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# Understanding the relationship between perceived school climate and bullying: A mediator analysis

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## Abstract

This study assesses how perceptions of school climate and four mediating factors (school connectedness, peer attachment, assertiveness, and empathy) influence reports of bullying behaviors among 2,834 students in 14 middle schools. Results revealed that students in positive school climates reported experiencing fewer physical, emotional, and cyberbullying behaviors. They also reported greater levels of school connectedness, peer attachment, assertiveness, and empathy, which in turn helped explain the influence of perceived school climate on bullying. In addition, the greater levels of empathy that students reported, the more likely they were to report being bullied. These results highlight the role that perceptions of school climate can play in influencing bullying and underscore the importance of mediating factors as schools work to track and improve school climate.

### Keywords

Evaluation; positive youth development; RCT; restorative practices

Health and education experts have declared bullying[1] a public health problem (Gladden, Vivolo-Kantor, Hamburger, & Lumpkin, 2014; Kann, 2016; Srabstein & Leventhal, 2010). Research has shown that 10%–30% of school-age youth are bullied physically or verbally (Cook, Williams, Guerra, Kim, & Sadek, 2010), and 11% are victims of cyberbullying (i.e., sending negative electronic messages or posting hurtful information online). Students who are bullied often miss more school and have lower academic achievement—losing more than a full letter grade in one academic subject across the three years of middle school (Kochenderfer & Ladd, 1997). Bullying victims are also at greater risk of depression,

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[1]Defined as aggressive, repeated behavior intended to harm another (Olweus, 1993, 2001), bullying has been characterized by *intentionality, repetition*, and an *imbalance of power* (e.g., Gladden et al., 2014; National Association of School Psychologists, 2012; Vaillancourt, Hymel, & McDougall, 2003; VandenBos, 2007).

anxiety, substance abuse, and suicide (Shetgiri, Espelage, & Carroll, 2015; Ybarra, Diener-West, & Leaf, 2007).

Given the prevalence of bullying and its potential impacts, preventing all types of bullying has become a priority for schools (Gladden et al., 2014). Addressing school climate has been recognized as one way to prevent bullying (National School Climate Council, 2007; U.S. Department of Education, 2007), which has spurred new policies and research on the link between positive school climate and improved student development (Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013). For example, the Every Student Succeeds Act (ESSA, 2015) emphasizes the importance of school climate in preparing students for college and career. ESSA also recommends that states use school climate (alongside academic data) as an indicator of school performance to differentiate between school quality and student success in their accountability systems (Astor, Benbenishty, & Estrada, 2009).

School climate—positive or negative—reflects the social, physical, emotional, civic, and ethical experiences of students and school personnel. Although there is no widely agreed upon definition, research has identified several environmental characteristics that might indicate a positive climate, including teacher and peer support, engagement of students, and safety as established through consistent and clear rules.

When school climate leans toward the negative, bullying behaviors are more prevalent and can victimize students on a daily basis over an extended time (Gendron, Williams, & Guerra, 2011; National School Climate Council, 2007; Thapa et al., 2013). Even at home children can experience cyberbullying from schoolmates (Campbell, 2005; Kowalski & Limber, 2013). When school climate is positive—especially when it involves high levels of teacher and peer support, engagement of students, and safety—it supports students developing higher levels of assertiveness, empathy, and other key social skills (Ortega-Ruiz, Rey, & Sánchez, 2012).

Many bullying programs (Baldry & Farrington, 2004; Gregory et al., 2010) are based on improving school climate, and some evaluations of those programs have shown significant decreases in bullying (Ttofi & Farrington, 2011; Williams & Guerra, 2007). A recent study similarly suggests that improving school climate may affect the outcomes of a bullying prevention program (Low & Van Ryzin, 2014).

The implication of all this existing research is that school climate can either promote or minimize bullying behavior and is associated with the development of social skills. This study assesses how school climate and four mediating factors influence reports of bullying behaviors among middle school students.

## The relationship between school climate and bullying needs to be clearer

Several studies have documented the relationship between climate and bullying, but few have identified possible variables associated with bullying that could be mediators between the two. Our four mediators—school connectedness, peer attachment, and the social skills of assertiveness and empathy—were selected because of their strong association with climate,

bullying, or both and because they represent key socio-ecological levels of influence on bullying.

Socio-ecological models have been widely used for violence prevention because, similar to bullying, violence results from a combination of influences on behavior and is associated with how individuals relate to those around them and to their broader environment (Dahlberg & Krug, 2002). A number of studies extend these models to bullying (Barboza et al., 2009; Espelage & Swearer, 2009; Hong & Espelage, 2012; Swearer & Hymel, 2015). Similarly, Low and Van Ryzin (2014) suggests that school climate interventions should take a social-ecological approach if they hope to impact bullying.

Prior research has also indicated some difficulty in teasing apart climate's specific contributions to the effectiveness of bullying interventions. Understanding more about the mechanisms by which school climate influences bullying would allow researchers to better evaluate anti-bullying programs and help schools select the types of interventions (e.g., whole-school program, single stand-alone program) most likely to improve climate and reduce bullying.

Selecting appropriate whole-school bullying interventions is difficult because findings about their effectiveness have been inconsistent (Smith, Schneider, Smith, & Ananiadou, 2004; Richard, Sneider & Mallet, 2012). A meta-analysis suggests caution in adopting these approaches to the exclusion of others, given the inconsistent findings, implementation challenges, and a nascent but growing research base that is still building consensus on the mechanisms that drive the effectiveness of these approaches (Smith et al., 2004). This study aims to contribute to this important discussion by exploring our four possible mediators of school climate approaches to bullying prevention.

The first possible mediator is *school connectedness*—a student's belief that adults in school care about her and her learning. Some definitions consider school connectedness to be part of school climate. Others argue that connectedness is more closely associated with perceptions of support and belonging—that is, that connectedness stems from the interaction between the student and the environmental conditions that characterize school climate (e.g., clear and consistent rules) (National School Climate Council, 2007; Thapa et al., 2013). Research has found that a student's feelings of connectedness predict her levels of victimization and aggression (Wilson, 2004).

Second, *peer attachment*—feelings of closeness to other students in school—reflects the interpersonal relationships between students. Research has associated bullying and victimization with poor relationships with other students (Nikiforou, Georgiou, & Stavrinides, 2013).

Finally, the role of social skills has also received attention in the bullying literature—in particular *empathy* (i.e., the ability to recognize and show concern for another person's emotions or perspectives) and *assertiveness* (i.e., the ability to initiate conversations and stand up for oneself or others in social situations) (Gresham, Elliott, Vance, & Cook, 2011; Jenkins, Demaray, Fredrick, & Summers, 2016). While empathy may be the intrapersonal skill with the most influence on preventing bullying (Ang & Goh, 2010; Munoz, Qualter, &

Padgett, 2011), higher levels of both empathy and assertiveness are associated with lower levels of bullying (Jolliffe & Farrington, 2006). Indeed, assertiveness is sometimes considered a skill-building area for youth who experience victimization. However, few studies have examined how school climate influences these intrapersonal social skills (Hinduja & Patchin, 2013).

## Study hypothesis

This study hypothesized that student school connectedness, peer attachment, assertiveness, and empathy mediate the relationship between perceived school climate and bullying. These specific mediators were chosen because they represent multiple layers of the social-ecological model—the school (institutional), peer group (interpersonal), and the student (intrapersonal)—that is commonly used to guide prevention efforts of complex and multifaceted public health problems like violence prevention and bullying (Dahlberg & Krug, 2002; Espelage & Swearer, 2003). In addition, these mediators were selected because they are also used in the Acosta et al. (2016) study of the Restorative Practices Intervention, a randomized controlled trial of a whole school intervention aimed at improving school climate, that are the source of our baseline data.

## Methods

### Study design

This study is a cross-sectional assessment of perceived school climate, mediating factors, and bullying behaviors in 14 Maine middle schools that are part of the Restorative Practices Intervention. Middle school students were selected because bullying peaks in these grades (Merrell, Gueldner, Ross, & Isava, 2008). The baseline data was collected in fall 2014 before the intervention started. All procedures were reviewed and approved by RAND's Human Subjects Protection Committee.

### Participants

The 2,834 participating students (response rate of 85%) were primarily in Grades 6 and 7 (99%) and ages 11 or 12 (79%). Most were White and 51% were male (Table 1). The 14 schools housed Grades 6–8 in the same building; five schools included Grades K–5 on campus and nine did not. Similar to the national average, 48% of students across the 14 schools received free and reduced lunch (ranging from 24% to 68% at individual campuses; U.S. Department of Education, 2012). Schools collectively had a 94% student retention rate for not only a single school year (85% to 99% of all students retained) but also from year to year (90% to 99% of all students retained). Average enrollment was 430 students (compared to the national middle school average of 594) and ranged in size from 91 to 921 students. (U.S. Department of Education, 2001). Attendance rates were slightly higher than the national average (95% vs. 91% nationwide) and ranged from 93% to 99% for individual schools. The average suspension rate was less than 5% (U.S. Department of Education, 2011). Out-of-school and in-school suspension rates ranged from about 1%–9%, and 21%, respectively.

## Measures

**Perceptions of school climate—**We used four select scales from the Inventory of School Climate (Brand, Felner, Shim, Seitsinger, & Dumas, 2003): Consistency and Clarity of Rules and Expectations, Teacher Support, Positive Peer Interactions, and Student Input Into Decision Making. The scales demonstrated good reliability (one-year test retest ranged from 0.69–0.81; internal consistency ranged from an alpha of 0.70–0.76) and explained significant between-school variance in measures of academic, behavioral, and socio-emotional adjustment in prior studies (suggesting the scale's validity) (Brand et al., 2003). We assessed internal consistency for the perceived school climate measures using McDonald's (1999) coefficient omega. Omega is a measure of internal consistency on the same metric as coefficient alpha. It has advantages over alpha in that it requires more realistic assumptions, has fewer problems with inflation due to number of items, and allows confidence intervals to be generated for a more accurate evaluation of the reliability of a scale (Dunn, Baguley, & Brunsden, 2014).

In our study, we found adequate internal consistency for all climate scales: Consistency and Clarity of Rules and Expectations, coefficient omega = 0.69, 95% confidence interval (CI) [. 66, .71]; Teacher Support, omega = 0.75, 95% CI [0.73, 0.76]; Positive Peer Interactions, omega = 0.74, 95% CI [0.72, 0.76]; and Student Input into Decision Making, omega = 0.74, 95% CI [0.72, 0.75]. Prior research has suggested that the scales have some validity: Students' self-reported climate ratings using these items were associated significantly and consistently with indexes of their academic, behavioral, and socio-emotional adjustment (Brand et al., 2003).

**School connectedness—**We used a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*) from the National Adolescent Health Study to measure students' perceptions of closeness to peers, happiness at school, belonging at school, and safety at school (McNeely, Nonnemaker, & Blum, 2002). The scale has shown good internal consistency in past studies (alpha = 0.78) (Anderman, 2002). In our data, coefficient omega was −0.80, 95% CI [0.79, 0.82]. The scale also has indicators that suggest its validity: It has associated school connectedness with indicators of emotional well-being (Sieving et al., 2001), which is consistent with other research (e.g., Frydenberg, Care, Chan, & Freeman, 2009).

**Peer attachment—**We used a four-item scale developed by Acosta (2003) in areas such as receiving encouragement from peers to do well in school, confiding in peers, emulating peers, and considering peers' reactions before acting (1 = *never* to 6 = *always*). Research has suggested the scale is reliable (alpha = 0.71) and valid: It has a strong factor structure and is associated with variations in peer group activity, with more attached peers reporting more peer interaction (Acosta, 2003). In our data, coefficient omega for this scale was −.65, 95% CI [0.62, 0.67].

**Social skills—**The Social Skills Improvement System-Rating Scale (SSIS-RS) (Gresham, Elliott, & Kettler, 2010) was used to assess students' perceptions of prosocial behavior in assertiveness and empathy. Students self-rate their behavior on a 4-point scale (0 = *never*, 1 = *seldom*, 2 = *often*, and 3 = *almost always*). For ages 13–18, the SSIS-RS has alpha

coefficients above 0.70 for all scales and test–retest indices ranging from 0.77 to 0.92 (Vaz, Parsons, Passmore, Andreou, & Falkmer, 2013). Prior research has established the criterion-related validity of the self-report form through correlations with associated measures (e.g., Youth Self-Report Form, Piers-Harris Children's Self-Concept Scale) (Gresham & Elliott, 1992). In our measurement modeling, items did not consistently coalesce in the scales they were intended to represent. Accordingly, we conducted exploratory structural equation modeling followed by confirmatory factor analysis to improve and assess the fit of the modeled conceptual scales to the data (details on this analysis available from authors upon request). We used two of the original four assertiveness items, moving a third assertiveness item ("I stand up for others when they are not treated well") to the empathy scale, where it showed greater interitem correlations and reasonable face validity, and we used all four empathy items. In our data, coefficient omega was 0.74, 95% CI [0.72, 0.76] for the revised assertiveness scale and 0.87, 95% [0.86, 0.88] for the revised empathy scale.

**Bullying victimization—**Three items used in the Communities That Care Survey (Arthur et al., 2007; Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002) were used to assess prevalence and frequency (not at all, somewhat, a whole lot) of verbal bullying (how often have you been taunted, teased, experienced name-calling, or been excluded or ignored by others in a mean way), physical bullying (how often has someone hit, kicked, or shoved you, or taken your money or belongings), and cyberbullying (how often has someone sent mean emails, text messages, or IMs, or posted hurtful information on the Internet about you) behaviors in the past 30 days. The Communities That Care study was a large scale RCT of prevention in 24 communities, across seven states with over 4,000 youth (Arthur et al., 2007). Similar questions used in a study of rural schools found similar rates of bullying (Dulmus, Theriot, Sowers, & Blackburn, 2004).

## Statistical analyses

All analyses were conducted in M*plus* 8.0 (Muthen & Muthén, 1998), using that software's MLR estimator, which uses a sandwich estimator for standard errors to accommodate nonnormality and data missing at random in models that combine continuous and discrete variables. We used the delta parameterization for discrete variables throughout. All models accounted for the multilevel nature of the sample with students nested within schools.

We first ran a multivariate logistic regression implemented in M*plus*, with a separate model for each of the four perceived school climate scales, to empirically link climate to bullying victimization. All three bullying outcomes were included in each model. These models were saturated and therefore fit perfectly.

To examine our hypothesis, we estimated a structural equation model (SEM) for each perceived school climate scale predicting each (latent) hypothesized mediating factor with logistic paths predicting reports of all three bullying types from mediating factors and as direct (residual) effects of perceived school climate variables. Given that this study is among the first exploring these relations, we estimated 16 individual models—one for each combination of perceived school climate predictors—and hypothesized mediating factor in order to tease apart individual relations among the correlated predictors and mediators.

Using the 16 models, we estimated the indirect effects of each perceived school climate variable on each bullying indicator via each hypothesized mediating factor.

Because we conducted numerous tests for each hypothesis, we applied the Benjamini-Hochberg adjustment to constrain the false discovery rate (FDR) to ≤ 0.05 for all tests within a given hypothesis. Given that we found cases of inconsistent mediation in our results, particularly with the social skills empathy scale, we also conducted post hoc tests of differential effects of our predictors and mediators on the three bullying outcomes. We applied the FDR adjustment to the resulting pairwise comparisons testing differential main effects of perceived school climate variables and mediators.

## Results

### Sample statistics

Across the sample ($N$ = 2,834), perceived school climate averaged 3.55 ($SD$ = 0.50) on a scale of 1 (*my school never exhibits positive school climate*) to 5 (*my school always exhibits positive school climate*). Scores ranged from the mid-point of the scale and higher for each component of climate: clarity/consistency ($M$ = 4.20, $SD$ = 0.55), teacher support ($M$ = 3.57, $SD$ = 0.68), positive peer interactions ($M$ = 3.71, $SD$ = 0.62), and student input ($M$ = 2.73, $SD$ = 0.75). Scores for school connectedness were neutral or better ($M$ = 3.87, SD = 0.80). Similarly, peer attachment scores were just above the mid-point on that scale ($M$ = 3.48, $SD$ = 0.92). In terms of social skills, students reported similar levels of empathy ($M$ = 3.17, $SD$ = 0.64) and assertiveness ($M$ = 2.74, $SD$ = 0.69).

As for the bullying variables, 21% of students reported experiencing physical bullying, 39% emotional bullying, and 11% cyberbullying. Forty-seven percent of students were not exposed to any bullying, 36% to one type of bullying, 14% to two types, and 4% to all three types. Table 2 contains correlations among the variables used in our models.

The relation of positive perceptions of school climate to reports of bullying was significant and beneficial for each bullying outcome after the FDR adjustment was applied to the three tests: physical bullying, logistic $b$ = −0.53, $SE$ = 0.07, $p$ < 0.001; emotional bullying, $b$ = −0.48, $SE$ = .05, $p$ < 0.001; cyberbullying, $b$ = −0.37, $SE$ = 0.07, $p$ < .001. Odds ratios relative to a single standard deviation increase in the perceived school climate variable showed substantial decreases in the odds of a student reporting being bullied: physical bullying, $OR$ = 0.30, 95% CI: 0.26, 0.34; emotional bullying, $OR$ = 0.31, 95% CI: 0.28, 0.34; and cyberbullying, $OR$ = 0.35, 95% CI: 0.30, 0.40.

We then regressed each of the four latent hypothesized mediating factors on each of the four perceived school climate measures in separate models, including the three binary bullying items as outcomes. All path coefficients and confidence intervals are reported with each mediator in

Table 3. The paths from the perceived school climate variable to the hypothesized mediating factors were positive and significant in all cases after FDR correction. Standardized

regression coefficients as measures of effect size ranged from 0.15 to 0.55 with a median of 0.34 across the 16 models.

## Mediator analysis

We calculated the indirect effects of each perceived school climate predictor on the three binary bullying outcomes via each latent hypothesized mediating factor. Because the current version of M*plus* does not accommodate bootstrapped confidence intervals with clustered data, we drew conclusions from comparing each product of coefficients to its delta-method standard error. Given our large sample size, we assumed the somewhat lower power of the delta-method approach was unlikely to substantially alter our conclusions.

The 16 models are reflected in Figure 1 (i.e., four school climate variables multiplied by four mediators) with direct (residual) paths leading from the perceived school climate variable to the bullying variables. Individual coefficients (linear for the paths from climate to mediating factor; logistic for the paths from climate and mediating factor to bullying outcomes) and the products of coefficients and their confidence intervals are reported in Tables 4, 5, 6, and 7 for physical, emotional, and cyberbullying, respectively. Even though the three outcomes were modeled concurrently, we have arranged the presentation by type of bullying for clarity of discussion. The total effects of perceived school climate variables on bullying outcomes are noted with each climate variable in the tables. We report odds ratios relative to standardized predictors as estimates of effect sizes. In all 16 models, more positive perceptions of school climate predicted a significantly lower likelihood of reported bullying. Because the significance and magnitudes of the individual paths and total effects are not of direct interest for our hypothesis, we applied the FDR correction only to tests of indirect effects. Our summary of the tests is organized around the bullying outcome.

**Physical bullying—**Indirect effects of all four perceived school climate variables on physical bullying via school connectedness, peer attachment, and assertiveness were significant and beneficial (consistent with more positive perceptions of school climate predicting lower likelihood of reporting bullying) after FDR correction. Empathy did not show a significant role as a mediating factor between any of the perceived school climate variables and reports of physical bullying.

**Emotional bullying—**Indirect effects of perceived school climate variables on emotional bullying via school connectedness, peer attachment, and assertiveness were significant and beneficial after FDR correction. The fourth mediator, empathy, served as an *inconsistent* mediator (opposite in sign from the total effect) for all perceived school climate variables except student input, for which the indirect effect was not significantly different from zero. For the first three mediators (i.e., assertiveness, school connectedness, peer attachment), more positive perceptions of school climate predicted greater empathy scores, but higher empathy was associated with *greater* likelihood of reporting bullying.

**Cyberbullying—**Indirect effects of all four perceived school climate variables on cyberbullying via school connectedness and assertiveness were significant and beneficial after FDR correction. As in the case for emotional bullying, empathy was a significant

inconsistent mediator for all perceived school climate variables. Peer attachment showed a significant indirect effect between cyberbullying and student input, but not for the other perceived school climate variables.

**Contrasts between bullying types—**Given empathy's unexpected results, we tested *post hoc* contrasts among the main effects of each climate variable on each pairwise difference in effect on the three types of bullying. We also estimated comparable models using each mediator as the sole predictor of bullying. Two pairs of effects (of 24 pairwise tests) showed significant differences involving empathy after FDR corrections. The effect of empathy on physical bullying was significantly more beneficial than the effects on either emotional or cyberbullying (and only the adverse effect on cyberbullying was significantly different from zero).

## Discussion

Although research has consistently shown that school climate can foster or inhibit bullying behaviors, to date there has been little research on how such impacts occur. Understanding the pathways of influence is critical to designing, implementing, and evaluating appropriate school programs and policies. Our study focuses uniquely on exploring some of the possible mechanisms through which student perceptions of school climate may mediate bullying across social-ecological environments.

Consistent with past research (Espelage, Low, & Jimerson, 2014; Gower, McMorris, & Eisenberg, 2015; Klein, Cornell, & Konold, 2012), the study confirmed our initial hypothesis that students who reported a better school climate were substantially less likely to report being bullied. What this study adds to the literature is that students in schools with a positive climate have greater levels of school connectedness, peer attachment, and social skills, which in turn predicts less bullying (with the partial exception of empathy). Our path analysis also found that school connectedness, peer attachment, and social skills generally mediated the influence of perceived school climate on bullying.

The study results are based on cross-sectional data and have some limitations (as discussed next), but if confirmed they could have significant implications for the implementation of bullying programs and policy. Prior research has found that the effectiveness of bullying programs varies and that the most effective programs involve a comprehensive, multilevel strategy that targets bullies, victims, bystanders, families, and communities. Findings from this study support this assertiveness by identifying the multiple levels of influence and some specific mechanisms these programs may want to target.

Administrators, teachers, and other officials who hope to improve school climate and reduce bullying could seek out climate-building programs with components that directly target these mediators. For stand-alone bullying programs, this study identifies which aspects of climate may help or hinder their work. Understanding how these factors vary by school may help administrators select the most appropriate bullying programs for their campuses depending on the climate and types of bullying they intend to address. For example, if an administrator

seeks to mitigate cyberbullying, selecting a stand-along bullying program that focuses on promoting peer attachment may be less effective than selecting one that builds assertiveness.

Evaluation research assessing the effectiveness of school bullying programs should attend to the mediators identified in this study to learn more about how stand-alone and climate improvement programs affect bullying and to identify potential targets for remediation if programs are shown to be ineffective. Similarly, the explanatory power of school climate measures, emphasized by ESSA, may be enhanced with additional measures of peer attachment, social skills, and school connectedness.

More research is needed to understand the role that empathy plays in bullying. Interestingly, higher empathy was associated with a greater likelihood of reported cyberbullying. It had an apparent (from point estimates) adverse effect on both emotional and cyberbullying despite an apparent beneficial effect on physical bullying. Past studies have also found that having more friends can lead to greater cyberbullying (Wang, Iannotti, & Nansel, 2009). More understanding is needed about how these dynamic social networks are navigated and which social skills protect against bullying and promote healthy development. Further research should also explore the extent to which a recursive relationship exists among school climate, bullying, and the mediators we examined, in which climate leads to improvements in the mediators and reductions in bullying behavior, which in turn improves the climate.

## Limitations

This study has three major limitations. First, data were acquired through self-report within a single state, which may limit generalizability of the findings, over or under represent the actual incidences of bullying, and result in a potential lack of independence among the key predictors, mediators, and outcome measures. Surveys that assess risk behaviors that are highly sensitive, like bullying, may be underreported due to social desirability; however, the survey was delivered electronically, which may have helped encourage students to more truthfully report their experience (Turner et al., 1998). In addition, the fact that all study variables were reported by students themselves introduces the possibility of common-reporter bias, in which a generally positive school experience could be a common cause of students reporting better experiences with both school climate and the mediators, and reflecting less experience with bullying. In future research, more objective measures of climate and of the socio-ecological influences (in this study the mediators) could address this concern.

Second, the psychometrics and validity of all measures used in the study are still being established. Finally, the analyses relied on a cross-sectional sample of students, rather than a longitudinal study, so we do not examine whether bullying has a cumulative impact or how school climate can influence these cumulative impacts (Baly, Cornell, & Lovegrove, 2014). Our inferences are based on the direction of the mediation reported in prior literature. Future longitudinal studies of schools with varying levels of school climate (some positive, some negative) could provide additional evidence supporting the direction of the mediation.

### Conclusion

Bullying is a significant public health problem in the United States and a priority for schools (Gladden et al., 2014). Promoting a positive school climate is one strategy to reduce bullying. A more robust understanding of mediating influences such as school connectedness, peer attachment, and social skills can provide insight into why some school climate interventions may influence bullying (e.g., because they build social skills) and some may not. This understanding can help schools select school climate programs and policies that are most likely to impact bullying behaviors (e.g., those that explicitly target mediators like social skills) and evaluate the processes through which their ongoing school climate and bullying improvement efforts may or may not be working. This study is a first step in enhancing this understanding, and these intermediate outcomes may also be useful evaluation measures to include in future studies of school climate interventions given their potential explanatory value.

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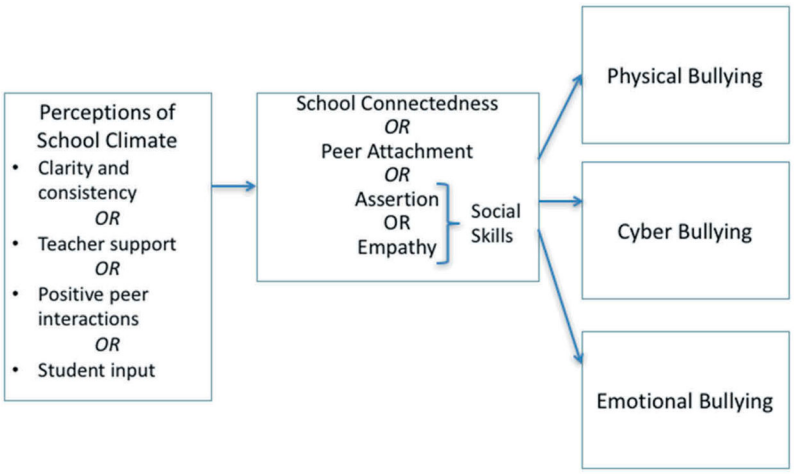


**Figure 1.**

Mediation model. This figure illustrates the mediation paths examined in this study. These paths are focused on understanding how three variables—school connectedness, peer attachment, and two social skills (i.e., assertion and empathy)—mediate the relationship between each perceived school climate variable (i.e., clarity or consistency, teacher support, positive peer interactions, and student input) and physical bullying, cyberbullying, and emotional bullying. These mediators are in the middle of the figure, with perceived school climate on the left and bullying on the right of the mediators.

**Table 1**

Student characteristics ($N$ = 2,834).

| Characteristic | % |
|---|---|
| Gender | |
| Female | 49 |
| Male | 51 |
| Grade | |
| 6th | 48 |
| 7th | 52 |
| Race/ethnicity | |
| Hispanic or Latino | 3 |
| American Indian or Alaska Native | 7 |
| Asian | 2 |
| Black or African American | 2 |
| Native Hawaiian or Other Pacific Islander | 1 |
| White | 86 |
| Other | 8 |

*Note*. Race/ethnicity does not add up to 100% because students could select more than one race/ethnicity.

**Table 2**

Correlation matrix of variables used in mediation models.

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Perceived school climate | 1 | | | | | | | | | | | |
| 2. Clarity and consistency | .73 | 1 | | | | | | | | | | |
| 3. Teacher support | .86 | .60 | 1 | | | | | | | | | |
| 4. Positive peer interactions | .69 | .36 | .43 | 1 | | | | | | | | |
| 5. Student input | .80 | .39 | .60 | .37 | 1 | | | | | | | |
| 6. School connected-ness | .56 | .37 | .49 | .51 | .37 | 1 | | | | | | |
| 7. Assertiveness | .40 | .32 | .36 | .31 | .25 | .44 | 1 | | | | | |
| 8. Empathy | .30 | .26 | .26 | .27 | .15 | .35 | .45 | 1 | | | | |
| 9. Peer attachment | .38 | .25 | .33 | .32 | .27 | .42 | .35 | .42 | 1 | | | |
| 10. Physical bullying | −.19 | −.15 | −.16 | −.15 | −.13 | −.25 | −.16 | −.04 | −.12 | 1 | | |
| 11. Emotional bullying | −.19 | −.15 | −.15 | −.18 | −.11 | −.23 | −.12 | .03 | −.09 | .41 | 1 | |
| 12. Cyberbullying | −.12 | −.14 | −.09 | −.07 | −.08 | −.14 | −.10 | .05 | −.03 | .25 | .32 | 1 |

*Note*. Student $N = 2{,}833$. Cluster $N = 14$. All correlations >.10 are statistically significant, $ps < .05$.

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## Table 3

Effect of perceived school climate on school connectedness, peer attachment, assertion, and empathy.

| School climate variable | Mediator | Effect (CI) of school climate on mediating factor |
|---|---|---|
| Clarity and consistency | School connectedness | 0.40 [0.36, 0.44], β = 0.42 |
| | Peer attachment | 0.49 [0.42, 0.55], β = 0.32 |
| | Assertion | 0.26 [0.21, 0.31], β = 0.33 |
| | Empathy | 0.23 [0.20, 0.26], β = 0.27 |
| Teacher support | School connectedness | 0.42 [0.38, 0.46], β = 0.54 |
| | Peer attachment | 0.55 [0.44, 0.65], β = 0.43 |
| | Assertion | 0.24 [0.20, 0.28], β = 0.39 |
| | Empathy | 0.19 [0.15, 0.23], β = 0.28 |
| Positive peer interactions | School connectedness | 0.49 [0.44, 0.53], β = 0.55 |
| | Peer attachment | 0.53 [0.47, 0.59], β = 0.40 |
| | Assertion | 0.22 [0.19, 0.25], β = 0.33 |
| | Empathy | 0.21 [0.18, 0.25], β = 0.28 |
| Student input | School connectedness | 0.29 [0.26, 0.32], β = 0.41 |
| | Peer attachment | 0.38 [0.29, 0.46], β = 0.34 |
| | Assertion | 0.15 [0.12, 0.17], β = 0.27 |
| | Empathy | 0.10 [0.05, 0.14], β = 0.15 |

## Table 4

Effects of perceived school climate and mediating variables on bullying.

| Predictor | Outcome | Standardized *OR* (95% CI) for predictor on bullying |
|---|---|---|
| Clarity and consistency | Physical bullying | 0.82 [0.77, 0.88] |
| | Emotional bullying | 0.85 [0.81, 0.88] |
| | Cyberbullying | 0.81 [0.77, 0.86] |
| Teacher support | Physical bullying | 0.82 [0.77, 0.87] |
| | Emotional bullying | 0.84 [0.82, 0.87] |
| | Cyberbullying | 0.82 [0.87, 0.92] |
| Positive peer interactions | Physical bullying | 0.82 [0.77, 0.88] |
| | Emotional bullying | 0.82 [0.79, 0.84] |
| | Cyberbullying | 0.89 [0.81, 0.97] |
| Student input | Physical bullying | 0.83 [0.79, 0.88] |
| | Emotional bullying | 0.88 [0.84, 0.93] |
| | Cyberbullying | 0.87 [0.81, 0.94] |
| School connectedness | Physical bullying | 0.70 [0.66, 0.74] |
| | Emotional bullying | 0.73 [0.69, 0.77] |
| | Cyberbullying | 0.76 [0.71, 0.81] |
| Peer attachment | Physical bullying | 0.77 [0.70, 0.84] |
| | Emotional bullying | 0.82 [0.77, 0.88] |
| | Cyberbullying | 0.85 [0.78, 0.93] |
| Assertion | Physical bullying | 0.76 [0.71, 0.81] |
| | Emotional bullying | 0.81 [0.77, 0.86] |
| | Cyberbullying | 0.77 [0.69, 0.85] |
| Empathy | Physical bullying | 0.94 [0.88, 1.00] |
| | Emotional bullying | 1.03 [0.97, 1.10] |
| | Cyberbullying | 1.10 [1.04, 1.16] |

**Table 5**

Indirect, direct, and total effects of the mediating factors and perceived school climate on physical bullying and component structural coefficients[a].

| School climate variable | Mediating factor | Indirect effect (CI) of school climate on bullying via mediating factor | Ratio of indirect effect to direct effect of school climate on bullying[b] | Effect (CI) of mediating factor on bullying | Direct effect (CI) of school climate on bullying |
|---|---|---|---|---|---|
| Clarity and consistency (Total effect = −0.65, *SE* = 0.12) | School Connectedness | −0.50[c] [−0.61, −0.39] | 0.73 | −1.24 [−1.47, −1.01] | −0.18 [−0.38, 0.02] |
| | Peer Attachment | −0.23[c] [−0.35, −0.10] | 0.34 | −0.47 [−0.68, −0.25] | −0.44 [−0.70, −0.19] |
| | Assertion | −0.25 [−0.37, −0.12] | 0.36 | −0.95 [−1.34, −0.55] | −0.44 [−0.69, −0.19] |
| | Empathy | 0.00 [−0.06, 0.06] | 0.00 | 0.00 [−0.25, 0.24] | −0.65 [−0.89, −0.41] |
| Teacher support (Total effect = −0.55, *SE* = 0.08) | School Connectedness | −0.56[c] [−0.67, −0.45] | 1.01 | −1.34 [−1.73, −1.05] | 0.00 [−0.19, 0.20] |
| | Peer Attachment | 0.24[c] [−0.40, −0.07] | 0.42 | −0.43 [−0.68, −0.18] | −0.33 [−0.55, −0.10] |
| | Assertion | −0.22[c] [−0.35, −0.10] | 0.39 | −0.93 [−1.32, −0.54] | −0.35 [−0.49, −0.20] |
| | Empathy | 0.00 [−0.04, 0.05] | 0.00 | 0.01[−0.23, 0.25] | −0.55 [−0.71, −0.39] |
| Positive peer interactions (Total effect = −0.59, *SE* = 0.10) | School Connectedness | −0.63[c] [−0.79, −0.48] | 1.09 | −1.30 [−1.57, −1.02] | 0.05 [−0.19, 0.29] |
| | Peer Attachment | −0.23[c] [−0.37, −0.09] | 0.39 | −0.44 [−0.68, −0.20] | −0.37 [−0.58, −0.16] |
| | Assertion | −0.20[c] [−0.29, −0.12] | 0.34 | −0.92 [−1.26, −0.59] | −0.40 [−0.56, −0.24] |
| | Empathy | 0.00 [−0.05, 0.05] | 0.00 | 0.01 [−0.22, 0.24] | −0.60 [−0.78, −0.41] |
| Student input (Total effect = −0.44, *SE* = 0.08) | School Connectedness | −0.37[c] [−0.46, −0.28] | 0.87 | −1.28 [−1.54, −1.02] | −0.06 [−0.20, 0.09] |
| | Peer Attachment | −0.19[c] [−0.31, −0.07] | 0.42 | −0.50 [−0.72, −0.27] | −0.26 [−0.45, −0.07] |
| | Assertion | −0.15[c] [−0.23, −0.07] | 0.33 | −1.02 [−1.43, −0.62] | −0.30 [−0.46, −0.15] |
| | Empathy | −0.01 [−0.04, 0.01] | 0.03 | −0.12 [−0.38, 0.14] | −0.43 [−0.58, −0.28] |

[a] Student *N* = 2,818, Cluster *n* = 14. *CI* = 95% confidence interval. Cell contents for effects are logistic structural coefficients and 95% confidence intervals. Total effects and model fit shown only once for each climate variable to reduce redundancy.

[b] Computed using total effects within each individual model for maximum accuracy; minor inconsistencies from the total effect reported via a given mediator are to be expected. Values > 1 reflect point estimates of indirect effects greater than point estimates of total effects, which can reflect omitted inconsistent mediators and/or sampling variability.

[c] Indirect effect is significant, $p < .05$, controlling false discovery rate. Direct effects and effects of mediators presented for context; statistical significance not marked.

**Table 6**

Indirect effects and total effects of the mediating factors and perceived school climate on emotional bullying and component structural coefficients[a].

| School climate variable | Mediating factor | Indirect effect of school climate on bullying via mediating factor (CI) | Ratio of indirect effect to direct effect of school climate on bullying[b] | Effect of mediating factor on bullying (CI) | Direct effect of school climate on bullying (CI) |
|---|---|---|---|---|---|
| Clarity and consistency (Total effect = −0.55, *SE* = 0.07) | School Connectedness | −0.43[c] [−0.51, −0.34] | 0.73 | −1.06 [−1.25, −0.88] | −0.16 [−0.28, −0.03] |
| | Peer Attachment | −0.16[c] [−0.24, −0.07] | 0.28 | −0.32 [−0.47, −0.17] | −0.40 [−0.53, −0.27] |
| | Assertion | −0.16[c] [−0.24, −0.07] | 0.28 | −0.61[−0.90, −0.32] | −0.40 [−0.55, −0.26] |
| | Empathy | 0.08[c] [0.02, 0.14] | Undefined | 0.35 [0.09, 0.60] | −0.63 [−0.74, −0.52] |
| Teacher support (Total effect = −0.46, *SE* = 0.0) | School Connectedness | −0.48[c] [−0.58, −0.39] | 1.01 | −1.16 [−1.38, −0.94] | 0.00 [−0.08, 0.08] |
| | Peer Attachment | −0.16[c] [−0.26, −0.05] | 0.34 | −0.29 [−0.46, −0.13] | −0.30 [−0.41, −0.20] |
| | Assertion | −0.14[c] [−0.23, −0.06] | 0.29 | −0.60 [−0.90, −0.29] | −0.32 [−0.40, −0.25] |
| | Empathy | 0.07[c] [0.02, 0.12] | Undefined | 0.36 [0.10, 0.62] | −0.53 [−0.58, −0.48] |
| Positive peer interactions (Total effect = −0.61, *SE* = 0.06) | School Connectedness | −0.50[c] [−0.61, −0.38] | 0.78 | −1.02 [−1.24, −0.80] | −0.14 [−0.27, −0.01] |
| | Peer Attachment | −0.14[c] [−0.25, −0.03] | 0.23 | −0.26 [−0.45, −0.08] | −0.48 [−0.62, −0.32] |
| | Assertion | −0.12[c] [−0.19, −0.05] | 0.20 | −0.55 [−0.82, −0.28] | −0.49 [−0.59, −0.40] |
| | Empathy | 0.09[c] [0.03, 0.14] | Undefined | 0.40 [0.14, 0.67] | −0.70 [−0.80, −0.59] |
| Student input (Total effect = −0.30, *SE* = 0.64) | School Connectedness | −0.33[c] [−0.40, −0.26] | 1.05 | −1.14 [−1.33, −0.95] | 0.02 [−0.12, 0.15] |
| | Peer Attachment | −0.14[c] [−0.21, −0.06] | 0.45 | −0.36 [−0.50, −0.22] | −0.17 [−0.29, −0.05] |
| | Assertion | −0.10[c] [−0.16, −0.05] | 0.34 | −0.70 [−1.02, −0.39] | −0.20 [−0.34, −0.07] |
| | Empathy | 0.02 [−0.01, 0.05] | Undefined | 0.21 [−0.04, 0.46] | −0.32 [−0.44, −0.21] |

[a] Student $N$ = 2,818, Cluster $n$ = 14. *CI* = 95% Confidence Interval. Cell contents are probit structural coefficients and 95% confidence intervals for indirect and total effects and for effects of mediators on bullying outcomes, and linear path coefficients for effects of climate variables on mediators. Total effects shown only once for each climate variable to reduce redundancy. Effects of climate variables on mediators shown only in Table 3 due to redundancy.

[b] Computed using total effects within each individual model for maximum accuracy; minor inconsistencies from the total effect reported via a given mediator are to be expected. Values > 1 reflect point estimates of indirect effects greater than point estimates of total effects. Quantity is undefined for inconsistent mediation.

[c] Indirect effect is significant, $p < .05$, controlling false discovery rate. Direct effects and effects of mediators presented for context; statistical significance not marked.

**Table 7**

Indirect effects and total effects of the mediating factors and perceived school climate on cyberbullying and component structural coefficients[a].

| School climate variable | Mediating factor | Indirect effect of school climate on bullying via mediating factor (CI) | Ratio of indirect effect to direct effect of school climate on bullying[b] | Effect of mediating factor on bullying (CI) | Direct effect of school climate on bullying (CI) |
|---|---|---|---|---|---|
| Clarity and consistency (Total effect = −0.70, *SE* = 0.10) | School Connectedness | −0.33[c] [−0.44, −0.23] | 0.48 | −0.83 [−1.10, −0.57] | −0.37 [−0.58, −0.15] |
| | Peer Attachment | −0.08 [−0.20, 0.04] | 0.12 | −0.17 [−0.40, 0.06] | −0.62 [−0.86, −0.38] |
| | Assertion | −0.19[c] [−0.33, −0.05] | 0.26 | −0.74 [−1.22, −0.26] | −0.53 [−0.76, −0.31] |
| | Empathy | 0.16[c] [0.10, 0.23] | Undefined | 0.70 [0.46, 0.94] | −0.85 [−1.08, −0.62] |
| Teacher support (Total effect = −0.38, *SE* = 0.08) | School Connectedness | −0.44[c] [−0.52, −0.36] | 1.22 | −1.06 [−1.29, −0.83] | 0.08 [−0.07, 0.23] |
| | Peer Attachment | −0.11 [−0.24, 0.03] | 0.28 | −0.19 [−0.44, 0.05] | −0.28 [−0.49, −0.06] |
| | Assertion | −0.21[c] [−0.35, −0.07] | 0.53 | −0.86 [−1.34, -.39] | −0.19 [−0.35, −0.02] |
| | Empathy | 0.12[c] [0.05, 0.18] | Undefined | 0.60 [0.37, 0.83] | −0.49 [−0.66, −0.31] |
| Positive peer interactions (Total effect = −0.35, *SE* = 0.14) | School Connectedness | −0.52[c] [−0.62, −0.42] | 1.68 | −1.07 [−1.32, −0.83] | 0.21 [−0.10, 0.52] |
| | Peer Attachment | −0.12 [−0.28, 0.05] | 0.28 | −0.22 [−0.51, 0.08] | −0.24 [−0.63, 0.15] |
| | Assertion | −0.19[c] [−0.29, −0.09] | 0.55 | −0.87 [−1.29, −0.46] | −0.16 [−0.42, 0.10] |
| | Empathy | 0.12[c] [0.07, 0.17] | Undefined | 0.58 [0.36, 0.79] | −0.47 [−0.74, −0.20] |
| Student input (Total effect = −0.33, *SE* = 0.10) | School Connectedness | −0.28[c] [−0.37, −0.20] | 0.96 | −0.98 [−1.23, −0.72] | −0.01 [−0.22, 0.19] |
| | Peer Attachment | −0.10[c] [−0.18, −0.01] | 0.29 | −0.25 [−0.46, −0.04] | −0.23 [−0.42, −0.04] |
| | Assertion | −0.13[c] [−0.22, −0.05] | 0.40 | −.90 [−1.36, −0.44] | −0.20 [−0.39, 0.00] |
| | Empathy | 0.04[c] [0.01, 0.08] | Undefined | 0.47 [0.24, 0.70] | −0.37 [−0.57, −0.17] |

[a] Student *N* = 2,818, Cluster *n* = 14. *CI* = 95% Confidence Interval. *Std OR* = Odds ratio standardized with respect to school climate variable. Cell contents are logistic structural coefficients and 95% confidence intervals for indirect and total effects and for effects of mediators on bullying outcomes, and linear path coefficients for effects of climate variables on mediators. Total effects shown only once for each climate variable to reduce redundancy. Effects of climate variables on mediators shown only in Table 3 due to redundancy.

[b] Computed using total effects within each individual model for maximum accuracy; minor inconsistencies from the total effect reported via a given mediator are to be expected. Values > 1 reflect point estimates of indirect effects greater than point estimates of total effects. Quantity is undefined for inconsistent mediation.

[c] Indirect effect is significant, $p < .05$, controlling false discovery rate. Direct effects and effects of mediators presented for context; statistical significance not marked.