within rather than between schools. For example, 91% of the total variance in 8th grade GPA was within schools. In other words, there was greater variability in GPA among students in the same school, than among students from different schools. For example, 84% of the total variance in 12th grade reading test scores was between students in the same schools. For 12th grade math test scores, 79% of the total variance was found within schools. Overall, results from preliminary analyses of the unconditional HLM models suggest that the majority of variance in academic outcomes across 8th, 10th, and 12th grades occurred within-schools which is a positive sign for this investigation because subsequent analyses will focuses on explaining within-school differences in academic outcomes in relation to emotional and behavioral school engagement. In spite of the fact that more attention is generally paid to between-school differences in academic outcomes, it was interesting to find that a greater degree of variability in grades and standardized test scores exists within schools.

Emotional and Behavioral School Engagement and Academic Outcomes

The first research question is divided into two parts. Part one asks whether a concurrent relationship exists between emotional and behavioral school engagement and academic outcomes at 8th, 10th, and 12th grade.
Therefore, part one of the analyses examined the concurrent association between: (a) 8th grade emotional and behavioral school engagement and 8th grade academic outcomes (i.e., GPA, reading test scores, and math test scores), (b) 10th grade emotional and behavioral school engagement and 10th grade standardized test scores, and (c) 12th grade emotional and behavioral school engagement and 12th grade academic outcomes.

The second phase of analyses under the first research question examined whether emotional and behavioral school engagement predicted school outcomes two and four years later (i.e., 10th and 12th grade). These analyses specifically examine: (a) the effect of 8th grade emotional and behavioral school engagement on 10th grade standardized test scores, controlling for 8th grade test scores and social background characteristics, (b) the effect of 10th grade emotional and behavioral school engagement on 12th grade GPA and test scores controlling for 10th grade standardized test scores and social background characteristics, and (c) the cumulative effects of 8th and 10th grade emotional and behavioral school engagement on 12th grade GPA and test scores, controlling for 8th grade GPA and social background characteristics.

8th Grade concurrent relationships

Table 5 presents estimates of the association between emotional and behavioral school engagement and GPA, reading, and math test scores in 8th grade. The coefficients for social background characteristics showed that gender, social class, and ethnic group differences contributed to significant differences in
academic outcomes. For example, girls had lower 8th grade GPAs than boys; and not surprisingly, family SES was positively associated with GPA. With the exception of Asian and Pacific Islander students, ethnic minority students had lower GPAs than white students. With background controls in place, both emotional (.13, p < .001) and behavioral (.26, p < .001) school engagement were significantly associated with 8th grade classroom performance.

A similar pattern was observed in the estimates for 8th grade reading test scores (Table 5, column 2). Boys had reading test scores that were more than a point and half lower than that of girls (-1.52, p < .001). And ethnic and racial minority students had 8th grade reading test scores that were lower than white students (although the coefficient for Hispanic students was not significant). The association between behavioral school engagement (1.23, p < .001) and 8th grade reading test scores was more than twice the size of the association between emotional school engagement (.61, p < .001) and reading scores.

The last column of Table 5 shows estimates for 8th grade math test scores. Family socioeconomic status had the largest association with math test scores, indicating that one standard deviation increase in family SES was associated with at least a five point increase in math test scores (5.31, p < .001). Math test scores were also significantly higher for Asian and Pacific Islander students (2.99, p < .001) than both white and other minority students. In particular, 8th grade math test scores were significantly below average for Black (-5.31, p < .001) and Native American students (-4.04, p < .001). As for school engagement,
behavioral school engagement was associated with a two point increase in math test scores (2.00, p < .001), while 8th grade emotional school engagement was associated with a much smaller change in math skills (.87, p < .001).

10th Grade concurrent relationships

Estimates of the concurrent association between emotional and behavioral school engagement and academic outcomes in 10th grade are presented in Table 6. The 10th grade concurrent associations were similar to those observed in the 8th grade. Estimates for 10th grade GPA are omitted because the data were not available. Controls for social background characteristics continued to be significantly associated with differences in math and reading test scores. Black, Hispanic, and Native American students had 10th reading test scores that were more than three and half points lower than white students; and math test scores were as much as six and half points lower. Gender differences were also significant. Boys had lower 10th grade reading test scores (-1.64, p < .001), but higher math test scores (1.04, p < .001) than girls. Family socioeconomic status had by far the largest, significant association with reading (4.35, p < .001) and math (6.21, p < .001) test scores.

Both emotional and behavioral school engagement were significantly associated with 10th grade reading and math standardized test scores. Once again, the association between behavioral school engagement and reading (1.39, p < .001) and math (2.63, p < .001) scores was higher than the associations for emotional school engagement. Overall, the effects of social background
characteristics on 10th grade math and reading scores were larger than the
significant effects of school engagement.

12th Grade concurrent relationships

Estimates of the associations between emotional and behavioral school
engagement in 12th grade revealed some interesting differences from the
previous models (see Table 7). The decline in sample size for the 12th grade
estimates were the result of fewer available data on 12th grade GPA.
Nevertheless, the results were similar to those observed in 8th and 10th grade. For
instance, under social background characteristics, family SES was still
significantly associated with reading (3.92, p < .001) and math (5.99, p <.001) test
scores. However, the association between SES and GPA was much smaller —
only .25 (p <.001), which suggests that at least by 12th grade, differences in
classroom performance associated with parents’ income and type of occupation
were reduced. As for gender differences, girls had slightly lower GPAs (-.17, p <
.001) and math scores (1.70, p < .001) than boys; and boys continued to have
lower 12th grade reading test scores than girls (-2.32, p < .001). Disparities in 12th
grade academic outcomes were largest for ethnic and racial groups differences.
Differences with whites in GPA were largest for Black (-.31, p < .001) and Native
American (-.34, p < .001) students. Similarly, Black and Native American
students tended to score the lowest on reading tests. And Black students had by
far the largest differential in 12th grade math skills (-7.29, p < .001).

Overall, the effects of 12th grade school engagement were significant but
generally modest compared to those of social background characteristics. For 12th grade GPA outcomes, the effect of emotional school engagement (.11, p < .001) in the same year was approximately half that of behavioral school engagement (.23, p < .001). The effects of emotional and behavioral school engagement on math and reading test scores were also significant, but only modest in magnitude. For example, liking one’s teachers and feeling connected to school was associated with only a 1.15 (p < .001) increase in reading test scores. As for math scores, classroom participation and effort on schoolwork helped students score at close two points above average in math skills (1.89, p < .001).

**Emotional and behavioral school engagement interactions**

To test the hypothesis that the effect of behavioral school engagement on academic outcomes was enhanced (or moderated) by emotional school engagement, interaction terms were created for emotional and behavioral school engagement at each grade level. Separate models were estimated for each grade level which included emotional and behavioral school engagement variables separately, background controls, and school engagement interaction terms. For each of the 8th, 10th, and 12th grade models, the effects of interactions between concurrent emotional and behavioral school engagement were small and not significant (results not shown here). Therefore, the results did not provide support for one of my main hypotheses that the effects of behavioral school engagement on school outcomes were moderated by the contribution of
emotional school engagement.

Summary

In sum, this first set of results provided some evidence that emotional and behavioral school engagement were significantly associated with academic outcomes across 8th, 10th, and 12th grade. On average, behavioral school had a larger association with classroom performance and test scores than emotional engagement, particularly in 8th and 10th grade. However, the effects for both emotional and behavioral school engagement were by and large overshadowed by gender differences, differences associated with family socioeconomic status, and ethnic/racial group differences.

Lagged-effects of Emotional and Behavioral School Engagement

Part two of research question one asks whether emotional and behavioral school engagement predicted subsequent academic outcomes. Thus far, there is scant evidence in the research literature that emotional and behavioral school engagement have any long-term effects on academic outcomes. The goal of these analyses was to determine whether prior levels of emotional and behavioral school engagement predicted academic performance across high school, over and above the effects of previous academic performance and individual background characteristics. The analyses were broken into three parts which estimated: (a) the effects of 8th grade emotional and behavioral school engagement on 10th grade standardized test scores, (b) the effects of 10th grade
emotional and behavioral school engagement on 12th grade GPA and test scores, and (c) the cumulative effect of 8th and 10th grade emotional and behavioral school engagement on 12th grade GPA and test scores.

As a result of controlling for prior academic performance and test scores, the estimates of lagged effects of prior achievement represent predicted changes scores in academic outcomes, instead of absolute scores. Thus, the following estimates represent how prior school engagement and academic outcomes predicted changes school outcomes between 8th and 10th grade, and 10th and 12th grade.

8th Grade lagged effects

How does 8th emotional and behavioral school engagement predict students’ 10th grade reading and math standardized test scores? The first set of lagged models estimated the effects of 8th grade emotional and behavioral school engagement on 10th grade reading and math test scores, controlling for both social background characteristics and 8th grade math and reading scores (see Table 8). Model 1 (column 1) shows estimates of the effects of school engagement and background characteristics on 10th grade reading scores. Variables for 10th grade emotional and behavioral school engagement were also included to assess the effect of 10th school engagement on 10th grade test scores relative to 8th grade school engagement. Model 2 (column 2) added controls for 8th grade reading and math test scores in order to assess the effect of prior test scores on 10th grade test scores, as well as the predicted change in reading test
scores between 8\textsuperscript{th} and 10\textsuperscript{th} grade associated with prior emotional and behavioral school engagement.

In the bottom half of Table 8, social background characteristics contributed significantly to differences in 10\textsuperscript{th} grade reading and math test scores over and above the effects of school engagement and prior academic performance. In particular, after controlling for prior performance, significant changes in math and reading test scores were predicted according to ethnic and racial group status. For example, the predicted changes in reading skills for Black (-1.82, \(p < .001\)), Hispanic (-1.03, \(p < .001\)), and Native American (-1.52, \(p < .001\)) students were by far larger than the effects predicted by 8\textsuperscript{th} or 10\textsuperscript{th} grade school engagement. The same was true for predicted changes in 10\textsuperscript{th} grade math scores. Similarly, family SES predicted larger and significant changes in reading (1.45, \(p < .001\)) and math (1.24, \(p < .001\)) skills between 8\textsuperscript{th} and 10\textsuperscript{th} grade.

According to column 2 in Table 8, emotional and behavioral school engagement in the 8\textsuperscript{th} grade predicted only modest changes in 10\textsuperscript{th} grade reading test scores. For example, 8\textsuperscript{th} grade behavioral school engagement predicted an increase in reading scores of (.28, \(p < .001\)). The predicted a change in 10\textsuperscript{th} grade reading scores associated with 8\textsuperscript{th} grade behavioral school engagement was (.82, \(p < .001\)). By comparison, 10\textsuperscript{th} grade emotional and behavioral school engagement predicted slightly larger changes in 10\textsuperscript{th} grade reading scores (.66, \(p < .001\) and .60, \(p < .001\) respectively).

Overall, the results under model 2 (column 2) for 10\textsuperscript{th} grade reading scores
indicated that a student’s behavioral engagement in school during 8th grade predicted only a modest but significant change in 10th grade reading test scores compared to 8th grade reading scores. However, the effect of both 8th and 10th grade school engagement were much smaller compared to the effects of social and family background characteristics. The fact that 8th grade behavioral school engagement continues to have a significant effect on 10th grade reading test scores even after controlling for 8th grade reading scores, suggests a potential mediating effect of 8th grade behavioral engagement. In other words, 10th grade reading test scores are function not only of 8th reading test scores, but also 8th grade behavioral school engagement.

The last two columns shows estimates for the effects of 8th grade school engagement on 10th grade math scores. Model 2 (column 4) shows that after controlling for 8th grade math test scores, feelings of connectedness to teachers and school in the 8th grade had a non-significant effect on 10th grade math scores. Only 8th grade behavioral school engagement predicted a modest change in 10th grade math scores (.60, p < .001). However its effect was still smaller that the effect of 8th grade math scores of (.94, p < .001). All in all, participating in class and doing one’s homework in the 8th grade was at best a modest predictor of change in math test scores between 8th and 10th grade.

10th Grade lagged effects

How do 10th grade emotional and behavioral school engagement predict academic outcomes in the 12th grade? Table 9 presents estimates of the effects of
10th grade school engagement on predicted changes 12th grade reading and math test scores. Social background characteristics again predicted significant differences in 12th grade reading and math test scores.

Under Model 2 (column 2) for 12th grade reading test scores, only 10th grade behavioral school engagement predicted a change in reading scores of (.44, p < .001) between 10th and 12th grade. By comparison, 10th grade reading scores predicted a change in 12th grade reading scores of .75 (p < .001). According to these estimates, 10th grade reading skills was a better of predictor of change in 12th grade reading scores, than the amount of effort students committed to schoolwork during 10th grade.

The last two columns of Table 9 present estimates for the effects of school engagement on 12th grade math test scores. Model 2 (column 4) shows that participating in school and doing classwork predicted a change in 12th grade math skills on the order of .55 (p < .001), which was larger than the effect of 12th grade emotional and behavioral school engagement (.40, p < .001 and .28, p < .05 respectively). However, an average score on 10th grade math test scores predicted a predicted change in 12th grade math skills of .89 (p < .001), which was larger than the effects for school engagement. Most notably, controlling for 10th grade math test scores changed the sign of the effect for Native American students from negative to positive. In other words, the effect of 10th grade math test scores in predicting 12th grade math scores was large and significant for Native American students, which suggests that students from this particular
ethnic group displayed significant gains in math skills and learning between 10th and 12th grade. Overall, students’ performance in prior math standardized tests was a better predictor of 12th grade math scores relative to prior school engagement; although 10th grade behavioral school also contributed modestly to changes in 12th grade math skills.

Table 10 presents estimates of the effects of 10th grade school engagement on 12th grade GPA. Under Model 2 (column 2) students’ perceptions of connectedness to teachers and participating in schoolwork were both significant, albeit modest predictors of change in 12th grade GPA. Behavioral school engagement had a larger effect than emotional school engagement. The effects of 10th grade school engagement were overshadowed by the effect of classroom performance as far back as 8th grade. While feeling connected to school and engaging in schoolwork during 10th grade predicted a change of .01 (p < .001) and .11 (p < .001) on 12th grade math scores, getting good grades in 8th grade was a better predictor of GPA four years later (.49, p < .001). In fact, academic performance in 8th grade had a larger effect on 12th grade GPA than any of the controls for social background characteristics. This suggests that doing well in schoolwork is a vital factor that helps students maintain grades and classroom performance throughout high school.

8th and 10th Grade cumulative effects

In the final set of analyses under question one, I examined the cumulative effects of 8th, 10th, and 12th grade emotional and behavioral school engagement in
predicting 12th grade academic outcomes. These estimates are presented in Tables 11 and 12. The bottom half of Tables 11 and 12 indicate ethnic group differences in 12th grade GPA, math, and reading test scores largely disappeared after controlling for prior academic performance and test scores, especially for Hispanic and Native American students. It seems that over the long run, differences in students’ 12th grade GPA had more to with prior levels of school engagement and school academic performance over the course of high school — than whether or not a student comes from a certain ethnic or racial group.

Gender and family socioeconomic status predicted differences in academic outcomes in ways similar to those observed for 8th and 10th grade outcomes. According to Model 2 (column 2), only school engagement during 10th and 12th grade predicted significant change in 12th grade reading scores throughout high school. Emotional school engagement effects ranged from .42 to .46 (p < .001), while behavioral school effects ranged from .38 to .57 (p < .001). However, each of these effects were small compared to the effect of controlling for 8th grade reading test scores. A change in 8th reading test scores of plus or minus one standard deviation predicted a change of less than a point in 12th grade reading scores (.75, p < .001). Controlling for 8th grade reading test scores dramatically altered both the direction and the size of the effect of ethnic group membership among Asian and Pacific Islander students on 12th grade reading test scores. In other words, accounting for previous performance on standardized reading test scores attenuated any disadvantages that Asian and Pacific Islander students
may have had on 12\textsuperscript{th} grade reading test scores that may have been attributed to their ethnic background. So while cumulative school engagement over the course of high school contributed to changes on reading skills by 12\textsuperscript{th} grade, past performance in reading tests was a more reliable predictor of changes standardized reading test scores.

For 12\textsuperscript{th} grade math scores (Table 11, column 4), 10\textsuperscript{th} grade behavioral school engagement had the largest effects on predicting 12\textsuperscript{th} grade math scores, over above the effects of controlling for math test scores as far back as 8\textsuperscript{th} grade. That is to say, the degree of class participation and effort that students' expended on their schoolwork during 10\textsuperscript{th} grade, on average, predicted a change in their 12\textsuperscript{th} grade math scores by more than a full point (1.11, p < .001). This was larger than the effect of 8\textsuperscript{th} grade math test scores (.85, p < .001). This particular set of estimates suggest that 10\textsuperscript{th} grade behavioral school engagement was the most critical factor in predicting how students performed on standardized tests of math during 12\textsuperscript{th} grade. A possible inference is that math skills learned in 10\textsuperscript{th} grade may have been especially applicable or transferable to the math skills needed in the 12\textsuperscript{th} grade; and that students who did well in math during 10\textsuperscript{th} grade were learning critical skills for later math applications.

Table 12 presents estimates of the cumulative effects of school engagement on 12\textsuperscript{th} grade GPA. Model 2 (column 2) shows that of the two school engagement measures, behavioral school engagement in 10\textsuperscript{th} and 12\textsuperscript{th} grade contributed the most in terms of predicting change in 12\textsuperscript{th} GPA. In other words,
the work and efforts that students committed to their schoolwork in 10th and 12th grade contributed to a .13 (p < .001) change in their GPA from 8th to 12th grade. However, controlling for 8th grade GPA had an even larger role in predicting 12th grade classroom performance by nearly half a point (.48, p < .001). Once again, consistent classroom performance throughout high school was the largest single predictor of the change in students GPA by the time they reached their senior year. The sign change from positive to negative in the effect of 8th grade emotional school engagement on 12th grade school outcomes was the result of a ceiling effect (Please see Appendix B for a detailed discussion).

Summary

The overall objective of the first research question was to determine whether emotional and behavioral school engagement mattered for academic achievement and cumulative skills in math and reading. These results provide positive evidence that in general emotional and behavioral school engagement mattered for academic outcomes. More specifically, behavioral school engagement was a consistent predictor of changes in subsequent achievement over and above the effects of prior achievement and skills. In addition, the effects of behavioral school engagement persisted over time and contributed to achievement outcomes later in high school. The cumulative effects of emotional and behavioral school engagement were larger for standardized test scores than for GPA. But prior academic performance and test scores were by far better predictors of long term academic outcomes than either behavioral or emotional
school engagement. Moreover, the effects of prior behavioral school engagement remained significant even after accounting for the effect of prior academic performance, which suggests that behavioral school engagement is a potential mediator of the effect of prior academic performance on subsequent achievement. However, the effect of emotional school engagement on later school outcomes was essentially erased after accounting for prior academic achievement.

Reciprocal Associations Between Emotional and Behavioral School Engagement

The second research question asked: Does emotional school engagement predict behavioral school engagement; and does behavioral school engagement predict emotional school engagement? The following analyses examined whether between emotional and behavioral school engagement were characterized by a reciprocal relationship. The analyses were conducted in three parts which estimated, (a) the effect of 8th grade emotional school engagement on 10th grade behavioral school engagement, as well the effect of 8th grade behavioral school engagement on 10th grade emotional school engagement; (b) the effect 10th grade emotional school engagement on 12th grade behavioral school engagement, and vice versa; and (c) the cumulative effects of 8th and 10th emotional school engagement on 12th grade behavioral school engagement, and the cumulative effects of 8th and 10th grade behavioral school engagement on 12th grade emotional school engagement. Each analysis controlled for prior school
achievement in order to account for the possibility that school engagement was also associated with prior academic achievement, in addition to prior school engagement.

These analyses are also important for assessing the order in which the linkages between emotional and behavioral school engagement and academic achievement operate. In other words, they can help us understand whether bonding with teachers and sense of connectedness to school predicts participation and effort toward schoolwork, which in turn predicts academic outcomes (i.e., attitudes precede behaviors). Or, whether doing well in school predicts emotional engagement in school, which then predicts or reinforces behavioral engagement in school (i.e., behaviors precede attitudes). Or, whether expending effort on schoolwork leads to good academic performance, which then predicts feelings of connectedness and bonding to teachers and school (i.e., behaviors predict grades which in turn predict attitudes). For reasons both theoretical and practical, it is important to understand the order in which these factors are related, because we can better understand the processes by which students learn as well as the factors that help drive both attitudes and behaviors related to learning.

8th and 10th Grade reciprocal associations

Is 10th grade emotional school engagement predicted by 8th grade behavioral school engagement? Table 13 presents estimates of the effects of 8th grade school engagement on 10th grade school engagement. In the first two
models (columns 1 and 2), 10th grade emotional school engagement was estimated as the outcome variable. Columns 3 and 4 modeled 10th grade behavioral school engagement as the outcome.

With respect to social background characteristics, family SES was positively associated with both emotional and behavioral school engagement in 10th grade. Ethnic and minority group status also significantly predicted emotional school engagement in 10th grade. However, only Asian/Pacific Islander students were rated as behaviorally engaged in school in 10th grade (.18, p < .001). Black and Native American students in particular were rated by teachers as less engaged in school (-.20, p < .001 and -.37, p < .001 respectively). These particular estimates appear to be consistent with Mickelson’s (1990) observation regarding an attitude-behavior paradox that racial and ethnic minority students tend to report positive attitudes toward education, but low behavioral engagement in schoolwork.

Controlling for 8th grade GPA (Model 2, column 2), 8th grade behavioral school engagement did not predict 10th grade emotional engagement. Instead, emotional school engagement at 10th grade was predicted by 8th grade emotional school engagement (.99, p < .001) and 8th grade school performance (.29, p < .001). These imply that bonding with teachers and feeling connected to school in 10th grade was associated significantly with feelings of connectedness in 8th grade and the grades a student received as an 8th grader.

In columns 3 and 4 of Table 13, 10th grade behavioral school engagement
was predicted by both emotional (.04, p < .001) and behavioral (.23, p < .001) school engagement. However, effort and engagement in schoolwork was predicted most by 8th grade academic performance (.35, p < .001). Therefore, students’ degree of participation and engagement in schoolwork at 10th grade was predicted by how well they performed in class and the effort and work they put into their studies as 8th graders. Although the size of these effects are modest at best, they provide some evidence that behavioral school engagement and academic performance are mutually reinforcing. If students do their schoolwork, they increase their likelihood of getting good grades. Getting good grades in turn encourage students to continue devoting effort into their schoolwork.

10th and 12th Grade reciprocal associations

Does 10th grade school engagement predict 12th grade engagement? Under column 2 of Table 14, 12th grade emotional school engagement was predicted most by 10th grade emotional school engagement (.64, p < .001). Behavioral school engagement in 10th grade (.07, p < .05) was a very modest—almost negligible predictor of 12th grade emotional school engagement. More importantly, 8th grade prior academic performance had a non-significant contribution to feelings of connectedness at 12th grade. In addition, with the exception of family SES, social background characteristics no longer contributed significantly to differences in 12th grade emotional school engagement. In all, these results suggest that feeling a sense of emotional school connectedness was predicted almost exclusively by feelings of connectedness and engagement in
As for 12th grade behavioral school engagement (columns 3 and 4), the amount of effort and work directed toward schoolwork as a senior was predicted by both emotional (.11, p < .001) and behavioral (.25, p < .001) school engagement in 10th grade, as well as 8th grade classroom performance (.23, p < .001). Roughly speaking, students who performed well in school as 8th graders, and who were emotionally and behaviorally engaged in school as 10th graders maintained a high level of behavioral engagement in school as seniors. However, it is important to note that with a range of 1 to 8, the intercept for 12th grade behavioral school engagement is high, which suggests that the students included in the analysis were highly engaged in school to begin with.

**8th and 10th Grade cumulative effects**

Lastly, Table 15 presents estimates of the cumulative effects of 8th and 10th grade behavioral school engagement effects on 12th grade school engagement. First, the effect of social demographic characteristics on 12th grade school engagement outcomes virtually disappeared relative to the cumulative effects of emotional and behavioral school engagement. In other words, over the long term, school engagement attitudes and behaviors were predicted primarily by school-related factors (i.e., engagement and academic performance) rather than by individual and social background differences.

Model 2 (column 2) illustrates that over the course of high school, 12th grade emotional school engagement was predicted primarily by prior emotional
engagement in 8th (.25, p < .001) and 10th grade grades (.53, p < .001). Prior
school performance also contributed as a predictor of 12th grade emotional school
connectedness, however, 8th grade school performance actually had a significant
but negative associations with emotional school engagement.

In Model 2 (column 4), 12th grade behavioral school engagement was
predicted by primarily by 8th grade (.16, p < .001) and 10th grade behavioral
school engagement. Emotional school engagement in 10th grade had a somewhat
significant but overall weak effect on senior year behavioral engagement. But
overall, 12th grade academic performance had by far the largest, significant effect
on 12th grade behavioral school engagement than any of the cumulative school
engagement variables. Therefore, in senior year, a period which is notorious for
declines in school engagement in general, the students were behaviorally
engaged in school had developed the practice of doing schoolwork throughout
8th and 10th grade. Connectedness and engagement with teachers had small
effects on the persistence of behavioral engagement, but prior school academic
performance made a significant contribution of overall behavioral school
engagement.

Summary

These analyses set out to determine if emotional and behavioral school
engagement were characterized by a reciprocal relationship. The current results
provide little evidence that emotional and behavioral school engagement were
reciprocally associated. Emotional school engagement was predicted almost
exclusively by prior levels of emotional connectedness to teachers and school in 8th and 10th grade. Behavioral school engagement had little or no impact on predicting subsequent levels of emotional school engagement. In more basic terms, students’ participation in learning was predicted largely by previous school participation and involvement, even after controlling for previous school performance. Emotional engagement with teachers made a somewhat large contribution to academic effort in the latter years of high school. On the other end, feeling engaged and connected with teachers was primarily a function of previous feelings of engagement and classroom performance. And it was clear that prior levels of academic performance in school contributed significantly to later levels of school engagement.
CHAPTER V

DISCUSSION

This discussion chapter is divided into four sections. The first section summarizes the key findings of this study with respect to the effects of emotional and behavioral school engagement on high school academic outcomes. The second section discusses the relevance of these findings for the extant empirical and theoretical literature on school engagement. The third section discusses the limitations of the present investigation, as well as some of the implications that the current results may have for future studies of school engagement. Lastly, the fourth section discusses some of the potential the practical and policy implications of school engagement for teaching and education.

Summary of Key Findings

An innovative aspect of this investigation was the effort to examine two distinct aspects or dimensions of the larger concept of school engagement: emotional and behavioral school engagement. To date, few studies have explicitly examined these two components are associated with academic outcomes. Indeed, the conceptual meaning of emotional behavioral school engagement are still somewhat unclear. Therefore, I present first a brief discussion of how this study operationalized and defined emotional and behavioral school engagement. And then I turn to some of the descriptive results
shed some light as to how these constructs functioned in this analysis as well as
the validity and reliability of emotional and behavioral school engagement.

Emotional school engagement was defined and measured as an indicator
of students’ sense of bonding and connectedness with teachers and their school.
To be more specific, this construct assessed the extent to which students felt that
their teachers cared about them and their education, and whether they felt
appreciated and respected by teachers.

Behavioral school engagement was defined as the degree of preparedness,
participation, and effort that students directed toward their schoolwork. Unlike
emotional school engagement, behavioral school engagement was measured
using teachers’ evaluations of students’ behavioral engagement and assessed
how prepared students were for class in terms of bringing appropriate materials
to class, whether they completed their assignments, and whether or not they
were attentive or disruptive in class.

Although item and scale reliabilities were adequate, results from
preliminary descriptive analyses showed that the emotional and behavioral
school engagement measures had weak to modest stability in the data. More
specifically, the correlation between the emotional school engagement measures
across 8th, 10th, and 12th grade ranged only from (.27 to .41). The correlation
between the behavioral school engagement measures were similarly weak,
ranging from (.23 to .27). These low correlations were an indication that the
measures of emotional and behavioral engagement were not very stable and that
students’ responses to these items varied a great deal between 8th, 10th, and 12th grade. This suggests that on average, students’ perceptions of connectedness with teachers, and teachers’ assessment of behavioral student engagement may have been relatively stable. However, at the person level, individual perceptions of connectedness to teachers, and teacher assessments of student behavioral engagement differed significant between 8th and 10th grade, and 10th and 12th grade.

The zero-order correlations between school engagement and academic outcomes were also weak and did not exceed (.40). The correlations between emotional school engagement and standardized test scores were particularly weak (e.g., .22 or less), and indicated that student-teacher connectedness had little association with how students performed on objective tests of cumulative learning in math and reading. This was not surprising because we would expect that the degree of closeness or connection between students and teachers would have greater bearing on how students performed in the classroom. However, the correlations between emotional school engagement and classroom performance (i.e., GPA) were also weak. Therefore, these preliminary raise the strong possibility that the quality of the student-teacher relationship may have no direct association with academic outcomes, or that its association operates more indirectly through the effects of behavioral school engagement.

The correlations between behavioral school engagement and academic outcomes were also weak to modest in magnitude. The largest association
between behavioral engagement and school performance was (.40) for 8th grade GPA and 8th grade behavioral school engagement. Thus, it appears that even the extent of effort and participation that students committed to schoolwork was not strongly associated with how they performed in school.

**Emotional and behavioral school engagement and academic outcomes**

My first objective was to examine the extent to which emotional and behavioral school engagement mattered for school outcomes—within and across grade levels. In cross-sectional analyses, emotional and behavioral school engagement were significantly associated with students’ classroom performance (i.e., GPA), and standardized tests of reading and math skills in 8th, 10th, and 12th grade. However, while the effects were statistically significant the size of these effects were modest and small compared to the effects of controls for social and demographic characteristics such as gender differences, family income and parental occupation, and racial/ethnic group differences. Moreover, interactions terms between emotional and behavioral school engagement were small and non-significant, thereby providing little or no evidence that one dimension of school engagement (i.e., emotional school engagement) moderated or contributed to the effect of the other form of engagement (i.e., behavioral engagement) on academic outcomes. This in particular seems to suggest that the combined effect of emotional and behavioral engagement in school does not have an appreciably larger effect on school outcomes, than either form of school
engagement alone.

Analyses of lagged-effects of school engagement between grade levels showed that emotional and behavioral school engagement significantly predicted change in academic outcomes between grades. More specifically, emotional and behavioral school engagement in the 8th grade predicted the amount of change reading and math test scores between 8th and 10th grade. That is, students’ behavioral and emotional engagement in the 8th grade was associated with the change in students’ math and reading test scores between 8th and 10th grade. Similarly, 10th grade emotional and behavioral school engagement predicted change scores in GPA, and reading and math skills between 10th and 12th grade, even after controlling for the effects of 10th grade school performance. However, the effort and work that students put into their schoolwork was a better predictor of changes in academic outcomes than feelings or perceptions of connectedness with teachers.

In addition to the main effects of emotional and behavioral school engagement, previous school performance and social background characteristics (i.e., gender, ethnic, and social class differences) were significant predictors of school outcomes as well. In fact, prior academic performance such as 8th grade GPA and 8th grade standardized test scores had significant effects on academic outcomes in 10th and 12th grade that were generally larger than the effects of emotional and behavioral school engagement in the same years.

Nevertheless, the first set of results showed that emotional and behavioral
school engagement contributed significantly to students’ classroom performance and scores on standardized tests of cumulative learning in math and reading. Despite variations in the effects of emotional and behavioral school engagement, my results still showed that both dimensions of school engagement matter for academic performance, and that their effects persisted over time—even after accounting for previous school performance and differences associated with gender, ethnicity, and social class.

The Effects of behavioral school engagement

Overall, behavioral school engagement consistently predicted changes in both GPA and standardized test scores across all grades. This confirmed the basic notion that students performed well in school when they attended classes regularly, came prepared with the necessary materials, participated in class, and completed their assignments.

The effects of behavioral school engagement were significant for both high school GPA and standardized test scores, which are two different indicators of learning and education. Grades and grade point averages reflect the regular efforts that students apply to their schoolwork in terms of completing homework assignments, taking in-class quizzes and exams, and completing class projects. Therefore, it was not surprising that behavioral effort and engagement in schoolwork was associated with changes in grades and GPA.

Indicators of standardized test scores, on the other hand, are objective single point-in-time assessments of a student’s cumulative skills and learning in
math or reading. The significant association between test scores and behavioral school engagement demonstrates that when students committed their efforts in class, they were also gaining the knowledge and learning the skills that would also help them perform well on tests that gauged their cumulative knowledge of math and reading. The key distinction worth emphasizing is that the effect of behavioral engagement on grades represents the association between working hard in class and getting grades. Whereas the effects of behavioral engagement on test scores represents the association between behavioral effort or commitment and learning, which are two distinctly different relationships. From this perspective, behavioral school engagement represents an important link between two different types or indicators educational outcomes. Behavioral school engagement helped students get good grades in class. It also helped them attain the skills that were necessary for learning cumulative and more complex learning skills in later grades and other subjects.

Only controls for prior academic performance had effects stronger than behavioral school engagement on academic outcomes. However, even after controls of prior achievement were accounted for, the effects of behavioral school engagement did not disappear. This is meaningful evidence that behavioral school engagement is a moderator of the relationship between prior school performance and subsequent school performance. In other words, getting good grades or test scores in the 10th grade was not solely a function of a students’ grades and test scores in 8th grade, but also a function of whether or not they
were doing their homework, completing their assignments, and coming to class in prior grades.

This study’s findings are consistent with results from previous studies that found modest to strong effects of behavioral school engagement on classroom grades and academic test scores (Connell et al., 1994; Connell et al., 1995; Finn & Rock, 1997; Lee & Smith, 1995; Marks, 2000). However, whereas previous studies relied on student self-report measures of behavioral engagement, this study utilized teachers’ reports of student participation and involvement in school. Teacher reports of behavioral school engagement are more objective measures of student school involvement which helped reduce some of the potential biases that can be associated with using student reports of their own behavioral engagement.

Although this study did not specifically examine between group differences in school engagement, there was ample evidence that the association between emotional and behavioral school engagement differed by gender, as well as across racial groups and socioeconomic status. The association between behavioral school engagement and math ability was stronger and more consistent with boys than with girls, which parallels Marks’ (2000) findings that boys were more engaged in math classes, and that girls more engaged in social studies and English classes.

The Effects of emotional school engagement

For the most part, emotional school engagement had weak effects on
academic outcomes, relative to the effects behavioral school engagement and prior academic achievement. While emotional school engagement was significantly associated with grades and test scores in cross-sectional analyses, the effects of prior school connectedness on subsequent academic outcomes were nullified after controlling for prior academic achievement. Moreover, unlike behavioral school engagement, emotional school engagement appeared to have little or no effect on predicting long term changes in grades or test scores. In addition, in almost all of the analyses the effects of social and demographic background characteristics contributed significantly toward differences in grades and test scores.

Emotional school engagement made its largest contribution to concurrent school outcomes, which suggests that the effect of feeling a bond or connection with a teacher on school outcomes is short-term and largely limited in terms of being context-specific. In other words, an emotional sense of connectedness to teachers was limited to the immediate relationship the student and teacher at a given point in time. Once a student moves on to another class and to other teachers, feelings of teacher connectedness did not carry over to other grades and with other teachers. Moreover, the limited effects of emotional school engagement suggest that it is a relationship-specific construct and that even if a student had a strong bond or connection with a teacher in the 8th grade, there was little evidence that this relationship made it easier to bond with other teachers in other subjects and in other grades.
The Relationship between emotional and behavioral school engagement

The second objective examined whether a reciprocal relationship existed between emotional and behavioral school engagement. The second set of analyses estimated the extent to which emotional school engagement predicted behavioral school engagement and vice versa. The findings provided partial support for the hypothesis of reciprocal association.

**Emotional school engagement and behavioral engagement**

First, previous emotional school engagement was a minor predictor of subsequent behavioral school engagement. That is, students’ sense of connectedness to teachers in the 8th grade had a small effect on academic effort and school participation in 10th grade. This effect was also minor compared to the effects of previous behavioral school engagement and prior academic achievement.

Similarly, 10th grade emotional school engagement had a slight but significant effect on predicting changes in 12th grade behavioral school engagement. But again, its effect was smaller than the effects of 10th grade behavioral school engagement and 8th grade GPA. For the most part, prior emotional school engagement was most effective in predicting changes in emotional school engagement two years later. The general conclusion was that the bond or connection between students and teachers contributed little to the academic efforts students expended on schoolwork in later grades.
Moreover, these results also ruled out, at least for these findings, the possibility that behavioral school engagement followed emotional school engagement. In other words, regardless of the kind of relationship students had with prior teachers, those relationships had little to do with whether they expended effort on their schoolwork. This can be interpreted as both a positive or negative process because, if a student has a poor relationship or is unable to establish a connection with a teacher in 8th grade, it does not mean that the poor quality of that relationship will negatively affect the student behavioral engagement in say the 9th or 10th grade.

However, process can go the other way. We cannot predict that a student will be behaviorally engaged in school during the 12th grade, based upon a positive relationship with teachers in the 8th or 10th grade. Overall, the results suggested that past academic performance and prior behavioral engagement were better predictors of subsequent behavioral engagement.

**Behavioral school engagement and emotional engagement**

The second set of findings showed that prior effort and participation in schoolwork did not predict changes in subsequent perceptions of connectedness with teachers and school. In general, emotional school engagement was predicted primarily by prior emotional engagement which means that attitudes or feelings of connectedness with teacher were not preceded by the efforts students put into schoolwork in prior years. In the 8th to 10th grade and cumulative effects models, prior academic performance contributed to changes
in subsequent emotional school engagement, which means that feelings of connectedness to teachers was predicted by how well (or how poorly) students performed in school previously.

However, the results can only be interpreted in the extent to which prior performance predicted changes in engagement attitudes. More specifically, we cannot infer that positive academic performance in the 8th grade necessarily predicts positive (or negative) feelings of connectedness with teachers in 10th grade. Rather, prior achievement predicted changes in emotional engagement. Whether the changes in emotional engagement are positive or negative would also depend upon prior levels of emotional school engagement as well.

**Implications for conceptual frameworks of school engagement**

Newmann model of school engagement

The conceptual model of school engagement laid out by Newmann et al. (1992) is one of the more comprehensive frameworks for school engagement that has been presented in the literature thus far. At its core are the emotional and psychological factors that Newmann and his colleagues believe are responsible for fostering students’ sense of psychological investment and interest in learning and education.

In this study, emotional school engagement or the sense of bonding and connectedness between students and teachers was the construct that most closely captured the conceptual meaning behind Newmann’s model of school
engagement – insofar as the notion that a close student-teacher relationship reflected a student’s sense of psychological and emotional engagement in school.

In my investigation, I had set out to demonstrate that the general concept of school engagement is composed of both an emotional and behavioral dimension. And in order to better understand the association between school engagement and academic outcomes, we need to conceptualize and model school engagement in terms of these two basic components, and examine how each concurrently affects school outcomes.

The present results indicate that overall, emotional school engagement had weak to modest effects toward academic outcomes. Although this study investigated both the emotional and behavioral school engagement components, there was little evidence linking both of these dimensions in terms of a combined contribution to school outcomes. The lack of any interaction effects between emotional and behavioral school engagement did not provide support for one of my main hypotheses that the effect of behavioral school engagement on school outcomes was enhanced by the contribution of emotional school engagement.

Therefore, this study concludes that at least with respect to school outcomes, emotional school engagement makes a modest contribution at best to academic achievement. One might surmise from these results that emotional school engagement plays a less direct or influential role on school outcomes; or that perhaps the emotional connectedness between students and teachers serves an entirely different role in education. It may be that emotional school
engagement may play a more integral role in terms of keeping students in
school, as a preventative mechanism against feelings of isolation, or reducing the
risk of dropping out of school (Connell et al., 1994; Connell et al., 1995; Finn,
1993; Finn & Rock, 1997). Overall, more research is needed in order to clarify the
definition of emotional school engagement and develop better and more
appropriate measures that capture students’ emotional and psychological
interest or attachment to school.

Self-systems process model

The findings from this study also did not coincide with some of the
elements advanced by Connell and his colleagues in their self-systems process
model (Connell et al., 1994; Connell et al., 1995; Skinner et al., 1990). The model
posits that when students receive positive support and reinforcement from
significant adults, it reinforces their academic self-efficacy beliefs and motivates
them to be more engaged in school. Positive school engagement then culminates
in greater effort and better school outcomes.

The weak effects of emotional school engagement that I had observed are
not consistent with the assertion in the self-systems model that positive
relationships with key adults—in this case teachers, was associated with school
engagement behaviors or school outcomes. And whereas the self-systems model
was tested using cross-sectional data, my investigation examined these links
using longitudinal data and found little evidence of long term effects of
emotional connectedness with teachers.
In addition, the self-systems process model was applied to studies of low-income minority adolescents who were at risk for educational underachievement and failure. This investigation, using a larger and more heterogeneous sample of high school students suggests that the effects of emotional school engagement may not generalize to high school students more broadly.

However, the framework of this study did not incorporate larger features of the self-systems process model, namely students’ beliefs and perceptions of ability and academic self-efficacy. In fact, incorporating measures of academic beliefs and academic self-efficacy may help answer why emotional school engagement had weak effects on academic outcomes. It may be that student-teacher connectedness may differ for students depending upon differences related to perceptions and beliefs of academic self-efficacy. In other words, students with lower perceptions of academic ability may be less likely to establish a positive connection or relationship with teachers. Conversely, it may be that students who possess higher self-efficacy beliefs may feel that they do not need to establish a close relationship with teachers. Students with strong beliefs in their academic abilities could be well-involved in school and get good grades. As a result, they might not feel the need to have a close relationship with a teacher.

**Attitude-behavior paradox**

This investigation of emotional and behavioral school engagement was motivated in part by Mickelson’s (1990) study of an attitude-behavior paradox
among low-income African-American adolescents; and in particular her argument regarding the dual nature of students’ attitudes and behaviors towards school and education. Mickelson used her framework to explain differences in academic achievement for economically and educationally disadvantaged African-American students. Rather than pursue evidence of a dialectical tension or paradox between school engagement attitudes and behaviors, my investigation sought to take closer look at the nature of the relationship between school engagement attitudes and behaviors. This was the objective of the second research question which examined whether emotional and behavioral school engagement were associated by a reciprocal relationship.

There was little evidence in the present findings that emotional and behavioral school engagement were associated by a mutually reciprocal relationship. Prior behavioral school engagement did have large effects on subsequent emotional school engagement; nor was prior emotional school engagement a significant predictor of subsequent behavioral engagement. The results do not explicitly indicate a paradox or contradiction between school engagement attitudes and behaviors per se, but rather the lack of strong reciprocal association between them in general.

However, the findings also showed that this association differed significantly along social background characteristics—namely race and family socioeconomic status. More specifically, the positive association between emotional and behavioral school engagement was disproportionately skewed
toward adolescents from families with higher incomes and parents with more education.

Moreover, there was some evidence of a paradox between emotional and behavioral school engagement for certain ethnic and racial groups. For example, African-American, Hispanic, and Native-American students had higher emotional school engagement scores in the 10th grade, indicating a positive emotional connectedness toward teachers. However, behavioral school engagement scores in the same year were lower for students from those same ethnic groups even after controlling for prior classroom performance.

The dichotomy between emotional and behavioral school engagement indicates that students from some minority groups may have liked their teachers, however this positive relationship had little or no bearing on their involvement and engagement in schoolwork. One could infer from these results that the dichotomy between emotional and behavioral school engagement is somewhat akin to the paradox Mickelson (1990) observed among low-income African-American adolescents with regard to positive ideological attitudes toward education, but negative or more pessimistic beliefs of the long-term benefits of education.

The concrete beliefs that Mickelson cited as the reasons why low-income African-Americans expended little effort in school was associated beliefs and experiences related to poverty and racial discrimination. However, in order to establish whether low school involvement and behavioral engagement is
associated with students’ attitudes toward social and opportunity structures, both measures would have to be incorporated into an empirical investigation. In addition, the relationship between behavioral engagement and opportunity beliefs would also have to control for the effects of students’ academic abilities and prior school performance in order to rule out the possibility that some students may be less engaged in school because existing academic difficulties or disadvantages.

Oppositional culture beliefs

This investigation of the association between school engagement attitudes and behaviors has some potentially important, although limited implications for a related line of research that focuses on the theory of oppositional cultural beliefs and whether low-income African-American students are discouraged from performing well in school by fellow black students, and whether these beliefs contribute to the achievement gap between White and African-American students.

Previously, evidence of oppositional culture beliefs came largely from ethnographic studies. Recent empirical investigations have used data from the NELS:1988 database to test whether evidence of oppositional education beliefs can be found using survey data (Ainsworth-Darnell & Downey, 1998; Cook & Ludwig, 1997, 1998). These studies found little evidence oppositional culture beliefs among a more general population of African-American high school sophomores. In fact, they have argued that African-American students have
largely more positive pro-education attitudes than students from other racial and ethnic groups, including whites. The indicators of educational attitudes they used included items such as educational opportunity beliefs, educational expectations, peers’ perceptions of educational effort, and occupational expectations. However, these positive educational attitudes were not consistent with lower scores on educational behaviors and habits such as time spent on homework and school attendance.

These authors have argued that the lack of negative attitudes toward schooling among African-American students suggests that oppositional culture beliefs are not as common as proponents of the theory have come to believe; and have questioned its utility in trying to explain the achievement gap among low-income African-American adolescents.

However, others have countered that the measures of school-related attitudes used in studies critical of oppositional culture theory are not adequately captured using data from the NELS:88 database. More specifically, apart from measures of educational expectations, occupational expectations, perceptions of future opportunities, and general feelings toward education, a thorough investigation of oppositional cultural beliefs has to include direct assessments of educational beliefs and perceptions of peers from both the same and different ethnic and racial groups. Moreover, direct measures of the influences of peer perceptions on individual beliefs are also necessary (Farkas, Lleras, & Maczuga, 2002; Ferguson, 1998).
Although this investigation did not explicitly address the issue of oppositional culture beliefs, some of the findings contradict certain assertions made by studies critical of the oppositional culture hypothesis. For example, while Ainsworth-Darnell and Downey (1998) showed that school attitudes mattered for academic outcomes in their cross-sectional analyses, my results showed that in longitudinal analyses, the effects of positive school attitudes were not significant relative to previous academic performance and school engagement behaviors. In addition, while previous studies indicate that African-American and white adolescents showed no significant differences in school-related behaviors using student self-report measures, my investigation which used teacher reported ratings of behavioral engagement, found significant differences in education behaviors between racial and ethnic groups. While these results do not argue specifically for or against the existence of oppositional culture beliefs, they do suggest that differences in the relationship between school engagement attitudes and behaviors were apparent across student race and ethnicity; and that variations in the relationship between attitudes and behaviors may be one of the possible contributors to differences in academic performance.

Limitations of this Study

This section discusses the limitations of this investigation and presents some of the issues and questions that have arisen from these findings. The first
part will discuss in some detail, further efforts that should be devoted to clarifying the conceptual definition and measurement of school engagement, and in particular emotional school engagement. The second part of this section will discuss the limitations of this study in terms of unobserved heterogeneity and other factors that were not incorporated in the design that may be associated with the effects of emotional and behavioral school engagement on school outcomes.

Clarifying concepts of school engagement

The construct of emotional school engagement as it was measured here, suffered from a low degree of stability across the three periods of assessment. Moreover, emotional school engagement had generally weak effects on academic outcomes, and its correlation with behavioral school engagement was weak as well. Therefore, these results raise two key issues particularly about emotional school engagement.

First, we need to further clarify our definition and conceptualization of emotional school engagement. More empirical research needs to be conducted that will identify the key components (or subcomponents) of emotional school engagement. And we need to develop tools that will help us measure emotional school engagement better than the ones that are currently available. Some of these issues are also relevant for behavioral school engagement, but this discussion will focus primarily on emotional school engagement because of its comparatively weaker effects.
Based on the current results, defining and operationalizing emotional school engagement in terms of students’ perceptions of connectedness to teachers and school, was inadequate—insofar as its effects on academic outcomes was concerned. If we are to pursue further efforts to understand whether emotional school engagement matters for school outcomes, we need to clarify what it means and explore whether there other factors associated with the emotional or psychological investment in learning that may matter for school outcomes.

The results which showed that prior emotional school engagement had weak effects on school outcomes, after controlling for prior behavioral engagement and prior achievement, suggests that whether or not students like or have positive opinions about their teachers, had little relevance for their academic performance. This raises some key questions about how emotional school engagement operates. For example, if a student felt a close connection with his math teacher in the 8th grade, and he received poor math grades in 10th grade, it could be that he liked his 8th grade math teacher because she was a nice instructor who demanded little in terms of commitment and effort to schoolwork. Therefore, he did poorly in 10th grade math, because his 10th grade instructor was more demanding than his previous math instructor in 8th grade, and he was unable to meet those new demands.

This scenario highlights the fact that emotional school engagement cannot be solely measured in terms of the student-teacher relationship or whether a
students like their teachers, because the basis for that evaluation may vary in association with the teaching habits and characteristics of both students and teachers. For example, some students may like a teacher because the instructor is lenient or non-demanding. Other students may like a teacher because she is demanding and requires students to put forth their best efforts toward schoolwork. In other cases, students may feel connected to a teacher because the instructor provides support and extra guidance on schoolwork, whereas other students may give high ratings to a teacher who give students more independence with regard to classwork.

The key point is that a more comprehensive and accurate assessment of the emotional connection or relationship between students and teachers must incorporate a variety of components or dimensions that not only tap into whether a student likes a teacher, or whether the feels teachers cares about him. A better measure of the student-teacher relationship must also assess other factors that are relevant for school outcomes such as: the expectations or demands that teachers require of students, the teaching strategies and approaches that teachers employ, the amount of support and guidance teachers provide, and students’ expectations and perceptions of what they should be learning in class.

Some of these issues actually appear in Newmann’s (1992) framework for school engagement. Adolescent need competence, school membership, and authentic work are the larger dimensions of the Newmann model that are
hypothesized to predict students’ school engagement in academic work. For example, the concept of student-teacher connectedness is incorporated under the area of school membership. In order for schools to make students feel that they are valued and integrated members of the school community, students and teachers need to be able to establish a relationship of connectedness in which students feel that teachers care about and appreciate them. However, other aspects of school membership also include a clear sense of purpose in terms of their reason for being at school. In this case, students may have positive feelings or opinions about their relationship with their teacher. But if in the context of that relationship, students still do not feel that school or education has no purpose or meaning for them, then the student-teacher relationship is not going to be successful in terms of instilling a belief that education is important and relevant for their lives.

The same is true for the concept of adolescent competence. Some students may have positive relationships with teachers because that instructors challenge them, and provide them with opportunities to develop their skills and knowledge. Other students may like their teachers for precisely the opposite reason – that teachers are not challenging or demanding. In other instances, students may have negative perceptions of their relationship with teachers precisely because teachers do not challenge their abilities or encourage their learning.

Our current conceptualizations and definitions of constructs such as
student-teacher connectedness, and many of the constructs outlined by Newmann, fall short in terms of measurement tools that are largely underdeveloped and not well established. Future attempts to test all or parts of this framework will have to address certain potential biases within the model because some of the key constructs involve self-report measures of student attitudes and beliefs related to schooling that still need to be developed and tested. For example, under the larger dimension labeled school membership, certain constructs such as caring, fairness, and sense of clarity of purpose are not well-defined or operationalized. Similarly, developing measures of constructs such fun and connection to the “real world” under the dimension of authentic work, will be a significant challenge in terms of establishing construct validity and reliability.

Despite these basic and fundamental challenges, the key to greater progress in understanding the importance of emotional school engagement, how it operates, and how it impacts students and academic outcomes, lies in developing greater clarity about what emotional engagement in school means to both teachers and students. Our definition(s) must be broadened to incorporate the variety of complex issues, ideas, and concerns that influence a young person’s sense of emotional attachment and psychological interest in learning and education.

**Unobserved heterogeneity**

Although this study controlled for prior school performance and social
demographic characteristics, all of which had relative modest to strong effects on academic outcomes, there may be other factors associated with emotional and behavioral school engagement. Differences in unobserved factors may have been associated with differences in emotional and behavioral school engagement. In other words, unobserved or unmeasured factors associated with the individual characteristics of students may have also contributed to either underestimates or overestimates of the effects of emotional and behavioral school engagement on academic outcomes.

For example, a student’s ability to participate in class and expend efforts on schoolwork may be associated with individual differences in learning abilities. If a student suffers from some form of learning or reading disability it is likely to impact his ability to engage and participate in learning, particularly if those disabilities are undiagnosed.

The same could be true for differences in emotional school engagement. The self-systems process model (Connell et al., 1994; Connell et al., 1995) tied emotional school engagement to students’ self-beliefs and beliefs about academic self-efficacy. This connection argued that students who had positive perceptions about themselves and believed that they had the skills necessary to do well in school, responded better to the support and guidance they received from teachers and parents, compared to those with more lower beliefs and perceptions.

There is also the possibility that school engagement attitudes and
behaviors are associated with differences in students’ attitudes toward compliance and conventionality. High school students are in that period of adolescence when they are testing their own limits and capabilities in terms of developing a sense of autonomy; and challenging the control and rules of authority figures such as parents and teachers (Eccles & Midgley, 1990; Eccles et al., 1993; Steinberg & Avenevoli, 1998). Therefore, the degree of emotional and behavioral school engagement a student displays may be associated with individual-level differences in their willingness to comply or not comply with rules and authority both inside and outside the classroom. For example, if I were to find that the students with lower behavioral school engagement scores were also less compliant, any effects of their behavioral school engagement on school outcomes might be underestimated.

We have no way of knowing whether individual differences in emotional and psychological characteristics may have contributed to differences in the effects of emotional and behavioral school engagement without controlling for the heterogeneity in individual-level characteristics that may be associated with emotional and behavioral school engagement. A solution for future investigations would be to account for these differences by estimating individual-level fixed-effects models. This strategy could control for potential selection biases as well as individual characteristics that may contribute to differences in the ability to form close relationships with teachers or engage in classwork at school.
Issues for Future Research

The findings presented here add some new information to our understanding about the association between emotional and behavioral school engagement, and their effects on high school academic outcomes. However, new questions and issues have also emerged that form the basis for potential topics of future empirical inquiry.

Conceptual and measurement development

The first and perhaps the most important issue for future research is the need to further develop and refine our conceptualization and definition of school engagement in general, and emotional school engagement in particular. There are a number of fundamental issues that through basic research will help form the foundation upon which more complex topics related to school engagement can be examined. These include basic studies to define and develop a larger conceptual framework for school engagement that identifies the essential subdomains or components related to school engagement such as emotional engagement, school membership, and authentic work.

In addition, we also lack well developed, tested tools to operationalize and measure a number of these concepts and ideas. I believe we are at the point where qualitative research has provided some observational evidence of the processes associated with school engagement operate in the context of student-teacher relationships. However, the vast degree of heterogeneity in schools and
educational experiences requires that we broaden the scope of school
engagement research and apply both quantitative and qualitative approaches to
studying school engagement processes more intently.

School characteristics

Another area for further investigation that this study logically moves
toward is an investigation of school level characteristics that may be associated
with differences in the effects of emotional and behavioral school engagement on
school outcomes. More specifically, are there differences in the characteristics
and attributes of high schools that contribute to the differential effects of
emotional and behavioral school engagement on academic outcomes? This issue
has been touched upon in studies of the effects of school reorganization and
school reforms on students’ school outcomes (Bryk & Thum, 1989; Lee, 2000; Lee
& Smith, 1993, 1995; Lee et al., 1997). Findings from these studies indicate that
some school reforms have positive effects on students’ behavioral engagement in
school.

Future studies in this topic area have great potential to add more
information to the school engagement literature through at least two ways. First,
the independent variables that gauge school reform and reorganization can
incorporate indicators that also have hypothesized effects on school engagement.
These might include school reform strategies that schools initiate to promote
students’ feelings of membership and integration into the school. Other more
complex measures such as the approaches that schools use to develop students’
opinions and beliefs about the purpose, objective, and relevance for education in their lives can also be explored. The second approach would be to develop and incorporate additional measures of school engagement in addition to behavioral school engagement, such as emotional engagement.

**Individual differences in school engagement**

In the results of my analyses, individual and social demographic characteristics had large effects on both academic outcomes and school engagement outcomes. Prospective studies can investigate how individual and group level differences predict variation in school engagement. In fact the association between school engagement and academic performance among educationally at-risk and economically disadvantaged students has been the topic of interest among several of the studies discussed in the literature review (Connell et al., 1994; Connell et al., 1995; Finn, 1993; Finn & Rock, 1997; Mickelson, 1990; Peng, 1994; Taylor, 1994; Taylor, 1991).

The social and demographic differences observed here serve as a reminder that the complex nature of school engagement is also likely to be associated with processes and relationships that are associated with differences outside of the school context, such as family processes, parental effects (e.g., parental beliefs, parenting styles) and parenting behaviors. These are just some of the examples of social and cultural factors that may also contribute to differences in how students from different social and ethnic groups relate to adults in their school and engage in learning.
School completion and retention

Lastly, future investigations should not need to be limited to studies of the effects of school engagement on academic outcomes. School engagement may also help explain differences for other school-related outcomes such as high school retention and completion.

Moreover, we can extend the longitudinal scope of future investigations of school engagement and examine whether school engagement effects that originate in high school carry over to outcomes in post-secondary education, as well as skills and behaviors in the workplace. For example, a basic starting point might be to assess whether differences in school engagement attitudes and behaviors are associated with students who enter college as opposed to those who directly enter the workforce. Furthermore, we could examine whether school engagement changes or operates in different ways in association with transitions to different life stages or contexts. For instance, to what extent do levels of school engagement differ between high school and college students? And, are the attitudes and behaviors associated with high school engagement, the same or different as engagement in the workplace?

Policy Implications

The implications that these findings might have for education practice and policy would be limited to the effects of behavioral school engagement on high school outcomes. This study has provided additional evidence that academic
outcomes are maximized when students carry out the day to day responsibilities of attending school regularly, complete their assignments, participate in class, and maintain a consistent level of behavioral engagement through high school. This fact is certainly not new to administrators, teachers, parents, and students alike.

However, in light of the current emphasis on national standards of student performance and teaching accountability, these findings raise some important issues about how behavioral engagement in schools will be affected by teaching strategies that increasingly focus on classroom teaching strategies that focus primarily on preparation for standardized test scores of learning and ability.

Behavioral school engagement predicted outcomes on standardized tests in math and reading, and classroom performance as well. Students who typically perform well on standardized tests of achievement may be less likely to have difficulties adjusting to classroom teaching strategies that “teach to the test.” However, this study has emphasized throughout that grades and grade point averages are indicators of learning and achievement that are different from standardized test scores. For students who may not perform on well on standardized tests, or who respond better to teaching strategies that promote creativity and independent or critical thinking, the focus on test taking skills may have more negative implications on their behavioral engagement and performance in class.
Teaching strategies that disproportionately lean toward specific approaches, may mean that the lack of variety or comprehensiveness in teaching methods may be harder for some students to adjust, and ultimately limit the opportunities for students to learn in more diverse and dynamic ways. As these national standards are implemented and schools adjust their curricula and strategies in response to the new mandates, it will be important for researchers, educators, and policymakers to monitor the impact that these changes could have to students’ behavioral effort and commitment to schoolwork.

The implications for policy and practice with respect to emotional school engagement are very limited, particularly because of the lack of a comprehensive conceptual framework for understanding and defining what emotional school engagement is, how it varies among students and schools, and how best to measure and assess it.

With that said, there are still potentially important implications of emotional school engagement for policy and practice. If further research can develop a comprehensive framework for emotional school engagement, it can help teachers, parents, and administrators identify the different ways by which they can tap students’ interests and motivations and utilize these as mechanisms for establishing meaningful connections and teaching relationships with students.

**Summary and Conclusions**

In summary, this investigation has shown that emotional and behavioral
school engagement matter for school outcomes. However, the effects of school engagement varied with respect to the type of engagement and the extent to which engagement effects persisted over time.

Students’ perceptions of connectedness to their teachers and their level of effort and commitment to schoolwork made significant contributions to short term academic performance. However, only behavioral school engagement was shown to have long term effects on high school academic outcomes over time.

There was also little evidence to support the notion that emotional and behavioral school engagement were mutually associated. It was clear, in fact, that both forms of engagement were predicted more consistently by previous academic performance. Overall, this investigation concludes that while emotional and behavioral school engagement matter for school outcomes, the links between academic performance and school engagement is complex and that future efforts are still needed to understand the ways in which the linkages between engagement and performance are unidirectional and/or bi-directional.
REFERENCES


toward school, achievement, and other educational variables. *Child Development, 67*, 1141-1152.


Figure 1. Path diagram of the links between emotional and behavioral engagement and academic performance.

Note: EE = Emotional school engagement; BE = Behavioral school engagement; 0 = 8th grade assessment; 1 = 10th grade assessment; 2 = 12th grade assessment;
Figure 2. Path diagram of the links between emotional and behavioral school engagement.

Note: EE = Emotional school engagement; BE = Behavioral school engagement; 0 = 8th grade assessment; 1 = 10th grade assessment; 2 = 12th grade assessment
Table 1. Sample demographic characteristics (n = 11,629)

<table>
<thead>
<tr>
<th>Variable</th>
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<tbody>
<tr>
<td>Gender</td>
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<tr>
<td>Males</td>
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<tr>
<td>Females</td>
<td>51%</td>
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<tr>
<td>Ethnicity</td>
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<tr>
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<tr>
<td>Asian</td>
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<td>Native Americans</td>
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Table 2. Means and standard deviations for academic outcomes, school engagement, and family SES in 8th, 10th, and 12th grade

<table>
<thead>
<tr>
<th>Variable</th>
<th>8th Grade (n = 11,629)</th>
<th>10th Grade (n = 10,575)</th>
<th>12th Grade (n = 6,557)</th>
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<td>Emotional school engagement</td>
<td>16.96 a (3.16)</td>
<td>16.87 b (2.76)</td>
<td>8.77 c (1.55)</td>
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<td>(Student report)</td>
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<tr>
<td>Behavioral school engagement</td>
<td>7.44 d (.98)</td>
<td>7.01 e (1.22)</td>
<td>7.07 f (1.16)</td>
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<tr>
<td>(Teacher report)</td>
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<tr>
<td>Reading IRT score</td>
<td>26.97 g (8.60)</td>
<td>30.74 h (9.93)</td>
<td>33.29 i (10.05)</td>
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<tr>
<td>Math IRT score</td>
<td>36.08 j (10.97)</td>
<td>43.89 k (13.93)</td>
<td>48.73 l (14.01)</td>
</tr>
<tr>
<td>Cumulative GPA</td>
<td>2.95 m (.74)</td>
<td>_</td>
<td>2.66 n (.76)</td>
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<tr>
<td>Family SES</td>
<td>-.11 (.78)</td>
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Note: Means in the same row that do not share the same superscript letter are statistically different at (p < .001).
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<td>3. 12th grade Emotional School Engagement</td>
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<td>.41**</td>
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<td>4. 8th grade Behavioral School Engagement</td>
<td>.15**</td>
<td>.10**</td>
<td>.09**</td>
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<td>8. 12th grade GPA</td>
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** p < .001
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<th>12&lt;sup&gt;th&lt;/sup&gt;</th>
<th>8&lt;sup&gt;th&lt;/sup&gt;</th>
<th>10&lt;sup&gt;th&lt;/sup&gt;</th>
<th>12&lt;sup&gt;th&lt;/sup&gt;</th>
<th>8&lt;sup&gt;th&lt;/sup&gt;</th>
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<td>.85</td>
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<td>.83</td>
<td>.84</td>
<td>.75</td>
<td>.78</td>
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<tr>
<td>Variance between</td>
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<td>.15</td>
<td>.18</td>
<td>.17</td>
<td>.16</td>
<td>.25</td>
<td>.22</td>
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<tr>
<td>Reading Test Scores</td>
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<tr>
<td>Math Test Scores</td>
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Table 5. Concurrent associations between 8th grade emotional and behavioral engagement and 8th grade academic outcomes.

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<tr>
<th>Student Level Predictors</th>
<th>8th Grade GPA Gamma Coefficients (SE)</th>
<th>8th Grade Reading Gamma Coefficients (SE)</th>
<th>8th Grade Math Gamma Coefficients (SE)</th>
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<tbody>
<tr>
<td>Intercept</td>
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<td>26.98 (.09)***)</td>
<td>36.06 (.15)***)</td>
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<tr>
<td>8th Grade Engagement</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Emotional engagement</td>
<td>.13 (.01)***)</td>
<td>.61 (.08)***)</td>
<td>.87 (.10)***)</td>
</tr>
<tr>
<td>Behavioral engagement</td>
<td>.26 (.01)***)</td>
<td>1.23 (.08)***)</td>
<td>2.00 (.10)***)</td>
</tr>
<tr>
<td>Background Controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>-.11 (.01)***)</td>
<td>-1.52 (.15)***)</td>
<td>.87 (.20)***)</td>
</tr>
<tr>
<td>SES</td>
<td>.26 (.01)***)</td>
<td>3.87 (.01)***)</td>
<td>5.31 (.14)***)</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>.23 (.03)***)</td>
<td>-3.6 (.30)***)</td>
<td>2.99 (.44)***)</td>
</tr>
<tr>
<td>Black</td>
<td>-.02 (.21)</td>
<td>-1.96 (.23)</td>
<td>-2.90 (.33)***)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-.17 (.06)**</td>
<td>-2.70 (.77)***)</td>
<td>-4.04 (.95)***)</td>
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</table>

% Var explained at level 1 25/91 13/82 15/75

N 11,621 11,621 11,621

*p < .05, ** p < .01, *** p < .001
Table 6. Concurrent associations between 10th grade emotional and behavioral engagement and 10th grade academic outcomes.

<table>
<thead>
<tr>
<th>Student Level Predictors</th>
<th>10th Grade Reading Gamma Coefficients (SE)</th>
<th>10th Grade Math Gamma Coefficients (SE)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>44.20 (.17)***</td>
</tr>
<tr>
<td>10th Grade Engagement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional engagement</td>
<td>1.19 (.10)***</td>
<td>1.42 (.13)***</td>
</tr>
<tr>
<td>Behavioral engagement</td>
<td>1.39 (.103)***</td>
<td>2.63 (.14)***</td>
</tr>
<tr>
<td>Background Controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>-1.64 (.18)***</td>
<td>1.04 (.23)***</td>
</tr>
<tr>
<td>SES</td>
<td>4.35 (.12)***</td>
<td>6.21 (.17)***</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>-.01 (.38)</td>
<td>3.18 (.52)***</td>
</tr>
<tr>
<td>Black</td>
<td>-3.88 (.31)***</td>
<td>-6.56 (.42)***</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-2.24 (.29)***</td>
<td>-3.58 (.40)***</td>
</tr>
<tr>
<td>Native American</td>
<td>-3.64 (.98)***</td>
<td>-5.84 (1.32)***</td>
</tr>
<tr>
<td>% Var explained at level 1</td>
<td>14/83</td>
<td>18/78</td>
</tr>
<tr>
<td>N</td>
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<td>10,544</td>
</tr>
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* p < .05, ** p < .01, *** p < .001
Table 7. Concurrent associations between 12th grade emotional and behavioral engagement and 12th grade academic outcomes.

<table>
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<th>Student Level Predictors</th>
<th>12th Grade GPA Gamma Coefficients (SE)</th>
<th>12th Grade Reading Gamma Coefficients (SE)</th>
<th>12th Grade Math Gamma Coefficients (SE)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2.80 (.01)***</td>
<td>34.50 (.17)***</td>
<td>51.50 (.23)***</td>
</tr>
<tr>
<td>12th Grade Engagement</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Emotional engagement</td>
<td>.11 (.01)**</td>
<td>1.15 (.16)***</td>
<td>1.67 (.21)***</td>
</tr>
<tr>
<td>Behavioral engagement</td>
<td>.23 (.01)**</td>
<td>.86 (.16)***</td>
<td>1.89 (.22)***</td>
</tr>
<tr>
<td>Background Controls</td>
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<td></td>
</tr>
<tr>
<td>Males</td>
<td>-.17 (.02)***</td>
<td>-2.32 (.28)***</td>
<td>1.70 (.36)***</td>
</tr>
<tr>
<td>SES</td>
<td>.25 (.02)***</td>
<td>3.92 (.21)***</td>
<td>5.99 (.29)***</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>.14 (.03)***</td>
<td>-.18 (.47)</td>
<td>2.78 (.58)***</td>
</tr>
<tr>
<td>Black</td>
<td>-.31 (.04)***</td>
<td>-3.87 (.54)***</td>
<td>-7.29 (.74)***</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-.11 (.04)**</td>
<td>-1.93 (.49)***</td>
<td>-3.34 (.69)***</td>
</tr>
<tr>
<td>Native American</td>
<td>-.34 (.08)***</td>
<td>-4.33 (1.45)**</td>
<td>-4.02 (2.04)*</td>
</tr>
<tr>
<td>% Var explained at level 1</td>
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<td>9/84</td>
<td>13/79</td>
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<tr>
<td>N</td>
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* p < .05, ** p < .01, *** p < .001
Table 8. Lagged models for 8th grade engagement and 10th grade reading and math test scores.

<table>
<thead>
<tr>
<th>Student Level Predictors</th>
<th>10\textsuperscript{th} Grade Reading Gamma Coefficients (SE) Model 1</th>
<th>10\textsuperscript{th} Grade Reading Gamma Coefficients (SE) Model 2</th>
<th>10\textsuperscript{th} Grade Math Gamma Coefficients (SE) Model 1</th>
<th>10\textsuperscript{th} Grade Math Gamma Coefficients (SE) Model 2</th>
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</thead>
<tbody>
<tr>
<td>Intercept</td>
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<td>31.17 (.15)***</td>
<td>44.52 (.18)***</td>
<td>44.53 (.09)***</td>
</tr>
<tr>
<td>School engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8th grade emotional</td>
<td>.35 (.11)***</td>
<td>.01 (.07)</td>
<td>.47 (.13)***</td>
<td>-.07 (.08)</td>
</tr>
<tr>
<td>8th grade behavioral</td>
<td>1.10 (.13)***</td>
<td>.28 (.08)***</td>
<td>2.11 (.16)***</td>
<td>.60 (.09)***</td>
</tr>
<tr>
<td>10th grade emotional</td>
<td>1.02 (.11)***</td>
<td>.66 (.07)***</td>
<td>1.19 (.14)***</td>
<td>.60 (.08)***</td>
</tr>
<tr>
<td>10th grade behavioral</td>
<td>1.17 (.12)***</td>
<td>.58 (.08)***</td>
<td>2.18 (.15)***</td>
<td>.90 (.08)***</td>
</tr>
<tr>
<td>8th grade reading test</td>
<td>-</td>
<td>.82 (.01)***</td>
<td>-</td>
<td>-</td>
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<td>8th grade math test</td>
<td>-</td>
<td>-</td>
<td>-.94 (.01)***</td>
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<td>Background controls</td>
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<tr>
<td>Males</td>
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<td>-.30 (.13)*</td>
<td>1.51 (.25)***</td>
<td>.52 (.14)***</td>
</tr>
<tr>
<td>SES</td>
<td>4.25 (.12)***</td>
<td>1.45 (.10)***</td>
<td>6.05 (.18)***</td>
<td>1.24 (.11)***</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
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<td>.47 (.30)***</td>
<td>2.80 (.56)***</td>
<td>.50 (.28)</td>
</tr>
<tr>
<td>Black</td>
<td>-3.88 (.33)***</td>
<td>-1.82 (.27)***</td>
<td>-6.36 (.44)***</td>
<td>-1.27 (.23)***</td>
</tr>
<tr>
<td>Hispanic</td>
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<td>-1.04 (.23)***</td>
<td>-3.27 (.43)***</td>
<td>-.35 (.23)</td>
</tr>
<tr>
<td>Native American</td>
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<td>-1.52 (.66)*</td>
<td>-5.37 (1.34)***</td>
<td>-1.27 (.52)**</td>
</tr>
<tr>
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<td>62/83</td>
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<td>75/78</td>
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<td>9,219</td>
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* p < .05, ** p < .01, *** p < .001
Table 9. Lagged models for 10th grade engagement and 12th grade reading and math test scores.

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<th>Student Level Predictors</th>
<th>12th Grade Reading Gamma Coefficients (SE)</th>
<th>12th Grade Reading Gamma Coefficients (SE)</th>
<th>12th Grade Math Gamma Coefficients (SE)</th>
<th>12th Grade Math Gamma Coefficients (SE)</th>
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<td>Model 1</td>
<td>Model 2</td>
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<td>51.78 (.25)**</td>
<td>51.13 (.33)**</td>
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<tr>
<td>School engagement</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10th grade emotional engagement</td>
<td>.75 (.19)**</td>
<td>-.10 (.13)</td>
<td>.97 (.25)**</td>
<td>.03 (.13)</td>
</tr>
<tr>
<td>10th grade behavioral engagement</td>
<td>1.31 (.20)**</td>
<td>.44 (.13)**</td>
<td>2.47 (.28)**</td>
<td>.56 (.14)**</td>
</tr>
<tr>
<td>12th grade emotional engagement</td>
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<td>.40 (.13)**</td>
<td>1.02 (.24)**</td>
<td>.40 (.13)**</td>
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<td>12th grade behavioral engagement</td>
<td>.51 (.18)**</td>
<td>.12 (.12)</td>
<td>1.39 (.24)**</td>
<td>.28 (.12)*</td>
</tr>
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<td>10th grade reading test scores</td>
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<td>10th grade math test scores</td>
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<td>-</td>
<td>.89 (.01)**</td>
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<tr>
<td>Males</td>
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<td>-1.02 (.21)**</td>
<td>1.81 (.37)**</td>
<td>1.19 (.21)**</td>
</tr>
<tr>
<td>SES</td>
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<td>1.45 (.18)**</td>
<td>5.66 (.30)**</td>
<td>1.19 (.17)**</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
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<td>.11 (.41)</td>
<td>2.02 (.65)**</td>
<td>.34 (.36)**</td>
</tr>
<tr>
<td>Black</td>
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<td>-1.90 (.45)**</td>
<td>-7.39 (.78)**</td>
<td>-2.08 (.46)**</td>
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<tr>
<td>Hispanic</td>
<td>-2.17 (.53)**</td>
<td>-1.16 (.44)**</td>
<td>-3.51 (.77)**</td>
<td>-.42 (.46)**</td>
</tr>
<tr>
<td>Native American</td>
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<td>-3.27 (1.12)**</td>
<td>-4.17 (2.17)**</td>
<td>1.05 (.88)**</td>
</tr>
<tr>
<td>% Var explained at level 1</td>
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<td>61/84</td>
<td>17/79</td>
<td>80/79</td>
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* p < .05, ** p < .01, *** p < .001
Table 10. Lagged models for 10th grade engagement and 12th grade GPA.

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<th>12th Grade GPA Gamma Coefficients (SE)</th>
<th>12th Grade GPA Gamma Coefficients (SE)</th>
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<td>Model 2</td>
</tr>
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<td>2.82 (.02)***</td>
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<td>School engagement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10th grade emotional engagement</td>
<td>.08 (.01)***</td>
<td>.01 (.01)***</td>
</tr>
<tr>
<td>10th grade behavioral engagement</td>
<td>.21 (.01)***</td>
<td>.11 (.01)***</td>
</tr>
<tr>
<td>12th grade emotional engagement</td>
<td>.07 (.01)***</td>
<td>.06 (.01)***</td>
</tr>
<tr>
<td>12th grade behavioral engagement</td>
<td>.18 (.01)***</td>
<td>.14 (.01)***</td>
</tr>
<tr>
<td>8th grade GPA</td>
<td>-</td>
<td>.49 (.02)**</td>
</tr>
<tr>
<td>Background controls</td>
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<td></td>
</tr>
<tr>
<td>Males</td>
<td>-.16 (.02)***</td>
<td>-.09 (.02)**</td>
</tr>
<tr>
<td>SES</td>
<td>.23 (.02)***</td>
<td>.13 (.01)***</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>.09 (.04)**</td>
<td>.01 (.03)</td>
</tr>
<tr>
<td>Black</td>
<td>-.31 (.04)***</td>
<td>-.24 (.04)***</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-.12 (.04)**</td>
<td>-.09 (.04)**</td>
</tr>
<tr>
<td>Native American</td>
<td>-.26 (.10)***</td>
<td>-.11 (.07)</td>
</tr>
<tr>
<td>% Var explained at level 1</td>
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<td>80/79</td>
</tr>
<tr>
<td>N</td>
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<td>3,150</td>
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</table>

*p < .05, **p < .01, ***p < .001
Table 11. Lagged models for cumulative 8th and 10th grade engagement and 12th grade reading and math test scores.

<table>
<thead>
<tr>
<th>Student Level Predictors</th>
<th>12th Grade Reading Gamma Coefficients (SE)</th>
<th>12th Grade Reading Gamma Coefficients (SE)</th>
<th>12th Grade Math Gamma Coefficients (SE)</th>
<th>12th Grade Math Gamma Coefficients (SE)</th>
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<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td>Intercept</td>
<td>34.78 (.19)***</td>
<td>34.83 (.13)***</td>
<td>51.98 (.28)***</td>
<td>52.19 (.16)***</td>
</tr>
<tr>
<td>School engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8th grade emotional engagement</td>
<td>-.02 (.21)</td>
<td>-.18 (.16)</td>
<td>.04 (.26)</td>
<td>-.19 (.17)</td>
</tr>
<tr>
<td>8th grade behavioral engagement</td>
<td>.80 (.25)**</td>
<td>.35 (.19)</td>
<td>1.74 (.32)***</td>
<td>.64 (.20)**</td>
</tr>
<tr>
<td>10th grade emotional engagement</td>
<td>.71 (.22)***</td>
<td>.42 (.17)**</td>
<td>.91 (.28)***</td>
<td>.38 (.19)*</td>
</tr>
<tr>
<td>10th grade behavioral engagement</td>
<td>1.14 (.21)***</td>
<td>.55 (.16)***</td>
<td>2.21 (.30)***</td>
<td>1.11 (.20)***</td>
</tr>
<tr>
<td>12th grade emotional engagement</td>
<td>.75 (.20)***</td>
<td>.47 (.17)**</td>
<td>.95 (.26)***</td>
<td>.46 (.17)**</td>
</tr>
<tr>
<td>12th grade behavioral engagement</td>
<td>.47 (.20)*</td>
<td>.39 (.15)**</td>
<td>1.31 (.26)***</td>
<td>.66 (.18)***</td>
</tr>
<tr>
<td>8th grade reading score</td>
<td>-</td>
<td>.75 (.16)***</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8th grade math test score</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.85 (.01)***</td>
</tr>
<tr>
<td>Background controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>-2.03 (.32)***</td>
<td>-.72 (.25)**</td>
<td>2.33 (.39)***</td>
<td>1.71 (.26)***</td>
</tr>
<tr>
<td>SES</td>
<td>3.83 (.22)***</td>
<td>1.06 (.18)***</td>
<td>5.81 (.32)***</td>
<td>1.78 (.22)***</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>-.39 (.55)</td>
<td>1.02 (.45)*</td>
<td>2.05 (.70)**</td>
<td>1.20 (.43)**</td>
</tr>
<tr>
<td>Black</td>
<td>-2.11 (.76)**</td>
<td>-.72 (.56)</td>
<td>-4.57 (.97)***</td>
<td>-1.43 (.63)*</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-1.65 (.58)**</td>
<td>-.23 (.43)</td>
<td>-2.19 (.83)**</td>
<td>-2.3 (.56)</td>
</tr>
<tr>
<td>Native American</td>
<td>-3.12 (1.86)</td>
<td>-1.64 (1.40)</td>
<td>-3.84 (2.60)</td>
<td>-.72 (1.44)</td>
</tr>
<tr>
<td>% Var explained at level 1</td>
<td>13/84</td>
<td>50/84</td>
<td>20/79</td>
<td>65/79</td>
</tr>
<tr>
<td>N</td>
<td>3,148</td>
<td>3,147</td>
<td>3,147</td>
<td>3,148</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001
Table 12. Lagged models for cumulative 8\textsuperscript{th} and 10\textsuperscript{th} grade engagement and 12\textsuperscript{th} grade GPA.

<table>
<thead>
<tr>
<th>Student Level Predictors</th>
<th>12\textsuperscript{th} Grade GPA Gamma Coefficients (SE)</th>
<th>12\textsuperscript{th} Grade GPA Gamma Coefficients (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>2.82 (.02)***</td>
<td>2.82 (.02)***</td>
</tr>
<tr>
<td>School engagement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8\textsuperscript{th} grade emotional engagement</td>
<td>.02 (.01)</td>
<td>-.03 (.01)**</td>
</tr>
<tr>
<td>8\textsuperscript{th} grade behavioral engagement</td>
<td>.16 (.02)***</td>
<td>.07 (.01)***</td>
</tr>
<tr>
<td>10\textsuperscript{th} grade emotional engagement</td>
<td>.07 (.01)***</td>
<td>.05 (.01)***</td>
</tr>
<tr>
<td>10\textsuperscript{th} grade behavioral engagement</td>
<td>.18 (.01)***</td>
<td>.13 (.01)***</td>
</tr>
<tr>
<td>12\textsuperscript{th} grade emotional engagement</td>
<td>.06 (.01)***</td>
<td>.07 (.01)***</td>
</tr>
<tr>
<td>12\textsuperscript{th} grade behavioral engagement</td>
<td>.16 (.01)***</td>
<td>.13 (.01)***</td>
</tr>
<tr>
<td>8\textsuperscript{th} grade GPA</td>
<td></td>
<td>.48 (.02)***</td>
</tr>
<tr>
<td>Background controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>-.13 (.02)***</td>
<td>-.08 (.02)***</td>
</tr>
<tr>
<td>SES</td>
<td>.22 (.02)***</td>
<td>.13 (.01)***</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>.09 (.04)**</td>
<td>.03 (.03)</td>
</tr>
<tr>
<td>Black</td>
<td>-.22 (.05)***</td>
<td>-.16 (.04)***</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-.07 (.04)</td>
<td>-.07 (.04)</td>
</tr>
<tr>
<td>Native American</td>
<td>-.12 (.13)</td>
<td>-.03 (.07)</td>
</tr>
<tr>
<td>% Var explained at level 1</td>
<td>40/85</td>
<td>58/85</td>
</tr>
<tr>
<td>N</td>
<td>3,148</td>
<td>3,147</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01, *** p < .001
Table 13. Student level models of 8th grade school engagement predicting 10th grade school engagement.

<table>
<thead>
<tr>
<th>Student Level Predictors</th>
<th>10th Grade Emotional Engagement (SE)</th>
<th>10th Grade Emotional Engagement (SE)</th>
<th>10th Grade Behavioral Engagement (SE)</th>
<th>10th Grade Behavioral Engagement (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td><strong>Intercept</strong></td>
<td>16.88 (.04)**</td>
<td>16.88 (.04)**</td>
<td>7.02 (.02)**</td>
<td>7.02 (.02)**</td>
</tr>
<tr>
<td><strong>School engagement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8th grade emotional engagement</td>
<td>1.03 (.03)**</td>
<td>.99 (.04)**</td>
<td>.08 (.01)**</td>
<td>.04 (.01)**</td>
</tr>
<tr>
<td>8th grade behavioral engagement</td>
<td>.12 (.04)**</td>
<td>.05 (.04)</td>
<td>.32 (.02)**</td>
<td>.23 (.02)**</td>
</tr>
<tr>
<td>8th grade GPA</td>
<td>-</td>
<td>.29 (.05)**</td>
<td>-</td>
<td>.35 (.02)**</td>
</tr>
<tr>
<td><strong>Background controls</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>-.09 (.05)</td>
<td>-.07 (.05)</td>
<td>-.12 (.03)**</td>
<td>-.09 (.02)**</td>
</tr>
<tr>
<td>SES</td>
<td>.19 (.04)**</td>
<td>.13 (.04)**</td>
<td>.18 (.02)**</td>
<td>.11 (.02)**</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>.58 (.10)**</td>
<td>.53 (.10)**</td>
<td>.24 (.05)**</td>
<td>.18 (.05)**</td>
</tr>
<tr>
<td>Black</td>
<td>.19 (.10)</td>
<td>.20 (.10)**</td>
<td>-.21 (.05)**</td>
<td>-.20 (.05)**</td>
</tr>
<tr>
<td>Hispanic</td>
<td>.25 (.10)*</td>
<td>.24 (.10)**</td>
<td>-.07 (.05)</td>
<td>-.07 (.05)</td>
</tr>
<tr>
<td>Native American</td>
<td>.53 (.27)*</td>
<td>.57 (.27)*</td>
<td>-.41 (.12)**</td>
<td>-.37 (.12)**</td>
</tr>
<tr>
<td><strong>% Var explained at level 1</strong></td>
<td>16/92</td>
<td>17/92</td>
<td>11/92</td>
<td>14/92</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>9,222</td>
<td>9,221</td>
<td>9,222</td>
<td>9,221</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01, *** p < .001
<table>
<thead>
<tr>
<th>Student Level Predictors</th>
<th>12th Grade Emotional Engagement Gamma Coefficients (SE)</th>
<th>12th Grade Emotional Engagement Gamma Coefficients (SE)</th>
<th>12th Grade Behavioral Engagement Gamma Coefficients (SE)</th>
<th>12th Grade Behavioral Engagement Gamma Coefficients (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>8.74 (.03)***</td>
<td>8.75 (.33)***</td>
<td>7.08 (.02)***</td>
<td>7.08 (.02)***</td>
</tr>
<tr>
<td>School engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10th grade emotional engagement</td>
<td>.65 (.03)***</td>
<td>.64 (.03)***</td>
<td>.13 (.02)***</td>
<td>.11 (.02)***</td>
</tr>
<tr>
<td>10th grade behavioral engagement</td>
<td>.06 (.03)**</td>
<td>.07 (.03)**</td>
<td>.29 (.03)***</td>
<td>.25 (.03)***</td>
</tr>
<tr>
<td>8th grade GPA</td>
<td></td>
<td>.03 (.04)</td>
<td></td>
<td>.23 (.04)***</td>
</tr>
<tr>
<td>Background controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>-.01 (.05)</td>
<td>.01 (.05)</td>
<td>-.17 (.04)***</td>
<td>-.15 (.04)***</td>
</tr>
<tr>
<td>SES</td>
<td>.12 (.04)**</td>
<td>.11 (.04)**</td>
<td>.14 (.03)***</td>
<td>.11 (.03)***</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>-.07 (.10)</td>
<td>-.04 (.10)</td>
<td>.06 (.07)</td>
<td>.05 (.07)</td>
</tr>
<tr>
<td>Black</td>
<td>-.09 (.10)</td>
<td>-.07 (.09)</td>
<td>-.12 (.08)</td>
<td>-.09 (.08)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-.00 (.10)</td>
<td>.00 (.10)</td>
<td>-.14 (.08)</td>
<td>-.13 (.08)</td>
</tr>
<tr>
<td>Native American</td>
<td>.34 (.23)</td>
<td>.38 (.23)</td>
<td>-.21 (.18)</td>
<td>-.12 (.18)</td>
</tr>
<tr>
<td>% Var explained at level 1</td>
<td>17/88</td>
<td>18/88</td>
<td>12/94</td>
<td>12/94</td>
</tr>
<tr>
<td>N</td>
<td>3,244</td>
<td>3,152</td>
<td>3,244</td>
<td>3,152</td>
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</tbody>
</table>

* p < .05, ** p < .01, *** p < .001
Table 15. Student level models of 8th and 10th grade school engagement predicting 12th grade school engagement.

<table>
<thead>
<tr>
<th>Student Level Predictors</th>
<th>12th Grade Emotional Engagement</th>
<th>12th Grade Emotional Engagement</th>
<th>12th Grade Behavioral Engagement</th>
<th>12th Grade Behavioral Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gamma Coefficients (SE)</td>
<td>Gamma Coefficients (SE)</td>
<td>Gamma Coefficients (SE)</td>
<td>Gamma Coefficients (SE)</td>
</tr>
<tr>
<td>Intercept</td>
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<td>8.75 (.03)**</td>
<td>7.07 (.02)**</td>
<td>7.08 (.02)**</td>
</tr>
<tr>
<td>School engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8th grade emotional</td>
<td>.23 (.03)**</td>
<td>.25 (.03)**</td>
<td>.01 (.02)</td>
<td>.01 (.02)</td>
</tr>
<tr>
<td>8th grade behavioral</td>
<td>.09 (.03)*</td>
<td>.08 (.04)*</td>
<td>.26 (.03)**</td>
<td>.16 (.03)**</td>
</tr>
<tr>
<td>10th grade emotional</td>
<td>.54 (.03)**</td>
<td>.53 (.04)**</td>
<td>.10 (.03)**</td>
<td>.05 (.03)*</td>
</tr>
<tr>
<td>10th grade behavioral</td>
<td>.04 (.03)</td>
<td>.01 (.03)</td>
<td>.25 (.03)**</td>
<td>.13 (.03)**</td>
</tr>
<tr>
<td>8th grade GPA</td>
<td>-</td>
<td>-.22 (.05)**</td>
<td>-</td>
<td>-.16 (.05)**</td>
</tr>
<tr>
<td>12th grade GPA</td>
<td>-</td>
<td>.31 (.06)**</td>
<td>-</td>
<td>.61 (.05)**</td>
</tr>
<tr>
<td>Background controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>.03 (.05)</td>
<td>.04 (.05)</td>
<td>-.15 (.04)**</td>
<td>-.09 (.04)*</td>
</tr>
<tr>
<td>SES</td>
<td>.11 (.04)**</td>
<td>.10 (.04)*</td>
<td>.13 (.03)**</td>
<td>.06 (.03)*</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>-.05 (.10)</td>
<td>-.04 (.10)</td>
<td>.08 (.07)</td>
<td>.06 (.07)</td>
</tr>
<tr>
<td>Black</td>
<td>-.10 (.09)</td>
<td>-.08 (.09)</td>
<td>-.09 (.08)</td>
<td>-.02 (.08)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>.00 (.10)</td>
<td>.01 (.10)</td>
<td>-.11 (.08)</td>
<td>-.09 (.08)</td>
</tr>
<tr>
<td>Native American</td>
<td>.42 (.23)</td>
<td>.41 (.23)</td>
<td>-.12 (.17)</td>
<td>-.08 (.16)</td>
</tr>
<tr>
<td>% Var explained at level</td>
<td>21/88</td>
<td>18/88</td>
<td>14/94</td>
<td>21/94</td>
</tr>
<tr>
<td>N</td>
<td>3,150</td>
<td>3,148</td>
<td>3,150</td>
<td>3,148</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01, *** p < .001
Appendix A. Item Descriptions of Emotional and Behavioral School Engagement Constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Response Categories</th>
<th>Scale reliability</th>
</tr>
</thead>
</table>
| 8th Grade Emotional School Engagement          | 1. Students get along with teachers  
2. Teaching is good at school  
3. Teachers are interested in students’ learning  
4. Teachers praise my efforts  
5. I often feel put down by teachers (rev)  
6. Teachers listen to me | 1 = Strongly Disagree  
2 = Disagree  
3 = Agree  
4 = Strongly Agree | \( \alpha = .79 \) |
| 10th Grade Emotional School Engagement         | 1. Students get along with teachers  
2. Teaching is good at school  
3. Teachers are interested in students’ learning  
4. Teachers praise my efforts  
5. I often feel put down by teachers (rev)  
6. Teachers listen to me | 1 = Strongly Disagree  
2 = Disagree  
3 = Agree  
4 = Strongly Agree | \( \alpha = .77 \) |
| 12th Grade Emotional School Engagement         | 1. Teaching is good at school  
2. Teachers are interested in students  
3. Students are graded fairly in class | 1 = Strongly Disagree  
2 = Disagree  
3 = Agree  
4 = Strongly Agree | \( \alpha = .73 \) |
| 8th Grade Behavioral Engagement – Teacher report | 1. Student rarely completes homework  
2. Student is frequently absent  
3. Student is frequently tardy  
4. Student is frequently inattentive in class | 1 = Yes  
2 = No | \( \alpha = .66 \) |
| 10th Grade Behavioral Engagement – Teacher report | 1. Student rarely completes homework  
2. Student is frequently absent  
3. Student is frequently tardy  
4. Student is frequently disruptive | 1 = Yes  
2 = No | \( \alpha = .61 \) |
| 12th Grade Behavioral Engagement – Teacher report | 1. Student rarely completes homework  
2. Student is frequently absent  
3. Student is frequently tardy  
4. Student is frequently disruptive | 1 = Yes  
2 = No | \( \alpha = .60 \) |
Appendix B. Analysis of Ceiling Effect for 8th Grade Emotional School Engagement on 12th grade GPA.

A follow-up analysis was conducted to test for the presence of a ceiling effect of 8th grade emotional school engagement on 12th grade GPA (-.03, p < .05) on Table 12. The cases were stratified according to low, medium, and high scores on 8th grade emotional school engagement. Separate OLS regression models were estimated with 8th grade emotional school engagement and social background characteristics as controls predicting 12th grade GPA. The beta coefficients for each of the three emotional engagement groups were compared, and the results indicated the presence of ceiling effects for the medium and high emotional engagement groups. The regression slope for students in the low emotional engagement group was .019 (p < .001), -.014 (ns) for the medium emotional engagement group, and -.004 (ns) for the high emotional engagement group. I concluded that the negative coefficient for 8th grade emotional school engagement on 12th grade GPA was due to the fact that students in the top two-thirds of 8th grade emotional school engagement had high GPAs. As a result the overall effect of emotional school engagement on 12th grade GPA had regressed downward toward the mean.
VITA
Frank R. Avenilla

Education
2003  Ph.D., Human Development and Family Studies and Demography,
      Pennsylvania State University
1999  M.S., Human Development and Family Studies and Demography,
      Pennsylvania State University
1990  B.A., Development Studies (Urban Planning Minor), University of California, Berkeley

Areas of Research Interest
Adolescent academic achievement, adolescent development, child welfare, welfare reform and
public policy, poverty, social demography, survey research, qualitative research

Experience
- Social Science Analyst Intern, Demographic and Behavioral Sciences Branch,
  National Institute of Child Health and Human Development, Bethesda, MD (August, 2001 to
  Present)
- Senior Graduate Research Assistant, Penn State University, University Park, PA (August 1996 to
  Present)
- Academic Counselor, AACE Educational Services, San Francisco, CA (June 1990 to July 1996)
- Research Intern, Overseas Development Network, The Philippines (Summer 1989)

Fellowships and Awards
2000 – 2001  Predoctoral Trainee, NICHD Predoctoral Traineeship in Demography

2nd Place  Family and Community Connections: The Relationship between social ties and
          educational/employment outcomes among adolescent single mother families.
          Social and Behavioral Sciences Division,
          13th Annual Graduate Research Exhibition, Pennsylvania State University

Publications and Manuscripts
Counting Couples: Improving marriage, divorce, remarriage, and cohabitation data in the federal statistical
system. Bethesda, MD: National Institutes of Health, The Data Collection Committee of the

Parenthood by African American Adolescent Mothers: A Person-Centered Exploratory Study.