SCHOOL DISCIPLINARY CLIMATE AND STUDENT ENGAGEMENT IN SCHOOL: A MEDIATION ANALYSIS OF PUBLIC SCHOOL SOCIAL CLIMATE

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ABSTRACT

TERRI L. DEMPSEY: School disciplinary climate and student engagement in school: A mediation analysis of public school social climate (Under the direction of Judith Meece, Ph.D.)

This study explored the association of school disciplinary climate (i.e., school rules) and school social climate (i.e., interpersonal relationships) with student engagement in school (i.e., effort and persistence). School social climate was hypothesized to mediate the association between school disciplinary climate and student engagement in school. Data are reported on 12,795 U.S. public school students who completed a base year survey for the U.S. Department of Education’s Education Longitudinal Study of 2002 (ELS:2002). Hierarchical multiple regression analyses revealed school disciplinary climate and school social climate were significantly associated with student engagement in school. School social climate appeared to mediate the association between school disciplinary climate and student engagement in school. The study concludes with a discussion of the implications of these findings for research and educators.
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CHAPTER I
INTRODUCTION

School climate refers to the values, norms, beliefs, and attitudes conveyed by schools (National Research Council & Institute of Medicine, 2004). School climate is different than the objective structural characteristics (e.g., size, sector) or student compositional (e.g., race/ethnicity, socioeconomic status) features of the school context that are largely beyond the control of the school (Crosnoe, Johnson, & Elder, 2004; Gottfredson, Gottfredson, Payne, & Gottfredson, 2005; Lee & Bryk, 1989; Rumberger, 1995; Welsh, 2000). School climate is recognized as an important aspect of successful and effective schools (Brand, Felner, Shim, Seitsinger, & Dumas, 2003; Koth, Bradshaw, & Leaf, 2008). School climate is also increasingly viewed as important to adolescent adjustment (Crosnoe et al., 2004; Loukas, Suzuki, & Horton, 2006).

Feelings of safety and security at school are important aspects of school climate (Brand et al., 2003; Kuperminc, Leadbeater, & Blatt, 2001; Lee & Bryk, 1989; Loukas et al., 2006; Schunk, Pintrich, & Meece, 2008). From extreme cases of fighting and bullying to student acts of disrespect for teachers, schools and teachers must grapple with some form of student discipline problems on a daily basis. According to the 2007 Indicators of School Crime and Safety Report from the National Center for Education Statistics (NCES), although student crime and victimization rates at school have declined or remained stable since 1992, students aged 12-18 were victims of 1.5 million nonfatal crimes at school in 2005, including theft and assault (Dinkes, Forrest Cataldi, & Lin-Kelly, 2007). Of the 83,200 U.S. public schools
included in the report, 86% reported one or more incidents of serious crimes, such as physical attack or fights with a weapon and vandalism. Twenty-four percent of public schools reported bullying and 18% reported student acts of disrespect for teachers occurring on a daily or weekly basis. Furthermore, 9% of public schools reported student verbal abuse of teachers, 3% reported sexual harassment of other students, 3% reported student racial/ethnic tensions, and 2% reported widespread disorder in classrooms occurred at least once a week.

After analyzing data from the National Household Education Survey on strategies students use to avoid harm at school, the 1995 NCES Statistics in Brief Report concluded that “students who must think about avoiding harm at school are diverting energy that should be expended on learning” (U.S. Department of Education, 1995, Summary section ¶ 19). Similarly, Lee and Bryk (1989) stated “at a purely behavioral level, a minimum of disciplinary problems is a necessary condition for the routine pursuit of academic work” (p. 189). One can see how student learning is disrupted in extreme cases of violence. However, school shootings are rare in comparison to other incidents of misconduct (Dinkes et al., 2007; Gottfredson et al., 2005; Welsh, 2000). The question then becomes, what influence do the more common forms of school violence and misconduct have on student academic and psychological outcomes? Moreover, what role does school climate play in promoting a safe and positive learning environment that promotes optimal student outcomes?

The purpose of this study was to examine characteristics of school climate associated with student engagement in school as well as identify the processes or mechanisms that can help explain such an association. Specifically, this research examined the association of two aspects of school climate -- school disciplinary climate and school social climate -- with
student engagement in school. School disciplinary climate generally refers to perceptions of safety in school (Crosnoe et al., 2004; Koth et al., 2004; Kuperminc et al., 2001; Planty & DeVoe, 2005), the fairness and effectiveness of discipline in school (Lee & Byrk, 1989; Ma, 2003), how strictly school rules are enforced, or disciplinary harshness (Brand et al., 2003; Ma, 2003), as well as the frequency of disciplinary incidents among students at school (Brand et al., 2003; Lee & Byrk, 1989). The present study examined school disciplinary climate in terms of student perceptions of the policies and practices associated with school rules (i.e., student perceptions of the clarity, fairness, consistent enforcement, and effectiveness of school rules). Research has shown that student perceptions of school rules are positively associated with student feelings of safety and security (Farmer, 1999; Ingels, Burns, Chen, Cataldi, & Charleston, 2005; Welsh, 2000) and negatively associated with indicators of school disorder, such as student crimes of perpetration and victimization in school (Gottfredson et al., 2005; Gottfredson & Gottfredson, 1985 as cited in Welsh, 2000; Welsh, 2000). Research has also found a positive association between school disciplinary climate and several student outcomes related to engagement, including higher academic expectations, academic aspirations, academic efficacy (Brand et al., 2003) and decreased dropout (Rumberger, 1995). School disciplinary climate has also been found to be positively associated with academic achievement (Brand et al., 2003; Lee & Byrk, 1989).

School social climate is the second aspect of the school climate examined in this study. The present study examined school social climate in terms of student perceptions of the quality of interpersonal relationships between teachers and students as well as among peers in the school (i.e., extent to which students get along well with teachers, teachers are interested in students, and there is real school spirit). This conceptualization is consistent
with previous studies that have measured the role of interpersonal relationships at school in terms of caring teachers and/or positive peer interactions at school (Brand et al., 2003; Loukas et al., 2006; Roeser, Midgley, & Urdan, 1996). Similar to the disciplinary climate of the school, research has found significant associations between school interpersonal relationships and several student outcomes related to student engagement in school, including increased effort and persistence (Kindermann, 2007; Klem & Connell, 2004; Hughes, Luo, Kwok, & Loyd, 2008); higher academic expectations, higher academic aspirations, and higher academic efficacy (Brand et al., 2003); as well as decreased dropout (Rumberger, 1995). Studies have also shown school interpersonal relationships are positively associated with higher academic achievement (Brand et al., 2003; Crosnoe et al., 2004). Furthermore, research has shown a positive association between school interpersonal relationships and school sense of belonging (Anderman, 2000; Battistich, Solomon, Kim, Watson, & Schaps, 1995; Juvonen, 2006; Loukas et al., 2006; Roeser et al., 1996). School sense of belonging has been shown to be positively associated with a wide range of student outcomes related to engagement, including liking for school, intrinsic academic motivation, academic efficacy, academic expectations, academic aspirations, and preference for challenging tasks (Battistich, et al., 1995; Osterman, 2000; Roeser et al., 1996; Vieno, Santinello, Pastore, & Perkins, 2007). School sense of belonging is also associated with higher academic achievement and lower rates of school dropout (Anderman, 2000; Loukas & Murphy, 2007; Pittman & Richmond, 2007; Vieno et al., 2007).

An emphasis on student engagement in school emerged in the 1980s when researchers described the organization and culture of comprehensive high schools in terms of “dispirited teachers and disengaged students ‘putting in their time’ while negotiating a sprawling and
fragmented curriculum...[that] followed the transmission model and induced passivity and boredom among students” (Marks, 2000, pp. 155-156). Since that time, student engagement in school has been increasingly recognized as essential for successful learning in school (Fredricks, Blumenfeld, & Paris, 2004; National Research Council [NRC] & Institute of Medicine [IOM], 2004). In order for students to learn the curriculum that is taught in schools, students must pay attention in class and put forth effort to complete their school assignments (Marks, 2000). Schunk et al. (2008) summarized the importance of student engagement in school with the following passage:

Motivation is an important quality that pervades all student activities. Motivated students display interest in activities, work diligently, feel self-confident, stick with tasks, and perform well…Given that motivation affects all aspects of schooling and contributes to students’ school success, improving students’ academic motivation is a worthwhile goal of schooling. (p. 3)

As discussed in the next chapter, the present study examined the behavioral and cognitive aspects of student engagement in terms of effort and persistence in schoolwork (Fredricks et al., 2004). Student engagement in school has been linked to a variety of positive student outcomes including higher student academic achievement, higher school attendance, more resilience, more positive student learning goals, and higher perceived academic ability (for a review, see Fredricks et al., 2004; Hughes et al, 2008; Multon, Brown, & Lent, 1991).

Student engagement in school is particularly important to those aspiring to improve student adjustment through school interventions because it is considered to be malleable and responsive to variations in the school environment (Connell, 1990; Finn & Rock, 1997 as cited in Fredricks et al., 2004).

After an extensive review of the research on the effects of high school policies and practices on student engagement in school, the Committee on Increasing High School
Students’ Engagement and Motivation to Learn (NRC & IOM, 2004) recommended that schools increase meaningful engagement and academic achievement by fostering supportive, personal, and continuous relationships between teachers and students in an environment of trust and respect. These recommendations speak not only to the need for positive school disciplinary climate but also positive interpersonal relationships at school: “taken together, the evidence suggests that student engagement in school and learning are fostered by a school climate characterized by an ethic of caring and supportive relationships, respect, fairness, and trust” (p. 103). Furthermore, research suggests that the association between school disciplinary climate and student motivation, engagement, and achievement may be mediated by the social climate of the school (Crosnoe et al., 2004; Ma, 2003; Lee & Byrk, 1989). The Committee on Increasing High School Students’ Engagement and Motivation to Learn (NRC & IOM, 2004) developed a theoretical model to explain the relationship between the educational context and engagement in urban high schools. Among other factors, feeling socially connected at school was thought to partially mediate the influence of the educational context (e.g., other aspects of school climate, organization, composition, size, and instruction) on student engagement in school. That is, student feelings of connectedness with school promote attachment to school and identification with the goals and values of schools. Large, impersonal schools with a climate of low standards tend to instill low expectations in students. Consequently, students develop general negative feelings toward teachers and school which, in turn, can lead to a lack of effort and ultimately school dropout.

Despite calls for more research examining the effects of multiple aspects of the school climate, such as order and discipline, on student outcomes (Brand et al., 2003; Loukas et al., 2006), a review of research indicates little attention has been given to the role of a positive
school disciplinary climate in student engagement, motivation, and achievement. Of the studies that have examined the school disciplinary climate, safe and orderly schools that use fair and effective disciplinary practices have been found to be positively associated with student outcomes related to student engagement and academic achievement in school (Brand et al., 2003; Lee & Bryk, 1989; Rumberger, 1995). Moreover, research suggests this association may be mediated by the social climate of the school (Crosnoe et al., 2004; Lee & Byrk, 1989; Ma, 2003). However, no studies were identified that specifically examined the link between the school disciplinary climate, school social climate, and student engagement in school. In order to develop ways to improve student outcomes, it is not only important to examine what aspects of the school environment are associated with positive student outcomes, but it is equally important to identify the underlying processes or mechanisms that can help explain how and why the school environment is associated with positive student outcomes. The present study aimed to do just that by examining the association of school disciplinary climate and school social climate with student engagement in school. The following research questions guided the investigation: (1) What is the association of school disciplinary climate and school social climate with student engagement in school? and (2) Does school social climate mediate the association between school disciplinary climate and student engagement in school? It was hypothesized that students would be more engaged in schools with more positive disciplinary and social climates. However, school social climate was hypothesized to play a central role in this association by serving as the mechanism to explain the relation between school disciplinary climate and student engagement in school. That is, students who perceived their school disciplinary climate as positive were expected to
report more positive interpersonal relationships at school. A positive interpersonal social
climate, in turn, was expected to be positively associated with student engagement in school.
CHAPTER II
LITERATURE REVIEW

This chapter briefly summarizes the existing theoretical and empirical research examining the association of school disciplinary climate and school social climate with student motivation, engagement, and academic achievement. Educational researchers have examined the association of school climate with both student engagement in school as well as student outcomes related to engagement. The following literature review includes both sets of outcomes because few studies have specifically examined measures of student effort and persistence in school.

The first part of this chapter describes how student engagement in school is defined in the literature as well as how it relates to other aspects of student engagement, motivation, and academic achievement. The second part of this chapter outlines the different ways school disciplinary climate and school social climate have been measured in terms of individual student perceptions versus aggregating student perceptions to represent the entire school. Although studies have shown that school disciplinary climate and school social climate are two unique constructs best measured by discrete scales (Brand et al., 2003), many of the reviewed studies measured school disciplinary climate and school social climate using just one scale representing student attitudes toward school (Freidlin & Salvucci, 1995; Lee & Smith-Adcock, 2005; Marks, 2000; McNeely, Nonnemaker, & Blum, 2002). Thus, the third part of this chapter defines school disciplinary climate in-depth and then focuses on studies that have examined the association between school disciplinary climate and student
engagement in school and then separately, those that examined the association of a general measure of school climate with student engagement in school. The fourth part of this chapter presents an in-depth definition of school social climate and then clarifies its connection with similar constructs such as school sense of belonging. Literature is then presented on the association of school social climate and student engagement within the context of the school and the classroom. The fifth part of this chapter focuses specifically on studies suggesting a mediation effect of school social climate. The final part of this chapter draws on both the school climate literature as well as literature on the role of the classroom context in order to outline the various theories that can help explain the link between school disciplinary climate, school social climate, and student engagement in school.

*Student Engagement in School Defined in the Literature*

After a comprehensive review of the definitions, measures, precursors, and outcomes of student engagement in school, Fredricks et al. (2004) described student effort and persistence as facets of both the (1) behavioral and (2) cognitive aspects of student engagement in school. Behavioral engagement refers to student participation in the academic, social, and/or extracurricular activities in the school. It includes specific behaviors such as effort, persistence, participation in school activities, as well as following school and class policies of appropriate behavior.

The second aspect of engagement outlined by Fredricks et al. (2004) is called cognitive engagement. Similar to behavioral engagement, cognitive engagement also focuses on student effort. However, cognitive engagement goes beyond “just doing the work” to include the thought processes behind engagement (Fredricks et al., 2004, p. 64). Cognitive engagement reflects student’s psychological investment or willingness to put forth the effort
needed to “comprehend complicated ideas and master difficult skills” (Fredricks et al., 2004, pp. 60-64). Cognitive engagement can be measured by student preference of challenging tasks, persistence in the face of difficulty, intrinsic motivation, and the use of self-regulation strategies such controlling and managing ones effort.

Although not defined in terms of effort and persistence, the third aspect of engagement outlined by Fredricks et al. (2004) is emotional engagement. Emotional engagement pertains to student’s interest, values, and emotions. It includes student reactions to academic work (e.g., interest or boredom) as well as feelings about their school and teachers (e.g., liking or disliking). Values can be measured by student feelings of success in school, enjoyment of school, the importance of a task in helping one to attain a goal, and the importance of a task in providing information about one’s self-concept.

The items used to measure engagement in the present study tap into both the behavioral and cognitive aspects of engagement (i.e., effort put forth by students, persistence in the face of difficulty, and self-regulation of effort). However, few of the identified studies examined the association of effort and persistence with school disciplinary climate and school social climate. As Fredricks et al. (2004) pointed out, researchers typically combine questions measuring the behavioral, cognitive, and emotional aspects of engagement in order to form a general scale of engagement. As a result, measures of one or two aspects of engagement are not as well developed.

As shown in Table 1, the following literature review includes studies measuring other aspects of behavioral, cognitive, and emotional engagement as well as other student outcomes related to engagement. For example, studies are included that measure preference for challenging tasks, intrinsic motivation, and school liking. In addition, studies examining
the association of school climate with student expectations for academic success (i.e., beliefs about how one will perform on tasks or activities) and student self-efficacy (i.e., an individual’s confidence in his or her own ability to perform a specific task) are also included. Both of these self perceptions of confidence have been found to be positively associated with student effort and persistence (for a review, see Multon et al., 1991). In addition, the association of school climate with student self-criticism (e.g., “If I fail to live up to expectations, I feel unworthy”) is also examined because research has found students who are more critical of themselves tend to participate less frequently in high school activities (Zuroff, Koestner, & Powers, 1994). Furthermore, studies examining the association of school climate with truancy in school (i.e., frequency of absence/tardiness) and preparation for school (i.e., coming to class with books, paper and pencil, or homework completed) are also included in the literature review because previous studies have used these indicators as a measure of student behavioral engagement in school (Finn & Voelkl, 1993; Klem & Connell, 2004). Literature on student dropout is also included because school dropout has been described as the “ultimate disengagement” (NRC & IOM, 2004, p. 33), or the end result of a long-term process of disengagement from school (Fredricks et al., 2004; Rumberger, 1995). Finally, several studies have found positive associations between many of the aforementioned measures of student engagement in school and academic achievement (for a review, see Fredricks et al., 2004; Hughes, et al., 2008; Multon et al., 1991). Therefore, studies examining the association of school disciplinary climate and school social climate with student academic achievement are also included in the following literature review.
Definitions and Measures of School Climate

The second part of this chapter outlines the different ways school disciplinary climate and school social climate have been measured in terms of individual student perceptions of school climate versus aggregating student perceptions to represent the entire school. A review of research indicates studies examining school climate typically fall into one of three categories, those that focused on: (1) the individual perspective, (2) aggregate school-level perspective, or (3) both perspectives. All three types of studies attempt to identify and explain the characteristics and conditions of schools that influence student engagement, motivation, and academic outcomes. The first perspective focuses on the influence of individual student beliefs and attitudes on student engagement, motivation, and academic outcomes (e.g., whether a student who feels safe at school is also engaged in school). Studies focusing on the second perspective typically combine individual student beliefs and attitudes together to form an aggregate measure of school climate at the school-level. These studies measure school climate based on the sum of the individual-level perspectives (Battistich, et al., 1995). Between-school differences are examined in an attempt to identify the characteristics of different schools that are associated with student engagement, motivation, and academic outcomes. The third type of studies considers both the individual- and school-level perspectives in an attempt to isolate the influence of between-school differences versus within-school differences, typically through the use of hierarchical linear modeling (HLM) procedures. That is, the influence of individual student beliefs and attitudes about school climate are examined separately from the influence of aggregated school climate on student engagement, motivation, and academic outcomes.
Although researchers have found both individual- and school-level perspectives to be important when measuring school effects, studies have found that between-school differences explain only a modest amount of variance in student motivation, engagement, and academic outcomes (Anderman, 2002; Battistich et al., 1995; Brand, et al., 2003; Lee & Loeb, 2000; Marks, 2000). These findings have led researchers to conclude that “engagement is largely a function of individual student characteristics and experiences” (Marks, 2000, p. 166). Indeed, the subjective experience of the individual is arguably the most important perspective to consider when attempting to explain motivation at the level of the individual. Individual students within a school may have very different perceptions of their school environment (Ames, 1992; Schunk & Meece, 1992) and positive characteristics of a school may have a protective effect on some students while having an adverse effect on others. For example, in a large-scale national survey study of middle and high school students, Anderman (2002) found higher student perceptions of social rejection and school problems among students who reported they did not belong in schools where most students reported they did belong. Indeed, the objective safety level of the school overall may not matter if individual students do not perceive their school as safe. Thus, the present study measured the individual student perspective using questions oriented toward the school as a whole (e.g., “There is real school spirit”). With that said, few studies have examined the association of individual student perceptions of the school disciplinary climate and school social climate with student engagement in school. Thus, it was necessary to include literature from all three types of studies (i.e., those examining the individual perspective, aggregate school-level perspective, and both perspectives) in order to describe the association of school disciplinary climate and school social climate with student engagement in school.
School Disciplinary Climate and Student Engagement in School

The present study focuses on one aspect of the school disciplinary climate: policies and practices associated with school rules (i.e., clarity, fairness, consistent enforcement, and perceived effectiveness of school rules). Researchers define and operationalize school disciplinary climate in various ways; however, it is typically measured by student perceptions of safety in school (Crosnoe et al., 2004; Koth et al., 2004; Kupermine et al., 2001; Planty & DeVoe, 2005), the fairness and effectiveness of discipline in school (Lee & Byrk, 1989; Ma, 2003), how strictly school rules are enforced, or disciplinary harshness (Brand et al., 2003; Ma, 2003), as well as the frequency of disciplinary incidents among students at school (Brand et al., 2003; Lee & Byrk, 1989). As mentioned previously, although the present study examined the school disciplinary climate separately from school social climate, many researchers combine school disciplinary climate and school social climate into just one scale measuring student attitudes toward school (Freidlin & Salvucci, 1995; Lee & Smith-Adcock, 2005; Marks, 2000; McNeely et al., 2002). Thus, the following literature review includes studies measuring the school disciplinary climate independently as well as in combination with school social climate. Studies are also included that measure the different behavioral, cognitive, and emotional aspects of student engagement as well as outcomes related to student engagement in school.

Brand et al. (2003) examined the association of multiple dimensions of school climate with student academic and behavioral adjustment over a period of three years in a sample of 188, 278 students representing 243 middle schools. A series of two studies were conducted to first develop and then evaluate the structure, reliability, and stability of a 50-item school climate index called the Inventory of School Climate – Student (ISC-S). School disciplinary
climate was just one of many aspects of the school climate measured in the ISC-S. Scales consisted of a mix of questions assessing the climate of the school as a whole as well as individual student experiences (e.g., victimization at school) aggregated to represent the climate of the entire school. Exploratory and confirmatory factor analysis revealed significant differences between items measuring school disciplinary climate and items measuring school social climate.

After establishing a version of the ISC-S that yielded reliable scores, Brand et al. (2003) evaluated the degree to which different dimensions of school climate were associated with various student outcomes related to student engagement in school. The three dimensions related to the school disciplinary climate were: (1) consistency and clarity of school rules and expectations (e.g., “Students understand what will happen to them if they break a rule” and “Teachers make a point of sticking to the rules in classes”), (2) disciplinary harshness (e.g., “The rules in this school are too strict”), and (3) safety problems (e.g., “Been afraid that someone will hurt or bother you at school?”). Student outcomes related to student engagement in school included academic efficacy (e.g., “I think if I tried harder I could do better in school”), academic aspirations (e.g., importance of graduating from high school and attending college), and academic expectations (e.g., “Do you think you will graduate from high school?”). Brand et al. were specifically interested in measuring the extent to which differences between schools were associated with student outcomes. Although the amount of variance explained by between-school differences was modest, students attending schools with a more positive disciplinary climate were significantly more likely to have positive student outcomes related to engagement across all three years of the study, even after controlling for personal student background characteristics at the school level. Students
attending schools higher in consistency and clarity of school rules and expectations had higher academic aspirations, academic efficacy, and academic grades. Students who attended schools with lower mean levels of safety problems also reported higher academic aspirations and academic efficacy as well as higher academic expectations. Finally, students attending schools with lower mean levels of disciplinary harshness also earned higher academic grades. In addition to providing analytic evidence of school disciplinary climate and school social climate as two unique constructs, Brand et al. provided evidence of a positive association between school disciplinary climate and student outcomes related to engagement in school in a large-scale national study of middle school students over a three year period.

Marks (2000) examined the association of school disciplinary climate with student engagement in school using a combined measure of school disciplinary climate and school social climate (called social support for learning). A sample of 3,669 students representing 24 elementary, middle, and high schools was used to examine the association of school climate with student engagement in school, after controlling for personal student background characteristics (i.e., gender, race, socioeconomic status, and prior achievement), through the use of HLM procedures. School disciplinary and social climate were measured by student perceptions of school safety, beliefs that teachers really listen and that students are treated fairly, as well as by perceived relationships with peers in school. Student engagement in school was measured in terms of student effort (e.g. “How often do you try as hard as you can?”), attentiveness (e.g. “How often do you pay attention in class”), lack of boredom in class, and frequency of completing class assignments. Marks (2000) found the disciplinary and social climate of the school contributed significantly to student engagement in school for elementary, middle, and high school students, even after controlling for the association of
personal student background characteristics. In fact, the association of individual
student race/ethnicity, socioeconomic status (SES), and prior achievement each dropped to
non-significance in the presence of school disciplinary and social climate. Overall, Marks’
(2000) study provided evidence of a significant, positive association of school disciplinary
and social climate with student school engagement for a sample of elementary, middle, and
high school students.

Kuperminc et al. (2001) conducted cross-sectional and longitudinal analyses to
examine the predictive influence of school disciplinary and social climate on student
outcomes related to engagement in a sample of 460 students attending a large diverse middle
school. Both school disciplinary climate and social climate were measured together in a 47-
item index called the School Climate Scale (SCS; Haynes, Emmons, & Comer, 1993, as cited
in Kuperminc et al., 2001). The SCS is based on seven different dimensions reflecting the
quality and frequency of interactions among and between adults and students including:
(1) order and discipline, (2) fairness, (3) student interpersonal relationships with peers, and
(4) student-teacher relationships. The SCS also included items measuring school
achievement motivation, parent involvement, and sharing of resources. However, the
majority of items measured student perceptions of the disciplinary and social climate of the
school. Student engagement in school was measured with a 112-item scale called the
Youth Self Report (YSR, Achenbach, 1991 as cited in Kuperminc et al., 2001). The YSR
covers a range of student behavior; however, several questions are related to student
behavioral, cognitive, and emotional engagement, such as participation in activities inside
and outside of school (e.g., sports), attention problems (e.g., cannot concentrate or poor
schoolwork), social problems (e.g., does not get along with others or not liked),
anxious/depressed (e.g., fears school or feels worthless), withdrawn (e.g., rather be alone), and delinquency problems (e.g., truancy; Ivanova et al., 2007).

Kuperminc et al. (2001) examined the association of the school disciplinary and social climate with student engagement as well as the association of individual student beliefs, such as a sense of efficacy and self-criticism, with student engagement in school. Research has shown student self-efficacy is positively associated with student effort and persistence in schoolwork (for a review, see Multon et al., 1991), whereas student self-criticism is negatively associated with student participation in school (Zuroff et al., 1994). Student sense of efficacy was defined in terms of goals and feelings of personal accomplishment (e.g., “I have many inner strengths and abilities”). Student self-criticism was defined in terms of feelings of hopelessness and inability to meet expectations and standards (e.g., “If I fail to live up to expectations, I feel unworthy”). Kuperminc et al. found positive associations of school disciplinary and social climate with student outcomes related to engagement measured in the YSR. Moreover, positive views of the school disciplinary and social climate moderated (i.e., diminished) the negative effects of low self-efficacy and high self-criticism on student engagement in school. With that said, after analyzing the role of the seven dimensions of school climate independently, the only dimensions significantly associated with outcomes related to student engagement in school were fairness and student-teacher relationships. Nevertheless, Kuperminc et al. extend the evidence supporting a positive association of school disciplinary and social climate with student engagement by providing evidence of the protective effects of these two aspects of school climate on student engagement in school.

In summary, few studies have examined the association of the school disciplinary climate independently from the association of the school social climate with student
outcomes related to student engagement in school. However, those studies that have examined school disciplinary climate have found significant associations with several student outcomes related to student engagement in school (Brand et al., 2003; Kuperminc et al., 2001; Marks, 2000). School disciplinary climate has been found to be significantly associated with the following: higher student effort and attentiveness, lower levels of boredom in class, higher levels of class preparation and participation, lower levels of truancy, higher academic expectations, higher academic aspirations, higher academic efficacy, lower levels of self-criticism, decreased rates of school dropout, and higher levels of academic achievement. Cross-sectional and longitudinal evidence was provided using large samples of elementary, middle, and high school students attending demographically diverse schools.

School Social Climate and Student Engagement in School

The present study defines school social climate in terms of student perceptions of the interpersonal relationships between and among students, teachers, and peers. Interpersonal relationships at school are typically measured by student perceptions of caring, involved teachers and/or positive peer relationships in school (Anderman & Kaplan, 2008; Crosnoe, 2004; Loukas et al., 2006; Roeser et al., 1996). Studies have used terms such as teacher-student relationships, intergenerational bonding, teacher involvement, teacher support, positive and negative peer interactions to represent interpersonal relationships at school (Brand et al., 2003; Crosnoe et al., 2004; Hughes et al., 2008; Ma, 2003). Although some researchers conceptualize student perceptions of positive teacher-student relations as a form of emotional engagement (Finn & Voelkl, 1993), the present study views interpersonal relationships as a separate aspect of the school climate that has a potential positive association with student engagement in school.
As Anderman and Kaplan (2008) pointed out, tremendous growth has taken place within the last decade in studies examining the role of social processes in academic motivation, particularly within the context of the classroom. However, this body of literature is still in its early stages. This is evident in the wide range of variables included in the reviewed studies, the different definitions used for key constructs, and diverse methodological approaches used to study interpersonal relationships at school as well as student engagement in school. A review of literature indicates that although several studies have examined interpersonal relationships between teachers and students within the context of the classroom (Furrer & Skinner, 2003; Kinderman, 2007; Skinner & Belmont, 1993), little attention has been given to interpersonal relationships within the context of the entire school. Nevertheless, research has shown a positive association between interpersonal relationships at school and school sense of belonging (Juvonen, 2006; Loukas et al., 2006; Roeser et al., 1996). School sense of belonging has received a lot of attention by researchers (for a review, see Osterman, 2000) and has been used interchangeably with interpersonal relationships, relatedness, connectedness, and sense of community (Juvonen, 2006; Kuperminc et al., 2001; NRC & IOM, 2004; Schunk et al., 2008). Thus, the following literature review includes studies examining interpersonal relationships among students, teachers, and peers in the school as well as in the classroom, and student sense of belonging in school.

School interpersonal relationships and student engagement in school. As mentioned previously, Brand et al. (2003) examined the association of multiple dimensions of school climate with student academic and behavioral adjustment among 188,278 students representing 243 middle schools over a period of three years. The dimensions from
the Inventory of School Climate – Student (ISC-S) that measured school social climate were: (a) teacher support (e.g., “Teachers take a personal interest in students”), (b) positive peer interactions (e.g., “Students in this school get to know each other really well” and “Students enjoy doing things with each other in school activities”), and (c) negative peer interactions (e.g., “Students in this school have trouble getting along with each other”). Each component of the school social climate was analyzed separately. Brand et al. found that students attending schools with higher mean levels of teacher support and positive peer interactions reported higher academic aspirations and academic efficacy, as well as higher academic grades. Students attending schools with lower mean levels of negative peer interactions also reported higher academic grades. Students attending schools with higher levels of support for cultural pluralism also had higher academic expectations and academic aspirations. Overall, Brand et al. provided evidence of a significant association between school social climate and student outcomes related to engagement (e.g., academic achievement) in a large-scale national study conducted in 243 middle schools.

School sense of belonging and student engagement in school. School sense of belonging has been defined and operationalized in various ways. However, it is typically defined in terms of the quality and frequency of interactions between and among students and adults (Kuperminc et al., 2001; Loukas et al., 2006; Schunk et al., 2008). Sense of belonging includes feelings of being liked, respected, accepted, cared for, supported and close to other members of an organization (Anderman, 2002; Battistich et al., 1995; Juvonen, 2006; Kuperminc et al., 2001; Roeser et al., 1996; Schunk et al., 2008; Vieno et al., 2007). Sense of belonging also includes feelings of commitment to the goals and values of an organization (Schunk et al., 2008). As mentioned previously, school sense of belonging has been used
Battistich et al. (1995) examined the association of individual- and school-level sense of belonging with several student outcomes related to student engagement in school. The study sample consisted of a diverse population of 4,515 third through sixth grade students attending 24 urban and suburban schools. School sense of belonging was measured by a mix of questions assessing student perceptions of caring and supportive relationships in the school (e.g., “People care about each other in this school”, “Students in this school help each other, even if they are not friends,” and “I feel that I can talk to the teachers in this school about things that are bothering me”) and in the classroom (e.g., “My class is like a family”), as well as student autonomy and the extent of influence students had in establishing classroom norms and involvement in decision making (e.g., “In my class students have a say in deciding what does on”). Battistich et al. found that individual student perceptions of a sense of belonging in school were positively associated with several student outcomes related to engagement; even after controlling for individual student gender, race, and grade level. Student outcomes related to student engagement that were significantly associated with sense of belonging included enjoyment of class, liking for school, task orientation (i.e., tendency to feel most satisfied when schoolwork is both challenging and leads to improved understanding), preference for challenging tasks (but only for third/fourth grade students), intrinsic academic motivation, intrinsic prosocial motivation, academic self-esteem, educational aspirations, educational expectations (but only for fifth/sixth grade students), and sense of efficacy. Individual student feelings of a sense of belonging was negatively associated with two other achievement orientations: ego orientation (i.e., tendency to feel
most satisfied when schoolwork allows one to demonstrate better performance than other students) and work avoidance (i.e., tendency to feel most satisfied when work is easy). Individual student feelings of a sense of belonging were also positively associated with several school interpersonal relationship variables including trust in and respect for teachers (but only for fourth/fifth grade students), enjoyment of helping others learn, concern for others, conflict resolution skills, acceptance of outgroups (but only for third/fourth grade students), and altruistic behavior.

Battistich et al.’s second level of analysis examined between-school differences in the association of aggregated school sense of belonging with mean levels of student outcomes, after controlling for student body composition in terms of gender, race, grade level, and school poverty. Aggregated school-level sense of belonging was significantly associated with many of the same student outcomes seen in the individual student level analysis. Enjoyment of class, liking for school, intrinsic academic motivation, intrinsic prosocial motivation, and sense of efficacy were significantly associated with school sense of belonging across all grade levels. Educational aspirations were significantly associated with school sense of belonging for fifth/sixth grade students. Similar to the individual student level analysis, school sense of belonging was also negatively associated with ego orientation and work avoidance. In addition, school sense of belonging was positively associated with many of the same school interpersonal relationship seen in the individual student level analysis. Enjoyment of helping others learn, concern for others, conflict resolution skills, and altruistic behavior were significantly associated with school sense of belonging across all grade levels. Trust in and respect for teachers were significantly associated with school sense of belonging for fourth/fifth grade students. Acceptance of outgroups was significant for third/fourth grade
students. In summary, Battistich et al. provided evidence of a significant association of school sense of belonging with school interpersonal relationships as well as a variety of student outcomes related to school engagement among third through sixth grade students. Students who felt a sense of belonging in their school had more positive interpersonal relationships with their teachers and peers and they were more engaged in school. In addition, schools with higher levels of school sense of belonging also had more positive interpersonal relationships among teachers, students, and peers as well as higher levels of student engagement in school.

In a series of studies, Anderman (2002) examined the association of individual- and school-level sense of belonging with school interpersonal relationships, and student engagement in school using data from the National Longitudinal Study of Adolescent Health. Anderman examined a sample of over 58,653 students from 132 diverse middle and high schools. Interpersonal relationships among students, teachers, and peers as well as student engagement in school were combined into one scale measuring the extent of problems students had in school. The school problems scale measured the extent to which students had trouble paying attention in school, getting homework done, getting along with teachers, and getting along with other students. Anderman found that students who felt a sense of belonging in their school had better interpersonal relationships with their teachers and peers and were more engaged in school. These results remained significant after controlling for personal student background characteristics (ethnicity, parent education, grade level, and gender) however the effect was weakened in larger schools. In contrast, school-level sense of belonging (i.e., aggregated student perceptions of school sense of belonging) was negatively associated with school interpersonal relationships and school engagement. Anderman
described these results as particularly troubling because it suggests students are at a greater risk of school problems if they feel they do not belong in a school where most students feel they do belong. In conclusion, Anderman provided further empirical evidence of a positive association of individual student perceptions of a sense of belonging in school, school interpersonal relationships, and student engagement in school. The negative association of aggregated school sense of belonging with school interpersonal relationships and school engagement provide further evidence of the importance of examining the individual student perspective of the school environment.

*Interpersonal relationships in the classroom and student engagement in school.*

Hughes et al. (2008) examined the association of teacher-student interpersonal relationships in the classroom, student engagement in school, and academic achievement in a longitudinal study of 671 first grade students followed for three years. Teachers reported the extent to which students exhibited effortful engagement. Effortful engagement measured in terms of student effort, attention, persistence, and cooperative participation in learning. The 10-item scale drew from the Conscientiousness scale of the *Big Five Inventory* and the Social Competence scale (John & Srivastava, 1999; Conduct Problems Prevention Research Group, 2004, as cited in Hughes et al., 2008). Interpersonal relationships between teachers and students were measured by a 22-item *Teacher Student Relationship Inventory* (Hughes, Cavell, & Wilson, 2001 as cited in Hughes et al., 2008). Teachers reported the extent of support, intimacy, and conflict in their relationship with individual students. Example questions included “I enjoy being with this child,” “This child talks to me about things he/she doesn’t want others to know,” and “This child and I often argue or get upset with each other.” Hughes et al. (2008) found a significant positive association between teacher-student
interpersonal relationships, effortful engagement, and academic achievement, after controlling for student characteristics such as prior academic engagement and achievement. Students who had better quality relationships with teachers in the first grade had higher effortful engagement. Higher effortful engagement led to better quality relationships with teachers as well as higher academic achievement in subsequent years. In conclusion, Hughes et al. (2008) provide evidence of a significant positive association between interpersonal relationships at school, effort and persistence, and academic achievement among elementary school students within the context of the classroom.

Klem and Connell (2004) investigated the association of student engagement in school and interpersonal relationships between teachers and students in the classroom using a sample of 1,846 third through fifth grade students from six urban elementary schools and 2,430 sixth through eighth grade from three urban middle schools. Students varied in ethnicity, gender, and SES. Interpersonal relationships between teachers and students (called teacher support) were measured by student perceptions of the extent of teacher involvement (e.g., “My teacher cares about how I do in school”), provision of structure (e.g., “My teacher is fair with me” and “My teacher’s expectations of me are way off base”), as well as support for autonomy (e.g., “My teacher thinks what I say is important”). Student reported engagement included questions on the extent to which students exerted “effort on schoolwork,” “pay attention in class,” “prepare for class,” and “believe doing well in school is personally important.” Students also reported on coping strategies used for dealing with challenges, including persisting in the face of difficulty. In addition, teachers reported on the level of engagement of individual students in their classrooms. These questions included the extent to which “students are attentive,” “come to class prepared,” and “do more than they
were required.” Klem and Connell found elementary and middle school students who perceived teachers as supportive were significantly more likely to be engaged in school. High levels of student engagement in school were also significantly associated with higher attendance and academic achievement. Higher attendance and academic achievement were described as “variables that strongly predict whether youth will successfully complete school and ultimately pursue post secondary education and achieve economic self-sufficiency” (Klem & Connell, 2004, p. 270). In summary, Klem and Connell provided additional evidence of a positive association of interpersonal relationships between teachers and students in the classroom with student engagement in school in a diverse sample of elementary and middle school students.

Kindermann (2007) examined the association of teacher-student interpersonal relationships in the classroom (called teacher involvement) as well as student-peer interpersonal relationships (called peer group association) with student behavioral and emotional engagement in a sample of 340 sixth grade students attending a middle school located in a suburban town in the northeastern United States. An eight-item scale measured student perceptions of their interpersonal relationships with teachers. Students indicated the degree to which they felt their teacher was available, caring, warm, and affectionate (e.g., “My teacher knows me well” and “My teacher doesn’t seem to enjoy having me in the class”) (Skinner & Belmont, 1993 as cited in Kinderman, 2007). Teachers rated the behavioral and emotional engagement of students using a 14-item scale that included such questions as: “This student works as hard as he/she can” (Wellborn, 1991 as cited in Kindermann, 2007). Interpersonal relationships between students and peers were assessed through a peer network strategy in which students were asked to indicate which students
hung around together frequently, spent time together, and did activities together on a regular basis. Students were then organized into several naturally occurring peer groups. It was hypothesized that students would selectively associate with peers who had similar levels of engagement in school. Furthermore, peer group affiliation was hypothesized to predict changes in students’ engagement in school over the first year of middle school, beyond the influence of positive teacher-student interpersonal relationships and personal student background characteristics (i.e., parent support and academic functioning). Kindermann found a significant positive association between teacher-student interpersonal relationships and student engagement in school over time, in both the fall and spring school semesters. Peer group association significantly predicted a small change in student engagement from the fall to spring semester, after controlling for teacher-student interpersonal relationships and personal student background characteristics. That is, students who affiliated with engaged peers in the fall semester remained highly engaged in the spring semester, whereas students who affiliated with less engaged peer groups showed declines in engagement over time. In summary, Kindermann extends the evidence of a positive association between school social climate and student engagement in school by demonstrating the influence of student-peer interpersonal relationships over time.

Summary. Few studies have specifically examined measures of interpersonal relationships among students, teachers, and peers in school. However, those studies that have examined the school social climate, in terms of interpersonal relationships in the school and in the classroom as well as school sense of belonging, have found significant associations with several student outcomes related to student engagement in school (Anderman, 2002; Battistich et al., 1995; Brand et al., 2003; Hughes et al., 2008; Kindermann, 2007; Klem &
The following student engagement, motivation, and academic outcomes were associated with measures of the social climate of the school or the classroom: higher student effort, higher persistence and attentiveness, higher levels of class preparation and participation, liking of school, belief that doing well in school is personally important, preference for challenging tasks, higher intrinsic motivation, higher academic expectations, higher academic aspirations, higher academic efficacy, and higher levels of academic achievement. Cross-sectional and longitudinal evidence was provided using large samples of elementary, middle, and high school students attending demographically diverse schools.

*Studies Suggesting a Mediation Effect of School Social Climate*

The aforementioned studies indicated positive associations between school disciplinary climate, school social climate, and student engagement in school when these concepts are examined together in the same study (Brand et al., 2003; Kuperminc et al., 2001; Marks, 2000). The following section describes studies suggesting the association between school disciplinary climate and student engagement in school is mediated by school social climate. Crosnoe et al. (2004) examined whether interpersonal relationships between teachers and students were predicted by a safe school climate and resulted in positive student functioning (i.e., increased academic achievement and decreased disciplinary problems). Crosnoe et al. (2004) used a national probability sample of 10,991 students representing 126 U.S. middle and high schools from the Longitudinal Study of Adolescent Health dataset. Several individual-level student characteristics were examined, such as race/ethnicity, gender, grade level; as well as school-level characteristics such as structure (e.g., class size and sector), student composition, and climate (e.g., school safety and mean parental education). Safe school climate was measured at the institutional level by aggregated student
perceptions of their school as safe. Interpersonal relationships between teachers and students were measured by individual student perceptions of the extent to which they had trouble getting along with their teachers, felt teachers cared about them, and believed teachers treated students in their school fairly. Crosnoe et al. (2004) found interpersonal relationships between teachers and students were significantly higher in schools that students perceived as safe. Perceptions of a safe school was the strongest school-level predictor of teacher-student interpersonal relationships over time in comparison to the effects of public vs. private schools, smaller class size, student similarity with the rest of the school in terms of race/ethnicity, higher student academic achievement in the school, and higher parental education among students in the school. Crosnoe et al. (2004) also found teacher-student interpersonal relationships were positively associated with subsequent academic achievement, especially for Hispanic females. Although Crosnoe et al. (2004) did not test a mediation effect directly, their research provides additional support for a positive relationship between school disciplinary climate, school social climate, and positive student outcomes related to student engagement in school.

Rumberger (1995) investigated the influence of school disciplinary climate and school social climate on student dropout (i.e., student disengagement in school) in a nationally representative probability sample of 17,424 students representing 981 middle schools drawn from the U.S. Department of Education’s National Education Longitudinal Study of 1988 (NELS:88) dataset. Hierarchical linear modeling procedures were used to estimate both individual- and school-level effects on dropping out. Although Rumberger was primarily interested in measuring the extent to which differences between schools were associated with student dropout, student-level analyses were conducted to examine the direct effects of
personal student background characteristics (i.e., gender, race, and SES), student school experiences (e.g., being held back in school and academic achievement), and student academic attitudes (e.g., educational expectations of graduating from high school, doing more homework and coming to class prepared, perceptions of school safety, and interpersonal relationships at school) measured during middle school on subsequent school dropout two years later. Each of the individual-level variables were then used to control for the effects of each other on student dropout. Analysis of the individual-level variables revealed individual student perceptions of safety in school was not significantly associated with student dropout after controlling for the rest of the personal student background characteristics, student school experiences, and academic attitudes. However, it is important to keep in mind that one of the control variables was interpersonal relationships between teachers and students. Furthermore, students who reported having better and more caring teachers as well as those who were viewed more positively by their fellow students were significantly less likely to dropout, even after controlling for other student characteristics. In the second level of analysis, fairness of the school disciplinary climate remained significantly associated with lower dropout rates even after controlling for individual student characteristics. Although Rumberger did not test for a mediation effect, study findings suggest that individual student perceptions of the social climate of the school may mediate the association between student feelings of safety in school and student dropout.

Ma (2003) investigated the association of school disciplinary climate, school social climate, and student engagement in school among a sample of 9,751 middle schools students attending 240 schools in New Brunswick, Canada. Ma (2003) examined student engagement in school a little differently than previously reviewed studies. Student engagement in school
was included in a measure of school climate called the academic press of the school. Items relating to student engagement in school asked students to report the degree to which their classmates were engaged in school. Specifically, students were asked the extent to which students in their school “try hard to get good marks on tests,” “could do better if they tried harder,” “usually do their homework on time,” and “feel they could do the work in class if they try.” Students also reported the extent to which they believed they could do well in school if they worked hard as well as their sense of self-efficacy in school. Responses to these questions were aggregated to represent the academic press of the school. Academic press was hypothesized to predict student perceptions of school belonging at the individual-level. School disciplinary climate items measured: fairness and clarity of school rules, harshness of punishment, and incidence of problem behavior among students (e.g., “Rules at this school are fair,” “The rules for behavior at this school are clear to me,” “Often the punishment for breaking the rules is too strict,” and “Students at this school get into fights”). Student sense of belonging was measured by the following items: “I feel like I belong at this school,” “Often I feel awkward and out of place,” “I feel the teacher likes me,” “Often I feel lonely at school,” “I make friends at school easily,” and “Other children seem to like me.” Ma (2003) found individual student perceptions of a sense of belonging in the eighth grade were significantly higher in schools with a more positive school disciplinary climate. In addition, individual student sense of belonging in the sixth grade was significantly greater in schools with higher school engagement and academic press. Although inconsistent results were found across the sixth and eighth grade, Ma (2003) provides additional evidence of a positive association between school disciplinary climate, school social climate, and student engagement in school.
Using data obtained from a large-scale, nationally representative study of 160 U.S. public and Catholic high schools from the U.S. Department of Education’s High School and Beyond dataset, Lee and Byrk (1989) found a positive association between several school-level characteristics and student achievement. Of particular importance to the present study is their operationalization and findings related to the disciplinary climate of the school. School disciplinary climate was based on aggregate student feelings of safety, aggregate student perceptions of fairness and effectiveness of discipline at the school, and the number of discipline incidents among students (e.g., student’s talking back to teachers, refusal to obey instructions). Lee and Byrk found student academic achievement, especially among minority students, was higher in schools with a safe and orderly disciplinary climate that used fair and effective discipline practices. This finding is important because other studies have found a positive association between student engagement in school and academic achievement (for a review, see Fredricks et al., 2004). Lee and Byrk argued that the association of school disciplinary climate with student academic achievement resulted from positive teacher-student interpersonal relationships. Safe and orderly schools provide access to a “rich spectrum of adult roles that, in turn, engage students personally and challenge them to engage in the life of the school” (p. 189). Although Lee and Bryk suggested that interpersonal relationships may be the mechanism for the association of safe and orderly schools with outcomes related to student engagement in school, they did not test a potential mediation effect in their study. Nevertheless, they provide a rationale to help explain the link between the school disciplinary climate, school social climate, and student outcomes related to student engagement in school.
In conclusion, Crosnoe et al. (2004), Rumberger (1995), Ma (2003), and Lee and Byrk (1989) provide further evidence of a significant positive association between school disciplinary climate, school social climate, and outcomes related to student engagement in school. These studies extend the literature by suggesting that school social climate is the mechanism behind the association of school disciplinary climate and student engagement in school.

Theoretical Explanations for the Link Between Variables

The school climate literature and classroom context literature offer many different theoretical perspectives to help explain the association between school climate and student motivation, engagement, and academic achievement. Three theories elucidate the role of school social climate in mediating the association between school disciplinary climate and student engagement in school: (1) social capital, (2) socialization, and (3) goodness-of-fit theories.

Social capital. Based on the theory of social capital, Crosnoe et al. (2004) argued that higher levels of teacher-student bonding occur in schools where students feel safe because the climate of the school influences a student’s ability to trust and form relationships with others in the school. The school is thought to be a conduit of social capital in the form of positive social interaction. That is, teacher-student bonding promotes positive student adjustment and increased learning because teachers transmit the knowledge, skills, and strategies students need for navigating the educational system as well as reinforce norms for conventional behavior (Crosnoe, 2004; Crosnoe et al., 2004). Positive social interaction between teachers and students are interrupted to the extent that safety concerns are a source of distraction from academic endeavors.
Socialization theory. Wentzel (2003) discussed the influence of school interpersonal relationships in terms of socialization theory (Grusec & Goodnow, 1994 as cited in Wentzel, 2003). Similar to effective parents, teachers who provide a classroom context of control (i.e., consistent enforcement of rules) and nurturance (i.e., warmth and approval) support student’s internalization, adoption, and pursuit of academic goals and values. By establishing rules for appropriate classroom behavior, teachers provide information to students regarding which goals they should or should not pursue and how to go about achieving those goals. In addition, peers supply other valuable resources by helping each other out, modeling, and communicating standards for appropriate behavior. Thus, teachers and peers act as socializers, helping to motivate students to pursue goals that are in line with the behavioral and academic goals of schools.

Goodness-of-fit theories. Drawing on the goodness-of-fit aspect of person-in-context theories, the research on school transitions provides an additional theoretical explanation as to how and why the school environment influences student outcomes (Eccles, Midgley, Wigfield, & Buchanan, 1993). This line of research has found negative changes in academic, behavioral, and psychological student outcomes resulting largely from the differing contexts of elementary and middle school classrooms. The idea is traditional middle school classrooms emphasize greater teacher control and discipline, fewer opportunities for student decision making, choice, and self-management, as well as less personal and positive teacher-student relationships when compared to elementary school classrooms. These environmental changes come at a time when students developmentally desire more autonomy, relatedness, and self-determination. A developmental mismatch ensues resulting in declines in motivation, interest, and performance among students (Anderman & Midgley, 1997; Eccles
et al., 1993; Hirsch & Rapkin, 1987; Seidman, Allen, Aber, Mitchell, & Feinman, 1994; Simmons & Blyth, 1987). Furthermore, research suggests that the structural and organizational characteristics of middle and high schools contribute to the impersonal climate of these schools. In contrast to elementary school students, middle and high school students move from class to class throughout the school day. This fluctuation results in students spending shorter amounts of time with multiple teachers, where they encounter different sets of rules and instructional routines, as well as different peers (Felner, Farber, & Primavera, 1980; Felner, Gitner, & Cauce, 1981 as cited in Brand et al., 2003). Departmentalized teaching, ability grouping, normative grading, and large student load are all believed to undermine student motivation as well as teacher motivation (Eccles, Lord, & Buchanan, 1996; Eccles et al., 1993; Lee et al., 1993; Seidman et al., 1994). Students have fewer opportunities to form a close relationship with any particular teacher, while teachers find it more difficult to monitor large numbers of students and often resort to more controlling strategies (Eccles et al., 1993). Lee and Smith (2001) argue that high schools often promote impersonal relationships between students and teachers as a way to maintain order:

The bureaucratic structure of most high schools relies on affectively neutral relationships to facilitate the administration of standardized rules and procedures. Strong personal ties among adults, or between adults and students, make it more difficult for staff to comply with standard practices and procedures. (p. 103)

Goodness-of-fit theories illustrate how the school environment can influence student outcomes related to motivation, engagement, and academic achievement when the school environment does not meet the needs of students.

Taken together, the wide variety of theories offering explanations for the influence of the school context on student outcomes all point to the importance of high quality relationships between teachers, students, and peers in school. Teachers and peers are an
invaluable source of information for students. Safe and orderly schools provide the foundation needed for positive school interpersonal relationships to grow and flourish. Positive school interpersonal relationships, in turn, provide opportunities for healthy student adjustment in terms of higher student motivation, engagement, and academic achievement. Optimal student adjustment is promoted when school environments meet students’ needs for positive school interpersonal relationships.

Purpose of the Present Study

The purpose of the present study was to examine the association of two aspects of school climate with student engagement in school, namely school disciplinary climate and school social climate. Two research questions guided the investigation: (1) What is the association of school disciplinary climate and school social climate with student engagement in school? and (2) Does school social climate mediate the association between school disciplinary climate and student engagement in school? It was hypothesized that students with more positive perceptions of their school disciplinary climate and school social climate would be more engaged in school. School social climate was hypothesized to play a central role in this association by serving as the mechanism underlying the association between school disciplinary climate and student engagement in school.
Overview of the ELS:2002 Sample

Data for the present study are from the public use data files for the U.S. Department of Education’s Education Longitudinal Study of 2002 (ELS:2002, National Center for Education Statistics, 2006). ELS:2002 is a nationally representative longitudinal study of U.S. 10th-grade students as they transition through high school and into postsecondary education or careers. Surveys were completed by students, parents, teachers, and school administrators during the base year of the ELS:2002 study. ELS:2002 field staff also completed a school facilities checklist assessing the conditions of the school buildings and grounds. Students were the primary unit of analysis for the present study, however data was drawn from all sources (including the sampling frame) in order to describe the schools students attend.

The ELS:2002 base year sample is a nationally representative probability sample. Two-stage stratified probability sampling was used to first select schools (Ingels et al., 2005; Ingels, Pratt, Rogers, Siegel, & Stutts, 2004; Ingels & Scott, 2004; Planty & DeVoe, 2005). Eligible schools included regular public schools (including state education agency and charter schools), Catholic, and other private schools that contained the tenth grade and were located in the United States (i.e., the 50 states and District of Columbia). Certain schools with special populations (e.g., schools serving student populations with severe disabilities) as well as those operated by the Bureau of Indian Affairs were not included in the sampling
frame. Schools were selected by geography and urbanicity with probability proportional to size. Private schools were oversampled.

The second stage of sampling selected approximately 26 students per school. Hispanic and Asian students were oversampled. Students were included in the ELS:2002 study if they were enrolled in a study school as a 10th-grade student during the spring term of the 2001-2002 school year and if their native language was English. Students were also included if they had received at least three years of academic instruction in English or the school felt the student could meaningfully respond to the survey questions. Students in special education classes were included if their individualized education plan indicated they could be tested with accommodations (e.g., extra time or instructions in sign-language) that could be practically implemented during the survey period.

*Study participants.* Of the 752 schools that participated in the ELS:2002 study, 580 (77.1%) were public schools, 95 (12.6%) were Catholic, and 77 (10.2%) were other private schools. The present study focused on the 12,795 students attending public schools. Approximately 93.9% of these students completed a questionnaire. As can be seen from the school characteristics displayed in Table 2, the majority of public school students attended schools located in suburban areas across the four national census geographic regions. The vast majority of students attended schools that included 9th through 12th grades or higher. Although schools ranged in size, approximately 43.7% of the students attended large schools with 1200 or more enrolled students. As can be seen from the student characteristics displayed in Table 3, gender of the student population was evenly split between males and females. The majority of students were White and the largest minority groups were Hispanic and Black. English was the native language for the majority of students. The vast majority of
students’ parents graduated from high school or attended at least some college. In addition, Table 3 displays student family socioeconomic status, a composite measure based on parental education, parental occupation, and family income (Ingels et al., 2005; Ingels & Scott, 2004). Student family socioeconomic status was categorized as low, middle, or high based on the unweighted quartiles of the study sample of public school students. As shown in Table 3, the majority of students were in the middle of the socioeconomic status range.

The school context. The school administrator survey provided additional contextual information on the safety and disciplinary incidents in the schools, school social and academic climate, as well as discipline policies and procedures. Approximately 86% of the 586 public school administrators completed a questionnaire and 11.8% completed a partial questionnaire. Thus, there was between 14–19% missing data on the public school administrator questions included in this study. Overall, the majority of school administrators indicated that the learning of students was either not at all hindered (41.1%) or hindered very little (35.7%) by a lack of discipline and safety in the school. Most schools implemented some safety procedures including controlled access to school buildings (64.5%), closed campus during lunch (59.7%), and used paid law enforcement or security services during school hours (64.7%), while students were arriving/leaving (60.4%), and/or at selected school events (79.0%). Tardiness, absenteeism, and class cutting were reported to occur on a daily or weekly basis (79.9%, 79.8%, and 65.5% respectively). The majority of administrators (at least 59%) reported serious crimes such as robbery/theft, vandalism, weapon possessions, and physical abuse of teachers occurred occasionally or never. However, 22% of administrators reported robbery or theft occurred at least once a month and 13.7% reported vandalism occurred at least once a month. Similarly, 32.9% of administrators
reported physical conflict among students occurred at least once a month as well as student bullying (28.6%), student verbal abuse of teachers (23.5%), and student acts of disrespect for teachers (26.5%). The majority of administrators (78.4%) reported student racial tensions occurred occasionally or never. Overall, school administrators reported that public schools in the ELS:2002 dataset had some student discipline problems. However, by and large administrators reported that learning was not hindered by these problems and the school social and academic climate were positive.

Measures

The following section begins by describing the items used in the present study to measure school disciplinary climate, school social climate, and student engagement in school. An overview is then provided of the instrument development process and procedures used in the ELS:2002 study to establish validity and reliability of measures. The third part of this section describes procedures used to prepare data for factor analysis and measures of internal consistency conducted in the present study. The fourth part of this section discusses the results of the factor analysis procedures and measures of internal consistency conducted in the present study.

School disciplinary climate. To measure the disciplinary climate of the school, students were asked to indicate the extent to which they agreed or disagreed with several statements concerning school rules. Students answered the following four items on a scale of 1 (strongly agree) to 4 (strongly disagree): (1) “Everyone knows what the school rules are,” (2) “The punishment for breaking school rules is the same no matter who you are,” (3) “The school rules are strictly enforced,” and (4) “If a school rule is broken, students know what kind of punishment will follow.”
School social climate. To measure the social climate of the school, students were asked to indicate the extent to which they agreed or disagreed with several statements about their school and teachers. Students answered the following three items on a scale of 1 (strongly agree) to 4 (strongly disagree): (1) “Students get along well with teachers,” (2) “There is real school spirit,” and (3) “Teachers are interested in students.”

Student engagement in school. To assess student engagement in school, students were asked to indicate how often a number of statements concerning effort and persistence applied to them. Students answered the following four questions on a scale of 1 (almost never) to 4 (almost always): (1) “When studying, I try to work as hard as possible,” (2) “When studying, I keep working even if the material is difficult,” (3) “When studying, I try to do the best to acquire the knowledge and skills taught,” and (4) “When studying, I put forth my best effort.”

Overview of the ELS:2002 instrument development process and procedures. Items selected for inclusion in the ELS:2002 study underwent an intensive development, review, and revision process based on input from: (1) a Technical Review Panel comprised of a group of substantive, methodological, and technical experts; (2) different government agencies, policy groups, and interested parties; (3) interdivisional review at NCES; as well as (4) a field test carried out to investigate the performance of items (Ingels et al., 2005; Ingels et al., 2004). Many of the ELS:2002 survey items originated from those used in previous large scale national longitudinal education studies conducted by the U.S. Department of Education, such as the National Education Longitudinal Study of 1988 (NELS:88) and the 2000 Program for International Student Assessment (PISA). All of these studies (i.e.,
ELS:2002, NELS:88, and PISA) carried out similar rigorous instrument development processes driven toward establishing high-levels of validity and reliability of measures.

Technical reports for the NELS:88 study discussed the results of factor analysis and the internal consistency of items measuring school disciplinary and social climate (Freidlin & Salvucci, 1995). However, the specific items used to measure school disciplinary climate and school social climate in the present study represent only a subset of those questions evaluated for internal consistency in the NELS:88 technical report. Thus, factor analysis and measures of internal consistency were calculated in the present study, as discussed in a later section. The ELS:2002 field test report discussed the results of measures of internal consistency for the student effort and persistence items (Burns et al., 2003). Cronbach’s alpha coefficients were calculated during the ELS:2002 field test as well as in a sample of students representing 22 different countries from the PISA study. Analyses indicated that the items measuring student effort and persistence in school had good internal consistency. The Cronbach’s alpha was .85 for the engagement scale in the ELS:2002 field test. Cronbach’s alpha ranged from .76 to .87 across the 22 field-test countries included in the PISA field test.

Preparation of data for factor analysis. A number of steps were conducted to prepare data for analysis. School disciplinary climate and school social climate items were reverse scored in order for higher numerical values to represent more positive perceptions of the school climate. Reverse scoring was not necessary for items measuring student engagement in school. Examination of data for missing values revealed substantial missing data for each of the scale items. Specifically, the percentages of missing data for the four school disciplinary climate scale items were 10.4%, 11.1%, 11.1% and 10.7% respectively. The percentages of missing data for the three school social climate scale items were 10.3%,
10.7%, and 11.9% respectively. The percentages of missing data for the four student engagement in school scale items were 32.3%, 34.0%, 34.9%, and 30.4% respectively. Because missing data decreases the precision of estimates, mean substitution was used to handle missing data for all three variables. Mean substitution is intended to reduce bias and allows analyses to proceed as if the dataset were complete (Kalton and Kasprzyk, 1982 as cited in NCES, 2002).

A correlation coefficient matrix was examined to evaluate assumptions of linear relationships between the scale items for factor analysis. As shown in Table 4, all scale items were significantly, positively correlated with each other. Means, standard errors, skewness, and kurtosis for each of the scale items are reported in Table 5. Stem-and-leaf plots, box plots, and histograms were also generated to evaluate assumptions of normality and homogeneity of variance. Although the items had a slight negative skew, all items were judged to be within acceptable limits of normality and homogeneity of variance.

Factor analysis of the ELS:2002 items. A series of exploratory factor analyses were conducted on the same sample using SPSS 15.0. Data included all 10th-grade students attending public schools in the ELS:2002 sample. Principal axis factor analysis was first conducted on five items initially thought to measure the disciplinary climate of the school and four items initially thought to measure the social climate of the school. However, not all of the school disciplinary climate items nor school social climate items loaded well on the appropriate factor. Appendix A provides a detailed discussion of the preliminary factor analyses and measures of internal consistency used to guide the final selection of items. One item was excluded from the final school disciplinary climate scale: “The school rules are fair.” One item was also excluded from the final school social climate scale: “Students make
friends with students of other racial and ethnic groups.” Principal axis factor analysis was then conducted a second time after the removal of these two items. Three criteria were used to determine the number of factors to rotate: (1) the a priori hypothesis that the items measured three different constructs, (2) Eigenvalues above 1.00, and (3) the results of the scree test. Factor extraction provided evidence of three factors. Thus, direct oblimin rotation was conducted on three factors. The rotated solution indicated three factors: Student Engagement in School (Factor 1), School Disciplinary Climate (Factor 2), and School Social Climate (Factor 3). Factor scores were then calculated for use in hierarchical multiple regression analyses described in the Results chapter. Pattern, structural, factor score coefficient, and factor score correlation matrices are reported in Tables 6 - 9.

Measures of internal consistency. Cronbach’s alpha coefficients were calculated for the school disciplinary climate, school social climate, and student engagement in school scale items. Coefficient alphas for all three scales indicated adequate internal consistency. The coefficient alpha for the final 4-item school disciplinary climate scale was .62. The coefficient alpha for the final 3-item school social climate scale was .54. The coefficient for the 4-item student engagement in school scale was .86. High internal consistency was expected for the student engagement in school scale based on the results of previous studies (Burns et al., 2003).

Procedures

The following section begins by describing the analytic procedures used in the present study to assess the association of school disciplinary climate, school social climate, and student engagement in school. The section ends with a discussion of the procedures used to prepare data for regression analysis in the present study.
Use of weights for complex survey design. As mentioned previously, the complex sampling design of the ELS:2002 uses both stratification, disproportionate sampling of certain strata, and clustering. Thus, certain groups were oversampled (i.e., private schools; Hispanic and Asian students) and students were clustered by school. This complex sampling design results in statistics that are more variable than those obtained through simple random sampling. Variance (i.e., standard errors) will be underestimated and sample statistics will be inflated in hypothesis testing, thus increasing the chance of a Type I error (i.e., rejecting the null hypothesis when it is actually true). The ELS:2002 dataset includes weights to compensate for both unequal probabilities of selection as well as adjustment for nonresponse effects (i.e., correcting for students who were selected but chose to not participate). This weighting procedure allows generalization to the 3 million students attending the tenth grade in the United States in 2002. In other words, using unadjusted weights, one student represents 196 other students (3 million/15,300 = 196). However, one student might represent fewer than 196 students because some groups were oversampled (or selected at a greater rate than their proportion in the population). At the same time, because not all students sampled eventually completed a survey, one student might represent many more than 196 students (NCES, 2006).

The statistical software package Stata 10 was used to apply weights that take into account complex survey sampling and design effects. However, existing software is limited in the number of commands supported for complex survey data. Thus, the statistical software package SPSS 15.0 was also used to examine descriptive statistics and graphs based on unweighted data. Whenever possible, statistics are presented in both SPSS and Stata in order to provide a comparison of statistics based on unweighted and weighted data.
Controlling for potential confounding variables. Previous analyses of the ELS:2002 base year student survey data found significant differences in student perceptions of school disciplinary climate and school social climate with respect to school type (public, Catholic, other private; Ingels et al., 2005). That is, Ingels et al. (2005) found students in Catholic school as well as other private schools were generally more likely to express positive views about their school disciplinary climate and school social climate when compared to their urban school counterparts. Therefore, the study sample was limited to public school students in order to reduce the potential confounding influence of school type.

Regression analysis procedures. Hierarchical multiple regression analysis procedures were used to calculate the association between school disciplinary climate and student engagement in school, as mediated by school social climate. Mediation effects were examined according to a four-step process outlined in Baron and Kenny (1986). Step 1 of the mediation analysis determined whether the predictor was significantly associated with the mediator. In this step, the mediator was treated as if it were the criterion. Step 2 determined whether the predictor was significantly associated with the criterion. This step establishes whether there is an effect that can be mediated. Step 3 determined whether the mediator was significantly associated with the criterion. Step 4 was conducted to show a mediation effect. According to Baron and Kenny (1986), there is no need for hierarchical or stepwise regression, nor is there a need to calculate partial or semi-partial associations when testing for mediation. Thus, Baron and Kenny recommended examining the effects of the predictor and mediator simultaneously. Evidence for mediation is provided when the association between the predictor and the criterion is lower in the presence of the mediator. Study hypotheses were tested at the .05 significance level.
Preparation of data for regression analysis. Data were first explored for potential problems. Several extreme outliers were identified and the distributions of the three factor scores appeared to have a slight negative skew. As shown in Table 10, means, standard errors, and ranges for each of the factor scores seemed appropriate. However, measures of skewness and kurtosis indicated that each factor was slightly negatively skewed. Stem-and-leaf plots as well as box plots indicated a small percentage of extreme outliers for all three variables (i.e., less than or equal to 2%). Histograms generated for each factor score indicated that the variables had slightly negatively skewed distributions. Data were further explored for problems using simultaneous linear regression procedures using unadjusted data.

Examination of the histogram of standardized residuals revealed the overall distribution of student engagement was leptokurtic (i.e., a high peak), but approximately normal at fixed points. Examination of the scatterplot of the residuals revealed many values outside +/- 2 standard deviations (see Appendix B). In addition, the matrix scatterplot of the bivariate correlations between all possible pairs of variables also indicated the presence of several bivariate outliers (see Appendix C).

Preliminary simultaneous linear regression procedures indicated that student engagement in school was moderately associated with some linear combination of the school disciplinary climate and school social climate variables, $R^2 = .113$, $F(2, 12792) = 811.20$, $p < .001$. The $t$ tests for school disciplinary climate, $t(12792) = 6.90$, $p < .001$ and school social climate, $t(12792) = 25.68$, $p < .001$ as well as inspection of tolerance and variance inflation factor (VIF) levels indicated that both variables contributed adequate unique variance. However, the potential influence of extreme outliers remained unclear. Casewise diagnostics indicated 57 cases had residuals outside +/- 3 standard deviations Therefore, data
were screened for anomalies by examining studentized residual scores, Mahalanobis distance values, and Cook’s $D$ values. Because there appeared to be some anomalies, simultaneous linear regression was re-calculated after the removal of 10 cases with residuals outside +/- 2 standard deviations that had correspondingly high Mahalanobis distance ($D^2 \geq 13.85$) and high Cook’s D values ($D_i \geq .002$). There was virtually no change in the proportion of variance explained ($R^2 = .114, F(2, 12782) = 820.31, p < .001$) for the regression equation testing the combined influence of the two school climate measures on student engagement. Therefore, all cases were retained in the mediation analysis discussed in the next chapter.
CHAPTER IV

RESULTS

Preliminary Results

Pearson correlations were calculated using unweighted data in order to analyze the associations between school disciplinary climate, school social climate, and student engagement in school (see Table 11). School disciplinary climate and school social climate were significantly correlated with each other ($r = .65$, $p < .001$). School social climate appeared to be more strongly correlated with student engagement ($r = .33$, $p < .001$) compared to school disciplinary climate ($r = .26$, $p < .001$). The scatterplot of the bivariate correlations indicated that the linear model was the appropriate fit for all of the bivariate associations. Thus, preliminary results indicated a significant, positive linear association between school disciplinary climate, school social climate, and student engagement in school.

Hierarchical Multiple Regression Analysis Using Weighted Data

Mediation was tested using the four-step regression procedure outlined in Baron and Kenny (1986; see Figure 1). Results were adjusted for complex survey sampling and design effects. Step 1 of the mediation analysis determined whether the predictor was significantly associated with the mediator. In this step, the mediator was treated as if it were the criterion. Thus, as shown in Figure 1, a high association seen in step 1 provided evidence for a direct association between school disciplinary climate and school social climate. A summary of the results of the regression analysis procedures is provided in Table 12. Step 1 of the regression
analysis revealed a significant positive association between school disciplinary climate and school social climate, $R^2 = .43$, $F(1, 299) = 5099.67$, $p < .001$. The regression equation for step 1 was:

$$\text{Pred Soc Climate} = -.009 + .62 \ (\text{Disc Climate})$$

Step 2 of the mediation analysis determined whether the predictor was significantly associated with the criterion. This step establishes whether there is an effect that can be mediated. Thus, in Figure 1, a high regression coefficient seen in step 2 provided evidence for a significant association between school disciplinary climate and student engagement in school. As shown in Table 12, step 2 of the regression analysis revealed a significant positive association between school disciplinary climate and student engagement in school, $R^2 = .07$, $F(1, 299) = 455.61$, $p < .001$. The regression equation for step 2 was:

$$\text{Pred Stu Engage} = -.011 + .29 \ (\text{Disc Climate})$$

Step 3 of the mediation analysis determined whether the mediator was significantly associated with the criterion. Thus, in Figure 1, a high association seen in step 3 provided evidence for a direct association between school social climate and student engagement in school. As shown in Table 12, step 3 of the regression analysis revealed a significant positive association between school social climate and student engagement in school, $R^2 = .11$, $F(1, 299) = 732.13$, $p < .001$. The regression equation for step 3 was:

$$\text{Pred Stu Engage} = -.008 + .39 \ (\text{Soc Climate})$$

Finally, step 4 of the mediation analysis was conducted to show a mediation effect. According to Baron and Kenny (1986), there is no need for hierarchical or stepwise regression, nor is there a need to calculate partial or semi-partial associations when testing for mediation. Thus, Baron and Kenny recommended examining the effects of the predictor
and mediator simultaneously. Evidence for mediation is provided when the association between the predictor and the criterion is lower in the presence of the mediator. Thus, in Figure 1, the association between school disciplinary climate and student engagement in school should be lower when school social climate is taken into account in step 4 as compared to step 2. Specifically, evidence for a partial mediation exists when there is a small drop in the regression coefficient in step 4 relative to step 2. Evidence for a full mediation exists when the regression coefficient in step 4 drops to zero. Although there is no set standard on what represents a large or small change, a drop in the regression coefficient was observed. As shown in Table 12, the unstandardized regression coefficient decreased from $b = .29$ in step 2 to $b = .08$ in step 4. When analyzed by itself, school disciplinary climate accounted for only 7% of the variance in student engagement in school, $R^2 = .07$, $F(2,299) = 455.61, p < .001$. Whereas school disciplinary climate and school social climate collectively explained 11% of the variance in student engagement in school, $R^2 = .11$, $F(2,298) = 375.28, p < .001$ (see Table 12). The regression equation for step 4 was:

$$Pred \ Stu \ Engage = -.008 + .08 \ (Disc \ Climate) + .34 \ (Soc \ Climate)$$

Thus, hierarchical multiple regression analysis indicated that school social climate mediated the association between school disciplinary climate and student engagement in school.
CHAPTER V
DISCUSSION

Feelings of safety and security in school are essential for student learning. Schools have an important role to play in creating a safe and positive learning environment that promotes optimal student learning. Optimal student learning is promoted when a student is engaged in school. However, little attention has been given to the association of student engagement, motivation, and academic achievement with an orderly school environment that uses consistent and effective disciplinary practices. Furthermore, no studies were identified that examined the processes or mechanisms by which an orderly school environment might be associated with these student outcomes.

The present study aimed to fill this gap in the literature by examining the association between individual student perceptions of school disciplinary climate, school social climate, and student engagement in school. School disciplinary climate was measured by student perceptions of the policies and practices associated with school rules (i.e., the clarity, fairness, consistent enforcement, and effectiveness of school rules). School social climate was measured by student perceptions of the quality of interpersonal relationships between teachers, students, and peers at school (i.e., extent to which students get along well with teachers, teachers are interested in students, and there is real school spirit). Student engagement in school was measured by student reported effort and persistence in schoolwork.
Two research questions guided the investigation: (1) What is the association of school disciplinary climate and school social climate with student engagement in school? and (2) Does school social climate mediate the association between school disciplinary climate and student engagement in school? It was hypothesized that students with more positive perceptions of their school disciplinary climate and school social climate would be more engaged in school. Furthermore, school social climate was hypothesized to play a central role in this association by serving as the mechanism behind the association of school disciplinary climate and student engagement in school. That is, students who perceived their school disciplinary climate as positive were expected to report more positive interpersonal relationships at school. A positive interpersonal social climate, in turn, was expected to be positively associated with student engagement in school.

The results of this study support these hypotheses. A significant, direct association was found between school disciplinary climate and student engagement in school. A significant, indirect association was also found between school disciplinary climate and student engagement in school via student perceptions of the school social climate. School disciplinary climate explained approximately 7% of the variance in student engagement in school by itself. However, approximately 11% of the variance in student engagement in school was accounted for by its linear relationship with both school disciplinary climate and school social climate. While individual student perceptions of the school climate explained only a moderate amount of variance in student engagement in school, it appears that students have the tendency to be more engaged in schools with a positive disciplinary and social climate. Positive school social climate played a central role in this association by serving as
the mechanism by which school disciplinary climate was associated with student engagement in school.

The results of this study contribute to the school climate literature in two important ways. First, the present study adds to the literature by showing a significant, positive, and direct association between student perceptions of school disciplinary climate, school social climate, and student engagement in school. This finding addresses an important missing link in prior research concerning the role of perceived disciplinary climate in predicting student engagement in school. Secondly, the present study expands upon the literature by demonstrating a mediation effect of school social climate. The association between school disciplinary climate and student engagement in school diminished in the presence of school social climate. This latter finding helps to improve understanding of the mechanisms or processes behind the association of school climate with student engagement in school. Based on theories of social capital, socialization, and goodness-of-fit, safe and orderly schools provide the foundation needed for positive school interpersonal relationships to grow and flourish. Clear, fair, and effective school rules that are consistently enforced help students understand which academic goals and values are important in school. Positive school interpersonal relationships, in turn, support student’s internalization, adoption, and pursuit of academic goals and values. Students exhibit pursuit of academic goals and values by putting forth effort and persistence in schoolwork. Optimal student adjustment is promoted when school environments meet students’ needs for positive school interpersonal relationships.
Limitations

Although the present study provides evidence of an association between school disciplinary climate, school social climate, and student engagement in school, the findings must be interpreted in light of study limitations. The first limitation is that individual student perceptions of the school disciplinary climate and school social climate explained only a moderate amount of variance in student engagement in school in the present study. Low to moderate effects have been found in previous studies examining the association of individual student perceptions of school disciplinary and social climate with outcomes related to student engagement in school over and above the association of student background characteristics (Crosnoe et al., 2004; Kuperminc et al., 2001; Marks, 2000). These results suggest that other student or school characteristics are responsible for the majority of the variance in student engagement in school.

Previous studies have found school disciplinary climate, school social climate, and student engagement in school to be significantly associated with other school and student characteristics, such as school urbanicity and school size as well as individual student race/ethnicity or socioeconomic background (Ingels et al., 2005; Koth et al., 2008; Lee & Loeb, 2000; Marks, 2000; McNeely et al., 2002). As mentioned previously in the Methods chapter, the study sample was limited to public school students based on the results of previous analyses of the ELS:2002 student survey data that found significant differences in student perceptions of school disciplinary climate and school social climate among public, Catholic, and private schools (Ingels et al., 2005). Ingels et al. (2005) also found significant differences among urban, rural, and suburban students in terms of their perceptions of school safety and the presence of gangs in school. Students attending urban schools were
significantly more likely to feel their schools were not safe and report the presence of gangs in their schools when compared to their rural or suburban school counterparts. Secondly, school size is another potentially influential school characteristic. Studies have found significant associations between school size and student perceptions of the school disciplinary climate and social climate (McNeely et al., 2002). Studies have also found significant associations between school size and student self-efficacy and emotional engagement in school (Koth et al., 2008). Furthermore, Lee and Loeb (2000) documented differences between small, middle, and large sized schools in terms of student composition (i.e., race/ethnicity and SES), teacher attitudes (i.e., collective responsibility for student responsibility for learning), and student achievement. Students in smaller schools were found to be more socially and academically advantaged. Thus, given the findings of previous studies, a limitation of the present study is the potential influence of other important school characteristics that were not controlled for, including school urbanicity and school size.

Other individual student background characteristics, such as race/ethnicity and socioeconomic status, may also influence the association between school disciplinary climate, school social climate, and student engagement in school. After analyzing the ELS:2002 base year student survey dataset, Ingels et al. (2005) found significant differences in student perceptions of the school social climate among students of different racial and socioeconomic backgrounds. White students and high-SES students tended to view the social climate of their school more favorably in terms of the extent to which students got along well with teachers and teacher interest in students. Furthermore, Ingels et al. (2005) found significant differences in student perceptions of the school social climate among students with different educational expectations, enrollment in different high school programs, and
achievement test scores. Specifically, those students who expected to obtain a bachelor’s degree or higher, who were enrolled in a college preparatory program, as well as students who scored in the highest achievement quartile were all significantly more likely to report real school spirit, students got along well with others, and teachers interest in students compared to students who expected to obtain a high school diploma or less, who were enrolled in a vocational or general high school program, and students who scored in the lowest achievement quartile. With that said, other studies have shown school disciplinary climate and school social climate are significantly associated with student engagement in school over and above personal student background characteristics. Although Marks (2000) found significant associations between personal background characteristics of students (i.e., gender, SES, and prior academic achievement) and student engagement in school, these background characteristics were not significantly associated with student engagement in school in the presence of student perceptions the school disciplinary climate and school social climate. Given the findings of both Ingels et al. (2005) and Marks (2000), future research is needed to investigate the influence of other important student characteristics on the association between school disciplinary climate, school social climate, and student engagement in school.

The present study was also limited in terms of the disadvantages associated with using secondary data. Although there are many strengths of secondary analysis, the present study was limited by the questions that were available in the ELS:2002 dataset, missing data for the scale items, as well as a lack of existing information on the construct validity and test-retest reliability of the measures. The ELS:2002 dataset included multiple questions measuring school disciplinary climate and school social climate. Although Cronbach’s alpha
coefficients calculated in the present study were relatively high considering the small number of items available for each scale, the alpha coefficients were generally low for the school disciplinary climate and school social climate scales. Therefore, the findings of the current study should be interpreted with caution. Secondly, as mentioned in the Methods chapter, each of the disciplinary climate, social climate, and student engagement scale items had missing data. Mean substitution was used to handle missing data in the present study, however, there are advantages and disadvantages associated with all methods of data imputation (Kalton and Kasprzyk, 1982 as cited in NCES, 2002). Thirdly, although content validity evidence is available on the ELS:2002 items, no information was found on the construct validity or test-retest reliability of the specific items used to measure school disciplinary climate, school social climate, or student engagement in the present study. Factor analysis and measures of internal consistency were calculated in the present study, however, evidence from multiple and varied sources are needed in order to best evaluate the validity and reliability of the measures.

Finally, an additional limitation of the present study is that the data are correlational in nature and thus, causation cannot be determined. It seems likely that improving student perceptions of school disciplinary climate and school social climate would in turn improve student engagement in school. However, a reciprocal relationship may exist. An alternative explanation for the association between school social climate and student engagement in school could be that students who are highly engaged are more likely to bond with teachers and their school (Juvonen, 2006). Skinner and Belmont (1993) provided evidence of a reciprocal relationship in their study of 144 elementary school students in third through fifth grade. Correlational and path analysis revealed that students who were more highly engaged
at the beginning of the school year were more likely to have higher quality interpersonal relationships with their teachers, receive more optimal structure from their teachers (i.e., in terms of the amount of information provided on how to effectively achieve teacher expectations), as well as receive greater support for autonomy from their teachers. In turn, teacher provision of optimal structure and support for autonomy also predicted student engagement throughout the school year. Future research is needed to investigate the extent to which school disciplinary climate, school social climate, and student engagement in school have a reciprocal relationship.

**Future Research**

In addition to addressing the limitations of the present study mentioned previously, future research is needed to: (1) examine developmental changes over time in the association between school disciplinary climate, school social climate, and student engagement in school; (2) develop better measures of both school disciplinary climate and school social climate that reflect the theoretical distinctions of these concepts; and (3) explore between-school differences using the ELS:2002 dataset to examine potential school effects. This study examined a cross-sectional sample of U.S. 10th-grade students attending public schools. However, follow up data are available on these students as they transition out of high school. Thus, it is possible to examine the association between school disciplinary climate, school social climate, and student engagement in school in this population longitudinally over time. In addition, future longitudinal research is needed to examine the association between school disciplinary climate, school social climate, and student engagement in school among younger elementary and middle school students. Brand et al. (2003) found a positive association of school disciplinary climate and school social climate on student motivation in middle school.
over the course of three years. However, new schools and students were added to the sample each year. Other longitudinal studies have examined the association between interpersonal relationships in the classroom and student engagement among elementary students over time (Hughes et al., 2008). However, further longitudinal research is needed to examine the association between all three concepts investigated in the present study, particularly using measures designed to capture student perceptions of the school as a whole.

Secondly, future research is needed to develop unique measures of school disciplinary climate and school social climate that reflect the theoretical and analytical distinctions between these two constructs. Although the present study found school disciplinary climate and school social climate to be strongly correlated, factor analysis procedures revealed they were indeed two unique constructs. As mentioned previously, researchers typically combine questions of school disciplinary climate and school social climate in order to measure student attitudes toward school (Freidlin & Salvucci, 1995; Lee & Smith-Adcock, 2005; Marks, 2000; McNeely et al., 2002). Indeed, factor analysis conducted in the present study revealed the school disciplinary climate item “The school rules are fair” was more closely associated with items on the school social climate scale. Perhaps this is because “The school rules are fair” measures how reasonable or just students perceive the school rules to be; as opposed to the disciplinary climate item “The punishment for breaking the rules is the same no matter who you are” which seems to measure fairness in terms of the equitable application of the school rules. Nevertheless, the results of the factor analysis, in combination with the finding that school social climate actually mediates the association of school disciplinary climate with student engagement in school, provide further evidence of the need to develop better measures of school disciplinary climate and school social climate as two distinct constructs.
Furthermore, as mentioned previously, the Cronbach’s alpha coefficients calculated in the present study were relatively high considering the small number of items available for each scale. However, the alpha coefficients were generally low for the school disciplinary climate and school social climate scales; providing further evidence of the need to develop better measures of these two constructs.

Finally, although the purpose of the present study was to examine the association of student perceptions of the school disciplinary climate and school social climate with individual student engagement in school, future research is needed to investigate the association of school disciplinary climate and school social climate with student engagement at the institutional level using hierarchical linear modeling. HLM is most appropriate when attempting to predict engagement at the school level because it allows one to control for the confounding effects of within-school variability (Finn & Voelkl, 1993). Although previous studies have consistently found that individual student perceptions have the strongest influence on student engagement in school, significant between-school differences have been found in terms of school disciplinary climate, school social climate, and student motivation, engagement, and academic outcomes (Anderman, 2002; Battistich et al., 1995; Brand, et al., 2003; Marks, 2000).

Educational Implications

The findings of the present study suggest that practitioners can address student perceptions of the disciplinary climate and social climate of the school as a way to improve student engagement in school. The School-Wide Positive Behavior Support Program (U.S. Office of Special Education Programs Technical Assistance Center on Positive Behavioral Interventions & Supports, n.d.) is one example of a school intervention program
that has the potential to address student engagement in school by creating a positive school disciplinary and social climate. School-wide Positive Behavior Support (SWPBS) is a systemic approach of instruction whereby clear behavioral expectations for students are established in the school and then reinforced by school staff in a variety of ways, including the use of a reward system. Schools vary in the way they implement the SWPBS program, but schools focus on adopting a common approach to discipline in order to build a school environment where students see more benefit in appropriate behavior than problem behavior (Carr et al., 2000; Irwin & Algozzine, 2007; Luiselli, Putnam, & Sunderland, 2002; Sugai & Horner, 2002; Sugai & Horner, 2007). Emphasis is placed upon the clarity and visibility of school rules and behavioral expectations. Teachers use verbal and/or tangible rewards in order to reinforce school rules. Much research has been devoted to investigating the potential influence of rewards on intrinsic motivation of students. This line of research suggests that rewards can have a positive (or negative) effect on student intrinsic motivation depending upon the interpersonal context in which the rewards are administered (Bandura, 1986; Cameron, Banko, & Pierce, 2001; Deci, Koestner, & Ryan, 1999; Eisenberger, Pierce, & Cameron, 1999; Good & Brophy, 2000; Henderlong & Lepper, 2002). Based on general interest theory, social cognitive theory, and cognitive evaluation theory, rewards are thought to enhance student intrinsic motivation when they are: (1) given in a sincere manner, (2) help students feel competent and self-efficacious, and (3) convey realistic task-specific standards and expectations. In contrast, rewards that allow an individual to attribute successful performance to ability, rather than effort, may have a negative impact on intrinsic motivation. These findings highlight the role of quality teacher-student interpersonal relationships on student engagement in school. The SWPBS program sets this association within the context
of reinforcing school rules. Thus, the School-wide Positive Behavior Support program may indeed prove useful for intervention practitioners looking to improve student engagement in school.

Conclusion

The present study provided evidence for an association of student perceptions of school disciplinary climate, school social climate, and student engagement in school. Specifically, school social climate was found to provide an important link between school disciplinary climate and student engagement in school. These findings contribute to the literature on the role of the school context in student motivation. The present study also contributes to educational psychology literature in particular by illustrating some of the processes or mechanisms behind the association between the school context and student engagement in school. This study has important implications for future research as well as for practitioners interested in implementing intervention programs focused on the school context.
Table 1. Student Engagement in School and Various Student Outcomes Associated with Student Engagement in School

<table>
<thead>
<tr>
<th>Aspect of student engagement</th>
<th>Definition</th>
<th>Student outcome associated with student engagement in school</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavioral engagement</strong></td>
<td>Effort (i.e., works hard, prepared, lower truancy)</td>
<td>Higher academic expectations for success</td>
</tr>
<tr>
<td></td>
<td>Persistence</td>
<td>Higher self-efficacy</td>
</tr>
<tr>
<td></td>
<td>Participation in school activities</td>
<td>Lower self-criticism</td>
</tr>
<tr>
<td></td>
<td>Appropriate behavior</td>
<td>Lower risk of school dropout</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Higher academic achievement</td>
</tr>
<tr>
<td><strong>Cognitive engagement</strong></td>
<td>Preference for challenging tasks (or task orientation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Persistence in the face of difficulty</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Academic intrinsic motivation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of self-regulation strategies</td>
<td></td>
</tr>
<tr>
<td><strong>Emotional engagement</strong></td>
<td>Interest in school</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liking of school or teachers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feelings of success in school</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enjoyment of school</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Importance of task in helping attain a goal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Importance of task in providing self-concept information</td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Demographics of Public Schools Using Unweighted (and Weighted) Data

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percent of schools</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urbanicity</strong></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>28.0 (28.0)</td>
</tr>
<tr>
<td>Suburban</td>
<td>50.1 (51.1)</td>
</tr>
<tr>
<td>Rural</td>
<td>21.9 (20.9)</td>
</tr>
<tr>
<td><strong>Geographic region</strong></td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>17.1 (17.4)</td>
</tr>
<tr>
<td>Midwest</td>
<td>23.7 (24.6)</td>
</tr>
<tr>
<td>South</td>
<td>37.6 (34.2)</td>
</tr>
<tr>
<td>West</td>
<td>21.6 (23.8)</td>
</tr>
<tr>
<td><strong>Grade span</strong></td>
<td></td>
</tr>
<tr>
<td>PK, K, 1, 2, 3, 4 or 5 through 12+</td>
<td>2.3 (3.2)</td>
</tr>
<tr>
<td>6, 7, or 8 through 12+</td>
<td>8.2 (6.6)</td>
</tr>
<tr>
<td>9 through 10, 11, or 12+</td>
<td>83.5 (85.0)</td>
</tr>
<tr>
<td>10 through 11 or 12+</td>
<td>4.6 (5.2)</td>
</tr>
</tbody>
</table>
Table 2 (continued). Demographics of Public Schools Using Unweighted (and Weighted) Data

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percent of schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>School enrollment</td>
<td></td>
</tr>
<tr>
<td>1-399</td>
<td>8.1 (8.3)</td>
</tr>
<tr>
<td>400-799</td>
<td>14.6 (16.1)</td>
</tr>
<tr>
<td>800-1199</td>
<td>16.6 (18.8)</td>
</tr>
<tr>
<td>1200-1599</td>
<td>16.2 (20.3)</td>
</tr>
<tr>
<td>1600-2499</td>
<td>20.4 (27.3)</td>
</tr>
<tr>
<td>2500+</td>
<td>7.1 (9.1)</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study (n = 12,795).
Table 3. Demographics of Public School Students Using Unweighted (and Weighted) Data

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percent of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>47.0 (50.7)</td>
</tr>
<tr>
<td>Male</td>
<td>47.8 (49.3)</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>1.0 (1.1)</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>10.1 (3.8)</td>
</tr>
<tr>
<td>Multiracial</td>
<td>4.5 (4.4)</td>
</tr>
<tr>
<td>Black/African American</td>
<td>13.9 (13.6)</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>14.8 (14.9)</td>
</tr>
<tr>
<td>White</td>
<td>49.6 (62.2)</td>
</tr>
<tr>
<td>Native language English</td>
<td>76.2 (87.0)</td>
</tr>
<tr>
<td>Parents highest level of education</td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>7.2 (6.5)</td>
</tr>
<tr>
<td>High school only</td>
<td>21.4 (21.7)</td>
</tr>
<tr>
<td>Some college</td>
<td>32.9 (23.6)</td>
</tr>
<tr>
<td>4-year degree</td>
<td>19.5 (21.5)</td>
</tr>
<tr>
<td>Graduate/professional degree</td>
<td>13.5 (14.7)</td>
</tr>
</tbody>
</table>
Table 3 (continued). Demographics of Public School Students Using Unweighted (and Weighted) Data

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percent of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomic status</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>19.2 (18.8)</td>
</tr>
<tr>
<td>Middle</td>
<td>49.8 (53.6)</td>
</tr>
<tr>
<td>High</td>
<td>25.0 (27.6)</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study *(n = 12,795).*
Table 4. Intercorrelations Between Scale Items for Public School Students Included in the Study (n = 12,795)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Clear school rules</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Fairly applied school rules</td>
<td>.20*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Effective school rules</td>
<td>.21*</td>
<td>.32*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Consistent school rules</td>
<td>.36*</td>
<td>.35*</td>
<td>.34*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Teachers-students get along</td>
<td>.15*</td>
<td>.20*</td>
<td>.10*</td>
<td>.13*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Real school spirit</td>
<td>.18*</td>
<td>.18*</td>
<td>.18*</td>
<td>.17*</td>
<td>.27*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Teacher interest</td>
<td>.19*</td>
<td>.29*</td>
<td>.17*</td>
<td>.21*</td>
<td>.36*</td>
<td>.25*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Works as hard as possible</td>
<td>.08*</td>
<td>.13*</td>
<td>.07*</td>
<td>.12*</td>
<td>.10*</td>
<td>.10*</td>
<td>.15*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Keeps working when difficult</td>
<td>.09*</td>
<td>.12*</td>
<td>.06*</td>
<td>.08*</td>
<td>.12*</td>
<td>.09*</td>
<td>.15*</td>
<td>.58*</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Tries best to learn</td>
<td>.10*</td>
<td>.12*</td>
<td>.08*</td>
<td>.10*</td>
<td>.12*</td>
<td>.10*</td>
<td>.16*</td>
<td>.60*</td>
<td>.63*</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>11. Puts forth best effort</td>
<td>.08*</td>
<td>.13*</td>
<td>.08*</td>
<td>.11*</td>
<td>.10*</td>
<td>.09*</td>
<td>.15*</td>
<td>.66*</td>
<td>.59*</td>
<td>.65*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note. Data based on public school students included in the study (n = 12,795).

*p < .001.
Table 5. Descriptive Statistics for Scale Items Using Unweighted (and Weighted) Data

<table>
<thead>
<tr>
<th>Item</th>
<th>$M$</th>
<th>$SD$</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disciplinary climate scale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear school rules</td>
<td>2.98 (2.98)</td>
<td>.64</td>
<td>-.50</td>
<td>1.03</td>
</tr>
<tr>
<td>Fairly applied school rules</td>
<td>2.67 (2.66)</td>
<td>.83</td>
<td>-.33</td>
<td>-.29</td>
</tr>
<tr>
<td>Effective school rules</td>
<td>2.73 (2.73)</td>
<td>.67</td>
<td>-.30</td>
<td>.36</td>
</tr>
<tr>
<td>Consistent school rules</td>
<td>2.77 (2.76)</td>
<td>.67</td>
<td>-.38</td>
<td>.50</td>
</tr>
<tr>
<td><strong>School social climate scale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers-students get along</td>
<td>2.76 (2.75)</td>
<td>.56</td>
<td>-.85</td>
<td>1.54</td>
</tr>
<tr>
<td>Real school spirit</td>
<td>2.80 (2.80)</td>
<td>.73</td>
<td>-.39</td>
<td>.23</td>
</tr>
<tr>
<td>Teacher interest</td>
<td>2.82 (2.82)</td>
<td>.65</td>
<td>-.57</td>
<td>.97</td>
</tr>
<tr>
<td><strong>Student engagement scale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Works as hard as possible</td>
<td>2.72 (2.70)</td>
<td>.73</td>
<td>-.056</td>
<td>.17</td>
</tr>
<tr>
<td>Keeps working when difficult</td>
<td>2.66 (2.66)</td>
<td>.72</td>
<td>-.005</td>
<td>.29</td>
</tr>
<tr>
<td>Tries best to learn</td>
<td>2.78 (2.78)</td>
<td>.70</td>
<td>-.13</td>
<td>.32</td>
</tr>
<tr>
<td>Puts forth best effort</td>
<td>2.76 (2.75)</td>
<td>.72</td>
<td>-.07</td>
<td>.17</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study (n = 12,795).
Table 6. Factor Analysis Pattern Matrix (Rotated) for the Final Scale Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Student engagement (Factor 1)</th>
<th>Disciplinary climate (Factor 2)</th>
<th>Social climate (Factor 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear school rules</td>
<td>.007</td>
<td>.414</td>
<td>.074</td>
</tr>
<tr>
<td>Fairly applied school rules</td>
<td>.029</td>
<td>.454</td>
<td>.148</td>
</tr>
<tr>
<td>Effective school rules</td>
<td>-.012</td>
<td>.512</td>
<td>-.004</td>
</tr>
<tr>
<td>Consistent school rules</td>
<td>.003</td>
<td>.751</td>
<td>-.103</td>
</tr>
<tr>
<td>Teachers-students get along</td>
<td>-.012</td>
<td>-.092</td>
<td>.673</td>
</tr>
<tr>
<td>Real school spirit</td>
<td>.007</td>
<td>.114</td>
<td>.368</td>
</tr>
<tr>
<td>Teacher interest</td>
<td>.044</td>
<td>.094</td>
<td>.528</td>
</tr>
<tr>
<td>Works as hard as possible</td>
<td>.778</td>
<td>.030</td>
<td>-.030</td>
</tr>
<tr>
<td>Keeps working when difficult</td>
<td>.748</td>
<td>-.037</td>
<td>.033</td>
</tr>
<tr>
<td>Tries best to learn</td>
<td>.795</td>
<td>-.018</td>
<td>.023</td>
</tr>
<tr>
<td>Puts forth best effort</td>
<td>.823</td>
<td>.014</td>
<td>-.035</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study (n = 12,795).
Table 7. Factor Analysis Structure Matrix (Rotated) for the Final Scale Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Student engagement (Factor 1)</th>
<th>Disciplinary climate (Factor 2)</th>
<th>Social climate (Factor 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear school rules</td>
<td>.111</td>
<td>.453</td>
<td>.282</td>
</tr>
<tr>
<td>Fairly applied school rules</td>
<td>.160</td>
<td>.534</td>
<td>.382</td>
</tr>
<tr>
<td>Effective school rules</td>
<td>.093</td>
<td>.508</td>
<td>.248</td>
</tr>
<tr>
<td>Consistent school rules</td>
<td>.131</td>
<td>.700</td>
<td>.272</td>
</tr>
<tr>
<td>Teachers-students get along</td>
<td>.140</td>
<td>.241</td>
<td>.624</td>
</tr>
<tr>
<td>Real school spirit</td>
<td>.124</td>
<td>.300</td>
<td>.427</td>
</tr>
<tr>
<td>Teacher interest</td>
<td>.198</td>
<td>.366</td>
<td>.586</td>
</tr>
<tr>
<td>Works as hard as possible</td>
<td>.777</td>
<td>.176</td>
<td>.184</td>
</tr>
<tr>
<td>Keeps working when difficult</td>
<td>.749</td>
<td>.134</td>
<td>.206</td>
</tr>
<tr>
<td>Tries best to learn</td>
<td>.798</td>
<td>.157</td>
<td>.217</td>
</tr>
<tr>
<td>Puts forth best effort</td>
<td>.817</td>
<td>.166</td>
<td>.182</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study (n = 12,795).
### Table 8. Factor Score Coefficient Matrix for the Final Scale Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Student engagement (Factor 1)</th>
<th>Disciplinary climate (Factor 2)</th>
<th>Social climate (Factor 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear school rules</td>
<td>.006</td>
<td>.162</td>
<td>.072</td>
</tr>
<tr>
<td>Fairly applied school rules</td>
<td>.012</td>
<td>.217</td>
<td>.125</td>
</tr>
<tr>
<td>Effective school rules</td>
<td>.002</td>
<td>.216</td>
<td>.050</td>
</tr>
<tr>
<td>Consistent school rules</td>
<td>.007</td>
<td>.449</td>
<td>.030</td>
</tr>
<tr>
<td>Teachers-students get along</td>
<td>.009</td>
<td>.031</td>
<td>.407</td>
</tr>
<tr>
<td>Real school spirit</td>
<td>.007</td>
<td>.080</td>
<td>.182</td>
</tr>
<tr>
<td>Teacher interest</td>
<td>.020</td>
<td>.104</td>
<td>.318</td>
</tr>
<tr>
<td>Works as hard as possible</td>
<td>.255</td>
<td>.028</td>
<td>.003</td>
</tr>
<tr>
<td>Keeps working when difficult</td>
<td>.225</td>
<td>-.008</td>
<td>.042</td>
</tr>
<tr>
<td>Tries best to learn</td>
<td>.289</td>
<td>.005</td>
<td>.046</td>
</tr>
<tr>
<td>Puts forth best effort</td>
<td>.322</td>
<td>.017</td>
<td>-.007</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study (n = 12,795).
Table 9. Factor Score Correlation Matrix for the Final Scale Items

<table>
<thead>
<tr>
<th>Factor</th>
<th>Student engagement</th>
<th>Disciplinary climate</th>
<th>Social climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student engagement</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disciplinary climate</td>
<td>.206</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Social climate</td>
<td>.225</td>
<td>.499</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study (n = 12,795).
Table 10. Descriptive Statistics for the Factor Scores Using Unweighted (and Weighted) Data

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary climate</td>
<td>.000 (-.009)</td>
<td>.93</td>
<td>-3.34 to 2.31</td>
<td>-.20</td>
<td>.99</td>
</tr>
<tr>
<td>Social climate</td>
<td>.000 (-.014)</td>
<td>.83</td>
<td>-3.51 to 2.39</td>
<td>-.61</td>
<td>1.46</td>
</tr>
<tr>
<td>Student engagement</td>
<td>.000 (-.014)</td>
<td>.79</td>
<td>-2.82 to 2.04</td>
<td>-.05</td>
<td>.57</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study (n = 12,795).
Table 11. Intercorrelations Between Factor Scores Using Unweighted (and Weighted) Data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Disciplinary climate</th>
<th>Social climate</th>
<th>Student engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary climate</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social climate</td>
<td>.65 (.65)*</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Student engagement</td>
<td>.26 (.26)*</td>
<td>.33 (.33)*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note. Data based on public school students included in the study (n = 12,795).

*p < .001.
Table 12. Summary of Hierarchical Regression Analysis for Variables Predicting Student Engagement in School Using Weighted Data

<table>
<thead>
<tr>
<th>Step</th>
<th>b</th>
<th>SE b</th>
<th>T</th>
<th>P</th>
<th>β bound</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Upper</td>
<td>Lower</td>
</tr>
<tr>
<td>Soc climate dependent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Disc climate</td>
<td>.62</td>
<td>.009</td>
<td>71.41</td>
<td>&lt; .001</td>
<td>.65</td>
<td>.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.63</td>
</tr>
<tr>
<td>Stu engage dependent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Disc climate</td>
<td>.29</td>
<td>.014</td>
<td>21.34</td>
<td>&lt; .001</td>
<td>.26</td>
<td>.26</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.32</td>
</tr>
<tr>
<td>Stu engage dependent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Soc climate</td>
<td>.39</td>
<td>.01</td>
<td>27.06</td>
<td>&lt; .001</td>
<td>.33</td>
<td>.36</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.42</td>
</tr>
<tr>
<td>Stu engage dependent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Disc climate</td>
<td>.08</td>
<td>.02</td>
<td>5.04</td>
<td>&lt; .001</td>
<td>.33</td>
<td>.05</td>
</tr>
<tr>
<td>Soc climate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.12</td>
</tr>
</tbody>
</table>

Note. Data based on public school students included in the study (n = 12,025). F for all models p < .001.
Where,

I = School disciplinary climate

M = School social climate

O = Student Engagement

Figure 1. Multiple regression model: Association of school disciplinary climate scores with student engagement scores, as mediated by school social climate scores.
APPENDIX A

Preliminary Factor Analysis

As discussed in the Methods chapter, a series of principal axis factor analyses were conducted to assess the dimensionality of the school disciplinary climate, school social climate, and student engagement in school scale items. Measures of internal consistency were also used to guide the final section of items.

Factor analysis was first conducted on five disciplinary climate items and four school social climate items included in the ELS:2002 student survey. These questions were both theoretically and operationally similar to questions used in previous studies that measured school disciplinary climate and school social climate. As shown in Table A1, all scale items were significantly, positively correlated with each other. Means, standard errors, skewness, and kurtosis for each of the scale items are reported in Table A2. Stem-and-leaf plots, box plots, and histograms were also generated to evaluate assumptions of normality and homogeneity of variance. Although the items had a slight negative skew, all items were within acceptable limits of normality and homogeneity of variance. Eigenvalues and scree plots generated during factor extraction provided evidence for three factors. Therefore, three factors were rotated using direct oblimin rotation. The rotated solution indicated three factors: School Disciplinary Climate (Factor 2), School Social Climate (Factor 3), and Student Engagement in School (Factor 1). However, not all of the school disciplinary climate items nor school social climate items loaded onto the expected factors.

School disciplinary climate. The pattern matrix table for the school disciplinary climate (DC) items indicated DC1, 3, 4 and 5 loaded together on Factor 2. However, DC2 loaded onto Factor 3 (i.e., School Social Climate) (see Table A3). The structure matrix table
indicated that DC2 was actually split between Factors 2 and 3 (see Table A4). In fact, it was more highly correlated with Factor 3 ($r = .54$). Furthermore, DC2 was included in the factor scores for Factor 3. In order to guide the final selection of items, Cronbach’s alpha coefficients were calculated on the school disciplinary climate items with and without DC2. Contrary to the results of the factor analysis, reliability analysis suggested the inclusion of item DC2. The Cronbach’s alpha coefficient decreased after removing DC2 ($r = .662$ to $r = .621$). However, the decision was made to exclude DC2, “School rules are fair,” from the school disciplinary climate scale because this item did not load onto the appropriate factor score (see Table A5).

**School social climate.** The pattern matrix table for the school social climate (SC) items indicated that SC1, 2, and 4 loaded together on Factor 3 (see Table A3). However, SC3 did not load at an acceptable value (i.e., above $r = .30$). In addition, as shown in Table A4, the structure table indicated SC3 was correlated with Factor 3 ($r = .28$); yet this correlation was low compared to other items (i.e., above $r = .44$). Reliability analysis confirmed the results of the factor analysis for the school social climate items. The Cronbach’s alpha coefficient increased from $r = .538$ to $r = .541$ after the removal of SC3. Thus, item SC3, “Students make friends with students of other racial and ethnic groups,” was dropped from the school social climate scale.

**Student engagement in school.** The pattern matrix for the student engagement (Eng) items indicated all 4 engagement items loaded onto Factor 1 (see Table A3). The structure matrix table also indicated that all 4 engagement items were highly correlated with Factor 1 (see Table A4). Reliability analysis confirmed the results of the factor analysis for the student
engagement scale. The Cronbach’s alpha coefficient was .87. All items were kept in the student engagement scale.
Table A1. Intercorrelations Between Scale Items Used in the Preliminary Factor Analysis for Public School Students Included in the Study (n = 12,795)

<table>
<thead>
<tr>
<th>Variables</th>
<th>DC 1</th>
<th>DC 2</th>
<th>DC 3</th>
<th>DC 4</th>
<th>DC 5</th>
<th>SC 1</th>
<th>SC 2</th>
<th>SC 3</th>
<th>SC 4</th>
<th>Eng 1</th>
<th>Eng 2</th>
<th>Eng 3</th>
<th>Eng 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 1</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC 2</td>
<td>0.29*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC 3</td>
<td>0.20*</td>
<td>0.37*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC 4</td>
<td>0.21*</td>
<td>0.14*</td>
<td>0.32*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC 5</td>
<td>0.36*</td>
<td>0.25*</td>
<td>0.35*</td>
<td>0.34*</td>
<td>1.00</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 1</td>
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<td>0.29*</td>
<td>0.20*</td>
<td>0.10*</td>
<td>0.13*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 2</td>
<td>0.18*</td>
<td>0.23*</td>
<td>0.18*</td>
<td>0.17*</td>
<td>0.27*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 3</td>
<td>0.13*</td>
<td>0.12*</td>
<td>0.16*</td>
<td>0.12*</td>
<td>0.13*</td>
<td>0.15*</td>
<td>0.19*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 4</td>
<td>0.19*</td>
<td>0.32*</td>
<td>0.29*</td>
<td>0.17*</td>
<td>0.21*</td>
<td>0.36*</td>
<td>0.25*</td>
<td>0.17*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eng 1</td>
<td>0.08*</td>
<td>0.13*</td>
<td>0.13*</td>
<td>0.07*</td>
<td>0.12*</td>
<td>0.10*</td>
<td>0.10*</td>
<td>0.08*</td>
<td>0.15*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eng 2</td>
<td>0.09*</td>
<td>0.14*</td>
<td>0.12*</td>
<td>0.06*</td>
<td>0.08*</td>
<td>0.12*</td>
<td>0.09*</td>
<td>0.09*</td>
<td>0.15*</td>
<td>0.58*</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eng 3</td>
<td>0.10*</td>
<td>0.14*</td>
<td>0.12*</td>
<td>0.08*</td>
<td>0.10*</td>
<td>0.12*</td>
<td>0.10*</td>
<td>0.08*</td>
<td>0.16*</td>
<td>0.60*</td>
<td>0.63*</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Eng 4</td>
<td>0.08*</td>
<td>0.13*</td>
<td>0.13*</td>
<td>0.08*</td>
<td>0.11*</td>
<td>0.10*</td>
<td>0.09*</td>
<td>0.09*</td>
<td>0.15*</td>
<td>0.66*</td>
<td>0.58*</td>
<td>0.65*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study (n = 12,795).

*p < .001.
Table A2. Descriptive Statistics for Scale Items Used in the Preliminary Factor Analysis Using Unweighted (and Weighted) Data

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disciplinary climate scale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC 1</td>
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<td>.64</td>
<td>-.50</td>
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</tr>
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<td>DC 2</td>
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<td>.73</td>
<td>-.28</td>
<td>-.09</td>
</tr>
<tr>
<td>DC 3</td>
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<td>.83</td>
<td>-.33</td>
<td>-.30</td>
</tr>
<tr>
<td>DC 4</td>
<td>2.73</td>
<td>.67</td>
<td>-.30</td>
<td>.36</td>
</tr>
<tr>
<td>DC 5</td>
<td>2.77</td>
<td>.67</td>
<td>-.38</td>
<td>.50</td>
</tr>
<tr>
<td><strong>Social climate scale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 1</td>
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<td>-.85</td>
<td>1.54</td>
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<td>.73</td>
<td>-.39</td>
<td>.23</td>
</tr>
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<td>SC 3</td>
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<td>-.64</td>
<td>1.30</td>
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<tr>
<td>SC 4</td>
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<td>.65</td>
<td>-.57</td>
<td>.97</td>
</tr>
<tr>
<td><strong>Student engagement scale</strong></td>
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<td></td>
</tr>
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<td>.73</td>
<td>-.06</td>
<td>.17</td>
</tr>
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<td>Eng 2</td>
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<td>.29</td>
</tr>
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<td>Eng 3</td>
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<td>.70</td>
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<td>.32</td>
</tr>
<tr>
<td>Eng 4</td>
<td>2.76</td>
<td>.72</td>
<td>-.07</td>
<td>.17</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study (n = 12,795).
<table>
<thead>
<tr>
<th>Item</th>
<th>Student engagement (Factor 1)</th>
<th>Disciplinary climate (Factor 2)</th>
<th>Social climate (Factor 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC item 1</td>
<td>.001</td>
<td>.399</td>
<td>.120</td>
</tr>
<tr>
<td>DC item 2</td>
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</tr>
<tr>
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<td>-.009</td>
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<td>.073</td>
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<td>.222</td>
</tr>
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</tr>
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<td>.023</td>
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<tr>
<td>Eng item 4</td>
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<td>-.037</td>
</tr>
</tbody>
</table>

*Note. Data based on public school students included in the study (n = 12,795).*
<table>
<thead>
<tr>
<th>Item</th>
<th>Student engagement (Factor 1)</th>
<th>Disciplinary climate (Factor 2)</th>
<th>Social climate (Factor 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC item 1</td>
<td>.114</td>
<td><strong>.464</strong></td>
<td>.334</td>
</tr>
<tr>
<td>DC item 2</td>
<td>.176</td>
<td><strong>.427</strong></td>
<td><strong>.539</strong></td>
</tr>
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<td>.163</td>
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<td>.446</td>
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<td>DC item 4</td>
<td>.094</td>
<td><strong>.492</strong></td>
<td>.256</td>
</tr>
<tr>
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<td><strong>.690</strong></td>
<td>.312</td>
</tr>
<tr>
<td>SC item 1</td>
<td>.141</td>
<td>.216</td>
<td><strong>.590</strong></td>
</tr>
<tr>
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<td>.126</td>
<td>.287</td>
<td><strong>.440</strong></td>
</tr>
<tr>
<td>SC item 3</td>
<td>.106</td>
<td>.219</td>
<td><strong>.280</strong></td>
</tr>
<tr>
<td>SC item 4</td>
<td>.199</td>
<td>.345</td>
<td><strong>.594</strong></td>
</tr>
<tr>
<td>Eng item 1</td>
<td><strong>.777</strong></td>
<td>.167</td>
<td>.195</td>
</tr>
<tr>
<td>Eng item 2</td>
<td><strong>.749</strong></td>
<td>.126</td>
<td>.219</td>
</tr>
<tr>
<td>Eng item 3</td>
<td><strong>.797</strong></td>
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<td>.227</td>
</tr>
<tr>
<td>Eng item 4</td>
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<td>.158</td>
<td>.194</td>
</tr>
</tbody>
</table>

*Note.* Data based on public school students included in the study (n = 12,795).
Table A5. Preliminary Factor Analysis Coefficient Matrix

<table>
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<th>Disciplinary climate (Factor 2)</th>
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*Note.* Data based on public school students included in the study (n = 12,795).
APPENDIX B

Dependent Variable: Student Engagement

Figure B1. Scatterplot of the studentized residuals and standardized predicted values based on public school students included in the study (n = 12,795).
Figure C1. Scatterplot of the bivariate associations between school disciplinary climate factor scores (Disc Clim), school social climate factor scores (Soc Clim), and student engagement factor scores (Stu Engage) based on public school students included in the study (n = 12,795).
REFERENCES


