


# Effect of SWPBIS on Disciplinary Exclusions for Students With and Without Disabilities

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## Abstract

School leaders react to inappropriate behaviors by excluding students, despite research suggesting an association with poor student outcomes. Students with disabilities are frequently subjected to these practices. One framework that has been proposed to reduce the reliance on reactive discipline procedures is schoolwide positive behavior interventions and supports (SWPBIS). In this study, we replicated several state-level quasi-experimental studies with discipline data from California. Using propensity score matching, we compared 544 schools implementing SWPBIS with fidelity and 544 schools that had never been trained. We found statistically significantly fewer out-of-school suspensions and days missed due to out-of-school suspensions across all students. Students with disabilities were statistically significantly less likely to be sent to alternative settings due to behavior in schools implementing SWPBIS with fidelity, with an effect size of  $-0.65$ . These results replicate and extend prior findings.

Disciplinary exclusion, defined as the process of removing students from classroom instruction or school for a specific period or permanently (Gage, Whitford, & Katsiyannis, 2018), continues to be a pressing concern for all students but particularly for students with disabilities (SWD) according to several studies and national reports (Sullivan, Van Norman, & Klingbeil, 2014; U.S. Department of Education, 2018). Research has consistently found that disciplinary exclusions rarely lead to their intended outcome—namely, persuading students to take account of their behavior and limit the motivation for rule breaking (Bear, 2012). For example, the American Psychological Association (APA) convened a task force to evaluate the effectiveness of disciplinary exclusions and, following an extensive search of the literature, unequivocally concluded that disciplinary exclusions do not decrease student problem behavior or improve school climate or school safety (APA Zero Tolerance Task Force, 2008).

Similarly, the American Academy of Pediatrics (AAP; 2013) issued a review of research and a subsequent policy statement highlighting the deleterious effect that disciplinary exclusions have on all students and SWD. Both the APA and the AAP found significant negative outcomes for students of all ages and, as a result, advocate for the proliferation of prevention efforts as alternatives to disciplinary exclusion. The AAP's recommendations specifically identify schoolwide positive behavior interventions and supports (SWPBIS) as an approach that schools can use to decrease reliance on disciplinary exclusions as a reactive procedure. Research is beginning to emerge empirically

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supporting the positive influence that SWPBIS can have on reducing schools' use of disciplinary exclusions (Gage, Grasley-Boy, George, Childs, & Kincaid, 2019; Gage, Lee, Grasley-Boy, & George, 2018). In this study, we evaluate the effectiveness of SWPBIS for reducing disciplinary exclusions, replicating our prior studies focused on outcomes for all students and extending them to evaluate effects for SWD.

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## Disciplinary Exclusion

Disciplinary exclusions include an array of practices, such as office discipline referrals, in- and out-of-school suspensions (OSSs), placement in an alternative setting, referral to law enforcement or juvenile justice, and expulsion, as a consequence for inappropriate or dangerous behaviors. During the 2015–2016 school year, >2.1 million students received an in-school suspension; ~2.0 million received an OSS; ~56,000 students were placed in alternative settings; and ~105,000 were expelled from school in the United States (Civil Rights Data Collection, <https://ocrdata.ed.gov/>). Of those students who received a disciplinary exclusion, data suggest that a disproportionate number were SWD. Twenty-seven percent of students receiving in-school suspensions were SWD; 35% of students receiving an OSS and 32% of students placed in alternative settings were SWD. Yet, only 12.4% of U.S. students received special education during the same year. Taken together, it is clear that disciplinary exclusions remain widely used in U.S. schools and that SWD receive a disproportionate share of those exclusions.

Research examining predictors of such disciplinary exclusions supports and extends these national administrative data. For example,

Sullivan, Klingbeil, and Van Norman (2013) examined predictors of suspension using data from a large Midwestern school district, with archival data from almost 18,000 students. Overall, odds ratios (ORs) indicated that students who were male (OR = 2.21), Black (OR = 3.28), receiving free or reduced-price lunch (FRL; OR = 2.94), or receiving special education services (OR = 2.15) were significantly more likely to receive a suspension. Sullivan et al. (2014) examined predictors of suspension for SWD using data from the same Midwestern school district as a follow-up to their earlier study. The authors replicated the results of their prior study but with SWD, finding again that being male, Black, and receiving FRL significantly predicted receiving at least one suspension. With regard to specific disabilities, Sullivan et al. found that students with emotional or behavioral disorders were 9 times more likely to receive at least one suspension when compared with a student receiving special education services for speech-language impairment.

Fabelo and colleagues (2011) provided one of the most refined examinations of disciplinary exclusion data for SWD. Using data from the entire state of Texas, they found that 74.6% of SWD received at least one suspension or expulsion between seventh and 12th grade. Of note, these data indicate that 90.2% of the students with emotional or behavioral disorders received at least one suspension or expulsion, as opposed to 76.2% of students with learning disabilities and 37.0% of students with other disabilities (e.g., autism, cognitive impairment). Perhaps more concerning, almost half of the students with emotional or behavioral disorders were suspended  $\geq 11$  times. These data, with prior research and the most recent national estimates, suggest the broad use of disciplinary exclusions for SWD, particularly for those with emotional or behavioral disorders.

## Effects of Disciplinary Exclusion

A large body of evidence has repeatedly found negative associations between disciplinary exclusions and student outcomes (AAP,

2013). Research suggests that exclusionary discipline is associated with decreased school engagement and academic achievement (Arcia, 2006; Cholewa, Hull, Babcock, & Smith, 2018; Losen, Hodson, Keith, Morrison, & Belway, 2015; Morris & Perry, 2016; Noltemeyer, Ward, & McLoughlin, 2015) and increased rates of future behavior incidents (Theriot, Craun, & Dupper, 2010), school dropout (Rumberger & Losen, 2016), and being arrested (Fabelo et al., 2011; Mowen & Brent, 2016; Noltemeyer et al., 2015). For example, Theriot and colleagues (2010) examined school records for almost 10,000 middle and high school students and found that students who received a disciplinary exclusion were significantly more likely to receive another disciplinary exclusion in the same year (OR for in-school suspensions = 1.25,  $p < .001$ ; OR for OSSs = 1.32,  $p < .001$ ). This is concerning, particularly due to research suggesting increases in juvenile justice contact for students with disciplinary exclusions. For instance, Cuellar and Markowitz (2015) examined county juvenile records and school referral data for students aged 13 to 17 years and found that an OSS more than doubled the probability that a student was arrested.

Only one meta-analysis has specifically examined the association between disciplinary exclusions and student outcomes. Noltemeyer and colleagues (2015) systematically reviewed 34 studies on the association between school suspension and student outcomes. Overall, they found that suspension from school was significantly associated with decreased academic achievement ( $r = -.21$ ,  $p < .001$ ) and increased school dropout ( $r = .28$ ,  $p < .001$ ). The authors then examined moderation effects by student and study characteristics, finding the largest effect sizes in studies with >60% ethnic minority and higher percentages of students considered low socioeconomic status. Although this review was comprehensive, no data were disaggregated for SWD. No review has examined the effect of alternative schools, but Lehr, Tan, and Ysseldyke (2009) reviewed state-level policy and found four important national trends.

First, the authors found that the number of students receiving alternative school services was increasing. Second, alternative schools are often defined as nontraditional settings designed to serve students at risk for school failure, students who are disruptive or have behavior problems, and students who have been suspended or expelled. Third, most students in alternative schools are there via mandatory placement rather than by choice. Last, a greater percentage of SWD attend alternative schools.

Not one of the reviews addresses the effects of disciplinary exclusions on SWD. Certainly, the deleterious outcomes found included SWD, but data were not disaggregated. A few studies, however, did examine the effects that disciplinary exclusions have on SWD. Fabelo and colleagues (2011) reported achievement and juvenile justice contact for SWD who received one or more suspensions or expulsions. Forty-eight percent of students with emotional disturbance who received a suspension or expulsion also had contact with the juvenile justice system, as compared with 24% of students with learning disabilities, 5.8% of students with other disabilities, and, importantly, 13.1% of students without disabilities.

There is limited research on the effects of alternative schools on student outcomes, including those for SWD. Wilkerson, Afacan, Perzigian, Justin, and Lequia (2016) examined student outcomes for students removed from traditional schools for behavioral concerns and placed in behavior-focused alternative school settings in a large Midwestern school district, including almost 30% receiving special education services for emotional or behavioral disorders. Wilkerson and colleagues used propensity score matching to identify an equivalent comparison group attending traditional public schools and found few differences with regard to office discipline referrals and suspensions, which suggested that students in behavior-focused alternative schools continued to receive disciplinary exclusions even after removal from their traditional public schools. Furthermore, students in these alternative schools had lower

attendance rates and earned fewer course credits than similar students in traditional public schools.

### **Schoolwide Prevention of Disciplinary Exclusion**

It is clear that (a) wide use of disciplinary exclusions continues and (b) disciplinary exclusions have deleterious effects on student outcomes. It may not be feasible for schools to eliminate the use of certain types of disciplinary exclusions for certain topographies of behavior (e.g., threats of extreme violence with dangerous weapons); however, not all disciplinary exclusions result from extreme behaviors. For example, Gage, Lee, et al. (2018) found that 54% of all disciplinary exclusions were the result of (a) incivility, defined as insubordination or disrespect to staff members or other students (e.g., non-compliance or vulgar language), or (b) 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 (including disruptive behaviors on school buses). Therefore, efforts to reduce all problem behavior—particularly less extreme behavioral incidents, such as incivility—may have a direct and meaningful influence on the reduction of disciplinary exclusions.

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Educators and policy makers have advocated more positive, preventative practices to reduce schoolwide behavioral incidents. One of these practices is SWPBIS, a multitiered framework for teaching and reinforcing appropriate behavior through evidence-based

prevention and intervention strategies (Sugai & Horner, 2009). Supports are organized into three tiers: Universal (Tier 1), preventative practices for all students; Secondary (Tier 2), targeted interventions for smaller groups of students who do not respond to Tier 1; and Tertiary (Tier 3), individualized interventions for students who have the most intense behavior support needs. SWPBIS is currently implemented in >25,000 schools nationally and internationally (OSEP Technical Assistance Center, 2017).

To date, eight studies of the effectiveness and efficacy of SWPBIS have been conducted, focusing on implementing Tier 1 supports with fidelity—namely, evidence-based practices aimed at preventing schoolwide problem behaviors. Improvements were found in office discipline referrals, suspensions, school safety and climate, academic achievement, and bullying (Bradshaw, Koth, Thornton, & Leaf, 2009; Bradshaw, Mitchell, & Leaf, 2010; Childs, Kincaid, George, & Gage, 2016; Gage, Leite, Childs, & Kincaid, 2017; Horner, Sugai, & Anderson, 2010; Sadler & Sugai, 2009; Simonsen et al., 2012; Waasdorp, Bradshaw, & Leaf, 2012).

Gage, Whitford, and Katsiyannis (2018) conducted a systematic review and meta-analysis of the effect of universal SWPBIS on disciplinary exclusions. The review focused exclusively on school-level implementation of universal SWPBIS as evaluated with a between-group experimental design (i.e., randomized controlled trials) or quasi-experimental design with a comparison group. Overall, they found four studies—two randomized controlled trials and two quasi-experimental designs—that included a total of 90 elementary and high schools. The authors found a large and statistically significant intervention effect for school suspensions ( $g = -0.86$ ), suggesting that implementation of universal SWPBIS reduces suspensions by almost a full standard deviation. Although promising, the limited number of studies and schools suggested a need for additional experimental research.

To address this concern, Gage et al. (2019) conducted a series of state-level quasi-experimental studies evaluating the effect of

universal SWPBIS implemented with fidelity. The authors examined the consequences of universal SWPBIS implemented with fidelity in 593 Florida schools on the reduction of disciplinary exclusions. They used propensity score matching to create an equivalent comparison group of 593 schools not implementing SWPBIS and found statistically significant reductions of OSSs in intervention schools ( $g = -0.55$ ) for all students but also for SWD ( $g = -0.56$ ). In a similar study, Gage, Lee, et al. (2018) evaluated the effect of universal SWPBIS implemented with fidelity in 119 Georgia elementary schools. Again, using propensity score matching, the authors identified 199 equivalent comparison schools, and the results indicated that implementation of universal SWPBIS significantly reduced OSSs ( $g = -0.54$ ) and in-school suspensions ( $g = -0.71$ ).

Based on the promising rigorous empirical support indicating positive and meaningful effects of universal SWPBIS implemented with fidelity on disciplinary exclusions, we replicated and extended those prior studies by evaluating the effect in California schools and focusing on the consequences for SWD. We chose California as it has an established statewide SWPBIS support system that has been a model for scaling up supports, with scaling up supports and had a large number of schools available for analysis. Since organized efforts began in 2010, the California PBIS Coalition has grown from just over 400 schools implementing SWPBIS to supporting >2,500 in 2017. Specific research questions guiding this study were as follows:

*Research Question 1:* Do schools implementing SWPBIS with fidelity have statistically significantly fewer exclusionary discipline incidents (i.e., in-school suspensions, OSSs, referral to alternative schools, expulsions) than matched comparison schools?

*Research Question 2:* Are there differences in exclusionary discipline incidents for student subgroups, particularly SWD, in schools implementing SWPBIS with fidelity when compared with matched schools?

## Method

### Sample

We obtained California public schools' discipline data from the U.S. Department of Education's Civil Rights Data Collection website (<https://ocrdata.ed.gov>) for the 2015–2016 school year. Every other year, the Office for Civil Rights requires all public local education agencies and schools to complete the Civil Rights Data Collection survey, which reports discipline outcomes disaggregated by gender, ethnicity, and disability status. We then gathered school demographic information for California public schools in 2015–2016 via the U.S. Department of Education's National Center for Education Statistics Common Core of Data (2018). We obtained additional school information (e.g., state standardized testing results) through the California Department of Education's School Accountability Report Card (2017a). Finally, we obtained California's SWPBIS implementation data for 2015–2016 directly from the California PBIS Coalition. National- and state-assigned identification numbers were used to merge the four data sets, resulting in a final data set that included 9,755 schools.

Consistent with Gage et al. (2019) and Gage, Lee, et al. (2018), we removed nontraditional schools (e.g., alternative, vocational, special education) and schools that provided a fidelity score but did not meet the criteria for Tier 1 fidelity, leaving 7,775 schools. Tier 1 fidelity was defined as  $\geq 70\%$  on the Tier 1 section of the Tiered Fidelity Inventory (TFI; Algozzine et al., 2014). We excluded schools reporting  $< 70\%$  fidelity at Tier 1 to accurately estimate a treatment-on-the-treated effect, and we ensured that schools that had been trained but were not implementing SWPBIS with fidelity were not included as untreated comparison schools. In 2015–2016, 1,384 California schools reported TFI scores, and 544 implemented Tier 1 with fidelity; thus, we removed 840 schools. Finally, we

**Table 1.** Demographics Characteristics of Schools and Baseline Equivalence.

School-level characteristic	All possible comparison schools ( <i>n</i> = 6,754)		PSM comparison schools ( <i>n</i> = 544)		SWPBIS schools ( <i>n</i> = 544)		Equivalence, <i>g</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Total enrollment, <i>n</i>	706.4	529.8	666.7	528.7	728.3	445.2	-0.13
Free or reduced-price lunch, %	60.6	28.4	70.4	26.5	68.1	27.3	0.09
White, %	26.1	24.5	17.3	21.1	18.6	20.6	-0.06
Black, %	5.5	9.4	8.4	14.1	6.3	8.5	0.18
Hispanic, %	53.5	28.9	57.8	28.0	57.0	30.2	0.03
Students with disabilities, %	10.5	5.1	10.2	4.8	10.5	4.2	-0.07
Limited English proficiency, %	24.1	20.0	30.5	21.2	29.3	20.5	0.06
Meet or exceed standards in 2015–2016, %							
ELA	47.5	19.8	41.0	19.3	42.6	19.6	-0.08
Math	36.4	19.9	32.5	19.2	33.4	20.7	-0.05
FTE teachers	29.4	21.4	27.2	20.6	29.8	18.1	-0.13
Title I eligible, %	70.0		83.8		81.1		0.11
School level, %							
Primary	61.5		74.8		74.4		0.01
Middle	15.2		18.0		16.7		0.13
High	13.5		6.1		8.3		-0.03
Other configuration	2.4		1.1		0.6		0.09
Urbanicity, %							
City	38.2		54.2		46.9		0.15
Suburb	37.9		31.3		37.5		-0.13
Town	6.7		10.8		9.9		0.03
Rural	9.7		3.7		5.7		-0.09

Note. Equivalence is defined as  $<.25$ -SD units. PSM = propensity score matched; SWPBIS = schoolwide positive behavioral interventions and supports; *g* = standardized mean difference; ELA = English language arts; FTE = full-time equivalent.

removed 477 schools with missing outcome data, resulting in a final pool of 7,298 schools prior to matching.

Table 1 provides demographic information for all potential comparison schools ( $N = 6,754$ ), matched comparison schools ( $n = 544$ ), and SWPBIS schools ( $n = 544$ ). Schools implementing SWPBIS with fidelity were more likely than all possible comparison schools to (a) be primary schools, (b) have more students, (c) be eligible to receive Title I funds, and (d) be located in urban areas. We used all available covariates from the data sources that align with those used in previous studies.

### Measures

**SWPBIS fidelity.** The California PBIS Coalition uses the TFI (Algozzine et al., 2014) to determine SWPBIS implementation fidelity.

The TFI is a 45-item self-assessment survey of SWPBIS implementation across all three tiers and is typically completed by the school team with its external coach. The survey items are divided by tier and scored with a 3-point scale (0 = *not implemented*, 1 = *partially implemented*, 2 = *fully implemented*). Fidelity for each tier is specified as earning  $\geq 70\%$  of the available points on that tier's items. For schools completing the TFI more than once in the 2015–2016 school year, we determined fidelity using scores from the final administration that year. McIntosh et al. (2017) reported that the internal consistency ( $\alpha$ ) of the TFI was .96 across tiers, .87 for Tier 1, .96 for Tier 2, and .98 for Tier 3 in their sample.

**School characteristics.** We included 13 school-level demographic characteristics in the final data set and used these for matching SWPBIS and comparison schools. Specifically, we

included the following from each school: total student enrollment; percentages of students eligible for FRL, White students, Black students, Hispanic students, SWD, students with limited English proficiency (LEP), students meeting or exceeding state standards in English language arts (ELA) and math; and number of full-time equivalent (FTE) teachers. Additionally, we included categorical variables indicating the following: Title I eligibility, school level (e.g., primary, middle), and urbanicity (e.g., city, suburb). We obtained all the demographic variables from the National Center for Education Statistics and California's School Accountability Report Card.

**Outcome variables.** We assessed 10 outcome variables from the Civil Rights Data Collection 2015–2016 school year data set. These variables included the following: the number of students receiving at least one in-school suspension; OSSs separated into students receiving only one OSS, students receiving more than one OSS, students receiving any OSS (i.e., the sum of the previous two variables), and the number of OSS incidents; days missed due to OSSs; expulsions; referrals to alternative schools for disciplinary reasons; referrals to law enforcement; and school-related arrests. The distributions of these outcomes are presented in Figures 1 through 10 (see supplemental materials). Among matched schools, outcome ranges and proportions of zeros were as follows: any in-school suspensions, 0–628 students, 43%; one OSS, 0–186 students, 13%; multiple OSSs, 0–352 students, 28%; any OSS, 0–376 students, 11%; OSS incidents, 0–583 incidents, 12%; days missed, 0–2, 180 days, 10%; expulsions, 0–96 students, 81%; referrals to alternative schools, 0–20 referrals, 91%; referrals to law enforcement, 0–107 referrals, 77%; school-related arrests, 0–25 arrests, 95%.

### Data Analysis

Using a quasi-experimental design, we compared schools implementing SWPBIS Tier 1 with fidelity (intervention) with propensity score-matched comparison schools that were

not implementing SWPBIS. We retained only schools with complete data for the final data set.

**Propensity score matching.** We replicated the propensity score matching methods used by Gage et al. (2019) and Gage, Lee, et al. (2018). Propensity score matching can decrease bias in intervention effect estimations in quasi-experimental studies where subjects are not randomly assigned to conditions (Leite, 2017). In this study, schools were not assigned to an intervention (i.e., implementing SWPBIS with fidelity); thus, propensity score matching was an appropriate method to use. According to Rosenbaum and Rubin (1983), propensity scores provide the conditional probability of intervention assignment with consideration of all available covariates. Propensity score matching allows for matching individual intervention and comparison subjects based on their propensity scores, thus creating covariate equivalence between the groups. What Works Clearinghouse evidence standards (2014) also recognize propensity score matching as a high-quality quasi-experimental research method. Although other propensity matching methods could have been used (e.g., propensity score weighting, many-to-one matching), we used one-to-one to ensure baseline equivalence between the samples following What Works Clearinghouse evidence standards.

We calculated propensity scores based on school characteristics (see covariates in Table 1) using logistic regression as specified by Leite (2017). We created an intervention indicator, coded 1 for intervention schools and 0 for comparison schools, and then used this indicator as the dependent variable in a logistic regression model that included the 13 school-level covariates to predict intervention group assignment. The resulting propensity score for each school is the predicted probability of assignment to intervention or comparison given the included covariates.

Next, we used *MatchIt* (Ho, Imai, King, Stuart, & Whitworth, 2017) and *optmatch* (Hansen, Fredrickson, Buckner, Errickson, & Solenberger, 2018) in R 3.4.1 (R Core

Team, 2017) to conduct one-to-one optimal matching (Rosenbaum, 1989), wherein each intervention school was matched with a similar comparison school based on their propensity scores. This matching technique results in the smallest overall distance between matches. Comparison matches were found for all 544 intervention schools, indicating that intervention outliers were successfully matched to similar comparison schools and selection bias was reduced. To replicate procedures from previous studies based on What Works Clearinghouse standards (2014), we calculated standardized mean difference effect sizes ( $g$ ) and included unbalanced covariates ( $g > 0.05$ ) in the final outcome models (see Table 1).

**Estimation of intervention effects.** We used Poisson regression to accurately estimate intervention effects, as all 10 outcomes were scaled as frequency counts. Given the excessive number of zeros within these outcomes, we applied zero-inflated Poisson (ZIP) regression to model the data accurately and account for overdispersion (Long, 1997). Although a zero-inflated negative binomial model could have been used, we replicated prior studies using ZIP models. Furthermore, there remains empirical debate whether there is a clear reason to prefer the negative binomial to the Poisson even when overdispersion is present in the data (Woolridge, 2010). We then exponentiated ZIP model coefficients to ORs for interpretation. To confirm our model choices, we used the Vuong (1989) test comparing the ZIP with an ordinary Poisson regression model. The *pscl* 1.5.2 (Jackman, 2017) R package was used to estimate all ZIP models. As previously mentioned, we included all unbalanced covariates ( $g > 0.05$ ) in ZIP models per What Works Clearinghouse (2014) criteria for high-quality quasi-experimental studies. Specifically, we included the following: urbanicity; Title I eligibility; school level; total enrollment; FTE teachers; and percentages of students meeting or exceeding state ELA standards, students receiving FRL, SWD, students with LEP, Black students, and White students.

**Effect size calculations.** We transformed ZIP model ORs to standardized mean differences ( $g$ ) using the procedures outlined by Borenstein, Hedges, Higgins, and Rothstein (2009). This conversion increases the interpretability of intervention effects while controlling for unbalanced covariates, which meets What Works Clearinghouse standards (2014).

## Results

### *Establishing Baseline Equivalence*

We used propensity score matching to establish a covariate-equivalent untreated group of schools based on all available school-level characteristics (see Table 1). A quantile-quantile plot of covariate balance across the full sample prior to matching is provided in Figure 11 (see supplemental materials). Starting with 6,754 possible untreated schools, propensity score matching identified 544 untreated schools matched to the 544 schools implementing SWPBIS with fidelity, resulting in a final analytic sample of 1,088 schools. All covariates met the equivalence standard of  $g < .25$  calculated with the *optmatch* package (Hansen et al., 2018); results are reported in Table 1, and a quantile-quantile plot of matched schools is presented in Figure 12 (see supplemental materials). Of the 13 covariate equivalence values, 11 were  $>.05$ -SD units and thus were included in all outcome models as specified by What Works Clearinghouse (2014).

### *Intervention Effects for Primary Outcomes for All Students*

We estimated 10 ZIP models to evaluate differences in the following: the frequency of in-school suspension, the number of students with one OSS, the number of students with more than one OSS, all OSSs, OSS incidents, days missed due to OSS, expulsions, referrals to alternative schools for disciplinary reasons, referrals to law enforcement, and school-related arrests. Vuong tests for all 10 models confirmed the choice of the ZIP model (i.e.,  $p < .05$ ). In all models, we controlled for



**Table 2.** Zero-Inflated Poisson Regression Models for Discipline Outcomes for All Students.

Parameter	One OSS			All OSS			Days Missed due to OSS		
	Estimate	OR	SE	Estimate	OR	SE	Estimate	OR	SE
Intercept	-2.00		1.08	-2.12		1.16	-2.32*		1.16
SWPBIS <sup>a</sup>	-0.42*	0.66	0.20	-0.45*	0.63	0.22	-0.43*	0.65	0.22
Suburb	0.26	1.29	0.21	0.36	1.43	0.23	0.33	1.39	0.23
Town	-1.52**	0.22	0.55	-1.36*	0.26	0.56	-1.34*	0.26	0.56
Rural	0.15	1.16	0.45	0.05	1.05	0.49	0.07	1.07	0.49
Title I ineligible	1.25***	3.48	0.35	1.12**	3.07	0.38	1.23**	3.43	0.38
Middle school	-0.41	0.66	0.36	-0.28	0.76	0.38	-0.26*	0.77	0.38
High school	-0.24	0.79	0.68	-0.04	0.96	0.70	-0.02	0.98	0.70
Other configuration	2.70*	14.93	1.07	2.88**	17.84	1.11	2.86	17.39	1.12
Total enrollment	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00
FTE teachers	-0.01	0.99	0.04	-0.01	0.99	0.04	-0.02	0.98	0.04
Meet or exceed ELA standards in 2015–2016	0.03***	1.03	0.01	0.03**	1.03	0.01	0.03*	1.03	0.01
FRL	1.39	4.00	0.80	1.61	4.98	0.85	1.81	6.12	0.86
SWD	-2.14	0.12	2.23	-1.85	0.16	2.36	-1.58	0.21	2.37
LEP	0.46	1.59	0.77	-0.02	0.98	0.83	-0.01	0.99	0.83
Black students	-2.67*	0.07	1.30	-3.20*	0.04	1.47	-3.21	0.04	1.47
White students	-0.10	0.90	0.74	-0.11	0.90	0.80	-0.08	0.92	0.80

Note. Urban was the reference group for urbanicity. Title I eligible was the reference group for Title I status. Primary school was the reference group for school level. OSS = out-of-school suspension; OR = odds ratio; FTE = full-time equivalent; ELA = English language arts; FRL = free or reduced-price lunch; SWD = students with disabilities; LEP = limited English proficiency.

<sup>a</sup>SWPBIS is a dichotomous indicator for schools implementing schoolwide positive behavioral interventions and supports.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

unbalanced covariates: urbanicity; Title I eligibility; school level; total enrollment; FTE teachers; and percentages of students meeting or exceeding state ELA standards, students receiving FRL, SWD, students with LEP, Black students, and White students. Differences between schools implementing SWPBIS with fidelity and propensity score matched comparison schools were statistically significant for the number of students with one OSS, all OSSs, and days missed due to OSS. Results for models with statistically significant intervention effects are presented in Table 2. Nonsignificant outcomes (e.g., in-school suspensions, referrals to law enforcement) were similar to Gage and colleagues' (2019) findings (contact first author for complete tables).

### Intervention Effects for Subgroups

In addition to modeling outcomes for all students, we modeled differences across all 10 discipline outcomes for student subgroups,

including SWD, Hispanic students, and Black students. The number of Hispanic students who received one OSS was significantly lower in schools implementing SWPBIS with fidelity, and the number of Black students who received more than one OSS was significantly lower in schools implementing SWPBIS with fidelity. Perhaps most important, SWD in schools implementing SWPBIS with fidelity were significantly less often referred to alternative settings for disciplinary reasons when compared with SWD in comparison schools. Statistically significant results for SWD are presented in Table 3.

*Perhaps most important, SWD in schools implementing SWPBIS with fidelity were significantly less often referred to alternative settings for disciplinary reasons when compared with SWD in comparison schools.*

**Table 3.** Zero-Inflated Poisson Regression Models for Discipline Outcomes for Students With Disabilities.

Parameter	Referral to Alternative Schools for Disciplinary Reasons		
	Estimate	OR	SE
Intercept	4.61		3.85
SWPBIS <sup>a</sup>	-1.18*	0.31	0.58
Suburb	0.53	1.69	0.60
Town	-0.44	0.65	0.97
Rural	0.16	1.17	1.14
Title I ineligible	-1.29	0.28	0.85
Middle school	-3.03**	0.05	0.94
High school	-5.61***	0.00	1.47
Other configuration	-2.90	0.05	1.61
Total enrollment	0.00	1.00	—
FTE teachers	0.03	1.03	—
Meet or exceed ELA standards in 2015–2016	0.06	1.06	0.03
FRL	-1.48	0.23	2.55
SWD	1.17	3.23	8.34
LEP	1.04	2.82	2.59
Black students	2.70	14.93	3.41
White students	-1.88	0.15	2.31

Note. Urban was the reference group for urbanicity. Title I eligible was the reference group for Title I status. Primary school was the reference group for school level. OR = odds ratio; FTE = full-time equivalent; ELA = English language arts; FRL = free or reduced-price lunch; SWD = students with disabilities; LEP = limited English proficiency.

<sup>a</sup>SWPBIS is a dichotomous indicator for schools implementing schoolwide positive behavioral interventions and supports.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

## Effect Sizes

To increase interpretation of the intervention effects, we converted statistically significant ORs to standardized mean difference effect sizes ( $g$ ). We converted all outcomes for all students, including nonsignificant intervention effects, for reference. Overall, only the intervention effect for all OSSs meets What Works Clearinghouse (2014) standards for “substantively important” intervention effect ( $\geq 0.25$ ), although the effect is considered small in traditional effect size interpretations. Among the significant effect sizes, the largest effect size, with regard to magnitude of effect, was for SWD and the number of students referred to alternative settings for disciplinary reasons. SWD are over a half standard deviation less likely to be referred to an alternative setting in schools implementing SWPBIS with fidelity ( $g = -0.65$ ; see Table 4).

## Discussion

In this study, we replicated and extended prior state-level quasi-experimental evaluations of the effect of implementing SWPBIS with fidelity on reducing disciplinary exclusions. A total of 544 California schools implemented universal SWPBIS with fidelity during the 2015–2016 school year, and we used propensity score matching to identify an equivalent comparison group of 544 schools not implementing SWPBIS. Results suggest that implementation of universal SWPBIS with fidelity significantly reduced OSSs for all students, and the effect size was clinically significant ( $g = -0.25$ ; What Works Clearinghouse, 2014); however, no significant differences were found for other types of disciplinary exclusions for all students.

*Results suggest that implementation of universal SWPBIS with fidelity*

**Table 4.** Covariate-Adjusted Effect Sizes for Discipline Outcomes.

Sample: Discipline outcome	OR	<i>g</i>
All students		
ISS	1.05	0.03
I OSS	0.66	-0.23
>I OSS	0.78	-0.14
All OSSs	0.63	-0.25
OSS incidents	0.69	-0.21
Days missed due to OSS	0.65	-0.24
Expulsions	1.05	0.03
Referrals to alternative schools for disciplinary reasons	1.12	0.06
Referrals to law enforcement	0.94	-0.03
School-related arrests	1.05	0.03
SWD: Referrals to alternative schools for disciplinary reasons	0.31	-0.65
Hispanic: I OSS	0.67	-0.22
Black: >I OSS	0.72	-0.18

Note. OR = odds ratio; *g* = standardized mean difference; ISS = in-school suspension, OSS = out-of-school suspension; SWD = students with disabilities.

*significantly reduced OSSs for all students, and the effect size was clinically significant.*

The results mirror those found by Gage et al. (2019) in Florida, which may not be surprising given the similar sample sizes between the studies. Yet, the effect size in Florida was over twice that found in California. The smaller effect size may be due to statewide efforts in California to reduce suspension rates. In 2015, California passed legislation limiting the use of suspensions for “willful defiance” and saw an overall reduction of 77% in suspensions resulting from defiant behavior (California Department of Education, 2017b). In light of the significant statewide reductions in suspensions, the significant and meaningful effect size may in fact reflect the added value of implementing universal SWPBIS with fidelity. Also, Florida suspends more students than almost any other state (Losen et al., 2015); therefore, there is a greater range between schools, and direct comparison of effect sizes may be limited.

The null results also mirror those found in Florida—specifically for in-school suspensions, referral to law enforcement, and expulsion. The null findings for the most severe

disciplinary exclusions are not surprising given their limited use and that they are typically the result of the most severe incidents (e.g., bringing weapons to school, physical aggression toward staff). Universal SWPBIS does not specifically target severe behavioral incidents and, as such, does not appear to have a substantial influence on their occurrence. The lack of findings for in-school suspensions are noteworthy, as they both replicate the findings in Florida (Gage et al., 2019) and counter the findings in Georgia (Gage, Lee, et al., 2018). The results suggest that schools implementing universal SWPBIS with fidelity use in-school suspensions at rates similar to comparison schools, yet, when contextualized with the reduction in OSSs, the interpretation is more positive. Taken together, the results suggest that schools are relying on in-school suspensions for incidents that may have previously resulted in OSS; thus, those behavioral incidents are not reflected as in-school suspensions. It is possible that there may in fact be a concurrent reduction in the number of students receiving in-school suspensions for less severe behavioral incidents, but, unfortunately, it is not possible to confirm this hypothesis from administrative data. Nonetheless, more research on the use of in-

school suspensions is warranted—specifically, when and how it is used and if any changes to its use are made following implementation of universal SWPBIS with fidelity.

The positive and statistically significant results related to SWD are encouraging, as they provide rigorous empirical support for the influence that universal SWPBIS can have. Across all of the included outcomes, the largest statistically significant effect size was found for removal of students from their home schools to alternative schools for behavioral reasons. SWD in California schools implementing SWPBIS with fidelity are significantly less likely to be removed from their schools and placed in alternative schools ( $g = -0.65$ ). This is particularly important given the research suggesting that students in alternative schools, including SWD, continue to receive similar disciplinary exclusions while earning less course credit and having lower attendance rates than those of equivalent students in traditional public schools (Wilkerson et al., 2016). Implementing universal SWPBIS with fidelity may in fact create environments that are predictable, with clear and consistent behavioral expectations, and provide positive reinforcement for appropriate behavior, thereby increasing the likelihood that students are engaged and meeting those school expectations and thus providing environments where all students, particularly SWD, can be successful. Although we did not disaggregate referrals to alternative schools for different age groups in this study, we suggest that future research assess these potential differences. Lehr et al. (2009) indicated that, at the time, most alternative schools served ninth through 12th graders, but there was a noted increase in those serving first through fifth graders. To date, no research has found that universal SWPBIS can have such a positive and meaningful effect on SWD. The finding in California—that schools can reduce the removal of SWD to alternative settings by over half a standard deviation based on the outcomes from >500 schools—is encouraging and worth continued study.

## Limitations

We made extensive efforts to ensure that this study represented high-quality quasi-experimental designs, but there are limitations to note. First, this study relied solely on administrative data, including reporting of fidelity of implementation and all outcomes. There is no way to confirm independently the reliability of the TFI scores that schools provided to the California PBIS Coalition; thus, we are unable to corroborate that these schools truly implemented Tier 1 with fidelity. We are confident in their accuracy, as schools receive extensive training and support, but no reliability data are available at the state level. Similarly, there is a possibility that outcome data were reported inaccurately; however, we believe that the required reporting for the Office for Civil Rights increases the likelihood that data are representative of actual outcomes. Second, as is the case in all quasi-experimental studies, there may be unmeasured confounds not included in the propensity score matching that possibly influence the dependent variables. For example, some schools may be implementing other behavior-focused initiatives. Future research may consider more in-depth evaluations of all schools, including policy and initiatives related to discipline. Third, California implemented a statewide initiative to reduce suspensions due to “willful defiance” in January 2015 (California Department of Education, 2017b). Although this legislation may have influenced observed suspension rates in 2015–2016, it was applied to all schools across the state at the same time; thus, schools in either group had an equal chance of being affected by the policy. Therefore, we are able to assess differences between schools implementing SWPBIS with fidelity and matched comparison schools because they were equally affected. Last, this study is a quasi-experiment relying on administrative data and not a randomized experiment. Although the propensity score matching approach is designed to control for possible confounds and include an equivalent comparison group, only randomized experiments can eliminate all potential confounds.

## Conclusion

Universal SWPBIS is widely implemented to reduce schoolwide problem behavior (Sugai & Horner, 2009). A growing evidence base has found statistically significant and meaningful reductions of disciplinary exclusions in schools implementing universal SWPBIS with fidelity. This study replicated those prior studies (Gage et al., 2019; Gage, Lee, et al., 2018) and extended the analyses to include SWD. The results were congruent with prior research but also extended the findings by identifying a statistically significant and large effect size for reducing the number of SWD removed from their home schools and placed in alternative schools for behavior reasons. This finding, alongside the other positive effects, highlights the potential value-add that implementing universal SWPBIS with fidelity can have on disciplinary exclusions for all students, particularly for SWD.

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## Supplemental Materials

The supplemental material is available in the online version of the article.

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