Assessing the Association Between Observed School Disorganization and School Violence: Implications for School Climate Interventions

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Objective: This study explored how observed features of the school physical and social environment relate to students’ perceptions of school climate and how these in turn were associated with students’ involvement in violence. Method: Observational assessments were conducted of the environments (i.e., disorder, illumination, adult monitoring, proactive behavioral management, and negative student behaviors) of 58 high schools using a validated assessment (the School Assessment for Environmental Typology). Student perceptions of school climate (i.e., delinquency, rules and consequences, and physical comfort) as well as their perpetration of violence were collected from 28,592 adolescents in these same schools in the corresponding Spring. Multilevel structural equation models were used to test for indirect effects. Results: A good fit was found for all models. No direct effects of environmental observations on violence involvement were identified. However, significant indirect effects on violence were found, specifically for illumination through perceptions of disorder (estimate = −.01, p = .05), illumination through perceptions of rules and consequences (estimate = −.01, p = .03), and negative student behaviors through perceptions of rules and consequences (estimate = −.01, p = .01). Conclusion: Changes to the school environment may be associated with reduced violence involvement, but only insofar as they alter student perceptions of the environment.

Keywords: multilevel mediation, observations, school climate, school violence

show that in the past 30 days 8.1% of high school students have been in a fight, 5.2% have carried a weapon, and 19.6% have experienced bullying at school (Centers for Disease Control and Prevention, 2013). Beyond placing individual students who engage in these negative behaviors at risk, such behaviors may also create fear in other students, which interferes with their ability to engage in learning (Robers, Kemp, Truman, & Snyder, 2013). The U.S. Department of Education, through its Safe Schools/Healthy Students Program and the Safe and Supportive Schools program, has been targeting school climate as a potential mechanism through which to reduce school violence (U.S. Department of Education, 2009). Moreover, positive school climate has been identified as a protective factor against violent and aggressive behavior (Gendron, Williams, & Guerra, 2011; Way, Reddy, & Rhodes, 2007).

School climate refers to the shared beliefs, values, and attitudes that shape interactions between students, teachers, and administrators and sets the parameters of normative and acceptable behavior in the school (Emmons, Corner, & Haynes, 1996; Kuperminc, Leadbeater, Emmons, & Blatt, 1997). School climate interventions therefore focus on establishing clear norms for behavior, supporting the development of positive relationships, and creating physical environments that are safe and conducive for learning (Sugai & Horner, 2006; U.S. Department of Education, 2009). Research on school climate has been heavily influenced by social–cognitive theory and the ecological model, which highlights the significant transactional processes at multiple levels that influence behavior (Bandura, 1977; Bronfenbrenner, 1979; Brookmeyer, Fanti, & Henrich, 2006; Espelage & Swearer, 2004). However, the majority of research on school climate has focused on student perceptions of the environment (Bradshaw, Waasdorp, Debnam, & Johnson, 2014). This study aimed to understand how (a) observed indicators of climate were associated with student involvement in violence and (b) whether the association between observed indicators of climate and student involvement in violence operated through students’ perceptions of school climate (i.e., delinquency, rules and consequences, and physical comfort).
This line of research has important implications for school-based violence prevention through environmental interventions.

**Role of Disorganization in Influencing Behavior**

Social disorganization theory (Shaw & McKay, 1969) focused attention on the influence of environmental conditions on individual’s decisions to engage in crime and violence. Work using this theory has emphasized the role of structural characteristics of neighborhoods, such as low socioeconomic status, ethnic heterogeneity, and residential mobility, in disrupting social organization which then leads to increases in crime and violence (Sampson & Groves, 1989; Steenbeek & Hipp, 2011). A common critique of this literature is that studies often do not include measures of the intervening processes (e.g., social organization). Other theories more directly focus on the process and seek to understand the role of communities’ level of cohesion and social control, or collective efficacy (Sampson, Raudenbush, & Earls, 1997). Neighborhood collective efficacy has been associated with decreased rates of violence and adolescent problem behavior (Leventhal & Brooks-Gunn, 2000 for a review). Broken windows theory (Wilson & Kelling, 1982) suggests that the presence of disorder signals the lack of social control in a neighborhood thus encouraging crime and delinquency. Studies have consistently found a relationship between social and physical disorder at the neighborhood-level and adverse outcomes among adolescents including substance use, high-risk sexual activity, self-reported fear, and lower academic performance (Bowen & Bowen, 1999; Cohen et al., 2000; Furr-Holden et al., 2011; Milam, Furr-Holden, & Leaf, 2010; Miles, 2008).

Prior reviews of existing research have identified commonly used methods to assess physical and social aspects of neighborhoods (e.g., Census measures, self-report, objective instruments) and noted some of the limitations of these methods (Leventhal & Brooks-Gunn, 2000; Nickelson, Wang, Mitchell, Hendricks, & Paschal, 2013; Schaefer-McDaniel, Dunn, Minian, & Katz, 2010). More recently, objective and standardized observations have been utilized to assess both the physical and social aspects of neighborhoods (Furr-Holden et al., 2008). For example, the Neighborhood Inventory for Environmental Typology (NIETy) Instrument is a reliable and validated objective tool that captures over 150 items within the neighborhood environment such as the presence of abandoned housing and evidence of landscaping (Furr-Holden et al., 2010). The NIETy was recently adapted to assess and better understand the physical and social environment of schools; the resulting instrument is called the School Assessment for Environmental Typology (SAFETy).

**Measuring Disorganization of the School Environment**

Overwhelmingly, research has relied on various school demographic factors as a way to describe the school environment (Bradshaw, Sawyer, & O’Brennan, 2009). Drawing on social disorganization theory, research has also shown that many of these school demographic factors, such as percentage of students receiving free and reduced priced meals, suspension rate, and student mobility, can be used as proxy indicators of disorder within a school (Beavers, Bradshaw, Micch, & Leaf, 2007; Birnbaum et al., 2003; Payne, Gainey, Triplett, & Danner, 2003). Indeed, Bradshaw et al. (2009) found that the percentage of students receiving free and reduced priced meals was predictive of bullying behaviors, attitudes, and decreased perceptions of feeling safe over and above the contribution of individual risk factors. Other compositional indicators such as teacher characteristics and concentration of students with behavior problems have been linked with diminished perceptions of safety and climate, attitudes favoring aggressive retaliation, and involvement in bullying (Bradshaw, Sawyer, & O’Brennan, 2007; Koth, Bradshaw, & Leaf, 2008). However, like Census data at the neighborhood level, the research is also clear that these demographic and compositional factors generally do not vary much year to year, and thus are not particularly sensitive to change, or especially informative in relation to intervention.

Aspects of the social environment in schools have been consistently associated with students’ academic performance and behavior (e.g., Allen et al., 2013; Mikami, Gregory, Allen, Pianta, & Lun, 2011; Pianta, Belsky, Vandergrift, Houts, & Morrison, 2008; Pianta, Hamre, & Allen, 2012; Plank, Bradshaw, & Young, 2009). For example, in one study of high schools, Gregory et al. (2010) found that student perceptions of consistent support from adults and enforcement of school discipline at the school level were associated with lower rates of bullying and victimization. Student connection to school is a strong predictor of adolescent academic outcomes, graduation rates, and reduced involvement in violence (Catalano, Oesterle, Fleming, & Hawkins, 2004; Crooks, Scott, Wolfe, Chiodo, & Killip, 2007; Gottfredson, Kearley, Najaka, & Rocha, 2005; Payne et al., 2003). Additionally, studies have also shown that indicators of social control, such as the presence of adults and a lack of physical deterioration, decrease the belief that violence is acceptable and will go unnoticed (Kitsantas, Ware, & Martinez-Arias, 2004; Mayer & Leone, 1999; Van Dorn, 2004). In fact, a study designed to apply broken windows theory in schools found support for an indirect effect of physical disorder on student perceptions that violence and delinquency were a problem at the school. Specifically, perceptions of physical disorder were related to increased fear and decreased collective efficacy, which were in turn related to increased perceptions that violence and delinquency were a problem at the school (Plank et al., 2009). The majority of research exploring the role of disorganization in influencing violence in the school environment has used perceptual self-report data as compared with objective measures. Benbenishi and Astor (2005) highlight the value of incorporating multiple perspectives of school climate.

There is an emerging body of literature which has linked building condition and building features such as age, air quality, and ambient noise with student academic performance (see Bosch, 2006; Uline & Tschanen-Moran, 2008). A related line of research has used the principles of Crime Prevention through Environmental Design (CPTED) to understand how the design of the school environment influences the likelihood of deviant behavior (Crowe, 1991). For example, work applying this framework has found that areas in a school that are considered “unowned” and less likely to be monitored by individuals are often where violence occurs (Astor, Benbenishi, & Meyer, 2004; Astor, Meyer, & Behre, 1999). Similarly, Wilcox and colleagues observed school-specific territoriality, natural surveillance, and school image/milieu in 65 public schools; although they found few significant associations between the physical environment and school crime in the student-reported measures, there were significant associations between...
Studies that have used observational methods to examine schools’ social environments have focused primarily on the evaluation of classroom interactions and instruction (Allen et al., 2013; Mikami et al., 2011; Pianta et al., 2008; Pianta et al., 2012). For example, Allen et al. (2013) found that high school students had higher scores on state achievement tests when they experienced classrooms where teachers were observed to be sensitive to students’ needs, use interesting and varied instructional approaches, and emphasize students’ problem solving and analysis. Yet the social environment of schools extends beyond the classroom, as students also spend time in nonclassroom settings such as the cafeteria, hallway, and arrival/departure areas. Observed student behaviors can vary across these contexts (Cash, Bradshaw, & Leaf, 2015). Moreover, less effective behavior management has been associated with more frequent student problem behaviors in non-classroom settings in middle schools (Rusby, Crowley, Sprague, & Biglan, 2011). Problematic social interactions that occur in non-classroom settings, such as peer harassment, can be troubling not only for victims who experience harassment directly, but also for witnesses (Nishina & Juvonen, 2005).

Overview of Current Study

In this article, we tested a multilevel mediational model to explore whether school physical and social disorganization, assessed by observed indicators of disorder, illumination, adult monitoring, proactive behavioral management, and negative student behaviors, was related to students’ involvement in violence via student perceptions of school climate (i.e., delinquency, rules and consequences, and physical comfort). Through this study, we addressed two gaps in the literature, first by using observations to understand the association between the school environment and school behavior and the second by exploring the pathway through which disorganization operates. We hypothesized that a disordered school environment would increase violence through decreased positive perceptions of school climate. This hypothesis was based on the logic that school-level factors that challenge school functioning and stability interfere with the school’s collective efficacy and ability to effectively enforce norms of behavior (Leventhal & Brooks-Gunn, 2000; Payne et al., 2003; Plank et al., 2009). We also explored a direct effect whereby disorganization at the school-level was directly related to increased violence (aka the broken windows hypothesis; Wilson & Kelling, 1982). We used a multi-level modeling approach because our design included nested data, whereby students’ reports of school climate and violence involvement were clustered within schools, and thus were not independent. This also allowed us to model school-level contextual correlates. For additional information on multilevel modeling, see Luke (2004) and Raudenbush and Bryk (2002).

Method

Participants

Data came from 58 high schools in 12 Maryland school districts across the state participating in a statewide project focused on measuring and improving school climate, called the Maryland Safe and Supportive Schools Initiative (MDS3). School and youth participation in the MDS3 Initiative was voluntary. Districts were approached in order of perceived need as determined by the Maryland State Department of Education. Upon expressing interest in the MDS3 Initiative, district specific administrator meetings were conducted to obtain school-level commitment to the project. During year 1 of the study (2011–2012 for Cohort 1 schools and 2012–2013 for Cohort 2), observations of the school environment were conducted in the fall, while data on student perceptions of school climate were collected in the spring using a Web-based survey. Participating schools included a diverse population with a mean minority rate of 45.65% (SD = 25.5) and student enrollment of 1,357.13 (SD = 481.1). An average of 25.4 classrooms per school participated in the data collection. Survey data were collected from a total of 28,592 survey adolescents in grades 9–12, 50% of whom were male.

Procedures and Measures

All data described here were collected anonymously; adults and students were not identified at any point. Therefore these data were deemed nonhuman subjects research and considered exempt by the Institutional Review Board.

Observations. Data were collected over the course of three days at each school by two trained observers. Each data collector received training in four stages: an initial didactic session, on-site practice, on-site interobserver agreement or reliability, and on-site recalibration. All data were entered in real-time on a Samsung handheld tablet using the Pendragon mobile data collection software. Electronic data collection helped facilitate accuracy (i.e., boundary parameters) and completeness of records. Observers transmitted data back to a secure server upon completion of each day of the observation.

The School Assessment for Environmental Typology (SAfETY; Bradshaw, Milam, Furr-Holden, & Lindstrom Johnson, 2015) is an instrument that measures three broad aspects of the school environment: school ownership (e.g., murals, positive behavioral expectations), disorder (e.g., litter, graffiti, alcohol paraphernalia), and surveillance (e.g., school police officers, surveillance cameras). Assessments are conducted in nine areas of the school: entrance to the school grounds, the entrance to the school building, the perimeter of the school building, hallways, stairwells, cafeteria, playing fields, and staff and student parking lots. The instrument draws from several validated measures including the NIFETy Instrument (Furr-Holden et al., 2008, 2010) and the CPTED School Security Assessment (Wilcox et al., 2006). The average percent agreement for both reliability and recalibration assessments was 87% (see Bradshaw et al., 2015 for more information about the training of raters and data collection procedures).

Items from the SAFETY instrument were used to create eight scales based on theory and results from confirmatory factor analyses (Bradshaw et al., 2015). The current investigation used two of the scales, the Disorder and Illumination scales. The Disorder scale included nine binary (e.g., presence or absence) items from locations within the school and on school grounds (e.g., alcohol bottles in playing fields, drug paraphernalia in playing fields, broken lights in hallways). The Disorder scale had acceptable internal consistency (Cronbach’s alpha [α] = .62). The Illumination scale measures the sufficiency of lighting (i.e., no pockets of
shadows) on a 4-point Likert scale (strongly disagree to strongly agree) in three areas of the school, namely the cafeteria, hallways, and stairwells. The Illumination scale also had acceptable internal consistency (Cronbach’s alpha = .65).

The Assessing School Settings: Interactions of Students and Teachers (ASSIST; Rusby, Taylor, & Milichak, 2001) was the second observational measure used in this study. The ASSIST assessed social processes between students and school staff. In each school, raters conducted 16 nonclassroom observations across a variety of settings, including three arrival observations, four in hallways, four in lunch areas, three in departure areas, and two in stairwells. An area of 20 × 10 feet was selected for each observation using physical boundaries such as classroom doors, lunch tables, or a basketball court. For 10 min, raters observed the behaviors of all students and adults within the designated area. At the conclusion of an observation cycle, raters completed a series of 51 global items. The average percent agreement for reliability was 88%, and 92% for recalibration. Further information on rater training is available in Cash, Bradshaw, and Leaf, 2015.

The ASSIST has been used to evaluate associations between patterns of student behaviors and teachers’ behavior management strategies in middle school nonclassroom settings (Rusby et al., 2011) and high school classroom settings (Pas et al., 2015). Global ratings items from the ASSIST nonclassroom assessment were scored on a 5-point Likert-type scale from 0 (never) through 4 (almost continuously). Two subscales of adult behaviors were included, specifically: Adult Monitoring (seven items including “adults actively move around the area” and “adults monitored all students and all areas;” α = .83) and Proactive Behavioral Management (five items including “adults used verbal reminders or nonverbal cues regarding expected behaviors” and “adults praise students for specific behaviors;” α = .88). One student subscale was included, Negative Student Behaviors (five items including “students are irritable or sarcastic toward peers” and “students verbally harass and threaten others,” α = .65).

Survey. The anonymous, online MDS3 School Climate Survey was administered using a waiver of active parental consent process and youth assent process. The survey was administered online in language arts classrooms to approximately seven classrooms of 9th grade students and six classrooms for all other grade levels of students (10th, 11th, and 12th grade students) at each school. School staff administered the survey following a written protocol (see Bradshaw et al., 2014 for more details about survey administration). School climate scales. The Delinquency subscale (α = .65) consisted of five items that captured student perceptions of physical and behavioral disorder within the school environment. Specific items included “disruptions by other students can get in the way of my learning” and “vandalism of school property is a problem at this school.” Answer choices were on a 4-point scale (from strongly agree to strongly disagree), whereby items were coded with a high score representing a more favorable school climate. The Rules and Consequences subscale (α = .74) consisted of five questions that asked about the existence and awareness of rules (e.g., there are clear rules about student behavior) and about teachers’ classroom management ability (e.g., teachers can handle students who disrupt class). Answer choices were on a 4-point scale (from strongly agree to strongly disagree), whereby items were coded with a high score representing a more favorable school climate. The Physical Comfort subscale (α = .80) included four items that measured students’ general perception of the physical environment including the overall cleanliness of the school and bathrooms and the temperature of the school (e.g., the school is usually clean and well maintained). Answer choices were on a 4-point scale (from strongly agree to strongly disagree), whereby items were coded with a high score representing a more favorable school climate.

Violence. A latent variable was used to measure violence perpetration, consisting of three items regarding weapon carrying, fighting, and bullying. Specifically, the weapon-carrying item asked students “During the past 30 days, how often did you carry a weapon, such as a knife or gun, on school property?” (Centers for Disease Control and Prevention, 2013). Response choices ranged from 0 days to 6 or more days. After examination of the distribution this was collapsed into four categories, 0, 1, 2–3, and 4 or more. Approximately 8% carried a weapon once or more on school property. Fighting was measured with the following item: “During the past 12 months, how many times were you in a physical fight on school property?” (Centers for Disease Control and Prevention, 2013). Response choices ranged from 0 times to 12 or more times. After examination of the distribution this was collapsed into four categories, 0, 1, 2–3, and 4 or more. In the current study, 17.9% had one or more physical fights on school property. Finally, consistent with the definition by Olweus (1993) and the CDC (Gladden, Vivolo-Kantor, Hamburger, & Lumpkin, 2014), the survey included a definition of bullying, which read,

A person is bullied when he or she is exposed, repeatedly and over time, to negative actions on the part of one or more other persons. Bullying often occurs in situations where there is a power or status difference. Bullying includes actions like threatening, teasing, name-calling, ignoring, rumor spreading, sending hurtful e-mails and text messages, and leaving someone out on purpose.

Students were then asked to report, “In the past 30 days how often have you bullied someone else?” Response choices for this question included several times a week, once a week, 2 to 3 times during the month, 1 time during the month, and not at all. Approximately 20.4% of participants bullied someone else 1 time in the month or higher.

Overview of Analysis

To examine whether the association between school-level observed characteristics (disorder, illumination, adult monitoring, proactive behavioral management and negative student behaviors) and individuals’ self-reported perpetration of violence was mediated by self-reported perceptions of delinquency, rules and consequences, and physical comfort a series of multilevel models were run. Given the predictor variables were modeled at level 2 (i.e., school-level) and the mediators and outcomes were modeled at level 1 (i.e., individual-level), the overall model was considered a 2–1–1 mediation model (Tofghi & Thoemmes, 2014). See Figure 1 for a pictorial view of the model. All models were fit using Mplus 7.3 (Muthén & Muthén 1998–2014), which adjusts for missing data using full information maximum-likelihood estimation (FIML) under the assumption that data are missing at random. Model fit was assessed by the Comparative Fit Index (CFI), Tucker-Lewis fit index (TLI), Root Mean Square Error of Approximation (RM-
Scholars suggest models with CFI and TLI of .95 or higher indicate a good model fit within multilevel models with large sample sizes (Chou & Bentler, 1995; Hox, 2010). The RMSEA assessed how well the proposed model approximates the true model (Hox, 2010); models with good fit will have a RMSEA of .05 or lower (Kline, 2005), and a value of less than .08 for the SRMR is considered a good fit (Hu & Bentler, 1999).

First, a measurement model of the violence outcome (i.e., weapon carrying, fighting, and bullying) was examined using a confirmatory factor analysis in Mplus. Results indicated a good fit (RMSEA = .02, CFI = .99, TLI = .97, SRMR = .01) with correlations between the variables ranging from .298 to .436 (all ps < .001) and factor loadings ranging from .48 to .69. Next, ICCs were examined to support the need for a multilevel model. Before analyzing data in a multilevel framework the covariates used were examined in SPSS to ensure that collinearity was not a concern (Tabachnick & Fidell, 2001). See Table 1 for correlations between the individual-level and school-level variables. Additionally, once in Mplus, the variables were added one at a time to ensure that changes in the direction of variable effects did not occur, which is another method for detecting collinearity (Raudenbush & Bryk, 2002). Through this, we identified collinearity among the mediating variables (i.e., student perceptions of delinquency, rules and consequences, and physical comfort). We therefore fit a series of models, where each mediator was examined sepa-

**Table 1**

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
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<th>8</th>
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<tr>
<td>School-level variables</td>
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<td>1. Disorder</td>
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<td>2. Illumination</td>
<td>-.12</td>
<td></td>
<td>.02</td>
<td>(.91)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>3. Adult monitoring</td>
<td>.05</td>
<td></td>
<td>-.17</td>
<td></td>
<td>1.03</td>
<td>(.63)</td>
<td></td>
<td></td>
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<tr>
<td>4. Proactive behavioral expectations</td>
<td>.02</td>
<td></td>
<td>-.13</td>
<td></td>
<td>.47</td>
<td></td>
<td>.63</td>
<td>(.48)</td>
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<td>5. Negative student behaviors</td>
<td>.14</td>
<td></td>
<td>-.11</td>
<td></td>
<td>.32</td>
<td></td>
<td>.52</td>
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<tr>
<td>Individual-level variables</td>
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<td>6. Delinquency</td>
<td>.10</td>
<td></td>
<td>.06</td>
<td></td>
<td>.04</td>
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<td>.04</td>
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<td>7. Rules and consequences</td>
<td>-.04</td>
<td></td>
<td>.05</td>
<td></td>
<td>-.03</td>
<td></td>
<td>-.04</td>
<td></td>
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<td>8. Physical comfort</td>
<td>-.16</td>
<td></td>
<td>.161</td>
<td></td>
<td>-.12</td>
<td></td>
<td>-.11</td>
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</table>

**Note.** All correlations were significant p < .01. Numbers on the diagonal are means with standard deviations in parentheses.
rately. All predictors in the model were grand mean centered (Enders & Tofghi, 2007; Tofghi & Thoemmes, 2014). To control for the false discovery rate, we used the Benjamini-Hochberg method (Benjamini & Hochberg, 1995), which adjusted the \( p \) values for the multiple mediation pathways (Thissen, Steinberg, & Kuang, 2002).

Results

Model 1: Delinquency Mediator

Results indicated this model fit the data well (RMSEA = .02, CFI = .97, TLI = .96, SRMR = .02). In the between school part of the model, delinquency positively predicted violence (Estimate = .08, \( p < .01 \)). This was also the case in the within school part of the model (Estimate = .13, \( p < .001 \)). There were no significant associations between the school level indicators and the mediator or the outcome (see Table 2), and therefore, no significant mediation was found.

Model 2: Rules and Consequences Mediator

Results indicated this model fit the data well (RMSEA = .02, CFI = .98, TLI = .97, SRMR = .01). In the between school part of the model, observed disorder negatively predicted perceptions of physical comfort (Estimate = −.06, \( p < .05 \)) and observed illumination positively predicted physical comfort (Estimate = .11, \( p < .01 \)). Although physical comfort was not significantly associated with violence at the between-level, it negatively predicted violence at the within school level (Estimate = −.11, \( p = .03 \)). Although the indirect effect of observed disorder on violence was not significant, the indirect effect of illumination on (within school level) violence was significant (Estimate = −.01, adjusted \( p = .01 \), CI = −.019, −.005). The direct effect of illumination on violence was not significant (see Table 2), thereby suggesting that the effect of illumination reflected an indirect effect (Zhao et al., 2010) through perceived physical comfort at the within school level.

Discussion

This paper extends prior work on social disorganization and broken windows theories by exploring the association between social disorganization in schools and students’ involvement in violence; a unique feature of this study was the use of observations of the school physical and social environment and our exploration of a mediational model whereby the environment was associated with students’ perceptions of school climate. We found support for an indirect effect of the observed environment on student involvement in violence. Specifically, we found evidence that illumination was related to violence both through student perceptions of rules and consequences as well as physical comfort. Additionally, observed student negative behavior was related to violence through student perceptions of rules and consequences. These findings are consistent with broken windows theory (Wilson & Kelling, 1982)

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Independent Variable</th>
<th>Estimate ((SE))</th>
<th>( p )</th>
<th>( CI )</th>
<th>Estimate ((SE))</th>
<th>( p )</th>
<th>( CI )</th>
<th>Estimate ((SE))</th>
<th>( p )</th>
<th>( CI )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mediator</td>
<td>Adult monitoring</td>
<td>−.01 (.04)</td>
<td>.76</td>
<td>−.07, .05</td>
<td>.03 (.03)</td>
<td>.34</td>
<td>−.02, .08</td>
<td>−.02 (.08)</td>
<td>.79</td>
<td>−.15, .14</td>
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<td></td>
<td>Proactive behavioral management</td>
<td>−.00 (.05)</td>
<td>.95</td>
<td>.09, .08</td>
<td>−.03 (.04)</td>
<td>.53</td>
<td>−.09, .04</td>
<td>.00 (.12)</td>
<td>.99</td>
<td>−.20, .24</td>
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<tr>
<td></td>
<td>Negative student behaviors</td>
<td>.30 (.17)</td>
<td>.07</td>
<td>.03, .58</td>
<td>−.26 (.12)</td>
<td>.03</td>
<td>.46, .06</td>
<td>−.53 (.32)</td>
<td>.10</td>
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</tr>
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<td></td>
<td>Disorder</td>
<td>.03 (.02)</td>
<td>.06</td>
<td>.00, .06</td>
<td>−.01 (.01)</td>
<td>.50</td>
<td>−.03, .01</td>
<td>−.06 (.27)</td>
<td>.02</td>
<td>−.11, .01</td>
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<td></td>
<td>Illumination</td>
<td>−.03 (.02)</td>
<td>.10</td>
<td>.06, .00</td>
<td>.03 (.01)</td>
<td>.05</td>
<td>.01, .05</td>
<td>.11 (.37)</td>
<td>.00</td>
<td>.05, .18</td>
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<tr>
<td>Violence</td>
<td>Adult monitoring</td>
<td>.00 (.01)</td>
<td>.97</td>
<td>−.02, .02</td>
<td>.00 (.01)</td>
<td>.78</td>
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<td>.88</td>
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<td></td>
<td>Proactive behavioral management</td>
<td>.02 (.01)</td>
<td>.19</td>
<td>.00, .04</td>
<td>.01 (.01)</td>
<td>.29</td>
<td>−.01, .03</td>
<td>.02 (.02)</td>
<td>.22</td>
<td>−.01, .04</td>
</tr>
<tr>
<td></td>
<td>Negative student behaviors</td>
<td>.01 (.03)</td>
<td>.72</td>
<td>−.04, .07</td>
<td>.00 (.03)</td>
<td>.95</td>
<td>−.05, .05</td>
<td>.03 (.03)</td>
<td>.35</td>
<td>−.02, .09</td>
</tr>
<tr>
<td></td>
<td>Disorder</td>
<td>−.00 (.00)</td>
<td>.83</td>
<td>−.01, .01</td>
<td>.00 (.00)</td>
<td>.92</td>
<td>−.01, .01</td>
<td>.00 (.00)</td>
<td>.79</td>
<td>−.01, .01</td>
</tr>
<tr>
<td></td>
<td>Illumination</td>
<td>.00 (.00)</td>
<td>.46</td>
<td>.00, .01</td>
<td>.00 (.00)</td>
<td>.24</td>
<td>.00, .01</td>
<td>.00 (.00)</td>
<td>.61</td>
<td>−.01, .01</td>
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<td></td>
<td>(mediator_between school)</td>
<td>.08 (.03)</td>
<td>.04</td>
<td>.03, .13</td>
<td>−.13 (.04)</td>
<td>.02</td>
<td>.19, .07</td>
<td>−.01 (.01)</td>
<td>.05</td>
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<tr>
<td></td>
<td>(mediator_within school)</td>
<td>.13 (.02)</td>
<td>.03</td>
<td>.10, .15</td>
<td>−.21 (.01)</td>
<td>.01</td>
<td>−.23, .19</td>
<td>−.11 (.02)</td>
<td>.03</td>
<td>−.13, .08</td>
</tr>
</tbody>
</table>

Note. CI = confidence interval. The top of the table presents the relationships between school-level observations and the respective mediator for each of the three models. The bottom of the table presents the relationships between the school-level observations and violence for each of the three models. Mediator_between school and mediator_within school are the relationship between each of the respective mediator variables and violence at the between and within level respectively.
and the tenets of collective efficacy (comprised of social cohesion and social control; Sampson et al., 1997), which suggest that environmental disorder cues behaviors that decrease social organization thus increasing involvement in deviant behavior. Although a large body of research supports social disorganization as defined as rates of specific student characteristics (e.g., percent free and reduced priced meal status, percent minority) to be related to both student perceptions of climate as well as involvement in violence (Bevans et al., 2007; Bradshaw et al., 2009; Payne et al., 2003), this is one of a handful of studies to consider observations of the school environment (Wilcox et al., 2006). Furthermore, this is one of the first studies to attempt to understand the pathway through which disorder may influence student outcomes (Plank et al., 2009).

Consistent with Crime Prevention through Environmental Design (CPTED; Crowe, 1991), a significant indirect effect of illumination on youth involvement in violence was identified both through perceptions of rules and consequences and perceptions of physical comfort. CPTED focuses on creating “defensible spaces” (Newman, 1972), by taking into consideration aspects of the space that indicate community control. Newman theorized that changes in the physical aspects of a space could impact indicators of community control—such as territoriality, natural surveillance, a sense of security, and the social milieu—and in turn reduce criminality (Newman, 1972). Therefore, as may be suggested by this study’s findings, school illumination could relate to increased violence both by increasing feelings that acts of violence will be noticed (i.e., through an improved ability for surveillance) and by improving perceptions of safety. Interestingly one study of structural modifications to schools based on the principles of CPTED produced mixed findings, including some reduction in crime victimization, but no improvements in student perceptions of safety (Wallis & Ford, 1981). More work is needed to tease out the potential influence of CPTED-focused modifications from other aspects of the school environment, such as size and poverty level, which have been linked with student perceptions of safety (Lleras, 2008). Illumination may also be associated with perceptions and behavior through its biological influence; for example, several studies have found an association between daylight exposure and self-reported victimization whereas our study explored perpetration. It could be that the physical environment is more strongly associated with decisions to engage in violence rather than the social environment. Another possible explanation for the absence of associations is that behavior management in high schools requires a more nuanced approach that the global assessments of monitoring and proactive expectations fail to capture. Adolescents’ perceptions of safety may be more contingent on the types of relationships they have with adults than observed monitoring or statements of expectations (Darling, Hamilton, & Hames Shaver, 2003). Gregory and Ripski (2008) similarly found that teachers who reported using a relational approach to behavior management were more likely to have less defiant behavior from students in their classrooms than teachers who did not report using such an approach. This association was mediated by student report of trust in teacher authority. Given that the students surveyed in the current sample were slightly older (M age of 15.92 years, SD = 1.37) than the students in the 2007 School Crime Supplement of the National Crime Victimization Survey (mean age of 14.8 years, SD = 1.8; Blossnick & Bossarte, 2011), the quality of adult-student relationships may be more strongly associated with perceptions of safety than general monitoring or statement of expectations. Moreover, the quality of adult-student relationships may also perform a critical role in moderating associations between reported violence and perceived rules and consequences or perceived delinquency. A related study by Eliot, Cornell, Gregory, and Fan (2010) found that ninth graders...
who perceived teachers and school staff to be supportive were more willing to seek help for threats of violence and bullying. Future research on adult behaviors associated with high school students’ perceptions of safety should emphasize the quality of adults’ connections and relationships with students as well as victimization experiences.

Limitations

Unfortunately, because of the complex design of this study, additional school-level and student-level covariates could not be modeled. For example, traditional multilevel models control for factors such as enrollment, urbanicity, racial/ethnic characteristics, and free and reduced meal status. However, the intent of these variables is to partially capture the level of social disorganization at the school. Instead our study used observations of actual physical and social disorder to capture this variability. We recognize that we did not capture all items that may influence student perceptions of climate (e.g., clean bathrooms, quality sporting equipment). Additionally, although temporal ordering existed for the first path of the mediation model (i.e., the association between observations and perceptions of climate), this criterion for mediation was not met for the second path (i.e., the association between perceptions of climate and violence). Some of the school-level variables had alphas that were in the acceptable range (i.e., .60–.70), which may have attenuated some of the findings; the somewhat lower alphas may be a statistical artifact of the relatively limited number of schools or the small number of items in some of the scales, thus suggesting that these observations should be modeled as an index. Although the study was large and included a diverse set of geographic area across the state, it was conducted in one state and districts were selected for participation by the Maryland Department of Education. Additionally, although the data suggested variation in school climate, because participation in this project was voluntary schools may have enrolled in the project because they were interested in improving their school climate. As a result, the extent to which these findings generalize to other schools in other states is unknown. Additionally, because of the size of our sample, some small relationships may be statistically significant but have limited practical relevance.

Research Implications

This study was novel in its use of school observations as well as in its attempt to understand the pathway through which the school social and physical environment influences violence. Previous research has relied primarily on self-report or demographic data to understand the association between the school environment and behavior. Although a rich body of literature exists connecting observed teacher behaviors in the classroom to student behaviors and outcomes (Allen et al., 2013; Mikami et al., 2011; Pianta et al., 2008; Pianta et al., 2012), less is known about how the physical environment of the school or teacher behaviors outside the classroom impact student behaviors. Future work should focus on identifying and measuring malleable aspects of the school social and physical environment. These recommendations are particularly important given the fact that observational work is both time-consuming and costly; focus in theory and measurement may be one way to reduce the burden. Additionally, it will be critical to elucidate more concretely the pathway through which each factor influences more violence involvement. This study suggests that while the physical environment contributes to students’ perceptions of school climate, it is these perceptions that are associated with their violence involvement behaviors. Other important lines of research focus on identifying for whom the school social and physical environment matters most; for example for students who come from disorganized neighborhood environments or for teachers who are experiencing burnout.

Prevention and Policy Implications

The findings of the current study emphasize the need for violence prevention interventions to address not only the physical and social environments within high schools, but to also address students’ perceptions of order and disorder. The sufficiency of illumination in nonclassroom areas was associated with violence involvement indirectly through perceptions of physical disorder as well as marginally through perceptions of rules and consequences. We believe this suggests that the addition or repair of light fixtures will only reduce violence if such an intervention also addresses students’ perceptions of order and disorder within the space. Likewise, negative student behaviors were associated with violence involvement through student perceptions of rules and consequences. This suggests that interventions to reduce negative student behavior will only be effective if students perceive consistent enforcement of rules and consequences. As such, interventions to reduce and prevent violence will be maximally effective if they create a space where acts of violence will be noticed and foster perceptions of order. This study used a latent variable of violence perpetration, highlighting the potential for structural interventions to influence more than one aspect of violence involvement by influencing perceptions. Although promising, more work is needed to explore and confirm these findings. Additional work using observations may highlight ways in which these factors are related to other outcomes supportive of student academic success and wellbeing. In general, this work supports a comprehensive approach to violence prevention, whereby the focus is on creating environments that are orderly and in which students are aware of expectations for behavior (Sugai & Horner, 2006).

References


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