

Authoritative School Climate and Student Academic Engagement, Grades, and Aspirations in Middle and High Schools

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This study tested the theory that an authoritative school climate characterized by disciplinary structure and student support is conducive to positive academic outcomes for middle and high school students. Multilevel multivariate modeling at student and school levels was conducted using school surveys completed by statewide samples of 39,364 students in Grades 7 and 8 in 423 middle schools and 48,027 students in Grades 9 through 12 in 323 high schools. Consistent with authoritative school climate theory, both higher disciplinary structure and student support were associated with higher student engagement in school, higher course grades, and higher educational aspirations at the student level in both samples. At the school level, higher disciplinary structure was associated with higher engagement, and higher student support was associated with higher engagement and grades in both samples. Overall, these findings add new evidence that an authoritative school climate is conducive to student academic success in middle and high schools.

Keywords: *school climate*

DURING early adolescence, many students experience a decline in their academic motivation and performance (Eccles, 2004; Eccles et al., 1993; Li and Lerner, 2011; Wigfield & Eccles, 2002). Early adolescents become less motivated to engage in school work and their grades decline (Archambault Janosz, Morizot, & Pagani, 2009; Barber & Olsen, 2004; Li & Lerner, 2011; Maehr & Midgley, 1996; Wigfield & Eccles, 2002). This decline is especially concerning because low engagement in school is also an important risk factor for high school failure and dropout (Archambault, Janosz, Fallu, & Pagani, 2009; Casillas et al., 2012; Eccles, 2008; Wang & Fredricks, 2014). These findings have prompted calls for reform at both the middle school and high school levels (A. Duncan, 2011; Eccles, 2008; Fowler et al., 2014; Rourke, 2006).

The adolescent decline has been attributed to a combination of biological, familial, and social developmental changes that interact with a new and more challenging secondary school environment (Eccles, 2004, 2008). A body of research has examined the idea that a supportive school climate can ameliorate the developmental stresses of early adolescence and protect against a decline in academic motivation and achievement (Barber & Olsen, 2004; Wang & Eccles, 2013). Furthermore, a supportive climate can buffer the negative impact of poverty on academic achievement (Malecki & Demaray, 2006). Because school climate is much more malleable than biological, familial, and social influences

that are outside the influence of the educational system, it has become a central target for school improvement efforts (Wang & Degol, 2015). The purpose of this study is to examine how *authoritative school climate* theory provides a framework for conceptualizing key features of school climate that are associated with higher levels of student engagement in schools. In order to achieve this aim, we examine academic engagement, academic grades, and educational aspirations and use a multilevel modeling approach that is most appropriate for the examination of school-level effects. We use two independent samples to test the consistency of findings across middle and high school grade levels.

Authoritative School Climate

There is little consensus on the definition of *school climate*. Wang and Degol (2015, p. 3) posited that school climate includes academic, community, safety, and institutional environment dimensions that “encompass just about every feature of the school environment that impacts cognitive, behavioral, and psychological development.” This approach equates school climate with all aspects of the school environment. For example, academic climate goes beyond the overall quality of the academic atmosphere to include curricula, instruction, teacher training, and professional development. Institutional environment broadly includes physical characteristics, such as the heating and lighting in the school,



as well as the adequacy of school supplies. Such an inclusive definition of school climate makes it difficult to distinguish school climate from other school characteristics. An alternative view is that qualities such as teacher training and professional development can be regarded as important background characteristics that influence teachers but are not necessarily part of the school climate. Similarly, physical qualities and resources of the school would be outside the conceptual boundary of its climate, in much the same way that the physical qualities of a building would be distinguishable from its meteorological climate. A more narrow conception of school climate would focus on the interpersonal interactions that take place in a school, as distinguished from physical attributes, such as the quality of the school building, or historical factors, such as how the teachers were trained.

One widely cited definition is that school climate encompasses the “quality and character of school life” and is “based on patterns of people’s experiences of school life and reflects norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures” (Cohen, McCabe, Michelli, & Pickeral, 2009, p. 182). This definition narrows the scope to social behavior and relationships but is still quite broad and poses challenges for measurement and investigation (Cohen et al., 2009; Cornell & Mayer, 2010; Thapa, Cohen, Guffey, & Higgins-D’Alessandro, 2013; Wang & Degol, 2015). Furthermore, there is a need for a theory of school climate that links together different components into a working model that predicts student outcomes.

Authoritative school climate theory posits that two key dimensions of school climate are disciplinary structure and student support (Gregory et al., 2010; Gregory & Cornell, 2009). *Disciplinary structure* refers to the idea that school rules are perceived as strict but fairly enforced. *Student support* refers to student perceptions that their teachers and other school staff members treat them with respect and want them to be successful (Konold et al., 2014). Without claiming that these two dimensions encompass all aspects of school climate or constitute a comprehensive theoretical model, there is considerable evidence that they are especially important qualities that deserve a central role in research on school climate.

Many studies have identified these two key aspects of school climate; for example, Johnson’s (2009) review of 25 studies concluded that “schools with less violence tend to have students who are aware of school rules and believe they are fair” and “have positive relationships with their teachers” (p. 451). Several school climate surveys measure these two domains in some capacity (Bear, Gaskins, Blank, & Chen, 2011; Brand, Felner, Shim, Seitsinger, & Dumas, 2003), but authoritative school climate theory gives them special prominence.

This nascent theory of authoritative school climate is derived from the model of authoritative parenting from the

work of Baumrind (1968) that stimulated a large body of child development research (Larzelere, Morris, & Harrist, 2013). Parenting research has found that authoritative parents provide a combination of strict discipline and emotional support for their children. Parents are less effective when they are demanding of discipline but not supportive (authoritarian), emotionally supportive but lacking in disciplinary structure (permissive), or lacking in both disciplinary structure and emotional support (disengaged or neglectful) (Larzelere et al., 2013). Authoritative school climate theory uses the terms *disciplinary structure* and *student support* to refer to constructs that other researchers have variously labeled *control/demandingness* and *warmth/responsiveness*.

Three studies of student academic achievement have tested relations with an authoritative school climate. Pellerin (2005) found that high schools using authoritative practices had less truancy and fewer dropouts than schools using an authoritarian approach. The Pellerin study was a secondary analysis of the 164 public high schools selected from the National Educational Longitudinal Study (NELS) of 1988. Pellerin constructed indicators of an authoritative school climate with a combination of administrator and student survey responses to available questions about school discipline and student–teacher relationships. Surveys were aggregated and analyzed at the school level, using school truancy and dropout rates, but lacked student-level outcome data.

Another analysis of NELS data conducted a multilevel (school and student) analysis of eighth-grade students and principals (Gill, Ashton, & Algina, 2004). This study found that authoritative schools, characterized as both demanding and responsive, had higher levels of student engagement, based on student self-reports that they usually did their homework and came to class with their books and pencil/paper. However, the study did not find an association between authoritative measures and academic achievement, based on a 40-item mathematics test.

A third study by J. Lee (2012) examined ninth- and 10th-grade students from 147 U.S. schools that participated in the Program for International Student Assessment (PISA) 2000, a project designed to compare academic achievement across the world. Authoritative school climate was measured by student self-report with five items concerning the quality of teacher–student relationships and four items asking whether their English teachers had high academic expectations for them. A multilevel analysis found that both positive teacher–student relationships and high academic expectations were associated with student self-reports of higher behavioral and emotional engagement. Behavioral engagement was measured by four items concerning student effort and perseverance in learning activities, and emotional engagement was based on six items concerning a sense of belonging at school. J. Lee also found that teacher–student relationships, but not academic expectations, were associated with the PISA test

of reading literacy. A limitation of all three studies is that the measures of school climate were constructed post hoc from available survey questions, which were not designed to measure an authoritative school climate.

A fourth study did not attempt to measure an authoritative school climate but used a different conceptual framework that suggests the role of authoritative characteristics. Wang and Eccles (2013) investigated how school climate characteristics were associated with different types of student engagement in a sample of 1,157 middle school students. Most notably, “school structure support” (defined as the clarity and consistency of teacher expectations) and “teacher emotional support” (defined as level of care and support from teachers) were associated with behavioral, emotional, and cognitive engagement.

Three reports specifically tested authoritative school climate theory in a statewide sample of nearly 300 high schools (Gregory et al., 2010; Gregory, Cornell, & Fan, 2011, 2012). Student survey measures of disciplinary structure and student support were associated with less peer victimization (Gregory et al., 2010), lower levels of student aggression toward teachers (Gregory et al., 2012), and lower suspension rates (Gregory et al., 2011). These studies demonstrated effects across a large and diverse group of schools, controlling for school demographics of enrollment size, ethnic and racial composition, and percentage of students receiving a free or reduced-price meal (FRPM).

A recent study using one of the samples used in the present study found that disciplinary structure and student support again were associated with peer victimization among middle school students (Cornell, Shukla, & Konold, 2015). Overall, a group of studies consistently demonstrated that an authoritative school climate model is associated with lower student aggression and misbehavior, but there is less evidence concerning student academic performance. A next step in this line of research would be to show more directly that an authoritative school climate is associated with positive academic outcomes.

Present Study

The purpose of the present study was to investigate the theory that an authoritative school climate characterized by high levels of disciplinary structure and student support would be associated with greater academic engagement, better academic grades, and higher educational aspirations. There are several distinguishing features of this study that make specific contributions to the research literature. First, to provide a more extensive test of this model, this study used school surveys completed by separate statewide samples of 39,364 students in Grades 7 and 8 in 423 schools and 48,027 students in Grades 9 through 12 in 323 high schools. The schools in this study constituted nearly all (>98%) of the public middle and high schools in Virginia. This provides an

unusually broad sample of schools with wide socioeconomic and racial/ethnic diversity across urban, suburban, and rural locations.

Second, the measures of school climate were constructed specifically to measure an authoritative school climate in previous studies of these samples (Konold et al., 2014; Konold & Cornell, in press). These studies used methodological advances in multilevel modeling that are relatively new in the development of measurement scales (Dedrick & Greenbaum, 2011). Employing both exploratory and confirmatory factor analyses, the studies identified sets of items that measured disciplinary structure, student support, and student engagement at both student and school levels of analysis. All three scales were derived from previous measures of authoritative school climate and bullying (Gregory et al., 2010, 2011, 2012).

Third, the study goes beyond previous reports (Konold et al., 2014; Konold & Cornell, in press) by examining how disciplinary structure and student support are related to engagement as well as academic grades and educational aspirations. Furthermore, this study makes use of demographic control variables at both student and school levels that provide a more rigorous and robust test of relations between school climate and academic outcomes. Previous studies of the relations between school climate and academic outcomes have relied on smaller, less representative samples without the benefit of scales constructed to measure authoritative school climate at both school and student levels.

There is considerable evidence that secondary school achievement differs across gender (Robinson & Lubienski, 2011), socioeconomic status (Sirin, 2005), and race/ethnicity (KewalRamani, Gilbertson, Fox, & Provasnik, 2007). Therefore, these analyses controlled for a series of student and school demographic variables. At the school level, the analyses controlled for the percentage of minority students, average level of parental education, and school size. At the student level, the analyses controlled for gender, parental education, and minority status. Parental education was used as an indicator of socioeconomic status, which can influence academic achievement by a variety of mechanisms (Sirin, 2005).

Finally, this study provided an opportunity to examine the reproducibility of our findings in two independent samples of middle and high schools. There are obvious developmental differences between students in middle and high schools as well as substantial differences in curriculum and academic expectations. We hypothesized that authoritative school climate would be positively associated with student engagement, academic grades, and educational aspirations in both middle and high schools. In light of concerns that psychological research findings often fail to replicate (Open Science Collaboration, 2015), we wanted to test the generalizability of findings.

Method

Participants

Both samples of schools were obtained from the Virginia Secondary School Climate Survey, which is part of the state's annual School Safety Audit program (Cornell et al., 2013; Cornell, Huang, et al., 2014). In the spring of 2013, the survey was administered to Virginia public schools with seventh- and/or eighth-grade enrollment. The school participation rate was 98.4%, based on 423 of 430 eligible schools. In the spring of 2014, the survey was administered to Virginia public schools with ninth-through-12th-grade enrollment. The high school participation rate was 99.7% based on 323 of 324 eligible schools. These high rates were obtained in cooperation with the Virginia Department of Education and the Virginia Department of Criminal Justice Services, which endorsed the study and encouraged participation. The study was approved by the University of Virginia Institutional Review Board.

Student samples. Schools had two options for sampling students: (a) invite all students to take the survey, with a goal of surveying at least 70% of all eligible students (whole grade option), or (b) use a random number list to select at least 25 students in each grade to take the survey (random sample option). Schools were given these options in order to choose a more or less comprehensive assessment of their students. Schools choosing the random sample option were provided with a random number list along with instructions for selecting students (for more information, see Cornell et al., 2013). All students were eligible to participate except those unable to complete the survey because of limited English proficiency or an intellectual or physical disability. The principal sent an information letter to parents of selected students that explained the purpose of the survey and offered them the option to decline participation (passive consent).

Student participation rate was defined as the total number of students across all schools who participated in the survey divided by the total number invited to take the survey. Student participation rates were assessed separately for schools choosing the whole-grade versus random sampling option. In the middle school sample, 274 schools used the whole-grade option and obtained an estimated participation rate of 85.3% (28,582 of 33,494). In 149 schools using the random sample option, the estimated participation rate was 83.9% (15,223 of 18,144). The overall participation rate for the Grades 7 and 8 sample was 84.8% (43,805 participants from a pool of 51,638 students asked to participate).

In the high school sample, 45 schools using the whole-grade option obtained an estimated participation rate of 82.9% (21,530 of 25,983). In 254 schools using the random sample option, the estimated participation rate was 93.4% (30,482 of 32,631). The overall student participation rate was 88.7% (52,012 student participants from a pool of 58,613 students asked to participate).

School principals completed reports identifying the reasons for student nonparticipation. In Grades 7 and 8, the reasons were as follows: student absent due to illness (41% of the nonparticipants), parent declined (28%), schedule conflict (8%), student declined (5%), student was unable to complete the survey due to a disability (5%), student was suspended from school (3%), or some other reason (such as computer problem, language barrier, or the student moved; 10%). In Grades 9 through 12, the reasons were as follows: student absent due to illness (39%), schedule conflict (17.8%), language barrier (2.5%), student disability (4%), student declined (16.7%), parent declined (3.9%), student was suspended (3%), or some other reasons (such as a computer problem; 10%).

Both samples were screened for survey validity on two criteria: (a) the time it took students to complete the survey and (b) responses to two validity screening questions (described under Measures). In order to determine a reasonable threshold time for completing the survey, the sample was examined for the amount of time each survey was completed, and a cutoff was identified for participants who completed the survey so quickly that it is unlikely they could have read each item (for details, see Cornell et al., 2013).

In the Grades 7 and 8 sample, 301 (0.7%) surveys completed in less than 7.22 min (433 seconds) were dropped. An additional 2,796 (7.1%) were dropped because students admitted that they were not truthful on one or both of the validity questions. In the high school sample, 649 students (1.3% of the sample) who completed the survey in less than 6.07 min were excluded. An additional 3,336 students (6.4% of the sample) were dropped for reporting on the validity questions that they were not telling the truth.

After screening, the seventh-and-eighth-grade sample for analytic purposes consisted of 39,364 cases, 51.7% female and 52.1% in seventh grade. The racial/ethnic breakdown was 52.4% White, 18.2% Black, 12.8% Hispanic, 3.4% Asian, 1.6% American Indian or Alaska Native, and 0.5% Native Hawaiian or Pacific Islander, with an additional 15.6% identifying themselves as having more than one race. Approximately 21.6% reported speaking a language other than English at home. The distribution of parental education was as follows: 24.5% completed postgraduate studies, 23.7% completed a 4-year college degree, 14.3% completed a 2-year college or technical education degree, 28.8% graduated from high school, and 8.7% did not graduate from high school.

After screening, the ninth-through-12th-grade sample for analytic purposes consisted of 48,027 cases, with 51.4% female and participants in ninth (26.1%), 10th (26%), 11th (24.9%), and 12th (23.1%) grades. The racial/ethnic breakdown was 59.1% White, 18.6% Black, 10.5% Hispanic, 4% Asian, 1.6% American Indian or Alaska Native, and 0.9% Native Hawaiian or Pacific Islander, with an additional 15.8% of students identifying themselves with having more

than one race. Approximately 18.9% reported speaking a language other than English at home. The distribution of parental education was as follows: 19.9% completed postgraduate studies, 24.1% completed a 4-year college degree, 16% completed a 2-year college or technical education degree, 31.2% graduated from high school, and 8.8% did not graduate from high school.

Measures

Students completed the survey in classrooms under teacher supervision using a standard set of instructions. Surveys were administered anonymously online using Qualtrics software. Students were required to answer each item before proceeding to the next page of the survey; as a result, there were no missing data for survey items.

Validity screening items. There were two validity screening items to identify students who admitted that they were not answering truthfully or who were answering randomly. The first item, “I am telling the truth on this survey,” had four response options: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Students answering *strongly disagree* or *disagree* were omitted from the sample. At the end of the survey, the second item was “How many of the questions on this survey did you answer truthfully?” This item had five response options: *all of them*, *all but one or two of them*, *most of them*, *some of them*, and *only a few or none of them*. Students answering *some of them* or *only a few or none of them* were omitted from the sample. Previous research with independent samples of middle and high school students found that the use of these items can identify students who tend to give exaggerated reports of risk behavior and more negative views of school conditions than other students (Cornell, Klein, Konold, & Huang, 2012; Cornell, Lovegrove, & Baly, 2014).

Disciplinary structure. A seven-item scale was designed to measure the perceived fairness and strictness of school discipline with items such as “The school rules are fair” and “The school rules are strictly enforced” (see appendix and Konold et al., 2014). Each item was answered on a 4-point Likert-scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*). The items were derived in part from the Experience of School Rules Scale used in the School Crime Supplement to the National Crime Victimization Survey (National Center for Education Statistics, 2005). In the present study, total scores ranged from 7 to 28, with Cronbach’s alpha = .77 for the middle school sample and .78 for the high school sample. The school-level measure of structure was based on the mean score of all students within each school.

Student support. This eight-item scale was designed to measure the perceived supportiveness of teacher–student relationships with items such as how much they agree that adults in

their school “really care about all students” and whether they would seek help from an adult in their school if “another student was bullying me” (see appendix and Konold et al., 2014). Each item was answered on a 4-point Likert-scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*). The items were derived in part from the Learning Environment Scale (Austin & Duerr, 2005) and the Willingness to Seek Help Scale (Bandyopadhyay, Cornell, & Konold, 2009). In the present study, total scores ranged from 8 to 32, with Cronbach’s alpha = .85 for the middle school sample and .87 for the high school sample. The school-level measure of support was based on the mean score of all students within each school.

Student engagement. Student engagement is generally recognized as a complex and multidimensional construct (Appleton, Christenson, & Furlong, 2008; Hazel, Vazirabadi, Albanes, & Gallagher, 2014; Lawson & Masyn, 2015; Wang & Fredricks, 2014). Although conceptions of student engagement vary widely, many authorities identify both affective and cognitive components. *Affective engagement* refers to the student’s positive feelings toward school, such as liking school and feeling proud to be identified with the school. *Cognitive engagement* concerns the student’s investment in learning at school. Fredricks and colleagues (2011) reviewed 14 different student self-report instruments used to measure student engagement, ranging in length from four items to 121 items. Hazel et al. (2014) compared two student engagement measures, one with 22 items and the other with 35 items. Although a detailed assessment of engagement is desirable, it is not practical to use lengthy scales as part of a student survey designed to measure school climate and safety conditions. Previous studies of academic achievement have relied on much briefer scales to measure engagement (Gill et al., 2004; J. Lee, 2012; Wang & Eccles, 2013). For this reason, the authoritative school climate survey relies on a more limited, six-item scale that assesses affective and cognitive engagement. Furthermore, these items were selected because a multilevel confirmatory factor analysis supported its use at both student and school levels of analysis (Konold et al., 2014).

Student engagement in school was measured with six items derived from the Commitment to School Scale (Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1991) and consisted of two factors, affective engagement and cognitive engagement (for details, see Konold et al., 2014). Each factor was measured with three items (see appendix) with total scores ranging from 3 to 12. Mehta, Cornell, Fan, and Gregory (2013) found that a nine-item version of this scale was negatively associated with student reports of the prevalence of teasing and bullying in school. A previous study with this sample of students (Konold et al., 2014) revealed that factor loadings for the Affective and Cognitive scales ranged from .84 to .94 and from .68 to .81, respectively. Cronbach’s alpha value for this scale was .76 in the middle school sample and .80 in the high school sample.

Academic grades and educational aspirations. Students were asked, “What grades did you make on your last report card?” with seven response choices (1 = *mostly As*, 2 = *mostly As and Bs*, 3 = *mostly Bs*, 4 = *mostly Bs and Cs*, 5 = *mostly Cs*, 6 = *mostly Cs and Ds*, 7 = *mostly Ds and Fs*). Educational aspirations were captured by the question, “How far do you expect to go in school?” with answer choices 0 = *I do not expect to graduate from high school*, 1 = *I might or might not graduate from high school*, 2 = *I expect to graduate from high school*, 3 = *I expect to graduate from a 2-year college or technical school*, 4 = *I expect to graduate from a 4-year college*, and 5 = *I expect to complete postgraduate studies*. Both items were recoded so that higher scores reflect higher levels.

Demographic information. The student survey was used to identify gender (1 = male, 0 = female), minority status (1 = non-White student, 0 = White), and parent educational level. The highest education level achieved by either parent was used as a proxy for socioeconomic status (1 = *did not graduate from high school*, 2 = *graduated from a high school*, 3 = *graduated from a 2-year college or technical school*, 4 = *graduated from a 4-year college*, 5 = *completed postgraduate studies*). The percentage of students eligible for FRPM served as a control variable at the school level. In our sample, parent education level aggregated at the school level was correlated $r = -.76$ with FRPM.

Gender, race/ethnicity, and parental education were used as control variables at the student level. School size, FRPM, and percentage of minority students were used as control variables at the school level and were obtained from the Virginia Department of Education.

Achievement test passing rates. Passing rates for the 2013–2014 Virginia Standards of Learning exams were used as a measure of school-level academic achievement. Passing rates indicate the percentage of students in a high school who performed at or above the minimum level on Standards of Learning exams, which are state-mandated subject tests intended to measure student learning and achievement (Virginia Department of Education, 2007). School passing rates for Standards of Learning exams were obtained from the Virginia Department of Education; individual results for the students in this study were not available. Students typically complete these exams at the end of the school year in correspondence with related courses. First administered in 1998, school performance on the Standards of Learning exams has been a criterion for school accreditation and funding since 2006 (Virginia Department of Education, 2010).

The Standards of Learning tests were developed using test blueprints, item development specifications, review committees, field testing, and item banking. These procedures were used to limit item bias and ensure appropriate

item difficulty and content coverage. As a whole, the Standards of Learning exams have been found to have acceptable reliability across race and gender ($\alpha > .70$; Virginia Department of Education, 2007). Four of the most commonly administered Standards of Learning subject exams completed in high school were analyzed: algebra, earth science, history, and English.

Data Analysis

Descriptive statistics were examined for all predictors and outcomes. Pearson product-moment correlations were calculated for all variables aggregated to the school level. A multivariate analytic approach was used to accommodate the associations among the outcome variables (student engagement, grades, and educational aspirations). Because student data were nested within schools, multi-level modeling was used to distinguish between-school effects from within-school effects (Raudenbush & Bryk, 2002). Preliminary examination of an unconditional two-level model that allowed outcomes to covary revealed intraclass correlation values of .08 and .075 for engagement, .09 and .05 for grades, and .04 and .05 for educational aspirations in the middle school and the high school sample, respectively. In addition, the design effect values (i.e., the effect of independence violations on standard error estimates) for the three outcomes were greater (all values >4) than those typically recommended (i.e., 2) for the purpose of ignoring the application of multilevel analysis (Peugh, 2010).

A comprehensive multilevel path modeling approach was used to analyze continuous (engagement) as well as categorical (grades and aspirations) student-level outcomes simultaneously. This analytic approach applied linear regressions for engagement and ordinal logistic regressions for grades and aspirations. The multilevel path modeling was conducted in two steps. In the first step (Model 1), all the control variables were introduced at the student level (male gender, dummy variables for race/ethnicity, and parent educational level) and school level (school size, mean parent education level, and percentage minority students). In the second step (Model 2), the authoritative climate measures (disciplinary structure and support) were added. Figure 1 presents the full multivariate multilevel path model. Student-level predictors are shown on the left-hand side, and school-level predictors are on the right-hand side in Figure 1. Separate analyses were performed for the middle school and high school samples.

Group mean centering of Level 1 variables and grand-mean centering of Level 2 variables can help simplify interpretation of the intercepts and separate within-group effects from between-group effects (Raudenbush & Bryk, 2002). Accordingly, student-level predictors were school-mean centered, and school-level independent variables were

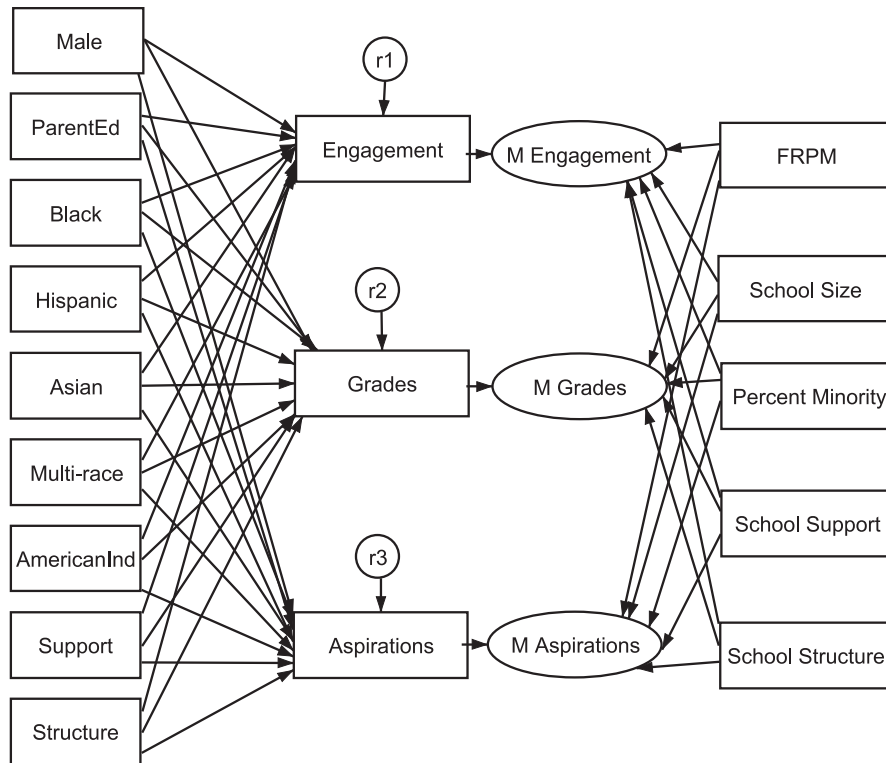


FIGURE 1. *Multivariate multilevel path model. M Engagement = school mean of engagement; M Grades = school mean of grades; M Aspirations = school mean of educational aspirations.*

grand-mean centered. Statistical analyses were performed with Mplus 6.1 using a maximum-likelihood estimator with robust standard errors and specification of a two-level analysis to account for the nesting of students within schools.

One limitation of the multilevel analyses is that both the independent measures of authoritative school climate and the dependent measures of student engagement, grades, and aspirations were measured with student self-report. Because the surveys were completed anonymously, it was not possible to link individual students with independent measures of their academic outcomes. However, data were available at the school level for passing rates on state-mandated achievement testing. We selected the outcomes of high school passing rates for algebra, earth science, history, and English for a multivariate analysis where these outcomes were allowed to covary. This analysis tested the association of passing rates for one of the four tests and the authoritative climate measures by entering school demographics (school size, FRPM, and percentage of minority students) at Step 1, followed by disciplinary structure and student support at Step 2.

Results

Descriptive statistics for all continuous variables at student and school levels are presented in Table 1 for middle

schools and high schools. Overall, middle and high school students reported similar levels of engagement ($M = 18.47$, $SD = 3.06$, for middle school; $M = 18.56$, $SD = 2.97$, for high school), support ($M = 23.65$, $SD = 4.59$, for middle school; $M = 23.75$, $SD = 4.00$, for high school), and disciplinary structure ($M = 18.60$, $SD = 3.94$, for middle school; $M = 18.60$, $SD = 3.74$, for high school). The breakdown for self-reported grades was as follows: 21% of middle school and 18.3% of high school students reported *mostly As*, 40% in middle and 39.6% in high school reported *mostly As and Bs*, 5.7% in middle school and 7.3% in high school reported *mostly Bs*, 20% in middle school and 21% in high school reported *mostly Bs and Cs*, 3.8% in middle school and 4.7% in high school reported *mostly Cs*, 6.7% in middle school and 6.6% in high school reported *mostly Cs and Ds*, and 2.6% in middle and 2.5% in high school reported *mostly Ds and Fs*. Many students reported that they expected to complete postgraduate studies (32.3% in middle and 39.7% in high school), graduate from a 4-year college (44.4% in middle and 35.6% in high school), or at least graduate from high school (12% in middle and high school), whereas few (3.6% in middle and 2.5% in high school) either were unsure or did not expect to graduate from high school.

Pearson product-moment correlations for the study variables aggregated at the school level are shown in the Table 2.

TABLE 1
Middle School (and High School) Descriptive Statistics

Measures	<i>n</i>	<i>M</i>	<i>SD</i>	Min	Max
Student					
Engagement	39,364 (48,027)	18.47 (18.56)	3.06 (2.97)	6 (6)	24 (24)
Student support	39,364 (48,027)	23.65 (23.75)	4.59 (4.00)	8 (9)	32 (32)
Disciplinary structure	39,364 (48,027)	18.60 (18.60)	3.94 (3.74)	7 (7)	28 (28)
School					
Mean parent education	423 (323)	3.25 (3.16)	0.50 (0.50)	2.09 (1.71)	4.69 (4.75)
School size	423 (323)	718.38 (1178.4)	415.79 (711.72)	61.00 (70.00)	4033.00 (4070.00)
% Minority	423 (323)	38.79 (39.53)	27.73 (26.94)	00 (00)	99.37 (99.00)
Student support	423 (323)	23.92 (23.97)	1.30 (1.09)	20.14 (20.74)	29.92 (29.57)
Disciplinary structure	423 (323)	18.90 (18.93)	1.30 (1.31)	15.00 (15.54)	23.21 (23.15)

Note. Middle school values are presented first, followed by high school values in parentheses.

TABLE 2
Correlations Among Middle School (and High School) School-Level Variables

Variable	1	2	3	4	5	6	7
1. Engagement	—						
2. Grades	.43** (.50**)	—					
3. Aspirations	.33** (.39**)	.56** (.53**)	—				
4. FRPM	-.35** (-.38**)	-.56** (-.42**)	-.54** (-.57**)	—			
5. School size	.16** (.22**)	.29** (.04)	.40** (.52***)	-.42** (-.29**)	—		
6. Percentage minority	-.22** (-.15**)	-.21** (-.51**)	.29** (.09)	.31 (.37*)	.30** (.34***)	—	
7. Student support	.75** (.84**)	.26** (.35**)	.07 (.16**)	-.12 (-.20**)	-.06 (.004)	-.28** (-.13*)	—
8. Disciplinary structure	.78** (.81**)	.30** (.33**)	.06 (.23**)	-.22** (-.31**)	-.002 (.10)	-.37** (-.17**)	.84** (.85**)

Note. Middle school correlation coefficients are presented first, followed by high school coefficients in parentheses. FRPM = free or reduced-price meal.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Correlations ranged from .33 to .56 among the outcomes of engagement, grades, and educational aspirations. As expected, higher levels of student support and disciplinary structure were linked with higher levels of engagement ($r = .75$ and $.78$ for middle school; $r = .84$ and $.81$ for high school), grades ($r = .26$ and $.30$ for middle school; $r = .35$ and $.33$ for high school), and aspirations ($r = .07$ and $.06$ for middle school; $r = .16$ and $.23$ for high school). In addition, higher levels of FRPM were associated with lower levels of academic outcomes. Multicollinearity effects were examined by conducting school-level regressions for the predictors of structure, support, and school demographics on engagement. All variance inflation factor values (<5) were well within recommended cutoffs (<10 ; Cohen, Cohen, West, & Aiken, 2003), suggesting negligible multicollinearity effects.

Multilevel path models were conducted for the middle school and high school students separately. These results are presented in Table 3 and Table 4 for middle schools and high schools, respectively. As presented in Model 1, the control variables were introduced in the model at student (gender,

parent education, and dummy variables for race/ethnicity) and school levels (FRPM, school size, and minority percentage) for the outcomes of engagement, grades, and educational aspirations. R^2 values in Table 3 and Table 4 are the ratio of variance explained by the predictors to the total variance of the outcome at a given level.

For middle schools, student-level demographics (FRPM, school size, and percentage minority) jointly explained 2%, 10.3%, and 11.3% of the variance—whereas school-level covariates explained 15.5%, 32.4%, and 47.8% of the variance—in engagement, grades, and aspirations, respectively (Table 3, Model 1). At the student level, boys reported lower levels of grades (log odds = $-.13$, $p < .001$) and aspirations (log odds = $-.16$, $p < .001$) than girls, but there was no significant difference in engagement. After controlling for other variables, an increase of 1 standard deviation in parental education was associated with an increase of 0.11 of a standard deviation in student engagement, 0.24 log-odds increase in grades, and 0.30 log odds increase in aspirations (all p values $< .001$). Overall, students from African American, Hispanic, or American Indian groups were likely to report lower levels

TABLE 3
Standardized Regression Coefficients for Middle Schools

Predictor	Engagement		Grades		Aspirations	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Student level						
Male	-.01	-.01*	-.13***	-.14***	-.16***	-.16***
Parental education	.11***	.09***	.24***	.23***	.30***	.30***
Black	-.02*	.001	-.12***	-.12***	.01	.01
Hispanic	-.05***	-.02**	-.09***	-.08***	-.002	.001
Asian	.04***	.02***	.06***	.05***	.04***	.04***
Multirace	-.04***	-.01	-.06***	-.05***	.03***	.03***
American Indian	-.02***	-.01*	-.04***	-.04***	-.02**	-.02*
Support	—	.42***	—	.08***	—	.07***
Structure	—	.23***	—	.09***	—	.02*
R ²	.019	.375	.103	.126	.113	.120
ΔR ²	—	.356	—	.023	—	.007
School level						
FRPM	-.25***	-.18***	-.58***	-.57***	-.59***	-.58***
School size	.15*	.09**	.02	.01	.05	.05
% Minority	-.16*	.08*	.08	.13*	.53***	.57***
Support	—	.44***	—	.18*	—	.10
Structure	—	.46***	—	.05	—	.07
R ²	.155	.809	.324	.369	.478	.497
ΔR ²	—	.694	—	.045	—	.019

Note. Model coefficients for grades and aspirations are in log-odds units at student level. FRPM = free or reduced-price meal.
* $p < .05$. ** $p < .01$. *** $p < .001$.

and Asian students were likely to report higher levels of outcomes compared to White students after controlling for other demographic characteristics. At the school level, higher levels of FRPM were significantly linked (all p values $< .001$) with lower levels of engagement ($B = -.25$), grades ($B = -.58$), and aspirations ($B = -.59$) after controlling for other variables. School size significantly predicted engagement ($B = .15$, $p < .05$) but not grades or aspirations. Schools with a higher percentage of minority students were likely to have lower student engagement ($B = -.16$, $p < .05$) but higher aspirations ($B = .53$, $p < .001$) on average.

Building upon Model 1, school climate measures of student support and disciplinary structure were introduced in the model at both levels of analysis (student and school) in Model 2 (see Table 3 and Figure 1). Model fit statistics and likelihood ratio test results indicated that Model 2 fit the data significantly better than Model 1, $\chi^2(12) = 19436$, $p < .001$, with lower values of the Akaike information criterion and Bayesian information criterion in Model 2. Controlling for all model covariates, these school climate predictors alone explained ($\Delta R^2 =$) 36%, 2%, and 0.7% of the variance at the within-school level in engagement, grades, and aspirations and 69%, 4.5%, and 2% of the variance at the between-school level, respectively. Both school climate measures

were significantly related with all three outcomes (all p values $< .05$) after controlling for other variables at the within-school level. On average, students who perceived higher levels of student support reported higher levels of engagement with their school ($B = .42$), grades (log odds = $.08$), and educational aspirations (log odds = $.07$). Similarly, students who perceived higher levels of disciplinary structure in their school were likely to be more engaged ($B = .23$) and to report higher grades (log odds = $.09$) and aspirations (log odds = $.02$) after controlling for support and demographic characteristics.

At the between-school level, results indicated significant relations between school climate measures and engagement ($B = .44$ for student support and $B = .46$ for disciplinary structure; p values $< .001$). Higher levels of support were linked with higher grades ($B = .18$; $p < .05$) but not with school-mean aspirations after controlling for other variables. In addition, disciplinary structure did not significantly predict grades and aspirations at the between-school level.

Similar relations between authoritative climate and academic outcomes were observed in high school students (Table 4). Model 1 in Table 4 presents the results for relations between control variables at within-school and between-school levels and three outcomes.

TABLE 4
Standardized Regression Coefficients for High School

Predictor	Engagement		Grades		Aspirations	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Student level						
Male	-.07***	-.07***	-.15***	-.16***	-.19***	-.19***
Parental education	.11***	.07***	.23***	.22***	.30***	.29***
Black	-.02*	.01	-.13***	-.12***	.02*	.02**
Hispanic	-.02**	-.001	-.07***	-.06***	.01	.01
Asian	.04***	.02***	.05***	.05***	.06***	.06***
Multirace	-.05***	-.01**	-.07***	-.06***	.02***	.02***
American Indian	-.02**	<.001	-.04***	-.03***	-.02**	-.01*
Support	—	.42***	—	.14***	—	.12***
Structure	—	.23***	—	.06***	—	.02**
R ²	.020	.358	.102	.135	.126	.143
ΔR ²	—	.338	—	.033	—	.017
School level						
FRPM	-.27***	-.15***	-.15*	-.22**	-.44***	-.55***
School size	.15**	.07***	-.12**	.06	.23***	.11**
% Minority	-.06	-.006	-.32***	-.34***	.28***	.30***
Support	—	.63***	—	.30**	—	.03
Structure	—	.26***	—	-.12	—	.15
R ²	.125	.849	.166	.290	.329	.407
ΔR ²	—	.724	—	.124	—	.078

Note. Model coefficients for grades and aspirations are in log-odds units at student level. FRPM = free or reduced-price meal.
* $p < .05$. ** $p < .01$. *** $p < .001$.

School climate variables were introduced in Model 2 for high schools in Table 4 and Figure 1. Model comparisons based on fit indices and the likelihood ratio test revealed that Model 2 fit better than Model 1, $\chi^2(12) = 23390$, $p < .001$, and lower values of the Akaike information criterion and Bayesian information criterion in Model 2. Controlling for all covariates, student support and disciplinary structure alone explained ($\Delta R^2 =$) 34%, 3.3%, and 2% of the variance in engagement, grades, and aspirations at the within-school level and 72%, 12%, and 8% of variance at the between-school level, respectively. Results at the within-school level indicated that school climate measures were significant predictors of all three outcomes (all p values $< .05$) after controlling for other variables. On average, students who perceived higher levels of support reported higher levels of engagement ($B = .42$), grades (log odds = .14), and educational aspirations (log odds = .12). Similarly, students who perceived higher levels of disciplinary structure in their school were likely to be more engaged ($B = .23$) and to report higher grades (log odds = .06) and aspirations (log odds = .02) after controlling for student support and demographic characteristics.

Between-school results indicated significant relations between school climate measures and engagement ($B =$

.63 for support and $B = .26$ for structure; p values $< .001$). Higher levels of support were linked with higher grades on average ($B = .30$; $p < .001$) but not with school-mean aspirations after controlling for other variables. Consistent with the middle school findings, structure did not significantly predict grades and aspirations at the between-school level in high schools.

The supplemental multivariate analysis examined associations of high school passing rates on four state-mandated achievement tests with student-reported measures of disciplinary structure and student support, after controlling for school demographics (i.e., FRPM, school size, and percentage White). Results indicated that disciplinary structure was statistically associated with algebra school pass rates ($B_{\text{structure}} = .26$, $p = .014$; $B_{\text{support}} = -.06$, $p = .57$; $\Delta R^2 = .04$) and that student support was associated with school pass rates of earth science ($B_{\text{structure}} = -.06$, $p = .50$; $B_{\text{support}} = .19$, $p = .03$; $\Delta R^2 = .02$) and history ($B_{\text{structure}} = .01$, $p = .923$; $B_{\text{support}} = .23$, $p = .02$; $\Delta R^2 = .05$). However, neither disciplinary structure or student support was found to be associated with English reading ($B_{\text{structure}} = .12$, $p = .178$; $B_{\text{support}} = -.02$, $p = .84$; $\Delta R^2 = .01$). Associations among the four outcomes were incorporated in the model, and the correlation values ranged from .16 to .49.

Discussion

These results support authoritative school climate theory as a framework for conceptualizing key features of school climate that are associated with student academic outcomes. An authoritative school climate characterized by strict but fair discipline and supportive teacher–student relationships was associated with higher student engagement, higher course grades, and higher educational aspirations. A remarkably similar pattern of findings was found in middle school and high school samples, which supports the robustness and generalizability of findings. These results add to previous studies finding that an authoritative school climate was associated with higher student engagement and academic achievement (Gill et al., 2004; J. Lee, 2012) as well as better attendance and higher graduation rates (Pellerin, 2005). Overall, this study supports a social-ecological perspective that school climate is an important factor in student academic outcomes (Thapa et al., 2013).

Student academic outcomes are often linked to demographic factors of family poverty and racial or ethnic background, although there is much debate about the interaction between these factors and how they affect student achievement (G. Duncan & Magnuson, 2005; Ladd, 2012). In this study, student race/ethnicity and parental education accounted for more than 10% of the variance in student grades and educational aspirations for both middle and high school students. Students of color (except for Asian students) reported lower grades than White students, and students with less educated parents reported lower grades than students with more educated parents.

At the school level of analysis, enrollment size, the percentage of low-income students (as measured by FRPM), and the percentage of minority students in a school together accounted for more than 30% of the variance in grades and more than 40% to 50% of the variance in educational aspirations among the middle and high schools. Because socioeconomic and racial/ethnic factors appear to have a substantial influence on student achievement, it may appear to educators that the demographics of their student body determine student achievement. On the contrary, the correlational evidence from this study suggests that school climate is strongly associated with student engagement in school and, to a more limited degree, course grades and educational aspirations, beyond the influence of student and school demographics.

Student Engagement

The strongest and most consistent school climate findings in this study were that student engagement was highest in schools with high disciplinary structure and student support. Among middle school students, the two school climate measures accounted for 35.6% of the variance in engagement at the individual student level and 69.4% of the variance at the school level, after controlling for student and school

demographic variables. Among high school students, the two school climate measures accounted for 33.8% of the variance in engagement at the individual student level and 72.4% of the variance at the school level, after controlling for student and school demographic variables. These findings speak to the close association between school climate and students' interest in learning and positive regard for their school. They provide strong support for previous studies reaching similar conclusions with smaller and less diverse samples (Appleton et al., 2008).

The measure of student engagement in this study was shorter than measures used in many other studies and does not include all aspects of engagement that others have identified (e.g., Hazel et al., 2014). It included three affective items concerned with feelings of pride and belonging in school and three cognitive items assessing motivation to learn and do well in school (Konold & Cornell, in press). Future studies might assess how different aspects of student engagement, such as interest in learning, participation in the classroom, emotional attachment to school, and behavioral involvement in school activities, are associated with school climate. Nevertheless, a brief measure served the purposes of this study and is more practical in a long school survey that includes multiple scales.

Student Course Grades

Students who perceived their teachers as supportive and school discipline as strict, but fair, reported higher course grades than students who perceived a less authoritative school climate. The combination of student support and disciplinary structure added 2.3% of the variance to the prediction of student-level grades in middle school and 3.3% in high school, after controlling for the influence of student gender, race/ethnicity, and parental education. At the school level, student support, but not disciplinary structure, contributed significantly to the association with course grades, accounting for 4.5% of the variance in middle school and 12.4% of the variance in high school. Although the contribution of school climate was relatively modest, it should be expected that other factors, such as the student's academic aptitude and dedication to learning, would be more important determinants of course grades.

These findings are consistent with previous studies showing that a positive school climate is associated with higher academic achievement (e.g., Brand, Felner, Seitsinger, Burns, & Bolton, 2008). A study by O'Malley, Voight, Renshaw, and Eklund (2015) found that a more positive school climate was associated with higher self-reported grade point averages in high school students. School climate was measured by averaging four constructs (school connectedness, relationships with adults at school, opportunities for meaningful participation in school, and school safety). At least 10 of the 15 items in this combined measure seem to

map onto constructs of disciplinary structure (e.g., “The teachers at this school treat students fairly”) and student support (e.g., “At my school there is an adult who really cares about me”).

Educational Aspirations

Educational aspirations are an important academic indicator because they are linked to academic success and graduation (Fraser & Garg, 2012). Students with low educational aspirations are more likely to fail and drop out of school (Garg, Melanson, & Levin, 2007). Students in schools with an authoritative school climate reported higher academic aspirations in both middle school and high school samples, although the combination of disciplinary structure and student support added less than 1% of the variance in middle school and 1.7% of the variance in high school samples after controlling for student demographics. At the school level, structure and support were not statistically significant predictors of schoolwide educational aspirations. However, previous studies have found that a positive school climate is associated with higher educational aspirations (Thapa et al., 2013).

Perhaps one reason that our effects were relatively small is that most students reported high aspirations (e.g., 77% of middle school and 75% of high school students expected to graduate from a 4-year college or obtain a postgraduate degree). Another reason is that the measure of educational aspirations was limited to a single question that asked how far students expected to go in school. Other studies have also relied on one or two items to measure student expectations that they will graduate from high school and obtain higher education (e.g., Garg et al., 2007; Hill et al., 2004). A more extensive measure might gauge the strength of the student’s aspirations and whether the student had specific occupational plans or goals. It also might be useful to assess teacher and parent expectations for their students, since teacher and parent expectations are associated with student achievement and high school graduation and might be more powerful predictors (V. Lee & Smith, 2001; Spera, Wentzel, & Matto, 2009).

Achievement Test Passing Rates

A supplemental multivariate analysis found that disciplinary structure was associated with higher schoolwide passing rates in algebra and that student support was associated with higher passing rates in earth science and history. The effect sizes for these outcomes ranged from 1.9% to 5.1% and are consistent with previous research that examined associations between other measures of school climate (i.e., student engagement and prevalence of teasing and bullying) and schoolwide passing rates in middle school samples, where effect sizes ranged from 1.5% to 4.6% (Lacey, Cornell, & Konold, in press). Neither disciplinary structure nor student support was associated with English passing

rates. Although the effect sizes were relatively small, they demonstrate relations with school climate after controlling for school demographics. These findings are useful because they represent an academic outcome that is independent of student self-report of school climate. An important limitation of these findings is that individual student test scores were not available, which could have provided a more compelling multilevel examination of the relations between school climate and academic outcomes. Passing rates are also limited because they are aggregate measures of schoolwide performance with less variance among schools than is observed among students. The school’s alignment of its curriculum with each test and the quality of teacher instruction are two highly important influences on passing rates that were not available for inclusion in these analyses. An ideal next step in this line of research would be to obtain individual student measures of school climate that could be matched with independent assessments of student academic performance, such as course grades recorded by teachers and individual test scores (rather than aggregate school passing rates), but this kind of analysis was not possible with an anonymous student survey.

Authoritative School Climate

The assessment of school climate has become a nationwide goal because of its recognized impact on school quality and student outcomes (Dary & Pickeral, 2013; Thapa et al., 2013). However, there is little consensus on the key qualities of a positive school climate. The present study helps to build a theoretical framework that can more precisely identify important elements of school climate.

An authoritative model of school climate is a developing theory that requires further elaboration and support. In previous studies of authoritative school climate, disciplinary structure and student support have been associated with the prevalence of teasing and bullying in a school, bullying victimization, and general peer aggression (Cornell et al., 2015; Gregory et al., 2010). Other studies have linked authoritative school climate to lower levels of student aggression toward teachers (Berg & Cornell, in press; Gregory et al., 2012) and lower suspension rates (Gregory et al., 2011). This study extends the research on authoritative school climate using these student survey measures from studies of student aggression to academic achievement.

Disciplinary structure was defined as student perceptions that school rules are fair and reasonable. Higher disciplinary structure means that students have a chance to explain their behavior when accused of doing something wrong and are punished fairly when they deserve it. Disciplinary structure is important because when students perceive that school authorities are fair and unbiased, they are more willing to comply with school rules and are less aggressive with their peers (Tyler, 2006). High structure also includes the

perception that students are treated fairly regardless of their race or ethnicity, which is increasingly important in light of national concern with racial disparities in school discipline (U.S. Department of Justice & U.S. Department of Education, 2014). Most school climate surveys include some assessment of the degree to which students perceive school discipline as fair, but they do not define it as fundamental to a positive school climate (Thapa et al., 2013).

It is important to distinguish the high degree of disciplinary structure characteristic of authoritative schools from the more punitive structure observed in authoritarian schools. School authorities can be strict and fair in their discipline without being harsh or castigatory. An authoritarian school might be characterized by a zero-tolerance philosophy of school discipline (American Psychological Association Zero Tolerance Task Force, 2008), similar to the rigid and controlling practices that Baumrind (1968) described in authoritarian parents. For example, Pellerin (2005) found that authoritarian schools emphasizing the use of punishment had higher rates of dropout than more authoritative schools.

The second component of an authoritative school is the supportiveness of teacher–student relationships, which is another widely recognized characteristic of a positive school climate (Thapa et al., 2013). In this study, student support was conceptualized as student perceptions that teachers care about all students and want them to do well and that students feel comfortable seeking help from them. These findings are consistent with previous research finding that adolescents who are exposed to supportive adults in the school have higher academic achievement (e.g., Goodenow, 1993; Gregory & Weinstein, 2004) and lower problem behavior (Henrich, Brookmeyer, & Shahar, 2005; Jessor et al., 2003).

A distinctive feature of an authoritative model is that both disciplinary structure and student support are regarded as foundational to a positive school climate. In practice, school administrators often think of school discipline in a more dichotomous manner that makes disciplinary structure and student support seem mutually exclusive. For example, two studies have found that principal attitudes toward discipline can be sorted into two seemingly contrary philosophies emphasizing strict discipline versus a more supportive, preventive approach (Nickerson & Martens, 2008; Skiba, Edl, & Rausch, 2007). As Gregory and colleagues (2010) concluded, school authorities do not have to choose between a “get tough” versus “be supportive” approach.

Limitations

This study examined disciplinary structure and student support, but there are other aspects of school climate to consider. The U.S. Department of Education devised Safe and Supportive Schools, a model of school climate that has 13 components organized into three domains: engagement, safety, and environment (Bradshaw, Waasdorp, Debnam, &

Johnson, 2014). There are components in this model that align with the scales used in this study, but the way all 13 components are related to one another should be a direction for future research. School climate may also interact with family and community variables that were not considered in this study.

An authoritative climate is generally conceptualized as involving components of demandingness and responsiveness (Gregory & Cornell, 2009). This study used disciplinary structure as an index of demandingness and student support as an index of responsiveness, but other indicators of an authoritative school climate might be included. For example, some studies have used the degree to which teachers demand high academic performance from their students (sometimes called academic press) as an indication of demandingness or structure (Gregory et al., 2011; Jia, Konold, & Cornell, in press). Several studies have found that a school climate characterized by high academic expectations will have greater student achievement (Brault, Janosz, & Archambault, 2014; Goddard, Sweetland, & Hoy, 2000).

Another study limitation is that most of the measures were based on student self-report. This study screened out surveys that were completed very rapidly and surveys in which the students reported that they were not telling the truth, but other self-report problems remain. Students may be biased to give favorable self-reports and correlations may be increased by shared-method variance. It will be useful in future studies to include independent measures of school climate, such as scales based on teacher perceptions, and to include student outcomes based on more objective measures, such as performance on standardized tests (Brand et al., 2008). Along these lines, a study of the high school sample used in this study found that student and teacher measures of authoritative school climate were associated with lower dropout rates (Jia et al., in press).

Correlational findings cannot establish causal relationships and are open to multiple interpretations. There may be bidirectional or reciprocal causal effects between school climate and academic outcomes. For example, the strong associations between student support and student engagement found in this study suggest that teachers who establish supportive relationships with their students will cause those students to feel more positively about school and become more engaged in learning, but it is also possible that students who come to school with higher motivation to learn will develop more favorable attitudes toward their teachers and elicit more supportive actions from them. The most effective way to disentangle these causal effects is to undertake experimental interventions that improve school discipline practices or teacher–student relationships and to track resulting changes in student engagement. Nevertheless, study findings are consistent with our hypothesized model by demonstrating a statistical effect of school structure and support on student engagement, grades, and aspirations after controlling for

known demographic influences and using a model that considers the nesting of students within schools. Few studies have conducted a multivariate multilevel analysis that can provide a more robust and comprehensive analysis.

As a balance to these limitations, these findings were obtained in two large and diverse samples of schools representing more than 98% of the state population of secondary public schools. A high participation rate is important because schools with high levels of discipline problems or low investment in student support may be less likely to participate in research. For example, some studies have reported that a low participation rate (e.g., 30%) limited their findings (Gottfredson, Gottfredson, Payne, & Gottfredson, 2005; Hanson & Austin, 2003). Moreover, this study was conducted with a racially and socioeconomically diverse group of students who also participated at a high rate.

Implications

Our view is that school administrators, teachers, and other staff can have a profound influence on school climate through their interactions with students in the two authoritative domains of school discipline and student support. A strict but fair enforcement of discipline and a supportive and respectful engagement with students create the basis for students to respond to academic expectations and demands with greater engagement and investment in learning. High school engagement, which has both cognitive and affective components, leads to greater learning that is reflected in greater academic performance. We recognize that this formulation is likely a simplification of a more complex process involving multiple and interacting causal pathways. For example, students who feel that they are disciplined unfairly for misbehavior could become disengaged and less motivated, they could lose instructional time (if suspended from school), and

their academic performance would suffer. At the same time, their academic difficulties may generate frustration and further misbehavior, leading to a cycle of disciplinary problems and declining engagement and academic performance.

An authoritative school climate theory could provide a valuable perspective on school improvement efforts and also provide a means of testing causal hypotheses suggested by the study findings. For example, professional development programs, such as My Teaching Partner–Secondary (MTP-S), provide coaching for teachers to improve teacher–student interactions (Gregory, Allen, Mikami, Hafen, & Pianta, 2014). One of the primary goals of MTP-S is to build an emotionally supportive relationship between teachers and students, which seems to parallel the authoritative conception of support. According to the MTP-S model, a supportive relationship is characterized by feelings of warmth and connection as well as responsiveness to the student’s academic and social/emotional needs. Authoritative school climate theory would suggest that the teacher–student relationship should be characterized by high disciplinary structure for students as well.

Another example is the Positive Behavioral Interventions and Supports (PBIS) model of school improvement (Horner, Sugai, & Anderson, 2010). Under the PBIS model, schools establish schoolwide expectations for student behavior that stress positive goals (e.g., “Be respectful to others”) and establish a reward system to reinforce positive behavior. PBIS also stresses that the entire school staff adopt a similar positive approach to reinforcing desired student behavior (Bradshaw, 2013). Conceivably, the principles of an authoritative school climate could be adopted into a PBIS model to inform these goals and to guide teacher behavior. In closing, we recommend the use of an authoritative conceptual framework to assess how school interventions modify school climate conditions and produce positive student outcomes.

Appendix

Items for Survey Scales

Disciplinary structure

1. The punishment for breaking school rules is the same for all students.
2. Students at this school only get punished when they deserve it.
3. Students are treated fairly regardless of their race or ethnicity.
4. Students get suspended without good reason (reverse scored).
5. The adults at this school are too strict (reverse scored).
6. The school rules are fair.
7. When students are accused of doing something wrong, they get a chance to explain it.

Student support

1. Most teachers and other adults at this school care about all students.
 2. Most teachers and other adults at this school want all students to do well.
 3. Most teachers and other adults at this school listen to what students have to say.
 4. Most teachers and other adults at this school treat students with respect.
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(continued)

Appendix (continued)

5. There are adults at this school I could talk with if I had a personal problem.
6. If I tell a teacher that someone is bullying me, the teacher will do something to help.
7. I am comfortable asking my teachers for help with my schoolwork.
8. There is at least one teacher or another adult at this school who really wants me to do well.

Engagement

1. I like this school.
 2. I am proud to be a student at this school.
 3. I feel like I belong at this school.
 4. I usually finish my homework.
 5. I want to learn as much as I can at school.
 6. Getting good grades is very important to me.
-

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Note

1. Although the majority of the variables were manifest in nature, latent variable modeling could have potentially been applied to these models to capture the measurement structures of some of the variables. However, because the measurement structures of these variables have been reported elsewhere (Konold et al., 2014), we examined the substantive relationships within a path-analytic framework. Path analysis is a widely used approach for examining relationships that are of substantive interest (Kline, 2011). The procedure allows for “theoretically meaningful relationships among variables that cannot be specified in a single additive regression model” (Schumacker & Lomax, 2010, p. 156), including multivariate relationships among several outcome measures.

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