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# When Prevention is Not Enough: Students' Perception of Bullying and School-Wide Positive Behavior Interventions and Supports

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**Abstract**

Bullying continues to be a major concern in U.S. schools and is the focus of myriad prevention and intervention efforts. Researchers have recently cited school-wide positive behavior interventions and supports (SWPBIS) as a prevention framework for reducing school-based bullying. Therefore, we examined the effect of universal SWPBIS implemented with fidelity on students' self-report of bullying victimization. We used school-level propensity score matching to compare 76,248 students' self-report of bullying victimization in 118 schools that implemented SWPBIS with fidelity and 118 matched comparison schools. Random-effects regression models found no statistically significant difference between treatment groups on students' self-report of bullying victimization. Recommendations and limitations are discussed.

**Keywords**

bullying, positive behavioral supports, challenging behavior(s), quasi-experimental design

Bullying continues to be a major concern in U.S. schools and is the focus of myriad prevention and intervention efforts (Espelage, Rose, & Polanin, 2015, 2016; Ttofi & Farrington, 2011). Recent national data suggest that more than one in five (20.8%) school-aged youth reported being bullied by peers in school within a 12-month period (Musu-Gillette et al., 2018), and that bullying can have significant negative short- and long-term effects on victims (Swearer, Espelage, Vaillancourt, & Hymel, 2010). In response, all U.S. states have passed anti-bullying legislation (Yell, Katsiyannis, Rose, & Houchins, 2016). It is clear that schools have a legal and ethical obligation to address bully victimization in their schools, but it remains unclear as to what practices, programs, or approaches should be implemented. Researchers have recently cited school-wide positive behavior interventions and supports (SWPBIS) as a prevention framework for reducing school-based bullying (Bradshaw, 2013, 2015). Therefore, we examined Bradshaw's recommendation by evaluating the relation between SWPBIS implemented with fidelity and students' self-report of bullying victimization.

## *Bullying Defined*

Bullying is a subcategory of interpersonal aggression, including physical (e.g., hitting, kicking, pushing), verbal (e.g., calling names, threats), social (e.g., rumor spreading, group exclusion), and electronic (i.e., cyberbullying) behaviors, which is defined as "any unwanted aggressive behavior(s) by another youth or group of youths who are not siblings or current dating partners that involves an observed or perceived power imbalance and is repeated or likely to be repeated" (Gladden, Vivolo-Kantor, Hamburger, & Lumpkin, 2014, p. 7). Whereas the central tenents of bullying are *intentionality, repetition*, and *imbalance of power* (Hymel & Swearer, 2015; Olweus, 1993), the key distinction between bullying and other forms of peer aggression is the abuse of power (Vaillancourt, Hymel, & McDougall, 2003).

Bullying is also grounded in social interactions, where involvement is based on the relationship and associations between an individual and complex social systems (i.e., family, peers, school, community, society) in which the individual is situated (Hong & Espelage, 2012). Navigation within and between these social systems is multifaceted, which may

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place some subgroups of students at escalated risk for involvement (Musu-Gillette et al., 2018; Rose, Nickerson, & Stormont, 2015). For example, youth with disabilities are victimized at disproportional rates when compared with youth without disabilities (Blake, Lund, Zhou, Kwok, & Benz, 2012; Rose & Gage, 2017; Rose et al., 2015). Although the intersection of several predictive factors (e.g., disability status, special education services, severity of disability) are associated with the disproportionate representation of youth with disabilities within the bullying dynamic (Rose et al., 2015), the most notable predictors include externalizing behaviors and social and communication skill deficits (McLaughlin, Byers, & Vaughn, 2010; Rose, Monda-Amaya, & Espelage, 2011). For example, Rose and Espelage (2012) found that students with behavior disorders engaged in significantly higher levels of bullying and fighting behaviors than their peers with and without disabilities. Similarly, Swearer, Wang, Maag, Siebecker, and Frerichs (2012) determined that students with behavior oriented disabilities, including behavior disorders, received more office disciplinary referrals, had lower prosocial behaviors, engaged in higher levels of bully perpetration, and experienced higher rates of victimization than their peers without disabilities.

In addition to disability status, prosocial skills, and externalizing behaviors, individual factors such as race, ethnicity, and gender have been evaluated as predictors of bullying involvement. However, extant literature on gender, race, and ethnicity has been conflicting, warranting further investigation (National Academies of Sciences, Engineering, & Medicine [NASEM], 2016). For example, some studies have determined that African American youth are victimized less frequently than their White and Latino/a peers (Nansel et al., 2001; Spriggs, Iannotti, Nansel, & Haynie, 2007), whereas others reported that Latino/a youth are victimized less than their White and African American peers (Hanish & Guerra, 2000; Musu-Gillette et al., 2018). Similarly, a conflicting gender discrepancy seems to exist, where females are more likely to report being bullied than males (NASEM, 2016), but males are more likely to engage in direct forms of bullying behaviors (Card, Stucky, Sawalani, & Little, 2008; Cook, Williams, Guerra, & Kim, 2010). To compound the issue, some have argued that females are more likely to experience and engage in indirect aggression (Sullivan & Stoner, 2012), whereas Card and colleagues (2008) argued that the difference between males and females on indirect bullying was nonsignificant. Given the conflicting data, it has become increasingly important to examine the role of race and ethnicity in bullying involvement.

## *School-Wide Positive Behavior Interventions and Supports*

SWPBIS is a systematic, multitiered framework for identifying students in need of behavior support and delivering universal, secondary, and tertiary social-behavioral interventions to increase the likelihood of prosocial behavior acquisition for all students (Sugai & Horner, 2009). SWPBIS is not a curriculum, strategy, intervention, or program but, instead, a process of building a school's capacity to (a) implement effective and preventive behavioral practices with integrity, (b) make data-based and team-based decisions, and (c) build a positive school climate and culture leading to school improvement and success (Gage, Whitford, & Katsiyannis, 2018; Horner et al., 2010). Universal prevention supports are designed to create a safe, predictable environment for all students by establishing a common set of school-wide expectations, teaching those expectations, and reinforcing students for demonstrating those expectations (Lewis, Mitchell, Trussell, & Newcomer, 2014).

Universal implementation is conducted school-wide, in nonclassroom settings, and in classrooms. Behavioral expectations are taught and reinforced at the school level, often using a school-wide token economy system and paired with active supervision and precorrections in nonclassroom settings, such as the cafeteria and playground. At the classroom level, universal classroom management is delivered, including high rates of behavior-specific praise, opportunities to respond, behavior prompting, and reinforcing behavioral expectations. Targeted interventions are then implemented for students who do not respond to universal prevention efforts and often include evidence-based mentoring programs, such as Check-In Check-Out (Crone, Hawken, & Horner, 2010), or small group social skills lessons (Mitchell, Stormont, & Gage, 2011). Students who continue to exhibit elevated levels of problem behaviors following targeted intervention are referred for intensive, tertiary supports. Tertiary supports typically involve a functional behavior assessment (FBA) and a subsequent individualized behavior intervention plan (BIP).

Research suggests that SWPBIS has positive effects on a number of important school- and student-level outcomes. For example, a series of studies have documented a direct effect of SWPBIS on disciplinary exclusions, including office discipline referrals (ODR) and in- and out-of-school suspensions (e.g., Childs, Kincaid, George, & Gage, 2016; Gage, Grasley-Boy, George, Childs, & Kincaid, 2018; Gage, Lee, Grasley-Boy, & George, 2018; Simonsen et al., 2012), and student attendance (Freeman et al., 2016). Research has also found positive effects on adult perceptions of school climate (Bradshaw, Koth, Thornton, & Leaf, 2009), school organizational health (Bradshaw, Koth, Bevans, Ialongo, & Leaf, 2008), and school safety (Horner et al., 2009). Recently, a longitudinal state-wide analysis found implementation of universal SWPBIS with fidelity also had a significant and meaningful effect on the percentage of students at or above state benchmarks in reading and mathematics (Gage, Leite, Childs, & Kincaid, 2017).

### SWPBIS and Bullying Victimization

In addition to direct effects on students' disciplinary and academic outcomes, there is evidence to suggest that SWPBIS may also have an effect on bullying. A series of studies have evaluated the impact of bully prevention in positive behavior support (BP-PBS; Ross & Horner, 2009, 2014). BP-PBS is designed to (a) define and teach the concept of "being respectful" to all students in a school, (b) teach all students a three-step response (stop, walk, talk) that minimizes potential social reinforcement when they encounter disrespectful behavior, (c) precorrect the three-step response prior to entering activities likely to include problematic behavior, (d) teach an appropriate reply when the three-step response is used, and (e) train staff on a universal strategy for responding when students report incidents of problem behavior (Ross & Horner, 2009). The BP-PBS intervention has also been adapted and expanded into the *Bullying and Harassment Prevention in Positive Behavior Support: Expect Respect* intervention and evaluated using single-case design methods (Nese, Horner, Dickey, Stiller, & Tomlanovich, 2014). However, BP-PBS and *Expect Respect* are additional interventions above and beyond implementation of SWPBIS. Therefore, although they are designed to be implemented alongside SWPBIS, they operate as separate interventions like the myriad of other school-based bullying interventions (e.g., *Olweus Bullying Prevention Program*; Olweus et al., 2007).

A question remains as to whether SWPBIS implemented with fidelity may alone reduce the likelihood of bullying in schools without the addition of a stand-alone or specifically integrated bullying program. Only a few studies have examined the effect of universal SWPBIS on bullying in schools, two of which used randomized group experimental designs. Waasdorp, Bradshaw, and Leaf (2012) examined data from a randomized controlled trial evaluating the effectiveness of universal SWPBIS implementation. Thirty-seven elementary schools were randomly assigned, with 21 in the treatment group and 16 in the control group. The authors used the Teacher Observation of Classroom Adaptation–Checklist (TOCA-C; Koth, Bradshaw, & Leaf, 2009) to evaluate students' risk of bullying perpetration. Specifically, teachers rated students about their likelihood to (a) tease classmates, (b) yell at others, (c) harm others, and (d) get into fights and then the items were averaged to create a composite score. Results from a longitudinal mixed-effects model found a significant effect for SWPBIS on the slope value, indicating that teachers in schools implementing SWPBIS rated their students as exhibiting fewer bullying behaviors across time than in control schools. The authors note that the "findings suggest that a universal SWPBIS model is a promising approach for preventing bullying" (p. 155). However, it is worth noting that the measure used was teacher report of bullying perpetration, not students' self-report of bullying victimization, which could capture whether peer-to-peer bullying is impacted by SWPBIS.

Ward and Gersten (2013) examined the effect of the Safe and Civils Schools model, a proprietary version of SWPBIS, on staff and student report of bullying victimization in 32 elementary schools, with 17 schools in the treatment group and 15 in the control group. The authors then examined the impact after 1 year of implementation. Difference-in-difference models found no significant effect on either staff or student reports of bullying after 1 year of implementation. It is worth noting that implementation of Safe and Civil Schools was evaluated using the Benchmarks of Quality (BoQ), a fidelity measure of SWPBIS and that the implementation for the treatment schools was, on average, below the 70% threshold for implementing SWPBIS with fidelity (Cohen, Kincaid, & Childs, 2007).

### Purpose

There is limited research evaluating the effect of SWPBIS on bullying victimization. Prior research has found that adult perceptions of bullying perpetration reduced across time in schools implementing SWPBIS (Waasdorp et al., 2012). However, the only study that included student responses (a) did not implement SWPBIS, but instead the proprietary Safe and Civil Schools; (b) did not implement with fidelity in all schools; and (c) found no impact. Therefore, research has not established clearly whether universal SWPBIS implemented with fidelity has a distal effect on bullying involvement. We believe that the effect is distal because SWPBIS alone is not designed specifically to address bullying, but to decrease problem behavior and increase prosocial behavior generally. The guiding research question for this study was:

> Does implementation of SWPBIS with fidelity have an effect on students' self-report of bullying victimization?

## Method

### Sample

During the 2015–2016 school year, 376,958 elementary students completed a school climate survey in Georgia. The de-identified data set included student responses on the measure, the school and district each student attended, and their grade. Students attended 1,285 schools distributed across 186 school districts. The sample included 128,419 third graders (34%), 124,865 fourth graders (33%), and 123,674 fifth graders (33%). We then collected demographic data for all public schools in Georgia for the 2015–2016 school year and discipline data for all public schools for the 2013–2014 school year (the earliest year indicated

on their website that Georgia began statewide SWPBIS implementation). We restricted the data to only public elementary and intermediate schools, excluding alternative schools, vocational/technical schools, middle schools, and high schools because the school climate survey was completed by elementary students only and SWPBIS was implemented with fidelity in public elementary and intermediate schools.

Implementation of SWPBIS in Georgia is supported by the state department of education (DOE). The DOE facilitates district-level planning and provides school team training, technical assistance, and ongoing coaching to SWPBIS districts. The DOE website reports the names of schools receiving SWPBIS training and support, and three levels of fidelity of implementation: Installing, defined primarily as fidelity below 70% on the BoQ; Emerging, defined as fidelity between 70% and 85% on the BoQ; and Operational, defined as BoQ above 85%. We focused exclusively on schools implementing SWPBIS with fidelity (BoQ > 70%; Emerging and Operational) to ensure that the treatment schools implemented the intervention as designed, and excluded schools that were Installing (i.e., not implementing Tier 1 SWPBIS with fidelity but had received training). A total of 119 schools implemented SWPBIS with fidelity during the 2015–2016 school year. We removed the 218 schools that received SWPBIS training but did not implement with fidelity to ensure that comparisons were only made between schools implementing SWPBIS with fidelity and schools never trained. We excluded from the potential sample of comparison schools any schools that had any missing demographic or behavior data ($n = 44$), leaving a final sample of 905 possible comparison schools and 118 treatment schools (i.e., implemented SWPBIS with fidelity).

The average school enrollment for the remaining 1,023 schools was 611.0 students ($SD = 235.0$), with slightly more White students (41.7%) than Black students (36.5%) students enrolled, followed by Hispanic students (14.5%). Sixty-seven percent of the students were considered economically disadvantaged, 11.1% of students received special education services, and 11.2% were classified as limited English proficient (LEP). Fifty-six percent of schools were located in an urban setting. Across schools, approximately 36% of students performed at or above state benchmarks in reading and 39% in math. On average, schools reported a rate of 0.05 in-school suspensions (ISS) per student, 0.06 out-of-school suspensions (OSS) per student, and 0.19 ODR per student. Demographic characteristics by treatment group are presented in Table 1. Overall, there are few differences between the treatment schools and all possible comparison schools on most of the available school-level demographic characteristics, including urbanicity, with 55% of schools in urban settings.

## Measures

*SWPBIS fidelity of implementation.* The benchmarks of quality (BoQ; Childs, Kincaid, & George, 2011; Cohen et al., 2007; Kincaid, Childs, & George, 2005, 2010) is a self-report measure used to assess the implementation fidelity of SWPBIS at the Tier 1/universal level. The BoQ consists of 53 items rated on a 3-point Likert-type scale (i.e., In Place, Needs Improvement, and Not in Place). Prior psychometric evidence suggests that the BoQ demonstrates strong internal consistency (overall $\alpha = .96$), interrater reliability ($r = .87$), and test–retest reliability ($r = .94$). The 53 items are organized under 10 subscales reflecting the essential components of Tier 1 implementation (e.g., faculty commitment, expectations and rule developed, classroom systems). Scores for the BoQ are scaled as the percentage of points earned out of the total possible points (107), with scores 70% or above considered implementing with fidelity (Cohen et al., 2007). The BoQ scores are collected each year in April and May for all schools implementing SWPBIS as part of the state-wide implementation project. The BoQ is collected by the school implementation teams in collaboration with the state DOE.

### School-level characteristics

*Student demographics*. We included 11 student demographic characteristics. First, we captured the total student enrollment for each school, and the percentage of students categorized as White, Black, Hispanic, Asian, Native American, and multiracial. We also included the percentage of students in each school considered economically disadvantaged, defined as the percentage of students receiving free or reduced lunch. Last, we included the percentage of students receiving special education services (students with disabilities [SWD]), the percentage of students receiving LEP services by their school, and the percentage of students considered migrants by their school.

*State Academic Assessment System*. The Georgia Student Assessment System is designed to measure how well students have learned the knowledge and skills outlined in the state-adopted content standards in English language arts and mathematics in Grades 3 through 5. Students receive a scale score and an Achievement Level designation based on their total test performance in each content area. Achievement levels are as follows: Beginning Learner, Developing Learner, Proficient Learner, and Distinguished Learner. We included the percentage of students at the Proficient Learner and above levels for each school across the four subject tests because this level indicates grade-level performance.

*Student discipline*. The state collects and reports on a number of student discipline outcomes. ODR are the results of 36 different behavioral incidents operationally defined

**Table 1.** Demographic Characteristics of All Treatment Groups.

| | All possible comparison schools ($n$ = 905) | | PSM comparison schools ($n$ = 118) | | Treatment schools ($n$ = 118) | | |
|---|---|---|---|---|---|---|---|
| Demographic | *M* | *SD* | *M* | *SD* | *M* | *SD* | Equivalence |
| Total enrollment | 605.98 | 231.03 | 648.47 | 214.18 | 649.91 | 261.48 | 0.01 |
| % White | 41.44 | 29.50 | 45.33 | 28.42 | 44.04 | 29.70 | −0.04 |
| % Black | 36.99 | 30.85 | 33.26 | 27.80 | 32.74 | 27.21 | −0.02 |
| % Hispanic | 14.31 | 16.54 | 14.40 | 17.40 | 16.20 | 15.90 | 0.11 |
| % Asian | 3.43 | 7.10 | 2.68 | 5.73 | 2.66 | 4.17 | 0.00 |
| % Native American | 0.14 | 0.36 | 0.03 | 0.18 | 0.07 | 0.25 | 0.18 |
| % Multiracial | 3.59 | 1.99 | 4.07 | 2.15 | 4.09 | 2.47 | 0.01 |
| % ED | 67.11 | 29.24 | 69.09 | 26.89 | 69.32 | 23.26 | 0.01 |
| % SWD | 11.13 | 4.88 | 11.23 | 3.39 | 11.25 | 3.05 | 0.01 |
| % LEP | 11.08 | 15.26 | 11.22 | 16.92 | 12.31 | 15.37 | 0.07 |
| % migrants | 0.34 | 1.49 | 0.30 | 1.06 | 0.25 | 1.06 | −0.05 |
| % at or above benchmark: Reading | 36.12 | 18.11 | 35.01 | 16.11 | 35.80 | 13.63 | 0.05 |
| % at or above benchmark: Math | 38.53 | 18.93 | 38.50 | 16.14 | 39.13 | 14.80 | 0.04 |
| ODR | 0.19 | 0.29 | 0.19 | 0.17 | 0.19 | 0.23 | 0.00 |
| ISS | 0.05 | 0.17 | 0.05 | 0.09 | 0.04 | 0.10 | −0.10 |
| OSS | 0.07 | 0.11 | 0.06 | 0.07 | 0.06 | 0.06 | 0.00 |
| Detention | 0.00 | 0.02 | 0.00 | 0.02 | 0.00 | 0.02 | 0.00 |
| Bus suspension | 0.03 | 0.07 | 0.04 | 0.06 | 0.03 | 0.04 | −0.20 |
| Physical restraint | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 |
| Corporal punishment | 0.01 | 0.04 | 0.00 | 0.02 | 0.01 | 0.02 | 0.06 |
| Juvenile or court referral | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Assigned to alternative school | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other disciplinary actions | 0.03 | 0.07 | 0.03 | 0.05 | 0.04 | 0.11 | 0.12 |
| Expulsions | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |

*Note.* Equivalence was calculated for the PSM comparison and treatment schools and is the standardized mean difference and established if less than 0.25 standard deviation units. PSM = propensity score matching; ED = economically disadvantaged; SWD = students with disabilities; LEP = limited English proficient; ODR = office discipline referrals; ISS = in-school suspension; OSS = out-of-school suspension.

by the state in a discipline matrix designed to provide guidance for schools. During the 2015–2016 school year, 33% of ODR were for incivility, defined as insubordination or disrespect to staff members or other students, which includes but is not limited to refusal to follow school staff member instructions, use of vulgar or inappropriate language, and misrepresentation of the truth; and 21% were for disorderly conduct, defined as any act that substantially disrupts the orderly conduct of a school function, substantially disrupts the orderly learning environment, or poses a threat to the health, safety, and/or welfare of students, staff, or others (includes disruptive behaviors on school buses). In addition, we captured the number of ISS, OSS, detentions, bus suspensions for 10 or fewer days, bus suspension for more than 10 days, physical restraints, corporal punishment incidents, juvenile or court referrals, students assigned to an alternative school, other discipline outcomes (e.g., call home, school community service), and expulsions. We converted all discipline outcomes to a rate per student by dividing the count for each discipline outcome by the total number of students in each school. As demonstrated in Table 1, most of the severe behavioral outcomes (e.g., corporal punishment, court referral) were infrequent in elementary schools.

### *Outcome variables*

*Student perceptions of bullying*. The state conducts an annual school climate survey of all students in Grades 3 to 5. Four items on the survey specifically target students' perception of bullying in their school. Students are asked to respond to the following questions: How often in the past couple of months have older, bigger, more popular, or more powerful kids picked on you by (a) hitting or kicking you, (b) spreading rumors about you, (c) threatening you, and (d) picked on you by leaving you out. All four questions include response options on a 4-point Likert-type scale from (0) *never*, (1) *once or twice*, (2) *a few times*, (3) *many times*, to (4) *everyday*. The item responses were converted to numerical values and summed across the four items, for a possible score of 0 representing never experiencing bullying behaviors to 16 representing experiencing all four types of bullying behaviors everyday. We calculated Cronbach's

alpha (α) using the full sample of 376,958 students to evaluate the internal consistency of the Bully score. We found α = .827, a mean of 3.29 ($SD$ = 3.77) and a range of 0 to 16 for the full sample of students.

## Data Analysis

To address the research question, we conducted a quasi-experimental design comparing schools implementing SWPBIS with fidelity (i.e., treatment) to propensity score-matched comparison schools not implementing SWPBIS. This approach allows for estimation of unbiased treatment effects by establishing equivalence on theoretically relevant characteristics (Forston, Verbitsky-Savitz, Kopa, & Gleason, 2012). Propensity score matching (PSM) was conducted at the school-level, then student responses were merged with the PSM data set.

*Propensity score matching.* PSM methods are designed to reduce bias in treatment effect estimates in experimental design studies that do not have random assignment of participants to conditions (Leite, 2017). A propensity score is defined as the conditional probability of treatment assignment based on all available covariates (Rosenbaum & Rubin, 1983) and can be used for one-to-one matching treatment to comparison schools. PSM allows for the identification of a covariate equivalent comparison group matched to a treatment group; meets established standards for high-quality quasi-experimental design research, such as those proposed by the What Works Clearinghouse (WWC; 2014) evidence standards; and yields treatment estimates that have been found to be as accurate as those from randomized controlled trial studies (Forston et al., 2012).

Following procedures outlined by Leite (2017), we estimated propensity scores using logistic regression and 25 school-level covariates. In addition to the 24 characteristics described in Table 1, we included a categorical variable that described the grades each school served (e.g., PK, K, first, second, third) to ensure matched schools had the same grade structure. For the logistic regression, we created a dichotomous variable for all schools, where schools that implemented SWPBIS with fidelity were coded as 1, with all other schools coded as 0. Then we estimated the predicted probability ($p$), or propensity score, that a school was in the treatment or control group based on the included covariates ($\log[p / (1 - p)]$). Next, we used the estimated propensity scores to match schools using the one-to-one optimal matching method (Rosenbaum, 1989), which minimizes global propensity score distance between treatment and comparison schools. The one-to-one matching procedure identifies a perfect match school for each treatment school so that the treatment and comparison schools are equivalent on all 25 covariates. The one-to-one optimal matching algorithm was conducted using the *matchit* (Ho, Imai, King, Stuart, & Whitworth, 2017) and *optmatch* (Hansen, Fredrickson, Fredrickson, Rcpp, & Rcpp, 2016) packages in R (R Core Team, 2013). To confirm covariate equivalence, we calculated standardized mean difference effect sizes ($g$), where equivalence is defined as $g < 0.25$ standard deviations (WWC, 2014).

*Mixed-effects modeling.* We estimated a mixed-effects model (Bates, Machler, Bolker, & Walker, 2015), also referred to as multilevel models or hierarchical linear models (Raudenbush & Bryk, 2002), to evaluate the effect of SWPBIS implemented with fidelity on students' perceptions of bullying. We treated both school and district as random effects to account for the nesting of students in schools and districts (i.e., three-level model). First, we estimated an unconditional (null) model for the intraclass correlation coefficient (ICC) to identify how much of the variance in students' perceptions of bullying is attributed to schools and districts. Next, we estimated the effect of SWPBIS implemented with fidelity on the Bullying scale. The final model included covariates of substantive interest, including student's grade level, the percentage of White students, the percentage of economically disadvantaged students, the percentage of SWD, and OSS. In addition, we included interaction terms for each of the four covariates and the treatment indicator. The full mixed-effects model was as follows:

$$y_{ijt} = \gamma_0 + \gamma_1 Z_{ijt} + \sum_{c=1}^{19} \gamma_c X_{cijt} + u_{0j} + u_{0t} + u_{1t} Z_{it} + \varepsilon_{ijt},$$

$$\varepsilon_{ij} \sim N\left(0, \sigma^2\right),$$

$$u_{0j} \sim N\left(0, \tau\right), u_{0t},$$

$$u_{1t} \sim N\left(0, \Phi\right),$$

where $y_{ijt}$ is perceptions of bullying for student $i$, in school $j$, in district $t$; $\gamma_0$ is the intercept, $Z_{ijt}$ is a dummy indicator of whether the student attended a school that implemented SWPBIS with fidelity; and $\gamma_1$ is the treatment effect. The model included 19 school-level covariates that are represented in the model above by $X_{cijt}$ that are related to the outcome through the $\gamma_c$ coefficients (see covariate names in Table 3). The model has four random effects: $u_{0j}$ is the random intercept of school $j$ with variance $\tau$, $u_{0t}$ is the random intercept and $u_{1t}$ is the random slope of the treatment effect in district $t$, and $\varepsilon_{ij}$ is an individual-level residual with variance $\sigma^2$. The covariance matrix between $u_{0t}$ and $u_{1t}$ is $\Phi$. All mixed-effects models were estimated in lme4 (Bates et al., 2015) in R 3.1.1. (R Core Team, 2013).

**Table 2.** Means and Standard Deviations for all the Bullying Scale and Individual Bullying Items.

| | Treatment schools ($n$ = 39,187) | | PSM comparison schools ($n$ = 37,061) | |
|---|---|---|---|---|
| Bullying item | *M* | *SD* | *M* | *SD* |
| Bullying Full Scale | 3.27[a] | 3.76 | 3.34[a] | 3.78 |
| How often in the past couple of months have older, bigger, more popular, or more powerful kids picked on you by: | | | | |
| a. Hitting or kicking you | 0.68 | 1.09 | 0.71 | 1.11 |
| b. Spreading rumors about you | 0.87 | 1.18 | 0.86 | 1.17 |
| c. Threatening you | 0.66 | 1.08 | 0.67 | 1.10 |
| d. Picked on you by leaving you out | 1.06 | 1.26 | 1.07 | 1.26 |

*Note.* The range of scores for the Bullying Full Scale measure is 0 to 16, and the range for the individual items is 0 to 4. Sample sizes are students attending the 188 treatment schools and 118 PSM comparison schools. PSM = propensity score matching.
[a]The means are covariate adjusted for the eight covariates with equivalence >0.05.

All models were estimated using restricted maximum likelihood (REML).

## Results

### *Establishing Equivalence*

The 118 schools that implemented SWPBIS with fidelity were propensity score matched to 118 comparison schools using 26 school-level covariates. We used WWC standards, which establish baseline equivalence between a treatment and control group if the difference is less than 0.25 standard deviation units on all available and conceptually relevant sample characteristics (WWC, 2014). We included current school demographic characteristics and school-level behavioral outcomes, including the rates of ISS, OSS, and ODR per student, from 3 years prior to the intervention. We matched at the school-level because (a) student-level demographic data were not available and (b) the treatment was school-wide, thus at the school level. Standardize mean difference effect sizes are presented in Table 1 comparing the treatment and PSM comparison schools. All differences between groups are less than 0.25, establishing baseline equivalence. Eight of the covariates' standardized mean difference was greater than 0.05; therefore, all models should include the covariates per WWC standards.

### *Treatment Effects*

The primary research question in this study was to evaluate the effect of SWPBIS implemented with fidelity on students' perceptions of bullying. Table 2 includes the means and standard deviations for the Bullying full scale score and each individual item. Overall, students in both treatment and comparison schools reported that bullying was, on average, infrequent. However, the standard deviations suggest that there is variability in student scores that may be accounted for by modeling predictors of bullying.

We estimated a series of mixed-effects models to identify a treatment effect, controlling for nesting of students in schools and districts, as well as the eight covariates with equivalence statistics greater than 0.05 standard deviation units. All models included 77,315 students in 236 schools in 73 school districts. First, we calculated ICC for schools and districts with a fully unconditional model. We found an ICC of 0.04 for between-group variance at the school level, indicating that 4% of the variance in Bullying is attributable to school-level differences, and an ICC of 0.01 for district-level differences. Results suggest that the majority of variance in the Bullying variable are attributable to individual differences within schools. The ICC results suggest that nesting of students in schools and districts may not impact modeling results. However, we chose to retain the mixed-effect model to account for any potential impact nesting could have on the treatment effect.

As noted, to ensure all models met WWC standards, we included the eight school characteristics with equivalence statistics greater than 0.05 in all models. The first model examined the treatment effect, controlling for the eight covariates (see Table 3). There was not a significant effect for treatment on students' perceptions of bullying. There was a significant negative effect on bullying for the percentage of students reading at or above benchmark, which suggests that students report less bullying in schools with more students reading at or above benchmark. Next, we modeled the treatment effect, the eight equivalence covariates, and five predictors of substantive interest. Specifically, we examined whether there was a relationship between students' perceptions of bullying and the percentage of White students, the percentage of students identified as economically disadvantaged, the percentage of SWD, the rate of OSS per student, and student grade level. We also examined the interaction effects for each of the five substantive characteristics to evaluate whether or not there was an interaction with each of the variables and implementing SWPBIS with fidelity. Model 2 results, also presented in Table 3,

**Table 3.** Three-Level Random Effects Model of SWPBIS Implemented With Fidelity Predicting Student Perceptions of Bullying.

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| Parameters | Estimate | *SE* | Estimate | *SE* |
| Fixed effects: | | | | |
| Intercept | 4.56*** | 0.16 | 5.12*** | 0.52 |
| SWPBIS | −0.03 | 0.10 | 0.72 | 0.52 |
| % White | | | 0.00 | 0.00 |
| % ED | | | 0.00 | 0.00 |
| % SWD | | | 0.01 | 0.02 |
| OSS | | | 0.00 | 0.00 |
| Fourth grade | | | −0.27*** | 0.05 |
| Fifth grade | | | −0.71*** | 0.05 |
| SWPBIS × % White | | | −0.01 | 0.00 |
| SWPBIS × % ED | | | 0.00 | 0.00 |
| SWPBIS × % SWD | | | 0.00 | 0.03 |
| SWPBIS × OSS | | | 0.00 | 0.00 |
| SWPBIS × Fourth Grade | | | −0.07 | 0.06 |
| SWPBIS × Fifth Grade | | | −0.01 | 0.07 |
| % Hispanic | −0.01 | 0.01 | −0.02* | 0.01 |
| % Native American | −0.07 | 0.19 | −0.05 | 0.19 |
| % LEP | 0.00 | 0.01 | 0.00 | 0.01 |
| % Migrant | −0.10* | 0.05 | −0.07 | 0.05 |
| % Reading | −0.03*** | 0.00 | −0.03*** | 0.01 |
| ISS | −0.42 | 0.52 | −0.61 | 0.52 |
| Bus suspension | 0.55 | 0.98 | 0.98 | 0.97 |
| Corporal punishment | −2.42 | 2.26 | −1.77 | 2.28 |
| Other discipline | 1.03 | 0.57 | 0.59 | 0.63 |
| Random effects: | | | | |
| School | 0.34 | | 0.34 | |
| District | 0.05 | | 0.03 | |
| Residual | 13.74 | | 13.66 | |

*Note.* In all, 77,315 students, 236 schools, and 73 school districts. The reference group for grade level is third grade. SWPBIS = school-wide positive behavior interventions and supports; ED = economically disadvantaged; SWD = students with disabilities; OSS = out-of-school suspension; LEP = limited English proficient; ISS = in-school suspension.
*$p < .05$. **$p < .01$. ***$p < .001$.

suggest that there was no treatment effect, and no interaction effects for the treatment condition and each of the five substantive characteristics. The significant relationship between bullying and the percentage of students reading at benchmark remained, while student grade level was also significant and negative. Specifically, as students' grade level increased, their perceptions of bullying decreased. Finally, to improve interpretation, we estimated the Bullying Full Scale marginal means for the treatment and control schools using the eight covariates with equivalence greater than 0.05 and calculated the standardized mean difference (Hedges's *g*) between the groups. Overall, we found covariate adjusted $g = -0.02$.

## Discussion

SWPBIS has been considered a promising approach for preventing bullying in schools (Bradshaw, 2013, 2015). However, very little rigorous, empirical research has specifically examined this relationship. This study was designed to evaluate whether universal SWPBIS has a distal effect on student perceptions of bullying victimization. Using a quasi-experimental design that established baseline equivalence using PSM, we found no significant effect, replicating and extending the results of Ward and Gersten (2013). Although we found a null result, the implications are important and need to be addressed in the research literature, policy domain, and practical application.

Perhaps the most important implication of this research is the confirmation that bully prevention programs should be integrated into SWPBIS implementation. Research demonstrates that SWPBIS implemented with fidelity has positive effects on ODR, suspension, and academic achievement (Gage, Grasley-Boy, et al., 2018; Gage, Lee, et al., 2018; Gage et al., 2017). Research also suggests that bullying victimization may be reduced when bully prevention programs

are integrated within SWPBIS (e.g., Ross & Horner, 2009). Bradshaw (2013) provided a cogent argument for the need to integrate bullying programs into SWPBIS systems, particularly because SWPBIS systems focus teaching prosocial behaviors, using data to make decisions, and reinforcing appropriate behaviors (see Good, McIntosh, & Gietz, 2011, for practical advice for integrating bullying programs with SWPBIS).

For example, school-wide social and emotional learning (SEL) programs, coupled with targeted interventions, with a specific focus on bully prevention, could be seamlessly integrated into the SWPBIS framework (Preast, Bowman, & Rose, 2017). At the universal level, SEL has demonstrated decreases in bullying involvement and delinquent behaviors over time (Espelage, Low, Van Ryzin, & Polanin, 2015), including for youth with behavioral disorders and other disabilities (Espelage, Rose, & Polanin, 2015, 2016). At the secondary level, Preast and colleagues (2017) recommended conducting school-wide behavioral screeners to identify students who are at risk for social and communication skill deficits, which place them at greater risk for bullying involvement (Rose et al., 2011), and providing them with targeted social skills training grounded in critical response approaches (e.g., conversation skills, group task completion, resolving interpersonal conflicts). For nonresponders (e.g., students with behavioral disorders), tertiary approaches are more intensive supports and training that meet the individual needs of the student, which may include an FBA and BIP (NASEM, 2016; Rose & Monda-Amaya, 2012).

### Limitations

There are a number of limitations that necessitate mention. First, the de-identified data set contained only student grade and no other student-level characteristic. This does not invalidate the results as the intervention was delivered at the school level. However, student-level characteristics would have allowed us to evaluate whether SWPBIS implemented with fidelity had differential effects on certain student groups' perceptions of bullying victimization. We used school-level characteristics as a proxy, but future research should attempt to include student-level characteristics to evaluate whether there are differential effects at the student level. Second, we do not have any information about bullying interventions that may or may not have been implemented in either the treatment or control schools. Third, we do not have an indicator for how long each of the treatment schools had been implementing SWPBIS or each school's specific BoQ score. Future research could examine differences in bullying by fidelity, modeling fidelity as a continuous variable. It is worth noting that we did model the different implementation levels, comparing schools with higher implementation (Operational) to those with lower implementation (Emerging). No differences were found. Fourth, the BoQ scores are based on self-report of the implementation team in collaboration with the DOE. Although we believe the fidelity scores are accurate, we cannot independently confirm this assumption. Future research should consider other measures completed by independent observers. Fifth, we do not have a measure of bullying perpetration to directly compare the results with the Waasdorp et al. (2012) study results. Last, data for this study come from a single state; therefore, the results may not generalize. Future research should include a nationally representative sample of students.

### Conclusion

SWPBIS is an evidence-based framework for reducing ODR and school suspensions but may not alone be effective at addressing bullying in schools. Unlike problem behaviors that typically lead to ODR and suspensions, such as noncompliance or disruptive behavior (Gage, Lee, et al., 2018), bullying is much more dynamic and involves intentionality, repetition, and an imbalance of power (Gladden et al., 2014). SWPBIS alone does not address the critical features of bullying and, based on our findings, does not have a distal effect. However, research supports and we believe that integrating evidence-based bully prevention and intervention programs with SWPBIS has the potential to increase positive outcomes for both problem behavior generally and bullying specifically.

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