

# The Impact of Schoolwide Positive Behavioral Interventions and Supports on Bullying and Peer Rejection

## *A Randomized Controlled Effectiveness Trial*

Tracy E. Waasdorp, PhD; Catherine P. Bradshaw, PhD; Philip J. Leaf, PhD

**Objective:** To build on prior research documenting the impact of School-wide Positive Behavioral Interventions and Supports (SWPBIS) on school climate and discipline problems to examine the extent to which it affects bullying and peer rejection during the transition into early adolescence.

**Design:** Three-level models were fit using hierarchical linear modeling to determine the effect of SWPBIS on children's involvement in bullying.

**Setting:** Thirty-seven Maryland public elementary schools.

**Participants:** Data involved 12 344 children (52.9% male, 45.1% African American, 46.1% white) followed up longitudinally across 4 school years.

**Intervention:** A randomized controlled effectiveness trial of SWPBIS.

**Outcome Measures:** Reports from teachers on bully-

related behaviors were assessed through the Teacher Observation of Classroom Adaptation – Checklist.

**Results:** Analyses indicated that children in schools that implemented SWPBIS displayed lower rates of teacher-reported bullying and peer rejection than those in schools without SWPBIS. A significant interaction also emerged between grade level of first exposure to SWPBIS and intervention status, suggesting that the effects of SWPBIS on rejection were strongest among children who were first exposed to SWPBIS at a younger age.

**Conclusions:** The results indicated that SWPBIS has a significant effect on teachers' reports of children's involvement in bullying as victims and perpetrators. The findings were considered in light of other outcomes for students, staff, and the school environment, and they suggest that SWPBIS may help address the increasing national concerns related to school bullying by improving school climate.

*Arch Pediatr Adolesc Med.* 2012;166(2):149-156

**T**HERE HAS BEEN INCREASING national concern regarding bullying,<sup>1</sup> which is broadly defined as intentional and repeated acts that occur through direct verbal, direct physical, and relational forms that typically happen when there is a power difference.<sup>2</sup> The negative effects of bullying include academic, interpersonal, physical health, and mental health problems.<sup>3-8</sup> Despite these growing concerns, there are relatively few school-based programs that have been shown to be effective at preventing bullying behaviors.<sup>9,10</sup> Many states and schools have adopted zero-tolerance policies (eg, automatic expulsion) to address bullying; however, such policies have not been shown to be effective.<sup>11,12</sup> An alternative to zero-tolerance policies is positive schoolwide prevention efforts that involve all school staff and are imple-

mented across all school settings.<sup>5,6</sup> Our study examines the extent to which one such widely used positively oriented universal behavioral prevention model called School-wide Positive Behavioral Interventions and Supports (SWPBIS)<sup>13</sup> affects teachers' reports of bullying and peer victimization using data from a randomized controlled effectiveness trial.

Consistent with the social-ecological framework,<sup>5</sup> there is a movement toward the adoption of universal schoolwide programs to prevent bullying and promote a positive school climate.<sup>14,15</sup> These efforts typically establish a common set of behavioral expectations across all school contexts and involve all staff in prevention activities. However, the findings from research investigating the effects of anti-bullying programs have been mixed.<sup>9,14,16-18</sup> Recent research on SWPBIS<sup>13</sup> suggests that it may help prevent bullying.<sup>19</sup>

**Author Affiliations:** Center for the Prevention of Youth Violence, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland.

SWPBIS<sup>13,20</sup> is a noncurricular, universal prevention model that draws on behavioral, social learning, and organizational principles. The model aims to alter the school environment by creating improved systems (eg, discipline and data management) and procedures (eg, office referral, behavioral reinforcement) that promote positive changes in staff and student behaviors. A SWPBIS team coordinates the program and establishes 3 to 5 positively stated schoolwide expectations regarding student behavior (eg, “be respectful, responsible, and ready to learn”) that are posted across settings, taught to all students and staff, and reinforced through praise and tangible rewards (eg, tickets). SWPBIS is implemented in all classroom and nonclassroom contexts. Data are collected on student behaviors including problem behaviors such as bullying and used by school staff to increase supervision and monitor the impacts of the universal program or guide the use of more intensive prevention efforts. It follows the 3-tiered public health approach to prevention,<sup>21,22</sup> which aims to prevent disruptive behavior by layering onto the universal SWPBIS model more targeted (selective) and intensive (indicated) programs and services to meet the needs of students who do not respond adequately to the universal system of positive behavior support. To date, most schools have focused on implementing the universal, schoolwide elements of SWPBIS.<sup>13</sup> Two group randomized controlled trials were recently conducted on the universal SWPBIS model in elementary schools. They documented significant impacts on teachers’ use of effective classroom management strategies, student and staff perceptions of school climate and safety, discipline problems, and academic achievement, as well as children’s aggressive/disruptive behavior problems, concentration problems, emotion regulation, and prosocial behavior<sup>23-26</sup> (also C.P.B.; T.E.W.; and P.J.L.; unpublished data, June 2011).

Our study extends this work by examining the effect of the universal SWPBIS model on bullying and peer rejection. While there has been little systematic research on bullying-related outcomes, SWPBIS includes several core elements found to be effective in a recent meta-analysis of bullying prevention programs,<sup>27</sup> suggesting that it too might affect bullying behavior. Although the theory of change process has not been explicitly examined, SWPBIS emphasizes schoolwide behavioral expectations (eg, respecting others), which likely address bullying-related behaviors. SWPBIS teaches behavioral expectations through direct instruction, positive reinforcement, and consistent consequences, promoting acceptable social and classroom behaviors. This in turn is theorized to reduce the likelihood of engaging in and rewarding bullying behavior. Furthermore, the emphasis on using data (eg, office discipline referrals, suspensions) to guide adult supervision to hot spots within the school as well as the training that staff receive on how to consistently manage behavior problems across school settings<sup>19</sup> are hypothesized to increase the likelihood that adults will intervene more consistently when they witness bullying. When all 3 tiers are implemented, students at increased risk for involvement in bullying receive more targeted and indicated preventive interventions. Together, these core elements are hypothesized to decrease rates of bullying.<sup>19</sup>

Determining the impact of SWPBIS on bullying also has important public health significance because more than 14 000 schools across the country are implementing SWPBIS and several state departments of education recommend its use.<sup>28</sup> The large-scale dissemination of this particular prevention model highlights the significance of research examining its impact on bullying-related behaviors.

## METHODS

### STUDY DESIGN

Data for our study came from a group randomized controlled effectiveness trial<sup>29</sup> of the universal SWPBIS model conducted in 37 Maryland public elementary schools to determine the impact of the model on discipline problems and the school environment. Only public elementary schools were eligible for inclusion, and all schools approached about participation agreed to enroll. An open-cohort design was used, allowing new students to enroll at each data collection; however, resources were not available to follow up students who left the participating schools. The schools were matched on select baseline demographics (eg, school enrollment, suspensions), with 21 schools being randomized by the research team to the intervention condition and 16 schools being assigned to the comparison condition, which refrained from implementing SWPBIS for 4 years. Annual assessments of SWPBIS implementation quality were conducted in all 37 schools by trained assessors, who were unaware of the schools’ implementation status, using the validated School-wide Evaluation Tool.<sup>30</sup> The assessments indicated that all schools with SWPBIS reached and maintained high-fidelity implementation by the end of the trial.<sup>24-26</sup> The project was approved by the institutional review board at the Johns Hopkins Bloomberg School of Public Health. Passive parental consent procedures were used for student participants.

### TRAINING

Each of the 21 schools assigned to receive SWPBIS training formed internal SWPBIS teams comprising 5 to 6 members (teachers, administrators) who attended an initial 2-day summer training led by 1 of the developers of SWPBIS. To maintain consistently high levels of implementation fidelity, the SWPBIS school teams attended annual 2-day summer booster training events. Consistent with the effectiveness trial design,<sup>31</sup> all initial training and booster training events were coordinated and led by the Maryland Positive Behavioral Interventions and Supports State Leadership Team and were also attended by other SWPBIS teams from across the state.<sup>28</sup> All SWPBIS schools received on-site support and technical assistance from a trained behavior support coach (eg, school psychologist, counselor) for the duration of the trial. Additional professional development and technical assistance were provided to the behavior support coaches through state-coordinated training events conducted 4 times each year.<sup>32</sup>

### SAMPLE

The sample included 37 elementary schools, the size of which was determined through a power analysis. A total of 5 data points (fall and spring semesters of year 1, and spring semester of years 2, 3, and 4) were collected during the course of 4 school years on 12 334 students who were in kindergarten, first grade, and second grade when the study was initiated (**Figure 1**).

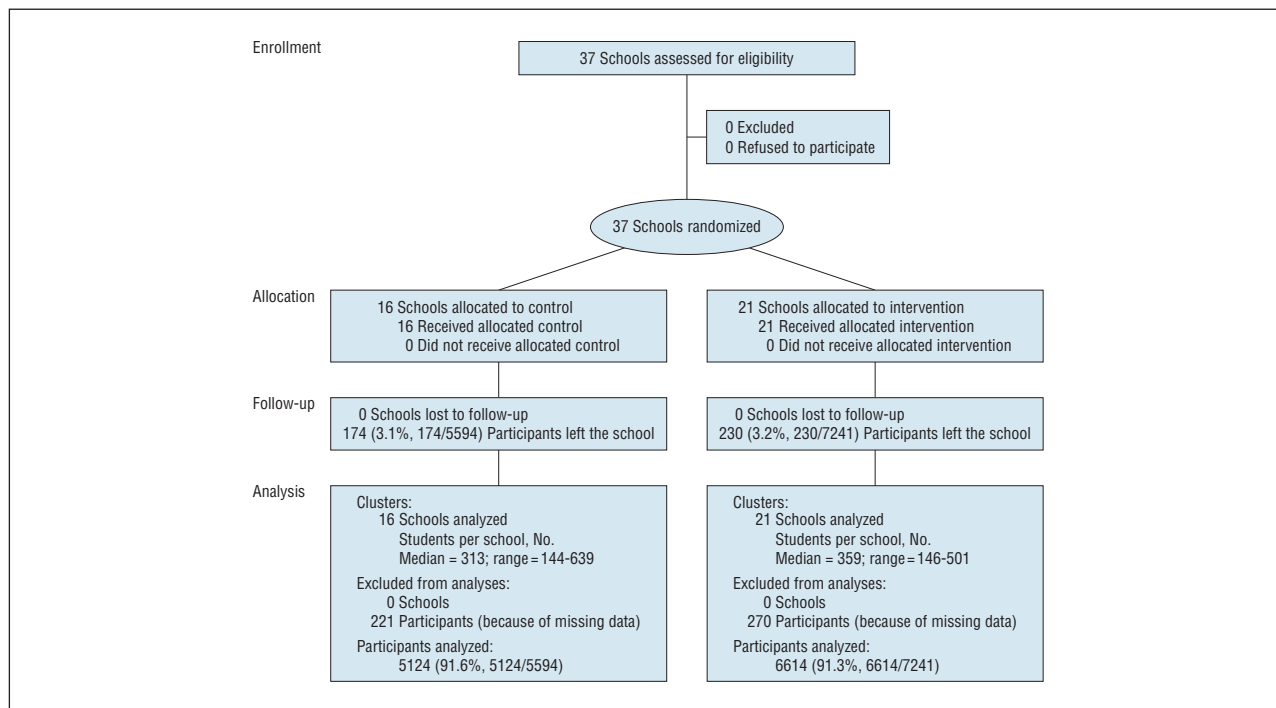


Figure 1. Consolidated Standards of Reporting Trials diagram for the randomized controlled trial.

## MEASURES

Reports from teachers on bullying-related behaviors were assessed through the Teacher Observation of Classroom Adaptation – Checklist (TOCA-C),<sup>33,34</sup> a research-based measure of student behavior problems that has been well validated. The bullying subscale included 4 items: (1) teases classmates, (2) yells at others, (3) harms others, and (4) fights ( $\alpha = .87$ ). Teachers rated the 4 items on a Likert scale ranging from 1 (never) to 6 (almost always). The 4 items were averaged to create composite scores. Reports from teachers on rejection were assessed through 3 TOCA-C items: (1) is rejected, (2) does not have many friends, and (3) is not liked by classmates ( $\alpha = .84$ ), which were also averaged.

## PROCEDURE

The trial was conducted from March 2002 through July 2007. Teacher TOCA-C packets were mailed to the schools and distributed by administrators, school psychologists, or administrative assistants. The packets contained a checklist in reference to each student in the classroom, and each TOCA-C had a unique identifier for each student in the class, thereby allowing individual student data to be tracked by researchers during the course of the project. Teachers completed a TOCA-C in reference to each student in the class and returned them to the research team through the mail. The teacher return rate for the TOCA-Cs was high (96.2%).

## ANALYSES

Three-level hierarchical linear modeling analyses were conducted using HLM 6.1<sup>35</sup> software to examine the effects of SWPBIS on reports of rejection and bullying during the study. Based on our prior research,<sup>25</sup> the following school-level variables were included as covariates in all models: (1) student mobility, (2) enrollment, (3) student to teacher ratio, and (4) faculty turnover rate. We also adjusted for the following

Table 1. Student and School Demographic Characteristics<sup>a</sup>

	No. (%)
Student characteristics (N=12 344 students)	
Sex	
Male	6482 (52.9)
Female	5782 (47.1)
Race/ethnicity	
American Indian/Alaskan Native	76 (0.6)
Asian/Pacific Islander	516 (4.3)
African American	5462 (45.1)
White	5588 (46.1)
Hispanic	473 (3.9)
Grade cohort	
Kindergarten, aged up to third grade	4156 (33.7)
First, aged up to fourth grade	4141 (33.5)
Second, aged up to fifth grade	4047 (33.0)
Special education status	1540 (12.9)
FARMS	5850 (49.4)
School characteristics (N=37 schools)	
Student mobility	Mean (SD) 23.6 (8.1)
Student to teacher ratio	11.3 (3.3)
Faculty turnover rate	16.0 (7.6)
School enrollment	486.4 (157.8)

Abbreviation: FARMS, free or reduced-price meals status.

<sup>a</sup>The school characteristics data are archival data provided by the Maryland State Department of Education and pertain to the entire baseline school year (ie, prior to training in School-wide Positive Behavioral Interventions and Supports) for all children attending that school (grades prekindergarten/kindergarten through fifth grade).

individual-level characteristics, which previous research suggested may be associated with bullying and peer victimization: (1) sex, (2) grade cohort (ie, the student's grade when the study began), (3) special education status, (4) free and reduced-price meals status, and (5) ethnicity (ie, coded 1 for African American vs 0 for all others). As a post hoc exploration, select inter-

**Table 2. HLM Results for 3-Level Model Examining the Effect of SWPBIS on Bullying Involving 12 344 Children**

Bullying <sup>a</sup>	Coefficient	SE	t Ratio	P Value
Intercept				
Intercept	1.4029	0.0242	58.06	<.001
School-level variables				
Mobility	0.0001	0.0028	0.02	.99
Student to teacher ratio	-0.0057	0.0053	-1.08	.29
Faculty turnover	-0.0016	0.0034	-0.47	.64
Enrollment	0.0089	0.0115	0.77	.45
Student-level variables				
Special education status	0.1176	0.0268	4.38	<.001
African American	0.2317	0.0316	7.33	<.001
Grade cohort	-0.0564	0.0473	-1.19	.24
FARMS	0.0846	0.0165	5.12	<.001
Sex	0.2261	0.0183	12.36	<.001
Slope, growth				
Intercept	0.0326	0.0099	3.28	<.001
School-level variables				
SWPBIS intervention	-0.0230	0.0088	-2.61	<.05
Mobility	0.0015	0.0009	1.70	.09
Student to teacher ratio	0.0043	0.0016	2.75	<.05
Faculty turnover	0.0023	0.0013	1.70	.09
Enrollment	-0.0114	0.0037	-3.05	<.05
Student-level variables				
Special education status	-0.0043	0.0089	-0.48	.63
African American	0.0333	0.0059	5.67	<.001
Grade cohort	0.0127	0.0161	0.79	.43
FARMS	0.0218	0.0051	4.27	<.001
Sex	0.0188	0.0064	2.94	<.001
Post hoc cross-level interactions				
Grade cohort × SWPBIS	-0.0208	0.0238	-0.87	.38
Sex × SWPBIS	0.0148	0.0111	1.34	.19
Special Education × SWPBIS	0.0006	0.0143	0.04	.97
<b>Random Effect</b>	<b>Variance Component</b>	<b>χ<sup>2</sup></b>	<b>P Value</b>	
Level 1	0.3456			
Level 2	0.2732	37749.3	<.001	
Level 3 time/slope	0.0022	393.2	<.001	

Abbreviations: FARMS, free or reduced-price meals status; HLM, hierarchical linear modeling; SE; standard error; SWPBIS, School-wide Positive Behavioral Interventions and Supports.

<sup>a</sup>Results are from the model that did not include post hoc interactions. Unadjusted interclass correlation coefficient for bullying=.05; Akaike information criterion=79 342.61; Bayesian information criterion=79 244.22. SWPBIS was coded 1 (intervention) or 0 (comparison). Free or reduced-price meals status was coded 1 (received) or 0 (not received). Sex was coded 1 (male) or 0 (female). Ethnicity was coded 1(African American) or 0 (all others). Grade cohort indicates the grade the youth was in when the trial began, coded as 1 (kindergarten) or 0 (grades 1 or 2). Special education indicates child receives special education services, coded 1 for yes or 0 for no.

actions were conducted among 3 demographic variables (sex, special education status, and grade cohort) and intervention status to determine if they were significant intervention effect modifiers.

### MISSING DATA

Although the participation rate was consistently high, we examined the patterns of missing data but did not find evidence that the level of missingness was problematic.<sup>36,37</sup> For example, baseline scores on concentration problems were unrelated to subsequent missingness on this measure (adjusted odds ratio=1.00, 95% CI=0.96-1.04). Baseline scores on the disruptive behaviors subscale were significantly associated with increased odds of subsequent missingness (adjusted odds ratio=1.05, 95% CI=1.03-1.07); yet this difference was small and likely has limited clinical significance. Neither sex nor intervention status had a significant effect on subsequent missingness on teacher ratings of behavior problems. As a result, our analyses assumed data were missing at random based on the assumption that the reason for missingness was not related to the missing value itself or was deemed random after control-

ling for the variables that were observed.<sup>38,39</sup> The HLM 6.1 software adjusts parameter estimates for attrition using full-information maximum-likelihood estimation, a widely recognized and appropriate means of handling missing data<sup>40</sup> under the assumption that data are missing at random.<sup>41</sup> Specifically, individuals can have missing data across any of the times and still be included in the analyses; therefore, hierarchical linear modeling is robust to this level of missing data with repeated measures.<sup>41,42</sup>

### RESULTS

The demographic characteristics of the sample are provided in **Table 1**. The sample of 12 344 children was 52.9% male, 45.1% African American, and 46.1% white. Approximately 49% of the children received free or reduced-price meals and 12.9% received special education services.

With regard to the 3-level hierarchical linear modeling results, the findings for the perpetration of bullying

**Table 3. HLM Results for 3-Level Model Examining the Effect of SWPBIS on Peer Rejection Involving 12 344 Children**

Rejection <sup>a</sup>	Coefficient	SE	t Ratio	P Value
Intercept				
Intercept	1.8174	0.0359	50.64	<.001
School-level variables				
Mobility	0.0021	0.0032	0.64	.53
Student to teacher ratio	-0.0011	0.0088	-0.13	.90
Faculty turnover	0.0018	0.0034	0.55	.59
Enrollment	0.0309	0.0141	2.18	<.05
Student-level variables				
Special education status	0.3646	0.0367	9.93	<.001
African American	0.1545	0.0288	5.36	<.001
Grade Cohort	-0.1095	0.0481	2.28	<.05
FARMS	0.2347	0.0241	9.73	<.001
Sex	0.2127	0.0176	12.06	<.001
Slope, growth				
Intercept	0.0767	0.0158	4.85	<.001
School-level variables				
SWPBIS intervention	-0.0339	0.0145	-2.35	<.05
Mobility	0.0011	0.0009	1.24	.23
Student to teacher ratio	0.0042	0.0022	1.92	.06
Faculty turnover	0.0028	0.0013	2.11	<.05
Enrollment	-0.0110	0.0048	-2.29	<.05
Student-level variables				
Special education status	0.0187	0.0121	1.55	.12
African American	-0.0024	0.0078	-0.32	.75
Grade cohort	0.0121	0.0181	0.67	.50
FARMS	-0.0018	0.0079	-0.23	.82
Sex	0.0056	0.0077	0.73	.46
Post hoc cross-level interactions				
Grade cohort × SWPBIS	-0.0451	0.0176	-2.17	<.05
Sex × SWPBIS	0.0120	0.0141	0.86	.74
Special education × SWPBIS	-0.0061	0.0184	-0.34	.39
<b>Random Effect</b>	<b>Variance Component</b>	<b>χ<sup>2</sup></b>	<b>P Value</b>	
Level 1	0.5844			
Level 2	0.3823	33230.7	<.001	
Level 3 time/slope	0.0030	319.5	<.001	

Abbreviations: FARMS, free or reduced-price meal status; HLM, hierarchical linear modeling; SWPBIS, School-wide Positive Behavioral Interventions and Supports.

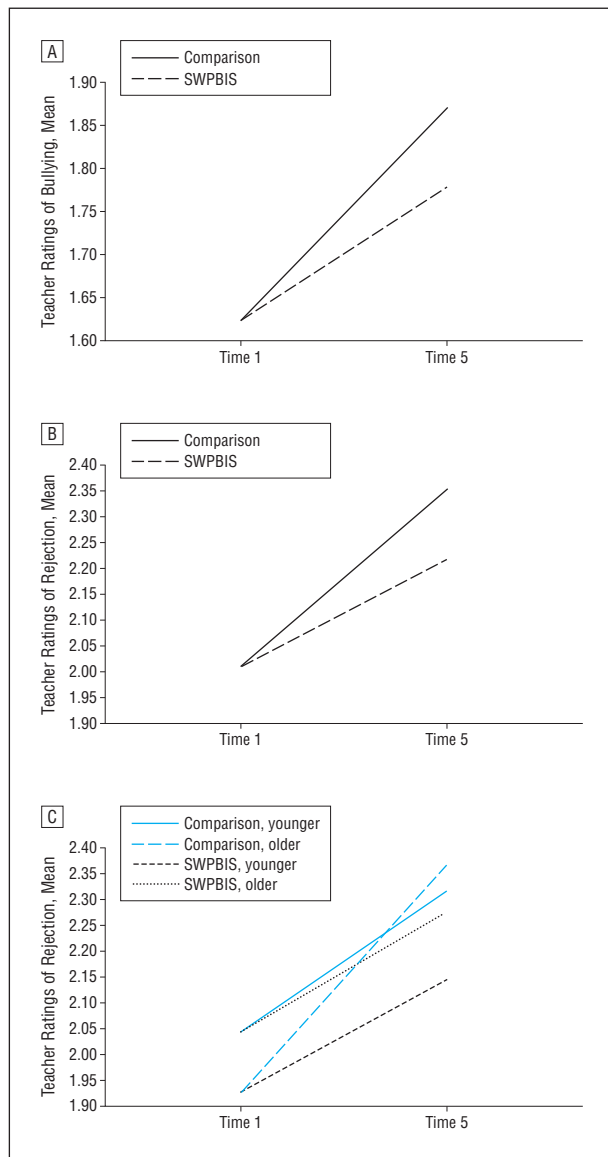
<sup>a</sup>Results are from the model that did not include post hoc interactions. Unadjusted interclass correlation coefficient for victimization=.04; Akaike information criterion=97 001.12; and Bayesian information criterion=96 916.73. SWPBIS was coded 1 (intervention) or 0 (comparison). Free or reduced-price meals status was coded as 1 (received) or 0 (not received). Sex was coded 1 (male) or 0 (female). Ethnicity was coded 1 (African American) or 0 (all others). Grade cohort indicates the grade the youth was in when the trial began, coded 1 (kindergarten) or 0 (grades 1 or 2). Special education indicates child receives special education services, coded 1 for yes or 0 for no.

are reported in **Table 2** and those for rejection are in **Table 3**. The slope terms (**Figure 2**) indicate that children in both conditions generally experienced an increased risk for involvement in bullying and peer rejection during the 4-year trial. However, the hierarchical linear modeling results indicated that children in the SWPBIS schools displayed significantly less bullying behavior ( $\gamma = -0.02$ ,  $t = -2.60$ ,  $P < .05$ ,  $SE = 0.01$ ) and experienced lower levels of rejection ( $\gamma = -0.03$ ,  $t = -2.32$ ,  $P < .05$ ,  $SE = 0.016$ ) over time vs children in the comparison schools (Table 1 and Table 2). We also examined for possible cross-level interaction effects of age, sex, and special education status on the impact of SWPBIS on bullying and rejection; however, only 1 interaction effect was significant (Table 2 and Table 3). The 1 significant cross-level interaction effect indicated that children in higher grades in comparison schools showed greater increases in rejection relative to their age-mates in SWPBIS schools (Figure 2C).

#### COMMENT

Given the increasing concerns about bullying<sup>43</sup> and the relative paucity of effective prevention programs,<sup>9,10</sup> there is a great need for further research on the impact of commonly used prevention programs on bullying. The current study used data from a randomized controlled trial of the widely disseminated SWPBIS model with the goal of exploring the impact of the program on teachers' ratings of children's perpetration of bullying behaviors and experience of peer rejection. We examined the effect of this program during late elementary school when the rates of bullying tend to increase.<sup>43-45</sup> Effective prevention efforts targeting this age group have the potential to attenuate the typical spike in bullying during middle school.

Consistent with prior developmental research, the data from our study indicated a significant increase in the risk for bullying and peer rejection as the children grew older.



**Figure 2.** The slope terms indicate that children generally experienced an increased risk for involvement in bullying and peer rejection over 4 years. A, Effect of School-wide Positive Behavioral Interventions and Supports (SWPBIS) on the perpetration of bullying behaviors. B, Effect of SWPBIS on peer rejection. C, Interaction between grade cohort and SWPBIS intervention status on peer rejection.

During middle school, there is less adult supervision and an increase in salience of peer relationships and social status, which in turn likely contribute to the peak in bullying.<sup>46</sup> However, the increases in bullying and rejection were attenuated in the schools implementing SWPBIS, indicating that in the SWPBIS environment, the typical escalation of bullying and rejection found as youth approach middle school was lessened.

There was only 1 significant cross-level interaction, which emerged for rejection; therefore, we are cautious in our interpretation of this finding. However, these data further highlight the developmental significance of being exposed to SWPBIS at a younger age because those children were least likely to experience rejection by peers. As a result of exposure to SWPBIS in elementary school, we anticipate that these children will make the transi-

tion to adolescence with a reduced risk for involvement in bullying. However, further longitudinal data are needed to confirm this hypothesis. While we were somewhat surprised that none of the other potential effect modifiers, such as sex, special education receipt, or ethnicity, proved to be significant, this finding is promising because it suggests that the main effects are rather robust for all children within schools.

Although it is difficult to discern what elements or aspects of SWPBIS accounted for the reduced risk for involvement in bullying, there are specific activities implemented through SWPBIS that likely reduce bullying, such as promoting a positive school environment based on respect, positive reinforcement of desired behaviors coupled with consistent discipline, and consequences for inappropriate behaviors.<sup>19</sup> Furthermore, the improved organizational climate<sup>19,25</sup> and overall reductions in student discipline problems<sup>23,26</sup> observed in schools with the SWPBIS model may contribute to a more positive school environment, which also has been linked with reductions in bullying.<sup>43</sup> Additional research is needed to explore the potential mediators of SWPBIS's effects on bullying and the possibility that SWPBIS may be more effective at stemming some forms of bullying (eg, more overt forms).

There were some limitations to our study. The measures of bullying and peer rejection were rather circumscribed; future studies should incorporate more comprehensive measures of bullying and victimization. Reports from teachers were used; however, future studies would benefit from using youth self-reports, peer reports, and/or outside observations of bullying behaviors to reduce possible biases in using 1 informant.<sup>43</sup> The intervention schools had only received training on the universal SWPBIS model; therefore, we anticipate even larger effects when the more intensive selective and indicated preventive interventions are layered onto the universal SWPBIS effort.<sup>13</sup> For example, children who are at risk for involvement in bullying could receive more targeted programs, such as social skills training, whereas those who are showing early symptoms of involvement in bullying would receive more intensive counseling and therapeutic services. Furthermore, the universal SWPBIS model is not directed specifically at bullying prevention; therefore, the effects of the universal program would also likely be stronger if specific activities related to bullying had been incorporated into the training.<sup>19</sup> Additional efforts to incorporate parents would also be beneficial; for example, schools should increase communication with parents regarding the reporting of bullying to the school<sup>47</sup> and effective strategies for supporting bullied youth.<sup>48</sup> Such efforts may more directly address issues related to bullying over and above the more general climate and behavior-enhancing universal program elements. The effect sizes were relatively small and although this is often the case in longitudinal efficacy and effectiveness studies,<sup>31,49</sup> the practical significance of these findings should be considered through a cost-benefit analysis. Although the schools all volunteered to participate in the trial, which limits the generalizability, a recent study used matching methods and found that the schools enrolled in the trial

were similar with regard to academic achievement and levels of discipline problems to other schools in the state, suggesting a potential for the generalizability of the findings to other Maryland schools.<sup>50</sup> Related research indicates that schools with greater needs (eg, higher suspensions, poorer academic performance) are more likely to volunteer for SWPBIS training and eventually adopt the model.<sup>28</sup>

Despite these limitations, the effects of SWPBIS on bullying are encouraging and consistent with policymakers' and researchers' emphasis on school climate and culture as potential targets for bullying prevention efforts as an alternative to zero-tolerance policies.<sup>15,51</sup> These findings suggest that a universal SWPBIS model is a promising approach for preventing bullying. Although the rates of bullying tend to be the highest in middle school, when SWPBIS is implemented in elementary school, it may help children better prepare for the transition into adolescence. Specifically, SWPBIS programming may suppress the increasing rates of bullying and rejection that typically occur during early adolescence. Given the extensive national network of SWPBIS schools, the model may also serve as a potential strategy through which other targeted and indicated bullying prevention approaches could be disseminated.

**Accepted for Publication:** July 28, 2011.

**Correspondence:** Catherine P. Bradshaw, PhD, Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, 624 N Broadway, Room 839, Baltimore, MD 21205 (cbradsha@jhsph.edu).

**Author Contributions:** Dr Bradshaw had full access to all data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Waapsdorp, Bradshaw, and Leaf. *Critical revision of the manuscript for important intellectual content:* Waapsdorp, Bradshaw, and Leaf. *Obtained funding:* Waapsdorp, Bradshaw, and Leaf.

**Financial Disclosure:** None reported.

**Funding/Support:** This study was supported by grants from the Centers for Disease Control and Prevention (R49/CCR318627, 1U49CE 000728, and K01CE001333-01), the National Institute of Mental Health (1R01MH67948-1A), and the Institute of Education Sciences (R305A090307).

**Disclaimer:** The opinions expressed are those of the authors, not of the funding agencies, and such endorsements should not be inferred.

**Additional Contributions:** We thank the Maryland Positive Behavioral Interventions and Supports State Leadership Team for its support of this project.

## REFERENCES

- Bryn S. Stop Bullying Now! a federal campaign for bullying prevention and intervention. *J Sch Violence*. 2011;10(2):213-219. doi:10.1080/15388220.2011.557313.
- Olweus D. *Bullying at School: What We Know and What We Can Do*. Malden, MA: Blackwell Publishing; 1993.
- Eisenberg ME, Neumark-Sztainer D, Perry CL. Peer harassment, school connectedness, and academic achievement. *J Sch Health*. 2003;73(8):311-316.
- Espelage DL, Swearer SM. Research on school bullying and victimization: what have we learned and where do we go from here? *School Psych Rev*. 2003;32(3):365-383.
- Espelage DL, Swearer SM. *Bullying in American Schools: A Social-ecological Perspective on Prevention and Intervention*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers; 2004.
- Fekkes M, Pijpers FIM, Fredriks AM, Vogels T, Verloove-Vanhorick SP. Do bullied children get ill, or do ill children get bullied? a prospective cohort study on the relationship between bullying and health-related symptoms. *Pediatrics*. 2006;117(5):1568-1574.
- Gladstone GL, Parker GB, Malhi GS. Do bullied children become anxious and depressed adults? a cross-sectional investigation of the correlates of bullying and anxious depression. *J Nerv Ment Dis*. 2006;194(3):201-208.
- Smokowski PR, Kopasz KH. Bullying in school: an overview of types, effects, family characteristics, and intervention strategies. *Child Schools*. 2005;27(2):101-110.
- Merrell KW, Guedner BA, Ross SW, Isava DM. How effective are school bullying intervention programs? a meta-analysis of intervention research. *Sch Psychol Q*. 2008;23(1):26-42. doi:10.1037/1045-3830.23.1.26.
- Ttofi M, Farrington D. Effectiveness of school-based programs to reduce bullying: a systematic and meta-analytic review. *J Exp Criminol*. 2011;7(1):27-56. doi:10.1007/s11292-010-9109-1.
- American Psychological Association Zero Tolerance Task Force. Are zero tolerance policies effective in the schools? an evidentiary review and recommendations. *Am Psychol*. 2008;63(9):852-862.
- Boccanfuso C, Kuhfeld M. Multiple responses, promising results: evidence-based nonpunitive alternatives to zero tolerance. *Child Trends*. [http://www.childtrends.org/Files/Child\\_Trends-2011\\_03\\_01\\_RB\\_AltToZeroTolerance.pdf](http://www.childtrends.org/Files/Child_Trends-2011_03_01_RB_AltToZeroTolerance.pdf). Published 2011. Accessed May 2011.
- Sugai G, Horner RR. A promising approach for expanding and sustaining School-Wide Positive Behavior Support. *School Psych Rev*. 2006;35(2):245-259.
- Smith JD, Schneider BH, Smith PK, Ananiadou K. The effectiveness of whole-school antibullying programs: a synthesis of evaluation research. *School Psych Rev*. 2004;33(4):547-560.
- Bradshaw CP, Waasdorp TE. Measuring and changing a "culture of bullying." *School Psych Rev*. 2009;38(3):356-361.
- Ferguson CJ, San Miguel C, Kilburn JC Jr, Sanchez P. The effectiveness of school-based anti-bullying programs: a meta-analytic review. *Crim Justice Rev*. 2007;32(4):401-414. doi:10.1177/0734016807311712.
- Ryan W, Smith JD. Antibullying programs in schools: how effective are evaluation practices? *Prev Sci*. 2009;10(3):248-259.
- Vreeman RC, Carroll AE. A systematic review of school-based interventions to prevent bullying. *Arch Pediatr Adolesc Med*. 2007;161(1):78-88.
- Ross SW, Horner RH. Bully prevention in positive behavior support. *J Appl Behav Anal*. 2009;42(4):747-759.
- Horner RH, Sugai G, Todd AW, Lewis-Palmer T. School-wide positive behavior support. In: Bambara L, Kern L, eds. *Individualized Supports for Students With Problem Behaviors: Designing Positive Behavior Plans*. New York, NY: Guilford Press; 2005:359-390.
- O'Connell ME, Boat T, Warner KE. *Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities*. Washington DC: Institute of Medicine; National Research Council. The National Academies Press; 2009.
- Walker HM, Horner RH, Sugai G, et al. Integrated approaches to preventing antisocial behavior patterns among school-age children and youth. *J Emot Behav Disord*. 1996;4(4):194-209. doi:10.1177/106342669600400401.
- Horner RH, Sugai G, Smolkowski K, et al. A randomized, wait-list controlled effectiveness trial assessing School-wide Positive Behavior Support in elementary schools. *J Posit Behav Interv*. 2009;11(3):133-144. doi:10.1177/1098300709332067.
- Bradshaw CP, Koth CW, Bevans KB, Ialongo N, Leaf PJ. The impact of School-Wide Positive Behavioral Interventions and Supports (PBIS) on the organizational health of elementary schools. *Sch Psychol Q*. 2008;23(4):462-473. doi:10.1037/a0012883.
- Bradshaw CP, Koth CW, Thornton LA, Leaf PJ. Altering school climate through School-wide Positive Behavioral Interventions and Supports: findings from a group-randomized effectiveness trial. *Prev Sci*. 2009;10(2):100-115.
- Bradshaw CP, Mitchell MM, Leaf PJ. Examining the effects of Schoolwide Positive Behavioral Interventions and Supports on student outcomes. *J Posit Behav Interv*. 2010;12(3):133-148. doi:10.1177/1098300709334798.
- Farrington DP, Ttofi MM. Bullying as a predictor of offending, violence and later life outcomes. *Crim Behav Ment Health*. 2011;21(2):90-98.
- Bradshaw CP, Pas ET. A state-wide scale-up of Positive Behavioral Interventions and Supports (PBIS): a description of the development of systems of support and analysis of adoption and implementation. *School Psychol Rev*. In press.
- Murray DM. *Design and Analysis of Group-randomized Trials*. New York, NY: Oxford Press; 1998.
- Horner R, Todd A, Lewis-Palmer T, Irvin L, Sugai G, Boland J. The school-wide evaluation tool (SET): a research instrument for assessing school-wide positive behavior support. *J Posit Behav Interv*. 2004;6(1):3-12. doi:10.1177/10983007040060010201.

31. Flay BR, Biglan A, Boruch RF, et al. Standards of evidence: criteria for efficacy, effectiveness and dissemination. *Prev Sci*. 2005;6(3):151-175.
32. Barrett SB, Bradshaw CP, Lewis-Palmer T. Maryland statewide PBIS initiative. *J Posit Behav Interv*. 2008;10(2):105-114. doi:10.1177/1098300707312541.
33. Koth CW, Bradshaw CP, Leaf PJ. Teacher Observation of Classroom Adaptation – Checklist: development and factor structure. *Meas Eval Couns Dev*. 2009;42(1):15-30. doi:10.1177/0748175609333560.
34. Werthamer-Larsson L, Kellam S, Wheeler L. Effect of first grade classroom environment on shy behavior, aggressive behavior, and concentration problems. *Am J Commun Psychol*. 1991;19(4):585-602.
35. Raudenbush SW, Bryk AS, Cheong YK, Congdon RT Jr. *HLM 6: Hierarchical Linear and Nonlinear Modeling*. Lincolnwood, IL: Scientific Software International; 2004.
36. Schlomer GL, Bauman S, Card NA. Best practices for missing data management in counseling psychology. *J Couns Psychol*. 2010;57(1):1-10.
37. Wothke W. Longitudinal and multigroup modeling with missing data. In: Little TD, Schnabel KU, Baumert J, eds. *Modeling Longitudinal and Multilevel Data: Practical Issues, Applied Approaches, and Specific Examples*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers; 2000:219-240, 269-281.
38. Arbuckle JL. Full information estimation in the presence of incomplete data. In: Marcoulides GA, Schumacker RE, eds. *Advanced Structural Equation Modeling: Issues and Techniques*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers; 1996.
39. Little RJ. Modeling the dropout mechanism in repeated-measures studies. *J Am Stat Assoc*. 1995;90:1112-1121.
40. Schafer JL, Graham JW. Missing data: our view of the state of the art. *Psychol Methods*. 2002;7(2):147-177.
41. Raudenbush S, Bryk A. *Hierarchical Linear Models: Applications and Data Analysis Methods*. 2nd ed. Thousand Oaks, CA: Sage; 2002.
42. Rumberger RW, Palardy GJ. Multilevel models for school effectiveness research. In: Kaplan D, ed. *Handbook of Quantitative Methodology for the Social Sciences*. Thousand Oaks, CA: Sage; 2004.
43. Swearer S, Espelage D, Vaillancourt T, Hymel S. What can be done about school bullying? linking research to educational practice. *Educ Res*. 2010;39(1):38-47. doi:10.3102/0013189X09357622.
44. Nansel TR, Overpeck M, Pilla RS, Ruan WJ, Simons-Morton B, Scheidt P. Bullying behaviors among US youth: prevalence and association with psychosocial adjustment. *JAMA*. 2001;285(16):2094-2100.
45. Bradshaw CP, Sawyer AL, O'Brennan LM. Bullying and peer victimization at school: perceptual differences between students and school staff. *School Psych Rev*. 2007;36(3):361-382.
46. Cillessen AHN, Mayeux L. From censure to reinforcement: developmental changes in the association between aggression and social status. *Child Dev*. 2004;75(1):147-163.
47. Waasdorp TE, Bradshaw CP, Duong J. The link between parents' perceptions of the school and their responses to school bullying: variation by child characteristics and the forms of victimization. *J Educ Psychol*. 2011;103(2):324-335.
48. Waasdorp TE, Bradshaw CP. Examining student responses to frequent bullying: a latent class approach. *J Educ Psychol*. 2011;103(2):336-352. doi:10.1037/a0022747.
49. Durlak JA, Weissberg RP, Dymnicki AB, Taylor RD, Schellinger KB. The impact of enhancing students' social and emotional learning: a meta-analysis of school-based universal interventions. *Child Dev*. 2011;82(1):405-432.
50. Stuart EA, Cole SR, Bradshaw CP, Leaf PJ. The use of propensity scores to assess the generalizability of results from randomized trials. *J Roy St A*. 2011;174(2):369-386. doi:10.1111/j.1467-985X.2010.00673.x.
51. Finkelhor D, Turner H, Ormrod R, Hamby SL. Trends in childhood violence and abuse exposure: evidence from 2 national surveys. *Arch Pediatr Adolesc Med*. 2010;164(3):238-242.