Triangulating School Climate: Areas of Convergence and Divergence Across Multiple Levels and Perspectives

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Bottiani, J. H., Lindstrom Johnson, S., McDaniel, H.L., & Bradshaw, C. P. (2019). Triangulating school climate: Areas of convergence and divergence across multiple levels and perspectives. *American Journal of Community Psychology, n.p.* DOI: 10.1002/ajcp.12410

This is a post-peer-review, pre-copyedit version of an article published in American Journal of Community Psychology. The final authenticated version is available online at: 10.1002/ajcp.12410

Agency: Institute of Education Sciences Grant Number: R305A150221

Abstract

Students often have differing perceptions of their school's climate. Although these subjective perceptions can be meaningful outcome predictors, discrepancies create challenges for those seeking to globally characterize or intervene to improve the climate of a school. Trained, outside observers can provide insights on perceptible and ostensibly malleable aspects of the school; however, the extent to which these outside observations help us to understand differences in students' report of school climate has not been examined. To study this, we examined convergence and divergence between independent observers' assessments and students' shared perceptions of school climate at the classroom- and school-levels. Data come from the Maryland Safe and Supportive Schools Initiative (MDS3), which included 20,647 students and observations of 303 teachers in 50 high schools. Students responded to survey items regarding safety, engagement, and environment; independent observers assessed teachers' classroom practices and the school physical environment. A three-level model partitioned variance to the individual, classroom, and school levels. Most of the variance in students' climate perceptions was between students, with classroom and school intraclass correlation coefficients (ICCs) ranging from 0.01 to 0.20; however, observations explained large percentages of between-school variation in climate (58% to 91%). Findings suggest the potential utility of outside observations for explaining school-level variation in school climate to inform decision-making and future research.

Keywords: classroom observations, physical environment, multilevel, school climate

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School climate is a global construct that broadly refers to a school's physical and psychological condition (Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013; Wang & Degol, 2016). School climate has been defined as the values, beliefs, and expectations in a school that ensure that students feel socially, emotionally, and physically safe (National School Climate Council, 2007). The U.S. Department of Education developed a comprehensive model for understanding and evaluating school climate, which includes three overarching domains of engagement, safety, and environment (Bradshaw, Waasdorp, Debnam, & Lindstrom Johnson, 2014; U.S. DOE National Center on Safe and Supportive Learning Environments, n.d.). The engagement domain includes dimensions reflecting strong and equitable relationships between students, teachers, families, and schools and strong connections between schools and the broader community; the safety domain assesses the extent to which students feel safe from violence, bullying, harassment, and controlled-substance use; and, the environment domain reflects the extent to which school facilities are clean and comfortable, classrooms are well-managed, school based health supports are available, and there is a clear and fair disciplinary policy.

These domains of school climate have been assessed by a wide range of indicators. For example, the presence of graffiti on the building exterior (Lindstrom Johnson, Bottiani, Waasdorp, & Bradshaw, 2018; Wilcox, Augustine, & Clayton, 2006), use of exclusionary discipline practices (Bottiani, Bradshaw, & Mendelson, 2017), and students' feeling of belonging and being cared about within the school community (Debnam, Lindstrom Johnson, Waasdorp, & Bradshaw, 2014; Payne, 2008) all have been examined as aspects of school climate. School climate is traditionally measured by asking students and other school stakeholders about their

perceptions of myriad aspects of the school, on the premise that a multidimensional, multi-informant view will provide a more valid and reliable assessment of climate. Yet students and other school community members often differ in their perceptions of the same school's climate (Waasdorp, Pas, O'Brennan, & Bradshaw, 2011), and it may be unclear how to reconcile these discrepancies when decisions must be made by administrators affecting the whole school.

Prior studies indicate that the majority of variability in student' perceptions of school climate are attributable to student-level differences (Fan, Williams, & Corkin, 2011; Koth, Bradshaw, & Leaf, 2008). Yet student-level differences in perceptions of climate should not be considered idiosyncratic and subjective to the student alone. Systematic gaps in climate perceptions are frequently identified based on student social position and identity factors (i.e., race, ethnicity, gender, socioeconomic status; Bottiani, Bradshaw, & Mendelson, 2016; Shukla, Konold, & Cornell, 2016; Voight, Hanson, O'Malley, & Adekanye, 2015), suggesting an important role of the environment and person-environment interactions. Yet, the extent to which the school social and disciplinary environment can explain such gaps is rarely reported (Bottiani et al., 2014), and a focus on the school physical environment is even less common (Lindstrom Johnson et al., 2018).

Research that can shed light on the extent to which variability in students' perceptions of school climate may be explained by school and classroom factors is likely to yield insights with implications for intervention. Independent observations may help to discern what specific, malleable aspects of the school and classroom explain differences in school climate perceptions, above and beyond individual-level factors. Toward that end, the current study sought to advance our knowledge of these aspects by evaluating the relationship between independently observed aspects of school climate at both the classroom- and school-level and student perceptions of

school climate at the individual-level across the domains of safety, engagement, and environment. An enhanced understanding of how observed school and classroom factors relate to students' perceptions of school climate may inform future research and initiatives aimed at improving school climate.

Subjective Measurement of School Climate and Related Outcomes

The rationale for measuring student perceptions of the school is heavily influenced by the bioecological model (Bronfenbrenner & Morris, 2007) and social cognitive theory (Bandura, 2001). The bioecological model emphasizes the importance of an individual's unique biological make-up, lived experiences, and interactions within a nested context as developmental determinants of wellbeing and achievement (Bronfenbrenner & Morris, 2007). Social cognitive theory (Bandura, 2001) suggests that students' perceptions of the school environment influence their behavior at school. Thus, student perceptions of school climate are considered important in their own right to assess and monitor as an indicator of the effectiveness of initiatives to improve climate and youth outcomes (Haynes, Emmons, & Ben-Avie, 1997). Empirical evidence supports this premise; students' subjective perceptions of climate have been associated with practically and clinically meaningful student outcomes of academic achievement, mental health, and delinquency (Thapa et al., 2013; Wang & Degol, 2016).

Objective Measurement of School Climate and Related Outcomes

Having established the importance of measuring students' subjective perceptions of school climate, improving our understanding of factors contributing to shared variance in students' perceptions within classrooms and schools, above and beyond individual-level differences, will yield important insights into malleable factors that could be adjusted to improve students' perceptions of climate on a broader-level. Although some research has examined

school climate perceptions in the aggregate at the school-level (e.g., Jia, Konold, & Cornell, 2016), there has been less exploration of the utility of outside observers' assessments of school climate at the classroom and school-levels.

Much of the work on classroom climate is motivated by the literature on teacher professional development, evaluation, consultation and feedback to promote more effective classroom interactions and teaching practices (Pianta & Hamre, 2009). Aspects of effective teaching that have been observationally assessed include proactive behavior expectations, use of praise, and opportunities to respond, as well as less effective practices such as reactive and punitive disciplinary tactics (Rusby, Crowley, Sprague, & Biglan, 2011). Proactive behavioral expectations refers to the setting of clear expectations (Sugai & Horner, 2002). The effective use of praise (or approval) to motivate positive learning behaviors is sparing, specific, and conditional (Good & Grouws, 1977). The active facilitation of learning through opportunities to respond (OTR; Brophy & Good, 1986; Sutherland, Wehby, & Yoder, 2002) reflects a combination of instructional talk, prompts, wait time, and feedback. Studies using observational methods to assess climate in classrooms demonstrate that effective teaching practices, such as setting proactive behavior expectations, use of limited praise, and opportunities to respond, are associated with more positive student-reported school climate experiences and higher levels of achievement (Allen et al., 2013; Mikami, Gregory, Allen, Pianta, & Lun, 2011). Alternatively, reactive and punitive classroom practices are thought to hinder opportunities for trusting teacher-student relationships and autonomy necessary for student engagement (Skiba & Losen, 2017).

Observations of areas outside the classroom environment are less frequently utilized; yet recent work suggests they may predict students' perceptions of school climate (Lindstrom Johnson et al., 2018). Specifically, observed negative student behaviors and lack of school

building illumination were related to student perceptions of disorder and rules and consequences which explained student involvement in violence (Lindstrom Johnson et al., 2018). From a school-level, observations of the school physical environment have often been grounded in theories related to youth engagement in antisocial behavior. Specifically, there has been an interest in the application of theories originally developed to characterize neighborhood influences, such as social disorganization theory and Crime Prevention Through Environmental Design (CPTED; Crowe, 2000), for use in school observations. These theories contend that an individual's risk for involvement in deviant behavior and perception of the environment are influenced by community contextual variables. Social disorganization theory and CPTED further suggest that observations of the school physical environment can help to capture particular school features that may interfere with effective enforcement of positive behavioral norms (Plank, Bradshaw, & Young, 2009) and monitoring of student behavior (Astor, Meyer, & Behre, 1999). As such, observations of the school physical environment have primarily focused on the presence of disorder in schools and found associations with teacher-perceived student misconduct (Wilcox et al., 2006) and student-reported drug use (Grana et al., 2010).

Overview of the Current Study

The present study was motivated by the potential of outside observations of malleable classroom social and school physical environment factors to explain, and thus identify points of intervention to improve, students' shared climate perceptions within classrooms and schools Toward this end, we leveraged data from multiple sources (i.e., student- and observer-reports) and across multiple levels (i.e., individual, classroom, and school) to explore how observations at the classroom- and school-level relate to student report of school climate. Findings inform our

understanding of areas of convergence and the potential value-added associated with different perspectives and sources of information on school climate.

Method

Procedure

Data for the current study come from the Maryland Safe and Supportive Schools (MDS3) statewide initiative. Recruitment in this project was led by the Maryland State Department of Education. After attending informal meetings that provided an overview of the project, interested principals voluntarily agreed to participate in the project. Schools sent home informational letters with opt-out waivers for parents who did not want their child to participate in data collection. A youth assent process was used in reference to the students' completion of voluntary, anonymous online self-report surveys; these measures were administered by school staff across approximately 25 classrooms in each school following a standardized written procedure. Each student entered a classroom-identifying password to access the survey, which allowed the research team to subsequently link and hierarchically nest student survey responses within classrooms. Students completed the survey in a core subject class (primarily language arts) to ensure that students were only surveyed once. See Bradshaw, Waasdorp, Debnam, & Lindstrom Johnson (2014) for additional details. In addition to the survey, the physical environment of the school, and approximately 25 classrooms per school, were also observed by trained observers. Physical environment observations systematically included, on the exterior, the entrance to school grounds, perimeter of school grounds, parking lots, playing fields, and building entrance; on the interior, entryway, two hallways, two stairwells, and the cafeteria. Language arts classes were prioritized for classroom observations following a random sampling of other core instructional classes (e.g., math, science, and social studies) that were observed until we met the

goal of observing 25 teachers/classrooms (see details on the observational data collection below). Data were recorded on a mobile handheld tablet using the Pendragon software. Observers were recruited from the surrounding area using job recruitment sites, selected by research team staff for interviews, and if selected to participate in training, passed criminal background checks. ASSIST observers and SAfETy observers were trained separately. Trainings included an 8-hour didactic session followed by in-school practice and reliability assessment. Observers were trained to reliability (at least 80% with an expert observer) and underwent recalibration midway through the data collection period to ensure consistency of data. These data were approved for analysis by the investigators' Institutional Review Board.

Participants

Data from 20,647 students in 303 classrooms and 50 high schools across 12 districts (i.e., half of all possible districts in the state) that participated in the MDS3 initiative were analyzed. Of the student survey participants, males and females were proportionate to one another, and 6,054 (29.3%) were Black, 962 (4.7%) were Latino, 9,838 (47.7%) were White, and 2,808 (13.6%) were another race/ethnicity or multiple race/ethnicities. The sample included slightly more 9^{th} graders (27%) and slightly fewer 12^{th} graders (19%). Seventy percent of students reported receiving mostly As and Bs on their report card. Gender, race/ethnicity data, grade-level, and academic achievement survey reports were missing from about 4.8% of the sample. Of 303 classroom teachers, approximately 73% were female. Classroom teachers assigned to majority students of color were 48.5%. See Table 1 for descriptive data on students and classrooms. The average school enrollment size in the 50 schools was 1236.8 students (*SD* = 457.6). The average percent of school enrollment comprised of Black students was 34.5% (*SD* =

24.6). The average percentage of students receiving free and reduced-price meals (FARMs) was 38.0% (*SD* =17.7). Schools average suspension rate was 15.5% (*SD* = 12.0).

Measures

Student report. Students in high schools participating in the MDS3 initiative were surveyed using an anonymous self-report measure of school climate, called the Maryland Safe and Supportive Schools (MDS3) School Climate Survey (Bradshaw et al., 2014). Consistent with the U.S. Department of Education's three-factor model of school climate, the measure included three primary domains of *Safety*, *Engagement*, and *Environment*. Specifically, *Safety* was assessed using three subscales: a) concerns about bullying (i.e., the extent to which bullying is a problem and students at the school try to stop it; Cronbach's α = .65, four items); b) concerns about substance use (i.e., asking to what extent drugs, tobacco, and alcohol consumption were a problem at that school; 3-item α = .87); and c) physical safety (i.e., feeling safe walking to school and at school and the extent to which weapon-carrying and physical fighting occur at school; 4-item α = .65). Three subscales were used to assess *Engagement*, including a) student-student connectedness (i.e., perceptions that students at school help, respect, like, and trust one another; 5-item α = .88); b) whole school connectedness (i.e., a positive feeling about the school, including pride and liking school; 4-item α = .84); and c) culture of equity (i.e., fair and inclusive treatment by race, gender, and socioeconomic status, and cultural background; 4-item α = .83). Finally*, Environment* was assessed using the following three subscales: a) rules and consequences (i.e., clear, proactively defined, and consistently reinforced positive school discipline; 5-item α = .74); b) physical comfort and cleanliness (i.e., comfortable temperature, bright and pleasant appearance, and clean spaces; 4-item α =.80); and c) disorder (i.e., students

are disruptive and disobey rules, staff let students misbehave, and the school has signs of disorder such as broken windows and vandalism); 5-item $\alpha = .58$).

Teacher observations. Independent observers were trained to reliably assess student and teacher interactions in the classroom using the Assessing School Settings: Interactions of Students and Teachers (ASSIST; Rusby, Taylor, & Milchak, 2001) observational measure. The ASSIST records tallies of specific teacher and student behaviors as well as global ratings of classroom social processes during a 15-minute observation period. For the purpose of this study, tallies of teacher behaviors were analyzed, including proactive behavior expectations, approvals (i.e., praise), opportunities to respond, reactive behavior management, and disapprovals (i.e., punitive discipline). The occurrence of these teacher behaviors was tallied by observers over the course of the 15-minute observation with each behavior only being counted in one category; one behavior could not be counted in multiple teacher behavior tallies. Each observer was required to reach an average of 80% inter-observer agreement with a master trainer across three classrooms prior to observing independently in study schools. The average training inter-observer agreement rate was 87% when these data were collected in the spring of 2014. Inter-observer agreement rates were examined again during active data collection and were also 87% (see Pas, Cash, O'Brennan, Debnam, & Bradshaw, 2015 and Gaias, Lindstrom Johnson, Bottiani, Debnam, & Bradshaw, 2019 for further description of the ASSIST training and reliability).

School observations. At the school level, the School Assessment for Environmental Typology (SAfETy; Bradshaw, Milam, Furr-Holden, & Lindstrom Johnson, 2015) was utilized, an observational measure of the school physical environment. This instrument measures three global aspects of the school environment: disorder, surveillance, and appearance. Each global domain was measured in multiple locations interior and exterior to the school building, including

hallways, stairwells, building entrances, and cafeterias on the interior and parking lots, playing fields, and the entrance to the school grounds on the exterior. To measure the three global aspects of school environment used in the present study (i.e., disorder, surveillance, and appearance), a *facet-representative* parceling strategy (Little, Cunningham, Shahar, & Widaman, 2002) was applied to the SAfeTy indicators. This strategy combined items based on location (i.e., interior, exterior) and item content and involved combining items that were (1) likely to share secondary characteristics and (2) likely to exhibit non-negligible residual correlations with one another based on shared features (e.g., measured in same location of the school). The resulting indicators of disorder included interior and exterior graffiti, property damage, litter, substance use paraphernalia, cigarette butts, and exterior only negative behavioral expectations. Indicators of surveillance included interior and exterior presence of surveillance video cameras, as well as negative behavioral expectations on the interior of the building, and exterior indicators of ownership. Indicators of appearance included clean and aesthetically maintained interior spaces, well-lit building entrances, murals and artwork on the building interior, and evidence of landscaping on the exterior of the building. The appropriateness of these groupings were examined via exploratory factor analysis (EFA). Confirmatory factor analysis was conducted in M*plus* (v7.11; Muthén & Muthén, 2012) thereafter to understand the dimensionality of the three constructs using the item parcels as factor indicators. Modification indices were used to guide the formation of cohesive, theoretically justifiable constructs. In many cases this meant the removal of parcels with a standardized factor loading of less than 0.40, as suggested by Thompson (2004) and others. Models were fit at the global level using root mean squared error of approximation (RMSEA), standardized root mean residuals (SRMR), and comparative fit index (CFI). At the local level, *p* values resulting from Wald tests on the parameter estimates (loadings, factor

correlations, etc.) were used to assess fit. Global fit results for the final, three-factor model were χ^2 (105) = 589.95, $p < .001$, CFI = 0.807, TLI = 0.770, RMSEA = 0.105 (95% CI = 0.083, 0.126), SRMR = 0.092.

Analyses

The cross-sectional data were nested such that student self-report (N = 20,647) was nested within classrooms (J = 303), which were nested within schools (K = 50). School-level design effects, were determined to exceed 2.0 for all outcomes (ranged from 16.2 to 79.6), indicating a need to account for the hierarchical structure of the data analytically with multilevel modeling (Peugh, 2010). A three-level model was fit to the data in M*plus*, such that student-level associations were modeled in a WITHIN model, and classroom- and school-level associations were modeled in two BETWEEN models. A step-by-step approach was employed to build the three-level model in M*plus*, adding one variable and one level at a time in order to be sensitive to the stability and significance of findings (Raudenbush & Bryk, 2002). Given the organization of school climate around three broad domains of safety, engagement, and environment (U.S. Department of Education, 2019), three separate models were run for each domain. Consistent with prior research highlighting multiple dimensions within this three-domain model of school climate (Bradshaw et al., 2014), the safety model included student-reported perceived safety, bullying, and substance use dimensions as outcomes. The engagement model included student-reported whole-school connectedness, student connectedness, and culture of equity dimensions as outcomes. Finally, the environment model included student-reported school physical comfort, rules and consequences, and disorder dimensions as outcomes.

The predictor variables for all three models were the same. At level-1, these included student demographics (e.g., gender, race/ethnicity, grade-level, and academic achievement

(measured by student self-reported grades). At level-2, we included the ASSIST teacher behavior tallies, including proactive behavior expectations, reactive behavior management, approvals, disapprovals, and opportunities to respond. We included the percent of the classroom composition that was students of color and an indicator of whether the classroom teacher was observed to be female or male. We also conducted latent partitioning, so that the ASSIST indicators could be used as predictors at level-2 and level-3 (Asparouhov & Muthen, 2006). Specifically, the ASSIST was treated as a latent covariate and decomposed into two uncorrelated latent variables for use as a predictor at the classroom and school levels. At level-3, we also added the SAfETy scores for appearance, surveillance, and disorder, in addition to school-level demographics including total student enrollment count, percent of the student enrollment that was Black, percent of student enrollment receiving one or more out-of-school suspension(s) that year, and percent of student enrollment receiving FARMs. All variables were standardized in StataIC 14 prior to running models in M*plus*; thus, all variables were grand-mean centered and the coefficients reported can be interpreted as effect sizes.

Missingness of the outcome data, which ranged for the nine outcome variables from 6.6% to 15.9%, were determined not to be Missing Completely at Random (MCAR); Missingness at Random (MAR) was assumed. Full-information maximum likelihood (FIML) estimation with robust standard errors in M*plus* was used to account for missing data in analyses (Enders & Bandalos, 2001). Although all models terminated normally, M*plus* produced a warning that was determined through sensitivity analyses to be caused by inclusion of binary covariates in the model, a warning that the software developers have specified as ignorable. We conducted further sensitivity analyses removing the binary covariates and confirmed all models terminated

normally with no warnings and we found the significance, size, and directionality of the estimates at levels 2 and 3 were substantively unchanged.

Results

Model Fit, Partitioning of Variance, and Variance Explained

Across models, most of the variation in student perceptions of school climate was attributable to the student-level (ranging from 76-94% of the unadjusted variance). In contrast, within-student R^2 were low, ranging between 1-5% across models, when including student race/ethnicity, gender, grade-level, and self-reported achievement as student-level predictors.

Safety. As reported in Table 2, the *Safety* model demonstrated adequate fit, $\chi^2(65) = 134.70$, $p < .001$, TLI = 0.993, CFI = .985, RMSEA = .007. Unadjusted level-3 intraclass correlation coefficients (ICCs) ranged from 0.071 to 0.073 for students' perceptions of physical safety, bullying as a problem at school, and substance use as a problem at school. The between-school R^2 in the final model with all covariates and latent partitioning of the ASSIST at level-3 was 77% for physical safety, 83% for bullying as a problem at school, and 91% for substance use as a problem at school. By comparison, unadjusted level-2 ICCs were 0.018 for physical safety, 0.013 for bullying as a problem at school, and 0.024 for substance use as a problem at school. The between-classroom R^2 in the final model with all covariates and latent partitioning of the ASSIST was 3% for physical safety, 7% for bullying as a problem at school, and 15% for substance use as a problem at school.

Engagement. As reported in Table 3, the *Engagement* model demonstrated adequate fit, $\chi^2(65) = 119.75$, $p < .001$, TLI = 0.991, CFI = .996, RMSEA = .007. Unadjusted level-3 ICCs were 0.066 for whole school connectedness, 0.076 for student connectedness, and 0.039 for culture of equity. The between-school R^2 in the final model with all covariates and latent

partitioning of the ASSIST was 74% for whole school connectedness, 90% for student connectedness, and 71% for culture of equity. By comparison, unadjusted level-2 ICCs were 0.013 for whole-school connectedness, 0.012 for student connectedness, and 0.011 for culture of equity. The between-classroom R^2 with all covariates and latent partitioning of the ASSIST was 10% for whole-school connectedness, 8% for student connectedness, and 6% for equity.

Environment. As reported in Table 4, the *Environment* model demonstrated adequate fit, $\chi^2(65) = 136.99$, $p < .001$, TLI = 0.968, CFI = .986, RMSEA = .008. Unadjusted level-3 ICCs were 0.201 for physical comfort, 0.051 for rules and consequences, and 0.072 for disorder. The between-school R^2 in the final model with all covariates and latent partitioning of the ASSIST at was 59% for physical comfort, 67% for rules and consequences, and 58% for disorder. By comparison, unadjusted level-2 ICCs were 0.021 for physical comfort, 0.012 for rules and consequences, and 0.007 for disorder. The between-classroom R^2 in the final model with all covariates and latent partitioning of the ASSIST was 11% for physical comfort, 4% for rules and consequences, and 7% for disorder.

Student-Level Associations Across Models

Student-level associations were found after partitioning out variance attributable to classroom and school clustering. Most notably, female students had significantly less favorable report of school climate compared to males across all nine dimensions, including physical safety ($\beta = -0.04$, $p < .001$), bullying as a problem at school ($\beta = 0.10$, $p < .001$), substance use as a problem at school ($\beta = 0.10$, $p < .001$), whole-school connectedness ($\beta = -0.09$, $p < .001$), student connectedness ($\beta = -0.15$, $p < .001$), culture of equity ($\beta = -0.04$, $p < .001$), physical comfort ($\beta = -0.09$, $p < .001$), rules and consequences ($\beta = -0.03$, $p < .001$), and disorder ($\beta = 0.03$, $p < .001$), regardless of their school or classroom. Additional significant associations of other individual-

level predictors (i.e., race, ethnicity, grade-level, and self-reported achievement) are presented in Tables 2-4.

Classroom-Level Associations Across Models

After partitioning the variance attributable to the individual- and school-levels, a small number of significant associations were found at the classroom-level. Specifically, ASSIST tallies of teachers' proactive behavior expectations at level-2 was significantly associated with lower levels of student perceptions that bullying and substance use were problems at school (both $\beta = -0.02$, $p < .01$ and .05 respectively), as well as higher levels of whole-school and student connectedness ($\beta = 0.03$, $p < .05$ and $\beta = 0.02$, $p < .05$, respectively). In addition, OTRs were associated with higher levels of student-reported whole-school connectedness and physical comfort at school (both $\beta = 0.02$, $p < .05$). No other ASSIST tallies of teachers' behaviors were associated with student perceptions of climate at the classroom level.

School-Level Associations Across Models

Portioning the latent variance in the ASSIST observations at the school-level, we found that higher observer counts of teachers' use of approvals in the classroom (i.e., observations of teachers giving praise or tangible rewards students) were associated with higher report student connectedness at the school-level ($\beta = 0.30$, $p < .05$), whereas higher counts of teachers' use of disapprovals in the classroom (i.e., observations of teachers making critical remarks or taking punitive actions) were associated with lower report of whole-school connectedness ($\beta = -0.18$, $p < .001$), student connectedness ($\beta = -0.15$, $p < .05$), culture of equity ($\beta = -0.11$, $p < .031$), and rules and consequences ($\beta = -0.13$, $p < .01$). We also found that higher observer counts of teachers giving students opportunities to respond in the classroom (at the school-level) were associated with higher student reports of physical comfort at school ($\beta = 0.02$, $p < .05$) and

significantly lower student reports that substance use was a problem at school ($\beta = 0.26$, $p < .05$). No other associations for the ASSIST were significant at the school-level.

Observers' ratings of positive school appearance, as measured by the SAfETy, were significantly associated with higher student report that substance use was a problem at school ($\beta = 0.10$, $p < .001$); however, it was also associated with higher student report of physical comfort at school ($\beta = 0.19$, $p < .01$). Observers' ratings of school disorder, as measured by the SAfETy, were significantly associated with less favorable student report of climate across five of nine dimensions, including less student-perceived physical safety ($\beta = -0.08$, $p < .05$), less whole-school connectedness ($\beta = -0.09$, $p < .05$), less student connectedness ($\beta = -0.08$, $p < .05$), more bullying as a problem at school ($\beta = 0.08$, $p < .05$), more substance use as a problem at school ($\beta = 0.15$, $p < .001$), and more student-perceived school disorder ($\beta = 0.10$, $p < .05$). Observers' ratings of school surveillance, as measured by the SAfETy, was also significantly associated with lower student reports that substance use was a problem at their school ($\beta = -0.05$, $p < .05$), but also lower student reports of whole-school connectedness ($\beta = -0.06$, $p < .05$), student connectedness ($\beta = -0.04$, $p < .05$), and positive disciplinary environment (rules and consequences; $\beta = -0.08$, $p < .01$). Significant associations of school-level covariates including enrollment size, percent Black enrollment, suspension, and FARMs are presented in Tables 2-4.

Discussion

This study examined the associations of observed, malleable classroom teacher practices and school physical environmental factors with students' perceptions of safety, engagement, and environment using a multi-level modeling analytic framework. We sought to identify discrete factors that could be modified to improve students' perceptions of school climate.

Student-Level Variance in Student-Reported Climate

Perhaps not surprisingly, this study's multilevel models demonstrated that variance in students' report of school climate attributable to the student-level ranged between 76-96%. These findings align with previous literature indicating that the majority of variability in student perceptions of school climate is nested at the individual level (Fan et al., 2011; Koth et al., 2008). It is noteworthy that student binary gender, race, grade-level, and self-reported academic achievement explained very little of the variance in climate perceptions at the student-level (not more than 5%). This finding suggests additional research is needed to explain more of the variance at the student-level in perceived climate – particularly because variance at the student-level represents the largest share of the variation overall. Unfortunately, it is not common practice in the field to present the within R^2 (individual-level variance explained) when examining factors predicting student perceptions of school climate. Better understanding of these individual-level factors, and whether they are discrete and modifiable, could inform intervention development and decision-making to promote positive climate.

Despite only explaining up to 5% of the level-1 variance, student identity and social position indicators (e.g., gender, race) were associated with significant differences in perceived climate, consistent with prior school climate research in the community psychology literature (e.g., Shukla et al., 2016; Voight et al., 2015). Gender disparities were most salient. The consistent pattern of less favorable climate perceptions for girls, across all outcomes measured in the study, suggests the need for intervention focused on improving factors in the school environment that may be contributing to gender disparities in climate experiences. We also found that when a broader range of indicators of school climate are included, and when observed levels of classroom and school climate are modeled as predictors, the racial school climate gap looks different than highlighted in prior research (Voight et al., 2015; Bottiani et al., 2016).

Specifically, although Black students reported less connectedness with their peers (consistent with the focus of prior research on racial disparities in school climate), they reported more favorable aspects of school climate in other areas. For example, on average, Black students reported lower perceptions of school disorder, higher levels of their school being comfortable and clean, lower perceptions that substance use was a problem at their school, and lower perceptions that bullying was a problem at their school. These findings controlled for classroom teacher practices and observer-assessed school disorder, appearance, and surveillance. Our findings suggest that when in similar classroom and school settings, as measured by these observational tools, Black students may perceive some aspects of school climate more favorably than White students.

Classroom- and School-Level Variance in Perceived Climate

The extent to which variance was nested within classrooms and schools varied across school climate outcomes and levels in this study (see ICC summaries at the bottom of Tables 3-5). In one striking instance, a very large percent of the variance was nested at the school-level (20.1%) in students' report that their school was physically comfortable and clean. Specifically, this scale asked students to rate the extent to which the temperature was comfortable, the school had a bright and pleasant appearance, and spaces (like bathrooms) were clean. Ostensibly, this relatively high ICC may be because these physical aspects of the school are less personally experienced than features of the social environment asked about in the other subscales. Other subscales' ICCs at the school level ranged between 4-8%. As might be expected, relative to the school level, less variance was attributable to the classroom level (.7% to 2.4%). A lower proportion of variance in student report of school climate attributable to the classroom was expected because of the high school setting, in which students are frequently changing

classrooms throughout the day and experiences in a single classroom setting are unlikely to drive their experience of the school climate more broadly. The setting level findings of this study are noteworthy, in particular because we were able to predict large amounts of variance at the classroom and school levels with the included class and school predictors. Across three models of safety, engagement, and environment, observed and contextual factors explained between 3-15% of the shared variance in students' perceptions of climate at the classroom-level and between 58-91% of the shared variance in students' perceptions of climate at the school-level. Notably, the models accounted for 80% or more of the variance in school-level perceived bullying and substance use as problems at school, and student connectedness. Additionally, it is noteworthy that shared variance in ASSIST classroom observations of teacher practices at the school-level was a key determinant of students' perceptions of school climate. This may have been particularly true as this study was of high schools, where students transition to multiple teachers and classrooms in a day, as compared to elementary and middle school settings, where exposure across multiple teachers and classrooms is more limited. Therefore, studies of secondary school contexts should consider how an aggregated experience of teacher behaviors and classroom experiences contributes to the overall experience of a school.

Classroom- and School-Level Associations

A number of significant classroom-level and school-level associations were found in this study. Adjusting for student and school characteristics (e.g., race/ethnicity and FARMs), we found that an increase in observed classroom teacher proactive behavior expectations was significantly associated at the classroom-level with less student-reported bullying and substance use as problems at school, and more student-reported sense of connectedness to their school and their peers. Conversely, increases in observed teacher disapproving statements and tangible

punitive consequences directed at students in the classroom was significantly associated, at the school-level, with lower levels of positive school climate, including whole-school connectedness, student connectedness with their peers, perceived school culture of equity, and disciplinary environment (rules and consequences). Similarly, approvals at the school-level were associated with more favorable student connectedness with their peers. Indicators of disorder in the physical environment, such as graffiti, were significantly associated with higher student-reports of bullying as a problem at school, substance use as a problem at school, and disorder, and lower student-reports of perceived safety and whole-school and student connectedness.

In light of national initiatives on school safety emphasizing target hardening approaches (i.e., use of surveillance cameras, metal detectors, and deployment of school police officers), the study findings on observed surveillance are striking. Whereas observed surveillance at the school-level was associated with lower perceptions that substance use was a problem at school, suggesting the possible benefits of this approach, observed surveillance was also associated with lower student self-report of feeling connected to their peers and to their school as a whole. Students also perceived the school disciplinary environment (rules and consequences) less favorably in schools with higher levels of observed surveillance tactics. A sense of connectedness to school and experience of positive discipline practices at school have been linked longitudinally to a wide range of positive student outcomes, including critical academic, social-emotional, and behavioral indicators (Bond et al., 2007; Bradshaw, Mitchell, & Leaf, 2010; Bradshaw, Zmuda, Kellam, & Ialongo, 2009). These findings highlight the importance of weighing the possible benefits of introducing surveillance measures in schools alongside the potential costs to students' social-emotional development and academic success at school (Lindstrom Johnson, Bottiani, Waasdorp, & Bradshaw, 2018).

Observed positive school appearance was associated with higher student perceptions that their school was comfortable and clean, but also with higher student perceptions that substance use was a problem at their school. To explain the latter finding, consider that better observer-rated appearance indicators included, for example, well-landscaped grounds; thus, positive appearance may also be an indicator that the school is located in a relatively wealthier neighborhood and draws students from families that are higher SES. Students in high socioeconomic groups have been shown to be at higher risk of using certain substances (e.g., heavy alcohol consumption; Botticello, 2009). Establishing linkages between the socioeconomic status of the student enrollment and positive appearance of the school will be important to better understand the association between appearance and higher report that substance use is a problem at school. In addition, future research could seek to ascertain which substances students consider to be a problem at school (i.e., binge drinking, use of illicit substances like heroin or cocaine, misuse of prescription opioids like Vicodin or stimulants like Adderall, or regular tobacco cigarettes or e-cigarettes and nicotine vaporizers like Juul).

Together with school administrative data on overall school characteristics (e.g., FARMs), these outside observations explained a substantial amount of the variance in students' perceptions of school climate between schools and, to lesser extent, between classrooms. These findings also inform our understanding of theories undergirding school climate research as well as guiding assessment and intervention efforts. For example, the association of classroom observations of teachers' behaviors in relation to students' perceptions of climate suggests a substantive role of teacher behaviors in the classroom in the school's broader climate (Allen et al., 2013; Mikami et al., 2011; Pianta et al., 2008). This seemed to be particularly true of observation of proactive behavioral management and approvals, which are integral to some

whole-school behavior management preventive interventions (e.g., Positive Behavioral Interventions and Supports [PBIS]), in which consistently setting expectations and rewarding positive behaviors is a critical component (Sugai & Horner, 2002). Relatedly, disapprovals (critical and punitive teacher classroom practices) were associated with less connectedness and equity, two dimensions of climate that prior research has identified as disparities affecting Black students and potentially related to disproportionate discipline practices. This finding is consistent with prior research advocating a shift away from punitive and critical discipline to reduce disproportionality (Skiba & Losen, 2017).

Finally, the findings highlighted the important role of the physical environment in determining student perceptions of climate. Consistent with theory (CPTED; Crowe, 2000), observed school disorder was negatively related to student connectedness with their peers and perceived physical safety (Grana et al., 2010; Wilcox et al., 2006). While the study of the school physical environment has primarily been supported by theories of social control, these findings support the idea that introducing monitoring features to the school physical environment can serve as not only a constraint on negative social interactions (e.g., surveillance to minimize illicit behavior), but also to positive and prosocial behaviors, too.

Limitations and Future Directions

Despite a number of strengths (e.g., sample size, multiple sources of data) of this study, some aspects of the study are constraining, and these are important to note. Specifically, the measures of climate at each level were related to one another, but not designed to measure precisely the same constructs. This is in part because observers could not be expected to perceive aspects of the school that are personally experienced (e.g., whether or not students feel connected to peers at school). Thus, constructs assessed across informants were conceptually related, but

did not in every instance directly overlap. Nevertheless, the alignment across several of the various dimensions of the broader school climate constructs speaks to the robustness of the findings (e.g., school-level disorder as measured by the SAfETy was associated positively and significantly with student-reported disorder at school). Future research is needed to further inform our understanding of more precisely aligned indicators of school climate.

Two other measurement considerations should be noted. One is that classroom observations were limited to 15 minutes due to resources required to observe 303 classrooms in 50 schools; although this may seem to be a small window into the classroom and school, our sampling strategy of 25 classrooms in core subjects allows us to make broader inferences about students' school experiences from these observations. Second, a few of the outcome scales for this study had relatively low internal consistency reliability (i.e., .58-.74); however, the majority of the scales had very good internal consistency reliability, ranging from .80 to .88.

We were also somewhat limited to a relatively narrow set of self-reported student characteristics, including academic achievement, race, and gender; a broader set of characteristics may provide a more complete understanding of the extent to which perceptions vary as a function of student characteristics. Similarly, we explored school-level demographic characteristics that were available through archival data. We also relied on external observers' report of the percentage of students of color present within the classrooms. Inclusion of additional information on classrooms and teachers could be further informed by teacher self-report data on their own experiences of the school environment, which in turn may have influenced their behaviors in the classroom and use of different behavior management and student engagement strategies. It may also be helpful to model teachers' own perspectives of climate as yet another perspective on the classroom and school environments in relation to the

students' and external observers' perceptions. Additionally, future research should explore the relationship between observed climate and student academic, health and mental health, and behavioral outcomes (e.g., academic achievement, social emotional learning indicators, graduation, contact with juvenile justice system).

Conclusion

Taken together, these findings enhance our understanding of areas of convergence and divergence of independent observations of climate in relation to students' viewpoints in a multilevel context. They suggest the importance of understanding variability in students' perceptions of school climate as explainable, both in terms of individual-factors as well as classroom and school-level conditions. Implications include the future integration of observational measures in comprehensive school climate assessment, including the potential value of a multi-informant approach to school climate. This could involve expanding already existing observational tools such as classroom walkthrough and school safety audits to assess aspects of school climate more broadly. Such work may serve to inform school improvement efforts aimed at improving the various aspects of school climate examined in the current study. In this way schools may have more explicit ideas about how to improve school climate, a construct with known implications for student well-being and academic success.

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Table 1

Demographic Characteristics of Students and Classrooms

Student Characteristics (N = 20,647)	N (%)
Gender	
Male	9,751 (47.2)
Female	9,914 (48.0)
Missing Gender Data	982 (4.76)
Race/Ethnicity	
Black	6,054 (29.3)
Latino	962 (4.7)
White	9,838 (47.7)
All Other (Multiracial, American Indian, and Asian/Pacific Islander)	2,808 (13.6)
Missing Racial/Ethnic Data	985 (4.8)
Grade	
Grade 9	5,584 (27.05)
Grade 10	5,278 (25.6)
Grade 11	4,848 (23.5)
Grade 12	3,281 (19.2)
Missing Grade Data	971 (4.7)
Academic Achievement (Self-Reported)	
Mostly As	6,688 (32.4)
Mostly Bs	7,765 (37.6)
Mostly Cs	3,978 (19.3)
Mostly Ds	868 (5.9)
Mostly Fs	356 (1.7)
Missing Achievement Data	992 (4.8)
Classroom Characteristics (J = 303)	N (%) / M (SD)
Female Teacher Gender	221 (72.9)
Classroom Composition is Majority Students of Color	147 (48.5)
School Characteristics (K = 50)	N (%) / M (SD)
Enrollment	1236.8 (457.6)
Percent Black	34.5 (24.6)
Percent Suspended	15.50 (12.0)
Percent FARMs	38.03 (17.7)

Table 2

Associations of the Three-Level Model of Safety

	Perceived School Safety (Student-Reported)				Bullying as Problem at School (Student-Reported)				Substance Use as Problem at School (Student-Reported)			
Student Level (N = 20,647)	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*
Female	**-0.04**	**0.01**	**-3.91**	**.000**	**0.10**	**0.01**	**12.88**	**.000**	**0.07**	**0.01**	**7.11**	**.000**
Black (ref. White)	0.01	0.01	0.90	.370	**-0.09**	**0.01**	**-8.07**	**.000**	**-0.12**	**0.01**	**-9.57**	**.000**
Latino (ref. White)	-0.01	0.01	-1.05	.293	-0.02	0.01	-1.65	.100	-0.01	0.01	-1.50	.135
Other (ref. White)	**-0.06**	**0.01**	**-6.15**	**.000**	0.00	0.01	-0.42	.677	-0.01	0.01	-0.94	.345
Grade-Level	0.02	0.02	0.95	.342	**-0.06**	**0.01**	**-4.12**	**.000**	**0.06**	**0.02**	**4.03**	**.000**
Academic Achievement	**0.14**	**0.02**	**9.16**	**.000**	**-0.05**	**0.01**	**-3.81**	**.000**	0.01	0.01	0.94	.350
Classroom Level (J = 303)	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*
Proactives (ASSIST)	0.02	0.01	1.29	.197	**-0.02**	**0.01**	**-2.60**	**.009**	**-0.02**	**0.01**	**-2.45**	**.014**
Approvals (ASSIST)	0.01	0.01	0.86	.388	0.00	0.01	-0.53	.598	0.01	0.01	0.87	.385
Disapprovals (ASSIST)	0.00	0.01	-0.32	.748	-0.01	0.01	-0.48	.634	-0.01	0.01	-0.36	.717
Reactives (ASSIST)	0.00	0.01	-0.08	.935	0.00	0.01	-0.29	.776	-0.02	0.01	-1.58	.115
OTRs (ASSIST)	0.00	0.01	0.33	.742	0.00	0.01	-0.16	.873	0.00	0.01	0.33	.740
% Students of Color (ASSIST)	0.01	0.02	0.45	.652	0.01	0.02	0.30	.766	-0.04	0.02	-1.75	.079
Female Teacher (ASSIST)	0.01	0.01	0.71	.476	0.01	0.01	0.85	.398	0.00	0.01	0.37	.715
School Level (K = 50)	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*
Proactives (ASSIST)	0.05	0.16	0.28	.778	-0.29	0.21	-1.43	.153	0.07	0.10	0.75	.452
Approvals (ASSIST)	0.29	0.21	1.41	.159	-0.24	0.22	-1.06	.288	-0.24	0.20	-1.20	.231
Disapprovals (ASSIST)	-0.09	0.06	-1.62	.106	0.11	0.07	1.64	.102	0.02	0.05	0.40	.689
Reactives (ASSIST)	-0.06	0.06	-0.94	.349	0.06	0.07	0.96	.337	0.02	0.06	0.40	.690
OTRs (ASSIST)	-0.17	0.18	-0.97	.330	0.25	0.19	1.32	.188	**0.26**	**0.10**	**2.51**	**.012**
Appearance (SAfETy)	0.00	0.03	0.06	.954	-0.01	0.04	-0.13	.895	**0.10**	**0.03**	**3.74**	**.000**
Disorder (SAfETy)	**-0.08**	**0.04**	**-2.35**	**.019**	**0.08**	**0.04**	**2.28**	**.022**	**0.15**	**0.03**	**4.99**	**.000**
Surveillance (SAfETy)	-0.03	0.03	-1.22	.221	0.01	0.03	0.42	.673	**-0.05**	**0.02**	**-2.35**	**.019**
Enrollment Size	-0.03	0.04	-0.83	.408	0.06	0.04	1.57	.116	**0.09**	**0.03**	**2.80**	**.005**
% Black	-0.02	0.04	-0.46	.647	-0.02	0.04	-0.48	.628	**-0.18**	**0.03**	**-6.20**	**.000**
% Suspended	-0.03	0.03	-1.31	.189	**0.10**	**0.03**	**3.36**	**.001**	0.01	0.02	0.55	.585
% Free & Reduced-Price Meals	**-0.17**	**0.03**	**-4.79**	**.000**	**0.16**	**0.04**	**4.47**	**.000**	**0.16**	**0.02**	**6.66**	**.000**
Classroom ICC	0.02				0.01				0.02			
School ICC	0.06				0.08				0.05			
R^2 - Within	0.03				0.02				0.02			
R^2 – Between Class	0.03				0.07				0.15			
R^2 – Between School	0.77				0.83				0.91			

Note. Model Fit: χ^2 (65) = 134.70, p <.001; RMSEA = .007; TLI = .99, CFI = .99. Proactives = Proactive behavior expectations, Reactives = Reactive behavior management, Approvals = Approval and tangible reward; Disapprovals = Disapproval and punitive consequence; OTRs = Opportunities to respond. ICC= Intra-class correlation coefficient.

Table 3

Associations of the Three-Level Model of Engagement

	Whole School Connectedness (Student-Reported)				Student Connectedness (Student-Reported)				Culture of Equity (Student-Reported)			
Student Level (N = 19,621)	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*
Female	**-0.09**	**0.01**	**-12.16**	**.000**	**-0.15**	**0.01**	**-19.99**	**.000**	**-0.04**	**0.01**	**-3.98**	**.000**
Black (ref. White)	-0.01	0.02	-0.80	.425	**-0.05**	**0.02**	**-3.34**	**.001**	-0.02	0.02	-0.78	.436
Latino (ref. White)	0.01	0.01	1.33	.185	-0.01	0.01	-1.07	.286	**-0.02**	**0.01**	**-2.65**	**.008**
Other (ref. White)	-0.02	0.01	-1.81	.071	**-0.04**	**0.01**	**-3.19**	**.001**	**-0.06**	**0.01**	**-5.27**	**.000**
Grade-Level	-0.03	0.02	-1.88	.060	-0.02	0.01	-1.45	.146	-0.02	0.01	-1.42	.155
Academic Achievement	**0.21**	**0.01**	**20.95**	**.000**	**0.15**	**0.01**	**12.68**	**.000**	**0.11**	**0.01**	**11.50**	**.000**
Classroom Level (J = 303)	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*
Proactives (ASSIST)	**0.03**	**0.01**	**2.26**	**.024**	**0.02**	**0.01**	**2.11**	**.035**	0.02	0.01	1.91	.056
Approvals (ASSIST)	-0.01	0.01	-0.64	.520	0.00	0.01	0.23	.820	-0.01	0.01	-0.67	.506
Disapprovals (ASSIST)	0.01	0.02	0.37	.714	-0.01	0.01	-0.98	.327	-0.01	0.01	-0.84	.403
Reactives (ASSIST)	0.00	0.01	0.15	.879	0.00	0.01	-0.11	.910	0.00	0.01	0.48	.628
OTRs (ASSIST)	**0.02**	**0.01**	**2.18**	**.029**	0.01	0.01	1.43	.153	0.00	0.01	-0.29	.772
% Students of Color (ASSIST)	-0.01	0.02	-0.44	.660	-0.01	0.02	-0.55	.582	-0.01	0.02	-0.47	.637
Female Teacher (ASSIST)	0.01	0.01	1.37	.171	0.01	0.01	1.10	.271	-0.01	0.01	-0.90	.367
School Level (K = 50)	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*
Proactives (ASSIST)	0.18	0.19	0.98	.329	0.25	0.16	1.54	.124	0.14	0.12	1.19	.236
Approvals (ASSIST)	0.25	0.17	1.52	.128	**0.30**	**0.14**	**2.20**	**.028**	0.14	0.17	0.82	.415
Disapprovals (ASSIST)	**-0.18**	**0.05**	**-3.65**	**.000**	**-0.15**	**0.06**	**-2.57**	**.010**	**-0.11**	**0.05**	**-2.15**	**.031**
Reactives (ASSIST)	-0.08	0.07	-1.25	.210	-0.10	0.06	-1.76	.079	-0.07	0.06	-1.12	.261
OTRs (ASSIST)	-0.17	0.18	-0.90	.370	-0.25	0.19	-1.27	.204	-0.32	0.18	-1.85	.064
Appearance (SAfETy)	0.03	0.04	0.79	.428	0.01	0.03	0.27	.785	0.04	0.03	1.48	.139
Disorder (SAfETy)	**-0.09**	**0.04**	**-2.26**	**.024**	**-0.08**	**0.04**	**-2.26**	**.024**	-0.04	0.03	-1.12	.262
Surveillance (SAfETy)	**-0.06**	**0.03**	**-2.18**	**.029**	**-0.04**	**0.02**	**-2.18**	**.029**	-0.03	0.02	-1.23	.218
Enrollment Size	0.03	0.03	0.84	.402	0.01	0.03	0.19	.848	0.02	0.03	0.65	.516
% Black	0.01	0.04	0.18	.855	-0.01	0.03	-0.21	.833	0.04	0.03	1.44	.150
% Suspended	-0.05	0.03	-1.95	.051	**-0.05**	**0.02**	**-2.03**	**.042**	**-0.07**	**0.03**	**-2.76**	**.006**
% Free & Reduced-Price Meals	-0.08	0.04	-1.94	.053	**-0.13**	**0.03**	**-3.91**	**.000**	-0.04	0.04	-0.96	.335
Classroom ICC	0.02				0.01					0.01		
School ICC	0.05				0.06					0.04		
R^2 - Within	0.05				0.05					0.02		
R^2 – Between Class	0.10				0.08					0.06		
R^2 – Between School	0.74				0.90					0.71		

Note. Model Fit: χ^2 (65) = 119.75, p <.001; RMSEA = .007; TLI = 1.00, CFI = .99. Proactives = Proactive behavior expectations; Reactives = Reactive behavior management Approvals = Approval and tangible reward; Disapprovals = Disapproval and punitive consequence; OTRs = Opportunities to respond. ICC= Intra-class correlation coefficient.

Table 4

Associations of the Three-Level Model of Environment

	Physical Comfort (Student-Reported)				Rules and Consequences (Student-Reported)				School Disorder (Student-Reported)			
Student Level (N = 19,621)	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*
Female	**-0.09**	**0.01**	**-7.04**	**.000**	**-0.03**	**0.01**	**-3.49**	**.000**	**0.03**	**0.01**	**3.15**	**.002**
Black (ref. White)	**0.03**	**0.01**	**2.31**	**.021**	0.02	0.01	1.83	.067	**-0.10**	**0.01**	**-7.94**	**.000**
Latino (ref. White)	0.01	0.01	1.93	.054	0.02	0.01	1.79	.073	**-0.03**	**0.01**	**-3.11**	**.002**
Other (ref. White)	**0.01**	**0.01**	**2.07**	**.038**	-0.02	0.01	-1.52	.128	-0.01	0.01	-1.21	.226
Grade-Level	-0.02	0.02	-1.15	.252	**0.03**	**0.01**	**2.30**	**.021**	0.00	0.01	0.12	.908
Academic Achievement	**0.06**	**0.01**	**5.17**	**.000**	**0.12**	**0.01**	**16.85**	**.000**	0.00	0.01	0.13	.897
Classroom Level (J = 303)	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*
Proactives (ASSIST)	0.00	0.01	0.23	.818	0.01	0.01	0.54	.589	0.01	0.01	1.53	.127
Approvals (ASSIST)	-0.02	0.01	-1.79	.074	0.02	0.01	1.46	.144	0.00	0.01	-0.34	.736
Disapprovals (ASSIST)	0.00	0.02	0.02	.988	-0.01	0.02	-0.41	.685	0.01	0.02	0.59	.557
Reactives (ASSIST)	0.02	0.01	1.64	.102	0.00	0.01	-0.10	.923	-0.01	0.01	-1.05	.292
OTRs (ASSIST)	**0.02**	**0.01**	**2.12**	**.034**	0.01	0.01	0.63	.531	-0.01	0.01	-1.31	.190
% Students of Color (ASSIST)	-0.03	0.02	-1.85	.064	-0.01	0.02	-0.42	.677	-0.01	0.02	-0.44	.657
Female Teacher (ASSIST)	-0.01	0.01	-1.08	.278	0.00	0.01	0.07	.941	0.01	0.01	0.71	.477
School Level (K = 50)	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*	γ	*SE*	*t*	*p*
Proactives (ASSIST)	-0.09	0.24	-0.39	.695	0.10	0.12	0.81	.417	0.08	0.18	0.43	.671
Approvals (ASSIST)	-0.41	0.30	-1.39	.165	0.18	0.18	1.01	.312	-0.01	0.27	-0.04	.965
Disapprovals (ASSIST)	-0.13	0.08	-1.66	.097	**-0.13**	**0.04**	**-3.09**	**.002**	0.10	0.07	1.37	.171
Reactives (ASSIST)	0.00	0.12	0.02	.987	**-0.12**	**0.06**	**-1.99**	**.046**	0.04	0.08	0.50	.619
OTRs (ASSIST)	0.06	0.31	0.18	.860	-0.12	0.16	-0.76	.447	0.08	0.22	0.36	.717
Appearance (SAfETy)	**0.19**	**0.06**	**3.23**	**.001**	0.01	0.03	0.36	.720	-0.04	0.04	-0.89	.373
Disorder (SAfETy)	-0.14	0.08	-1.74	.081	-0.07	0.04	-1.84	.065	**0.10**	**0.05**	**2.22**	**.026**
Surveillance (SAfETy)	0.01	0.05	0.19	.850	**-0.08**	**0.02**	**-3.38**	**.001**	-0.01	0.03	-0.17	.869
Enrollment Size	-0.03	0.06	-0.42	.678	0.01	0.03	0.24	.810	0.07	0.05	1.59	.113
% Black	-0.02	0.06	-0.44	.663	-0.01	0.03	-0.27	.790	0.03	0.04	0.71	.480
% Suspended	-0.02	0.04	-0.59	.554	**-0.05**	**0.02**	**-2.18**	**.029**	0.05	0.03	1.85	.064
% Free & Reduced-Price Meals	-0.12	0.07	-1.82	.069	**-0.08**	**0.03**	**-2.48**	**.013**	**0.12**	**0.04**	**3.29**	**.001**
Classroom ICC	0.02				0.01					0.01		
School ICC	0.20				0.04					0.08		
R^2 - Within	0.01				0.02					0.01		

R^2 – Between Class	0.11	0.04	0.07
R^2 – Between School	0.59	0.67	0.58

Note. Model Fit: χ^2 (65) = 136.99, p <.001; RMSEA = .008; TLI = .97, CFI = .99. Proactives = Proactive behavior expectations; Reactives = Reactive behavior management; Approvals = Approval and tangible reward; Disapprovals = Disapproval and punitive consequence; OTRs = Opportunities to respond. ICC= Intra-class correlation coefficient.