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An Exploration of the Relationship Between PBIS and Discipline Outcomes for Students With Disabilities

Brandi Simonsen, PhD[1], Jennifer Freeman, PhD[1], Anthony J. Gambino, PhD[1], Sandra Sears, MA[1], Katherine Meyer, PhD[1], and Robert Hoselton, BA[2]

Abstract

To support all students, including students with disabilities, many schools have adopted a positive behavioral interventions and supports (PBIS) framework. Although rigorous research documents the beneficial effects of Tier 1 PBIS for all students and emerging research extends these findings to students with disabilities, there has not been a national U.S. study focused on PBIS and discipline outcomes for students with disabilities. In this exploratory study, we combine existing national data sets to explore the relationship between (a) known PBIS exposure (i.e., being in the PBIS data set) and fidelity (i.e., meeting the criterion on an established fidelity measure of Tier 1 PBIS) and (b) exclusionary discipline for students with disabilities. Using two-part path analysis, we document that PBIS may be associated with decreased use of suspension; however, findings are less consistent for other discipline outcomes. This study highlights the critical need for more accurate data on discipline outcomes and further research on effective intervention.

Keywords

PBIS, positive behavioral interventions and supports, students with disabilities, exclusionary discipline

Students with disabilities are more likely to experience exclusionary discipline (e.g., suspensions, expulsions) than their peers without disabilities (U.S. Department of Education Office for Civil Rights, 2018). Although some scholars argue that factors other than disability (e.g., race, gender, SES) contribute more significantly to this discipline gap (cf. Morgan et al., 2019), there is a general consensus that the (a) intersection of disability, race (Black), and gender (male) are collectively associated with increased use of exclusionary discipline and (b) students with disabilities are at higher risk for exclusionary discipline than peers without disabilities (e.g., Fabelo et al., 2011; Sullivan et al., 2014). Students who experience exclusionary discipline are more likely to experience poor outcomes in school and later in life, including incarceration—a phenomenon described as the "school-to-prison pipeline" (Fabelo et al., 2011; Hemez et al., 2020; Skiba et al., 2014). Therefore, it is critical to invest in the effective intervention approaches to reduce exclusionary discipline and improve outcomes for students with disabilities.

Supporting Students With Disabilities Within a PBIS Framework

By definition, students with disabilities require individualized, specially designed instruction and other supports to be successful. To provide a strong foundation for individualized support, skilled educators design school and classroom environments to be inclusive and supportive of all students, including students with disabilities. Multi-tiered systems of support frameworks, like positive behavioral interventions and supports (PBIS), have emerged as effective ways to design, implement, and monitor universal support in academic, social, emotional, and behavioral domains (Sugai & Horner, 2009, 2020).

Overview of PBIS

PBIS is a widely adopted prevention framework for improving social, emotional, behavioral, and academic outcomes for all students (Sugai & Horner, 2020). In defining the PBIS framework, the Office of Special Education Programs National Technical Assistance Center on Positive Behavioral Interventions and Supports (2021) emphasizes three interrelated core features (systems, data, and practices) to promote

[1]University of Connecticut, Storrs, USA
[2]University of Oregon, Eugene, USA

Corresponding Author:
Brandi Simonsen, University of Connecticut, 249 Glenbrook Road, Unit 3064, Storrs, CT 06269-3046, USA.
Email: brandi.simonsen@uconn.edu

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equitable implementation and outcomes for all students, including students with disabilities. First, schools implementing PBIS invest in systems to support implementation. Systems include, for example, a representative leadership team; comprehensive professional development; proactive and instructive discipline policy; and active involvement from faculty, student, family, and community members (Freeman et al., 2021).

Second, schools implementing PBIS collect and use data to monitor and evaluate implementation fidelity and outcomes (Center on Positive Behavioral Interventions and Supports, 2020). PBIS is a problem-solving framework: School leadership teams actively use data to match interventions with student needs, identify implementation strengths and challenges, guide intervention adjustments or enhancements, and promote benefit for all students, including students with disabilities. Teams' use of data is a key feature related to sustained implementation of PBIS (McIntosh et al., 2013).

Third, schools implementing PBIS use the framework to organize evidence-based practices into a three-tier continuum of support: Primary (Tier 1) universal support practices for all students; secondary (Tier 2) targeted supports for smaller groups of students who display social, emotional, or behavioral risk; and tertiary (Tier 3) individualized supports for students with the most intensive needs. Although students benefit when schools implement the full continuum of support, schools are more likely to implement Tier 1 than advanced tiers. More than 10,000 U.S. schools report meeting the fidelity criterion for Tier 1, whereas 5,000 and 3,000 U.S. schools report implementing Tiers 2 and 3 at similar levels, respectively (Center on Positive Behavioral Interventions and Supports, 2021). Furthermore, rigorous research documents the beneficial effects of Tier 1 PBIS. Specifically, implementation of Tier 1 PBIS with fidelity (documented with an established fidelity measure) is associated with (a) enhanced school climate (Bradshaw et al., 2009), (b) improved academic (Horner et al., 2009; Lee & Gage, 2020) and social-emotional (Bradshaw et al., 2012), outcomes, and (c) reduced exclusionary discipline (Bradshaw et al., 2010, 2012; Horner et al., 2009). Therefore, the Center on PBIS recommends educators implement and differentiate Tier 1 support to (a) create a supportive and inclusive environment and (b) improve outcomes for all students, including students with disabilities (Simonsen et al., 2020).

Promise of Tier 1 PBIS for Students With Disabilities

Preliminary evidence suggests students with disabilities may benefit when schools implement Tier 1 PBIS. Specifically, small-scale or state-level analyses indicate students with disabilities may experience (a) increases in prosocial behavior and emotional regulation and (b) decreases in clinical symptoms, aggressive or challenging behavior, concentration problems, office referrals, suspensions, physical restraint, and referrals to alternative schools (Benner et al., 2010; Bradshaw et al., 2012; Farkas et al., 2012; Gage, Grasley-Boy, et al., 2019; Grasley-Boy et al., 2019; Loman et al., 2017; Simonsen et al., 2010). Given (a) the national scope of technical assistance provided by the Center on PBIS, (b) the promising outcomes and large-scale implementation of Tier 1 PBIS in U.S. schools, and (c) the variability in policy and practice across states (e.g., Gage, Whitford, et al., 2019; Zhang et al., 2004), a national exploration of Tier 1 PBIS implementation and outcomes for students with disabilities would benefit the field.

Exploring a Relationship Between Tier 1 PBIS and Outcomes for Students With Disabilities

To date, there has not been a comprehensive national evaluation of the relationship between implementing Tier 1 PBIS with fidelity and outcomes for students with disabilities in the United States. In part, this is due to challenges with existing national data sets. More than 20,000 U.S. schools use PBISApps (www.pbisapps.org)—an online data management system supported by the Center on PBIS—to document PBIS fidelity and outcome data; however, school staff have not consistently recorded data on students' disabilities in this system. Fortunately, the Civil Rights Data Collection (CRDC) captures information about the number of students with disabilities who experience various outcomes in reported years for all U.S. schools. Unfortunately, there are known challenges with underreporting exclusionary discipline outcomes in the CRDC data set.

Challenges and Opportunities With the CRDC Data Set

The U.S. Government Accountability Office (U.S. GAO, 2019) reviewed the 2015–2016 CRDC data set and concluded, "CRDC data do not accurately capture all incidents of restraint and seclusion in schools" (p. 3)—70% of school districts reported zero incidents of restraint or seclusion. The National Council on Disability (2015, June) raised similar concerns with underreporting of restraint, seclusion, suspension, expulsion, and other discipline outcomes for students with disabilities in earlier waves of CRDC data. Despite known challenges with underreporting, the CRDC data set presents a unique opportunity to (a) examine the percentage of schools reporting data and (b) among schools reporting data, explore the relationship between implementing Tier 1 PBIS and exclusionary discipline for students with disabilities. In the absence of more comprehensive and

accurate data, the CRDC data sets provide one of the only opportunities for large-scale analysis of the relationship between intervention approaches and discipline outcomes at the national level.

Purpose of Study

This study combines national data sets to explore the relationship between Tier 1 PBIS (PBIS data set) and exclusionary discipline for students with disabilities (CRDC data set) in U.S. schools reporting data, addressing two exploratory evaluation questions:

- **EQ1.** Is there a relationship between known PBIS exposure (i.e., schools represented in the PBIS data set, regardless of fidelity) and the number of students with disabilities who experience exclusionary discipline?
- **EQ2.** Is there a relationship between Tier 1 PBIS implementation fidelity and the number of students with disabilities who experience exclusionary discipline?

Method

Sample

We retrieved extant data to document the independent (known PBIS exposure and fidelity) and dependent (counts of students with disabilities experiencing exclusionary discipline) variables from the PBIS Assessment and CRDC data sets, respectively. These data sets represent (a) a national sample of all schools required to report data to CRDC and (b) schools that choose to report PBIS fidelity data to the Center on PBIS.

PBIS data set. We retrieved PBIS fidelity data from (a) the Center on PBIS (University of Oregon, 2019) for all U.S. states and districts, except Florida, and (b) Florida's PBIS Project. Once merged, this PBIS data set contained information on PBIS fidelity measurements for participating schools in all 50 states and Washington, DC, for academic years ranging from 2008 to 2017. Schools in this data set had known exposure to PBIS; however, other schools in the CRDC data set may have been exposed to PBIS (unknown), as described in study limitations. Table 1 presents the descriptive statistics for schools in the combined PBIS data set for the 3 academic years when CRDC data are available (i.e., focus years for this study).

CRDC data set. We retrieved CRDC data sets from the U.S. Department of Education's Office of Civil Rights to examine outcome data for schools in all 50 states and Washington, DC. Specifically, we included CRDC data from the 2011–2012, 2013–2014, and 2015–2016 academic years—the only years with data available during this time period.[1] For each wave, Table 2 presents counts of school types, student population, students with disabilities, and students with disabilities who experience each exclusionary discipline consequence (described subsequently).

Final analysis sample. After merging the data sets, the sample sizes for the 2011–2012, 2013–2014, and 2015–2016 analysis models with known PBIS exposure as the independent variable (Evaluation Question 1) were 85,081 schools (14,715 districts), 88,107 schools (15,516 districts), and 89,068 schools (16,008 districts), respectively. The sample sizes for the 2011–2012, 2013–2014, and 2015–2016 models with PBIS fidelity status as the independent variable (Evaluation Question 2) were 3,313 schools (813 districts), 3,091 schools (820 districts), and 4,058 schools (955 districts), respectively (see Table 2).

Measures

PBIS fidelity. We modeled two independent variables in this secondary analysis. First, we created a known PBIS exposure variable for each academic year, coding schools as a 1 or 0 based on whether or not they were in PBIS data set each year. Second, we created a Tier 1 PBIS fidelity variable for each academic year. We assigned schools a 0 if they did not reach the fidelity criterion on any of the three included fidelity measures in each academic year and a 1 if they reached the Tier 1 fidelity criterion for at least one of the three included measures in each academic year (see Table 2). In particular, we considered the following fidelity measures.

School-wide Evaluation Tool (SET; Horner et al., 2004). The SET is an external evaluation of Tier 1 PBIS fidelity, which is typically completed annually via staff and student interviews, a school observation, and permanent product reviews. The SET contains 28 items, and schools with total scores at or above 80% are considered to be implementing with adequate fidelity (e.g., Freeman et al., 2016; Kim et al., 2018). The SET has established psychometric properties with adequate internal consistency ($\alpha = .96$), test–retest agreement ($r = 97\%$), and interobserver agreement ($M = 99\%$) in prior samples (Horner et al., 2004).

Benchmarks of Quality (BoQ; Kincaid et al., 2010). The BoQ is a Tier 1 annual evaluation that combines PBIS team members' perspectives and the perspective of an internal or external coach. The BoQ contains 53 items, and schools with total scores at or above 70% are considered to be implementing with adequate fidelity. The BOQ also has established psychometric properties, with adequate internal consistency ($\alpha = .96$), test–retest reliability ($r = .94$), and interrater agreement ($M = 89$) in prior samples (Cohen et al., 2007).

Table 1. Descriptive Information About U.S. Schools in the PBIS and CRDC Databases by Academic Year.

	PBIS			CRDC		
Sample Characteristics	2011–2012	2013–2014	2015–2016	2011–2012	2013–2014	2015–2016
Schools in sample (*n*)	5,845	5,233	5,791	95,258	95,147	95,835
School enrollment (*M*)						
All students	518	511	524	521	524	525
Students with disabilities	—	—	—	71	68	70
Schools with each grade (*M* %)						
Preschool	26.9	26.6	28.2	29.6	30.4	31.2
Kindergarten	64.1	63.0	64.6	53.7	53.1	53.2
Grade 1	65.4	64.2	65.7	54.3	53.7	53.8
Grade 2	65.7	64.4	66.1	54.2	53.8	53.9
Grade 3	65.8	64.3	66.2	54.2	53.8	53.9
Grade 4	65.3	63.8	65.8	53.9	53.4	53.5
Grade 5	63.3	61.7	63.4	52.6	51.9	51.9
Grade 6	37.2	36.7	36.8	37.4	36.2	36.3
Grade 7	26.6	27.6	26.9	31.0	30.4	30.6
Grade 8	26.3	27.6	26.8	31.1	30.7	30.8
Grade 9	11.1	12.3	11.8	25.9	25.3	25.2
Grade 10	11.1	12.2	11.9	25.8	25.4	25.5
Grade 11	11.0	12.1	11.8	25.9	25.5	25.5
Grade 12	11.0	12.1	11.8	25.8	25.4	25.5
Students identifying as (*M* %)						
American Indian/Alaska Native	1.4	1.6	1.5	2.0	1.9	1.9
Asian	3.5	3.6	3.8	3.5	3.6	3.7
Hispanic of any race	16.7	17.6	20.5	20.2	21.4	22.3
Black	15.0	12.6	12.8	15.8	15.3	15.4
White	59.7	60.0	56.8	55.3	54.2	52.8
Hawaiian Native/Pacific Islander	0.2	0.6	0.3	0.5	0.4	0.4
Two or more races	3.4	3.9	4.3	2.7	3.1	3.6
Female	48.1	48.0	48.1	47.5	47.6	47.6
Free/reduced lunch eligible	53.9	54.6	55.6	—	—	—

Note. The PBIS data described here do not include the Florida PBIS data, as the Florida PBIS data set did not contain these data. PBIS = positive behavioral interventions and supports; CRDC = Civil Rights Data Collection.

Tiered Fidelity Inventory (TFI; Algozzine et al., 2014). The TFI assesses PBIS implementation fidelity at all three tiers. The Tier 1 scale is intended to be completed by the school SWPBIS team, with facilitation from an external coach or coordinator who is knowledgeable about SWPBIS systems. The Tier 1 scale contains 15 items, and schools with total scores at or above 70% are considered to be implementing with adequate fidelity. McIntosh et al. (2017) documented psychometric properties of the TFI, establishing content (favorable ratings from expert panel) and concurrent validity (statistically significant correlations with established fidelity measures), usability (favorable ratings from users), interrater and test–retest reliability (intraclass correlations [ICCs] = .99), and internal consistency (α = .96) in prior samples.

We used three established fidelity measures for several reasons. First, schools widely use all three tools, and state or regional support may influence tool selection (e.g., some states prioritize one tool for their school recognition systems). Therefore, using all three tools provides a more complete national picture of school fidelity across geographic regions. Second, although each fidelity measure varies slightly in the specific items measured, all tools measure the critical features of Tier 1 PBIS implementation. Furthermore, Mercer et al. (2017) established convergent validity among the three tools, with *r*s ranging between .63 and .93 ($p < .001$). Third, researchers have used similar approaches to incorporate data from multiple fidelity tools (e.g., Freeman et al., 2015, 2016). Thus, our approach aligns with prior research practices.

Table 2. Descriptive Information About Known PBIS Exposure and Fidelity (Independent Variables) by Academic Year.

Schools in Sample	2011–2012	2013–2014	2015–2016
Sample for research question 1 (known PBIS exposure)			
Schools in sample (*n*)	85,147	88,107	89,068
Schools in PBIS data set (%)	7.3	6.5	7.3
Sample for research question 2 (PBIS fidelity)			
Schools with fidelity measurements (*n*)	3,313	3,091	4,058
Schools with >1 fidelity measurement (%)	6.2	9.0	7.1
Schools meeting ≥1 fidelity criterion (%)	79.1	81.2	75.3
Breakdown by fidelity measure			
School-wide evaluation tool			
Schools with measurements (*n*)	1,016	761	415
Schools meeting fidelity criterion (%)	85.9	86.2	79.0
Benchmarks of quality			
Schools with measurements (*n*)	2,653	2,729	2,355
Schools meeting fidelity criterion (%)	75.9	79.7	76.6
Tiered fidelity inventory			
Schools with measurements (n)	—	—	1,744
Schools meeting fidelity criterion (%)	—	—	69.6

Note. These values correspond only to the data included in the analyses. The total number of districts ranged from 14,776 to 16,008 and included districts from all 51 U.S. states (counting Washington, DC, as its own state). The number of districts with fidelity measurements ranged from 813 to 955 and included districts from 32 to 39 states (counting Washington, DC, as its own state). PBIS = positive behavioral interventions and supports.

Exclusionary discipline. Outcome measures represent the proportion of students with disabilities who experienced each type of discipline at least once in each school each year (see Table 3). That is, each outcome measure reflects the number of students with disabilities who experienced at least one instance of a specific discipline outcome in each school divided by the total number of students with disabilities in each school. We explored five outcomes: expulsions, physical restraints, seclusions, in-school suspensions, and out-of-school suspensions, which Civil Rights Data Collection [CRDC] (n.d.) consistently defined across data collection waves.

Expulsions. When the local educational agency removes a student from their regular school for the remainder of the school year or longer, possibly for disciplinary purposes, it is known as expulsion. In this study, expulsions included expulsions under zero tolerance policies, expulsions with educational services, and expulsions without educational services (CRDC, n.d.).

Physical restraints. Physical restraint is "a personal restriction that immobilizes or reduces the ability of a student to move his or her torso, arms, legs, or head freely. The term physical restraint does not include a physical escort. Physical escort means a temporary touching or holding of the hand, wrist, arm, shoulder or back for the purpose of inducing a student who is acting out to walk to a safe location" (CRDC, n.d.).

Seclusions. "Seclusion refers to the involuntary confinement of a student alone in a room or area from which the student is physically prevented from leaving. It does not include a time-out, which is a behavior management technique that is part of an approved program, involves the monitored separation of the student in a non-locked setting, and is implemented for the purpose of calming" (CRDC, n.d.).

In-school suspensions. "In-school suspension is an instance in which a child is temporarily removed from his or her regular classroom(s) for at least half a day for disciplinary purposes, but remains under the direct supervision of school personnel. Direct supervision means school personnel are physically in the same location as students under their supervision" (CRDC, n.d.).

Out-of-school suspensions. "For students with disabilities served under IDEA: Out-of-school suspension is an instance in which a child is temporarily removed from his/her regular school for at least half a day for disciplinary purposes to another setting (e.g., home, behavior center). Out-of-school suspensions include both removals in which no individualized family service plan (IFSP) or individualized education plan (IEP) services are provided because the removal is 10 days or less as well as removals in which the child continues to receive services according" (CRDC, n.d.).

Analysis

Given known issues with a large number of schools reporting zero instances of outcome variables in the CRDC data set, we treated each outcome variable as semicontinuous (Olsen & Schafer, 2001). We used Mplus version 8 (Muthén

Table 3. Descriptive Information About Exclusionary Discipline (Outcome Variables) for Students With Disabilities by Academic Year.

Academic year	Outcome	Schools with outcome measurements (*n*)	Schools with 0 students with disabilities experiencing each outcome (%)	Students with disabilities experiencing each outcome (*M* %)
2011-2012	Expulsions	85,053	91.7	6.7
	Physical restraints	84,799	86.1	6.9
	Seclusions	84,808	95.9	9.3
	In-school suspensions	84,540	46.6	17.5
	Out-of-school suspensions	84,644	30.1	17.0
2013-2014	Expulsions	87,692	92.9	8.3
	Physical restraints	88,070	87.8	7.6
	Seclusions	88,084	96.0	10.2
	In-school suspensions	87,431	48.4	16.2
	Out-of-school suspensions	87,446	33.2	16.3
2015-2016	Expulsions	88,627	92.2	6.8
	Physical restraints	88,540	85.3	7.6
	Seclusions	88,614	95.2	9.8
	In-school suspensions	88,435	46.9	16.0
	Out-of-school suspensions	88,453	31.0	15.9

Note. The number of districts ranged from 14,755 to 16,000 and included districts from all 51 U.S. states (counting Washington, DC, as its own state).

& Muthén, 2017) to estimate two-part path analysis models for each wave of data (Boulton & Williford, 2018; Olsen & Schafer, 2001). Specifically, we used the "DATA TWOPART" command to create two new variables for each outcome: A binary variable that is 0 if the original outcome was 0 and 1 if it was nonzero, and a continuous variable that is missing if the original outcome was 0 and the original value if the original outcome was nonzero. The continuous variable allowed us to explore effects among schools reporting at least one instance of each outcome. Each of the continuous variables had positively skewed distributions, even after the removal of the zeroes. Therefore, we log-transformed each continuous variable in the analyses, which successfully improved the normality of their distributions (see Table 4).

We then constructed multivariate path analysis models and estimated (a) a logistic regression for each path from an independent variable to a binary part of an outcome and (b) a log regression for each path from an independent variable to a continuous part of an outcome. We used this approach, within each available academic year, to estimate two models. First, we explored the effects of known PBIS exposure (i.e., whether the school was in the PBIS data set that year) as the independent variable. Second, we explored the effects of PBIS fidelity (i.e., whether the school implemented with fidelity that year) as the independent variable. Because researchers have linked school enrollment to discipline outcomes for students with disabilities (Camacho & Krezmien, 2019), we grand-mean centered the total school enrollment for each year and included it as a covariate in all models (see Figure 1 for path diagram models for each year).

We handled missing data using full information maximum likelihood (FIML) estimation with robust standard errors, which produces unbiased estimates assuming the data are missing at random (MAR). We used FIML cluster-robust standard errors via the "TYPE = COMPLEX" command in Mplus 8 to account for the clustering by district in the data. This was necessary because each part of the outcome variables contained considerable variation explained by the district clustering. Table 5 reports the ICCs for each part of the outcome variables.

Although we estimated effects on the continuous portions of the outcomes, these estimates may be less trustworthy due to there being low covariance coverage within the data. Covariance coverage is a pairwise measure of the proportion of sample units with observations on both variables being considered (e.g., if half of the sample had observed values for both known PBIS exposure and the continuous part of the expulsions outcome, their covariance coverage would be 0.5). Muthén and Muthén (2017) suggest 0.10 as a guideline for minimum covariance coverage. Values in this study fell below 0.10, which may have led to the estimation algorithm not adequately handling the missingness in the continuous parts of the outcomes. Therefore, evaluate effects on the continuous parts of the outcomes with some caution.

Results

We performed hypothesis tests for the effects of known PBIS exposure and PBIS fidelity on each of the discipline outcomes within each year's models to evaluate the strength

Table 4. Improvements in the Skewness and Kurtosis of the Outcomes After Log-Transformations.

		Raw		Log-transformed	
Analysis model	Outcome	Skewness	Kurtosis	Skewness	Kurtosis
2011–2012 known PBIS exposure	Expulsions	4.53	29.07	0.41	0.12
	Physical restraints	4.70	31.18	0.47	0.47
	Seclusions	3.79	18.57	0.43	0.15
	In-school Suspensions	1.70	3.34	−0.16	−0.67
	Out-of-school suspensions	1.94	4.87	−0.17	−0.42
2013–2014 Known PBIS exposure	Expulsions	4.15	20.54	0.61	0.27
	Physical restraints	4.98	31.41	0.62	0.70
	Seclusions	3.74	16.66	0.53	0.14
	In-school suspensions	2.14	6.19	−0.11	−0.60
	Out-of-school suspensions	2.39	7.86	−0.11	−0.27
2015–2016 Known PBIS exposure	Expulsions	5.36	37.06	0.52	0.51
	Physical restraints	5.12	33.42	0.57	0.68
	Seclusions	3.73	17.68	0.41	0.06
	In-school suspensions	2.15	6.32	−0.10	−0.58
	Out-of-school suspensions	2.48	8.55	−0.11	−0.25
2011–2012 Tier 1 PBIS fidelity	Expulsions	3.97	19.25	0.66	0.40
	Physical restraints	5.01	36.79	0.43	0.38
	Seclusions	2.53	8.25	0.27	−0.34
	In-school suspensions	1.90	3.80	0.07	−0.78
	Out-of-school suspensions	1.87	4.20	−0.17	−0.49
2013–2014 Tier 1 PBIS fidelity	Expulsions	4.13	17.51	1.02	1.29
	Physical restraints	4.82	37.06	0.41	−0.04
	Seclusions	3.98	24.82	0.33	−0.18
	In-school suspensions	2.31	7.86	0.01	−0.70
	Out-of-school suspensions	2.35	8.13	−0.12	−0.35
2015–2016 Tier 1 PBIS fidelity	Expulsions	5.46	40.95	0.72	0.61
	Physical restraints	3.70	20.63	0.27	−0.20
	Seclusions	3.82	25.63	0.09	−0.05
	In-school suspensions	2.14	6.98	−0.09	−0.68
	Out-of-school suspensions	2.38	8.82	−0.16	−0.35

Note. Excess kurtosis is reported here, which subtracts 3 from the traditional kurtosis. Kline (2016) recommends considering skewness values between −3 and +3 and excess kurtosis values between −10 and +10 to be acceptable for structural equation modeling. The goal of the transformation is to make the variables' distributions more like the normal distribution, which has skewness and excess kurtosis values of 0. PBIS = positive behavioral interventions and supports.

of the relationships. We report results for each evaluation question.

Relationship Between Known PBIS Exposure and Exclusionary Discipline (Question 1)

To address the first evaluation question, we explored the relationship between known PBIS exposure (i.e., schools in the PBIS data set, regardless of fidelity) and the use of exclusionary discipline for students with disabilities. First, across all waves of data, schools in the PBIS data set were generally more likely to report that at least one student with a disability experienced each type of exclusionary discipline outcome (binary model) than other schools ($p < .01$; see top left quadrant of Tables 6–8). The one exception was expulsion—schools exposed to PBIS were less likely to indicate expelling one or more students with a disability. Second, among schools reporting data (continuous model), students with disabilities were less likely ($p < .05$) to experience in-school suspensions in schools exposed to PBIS. Other findings were inconsistent for the relationship between known PBIS exposure and discipline outcomes across years (see bottom left quadrant of Tables 6–8).

Relationship of PBIS Fidelity With Exclusionary Discipline (Question 2)

To address the second evaluation question, we explored the relationship between PBIS fidelity and discipline outcomes for students with disabilities in schools represented in the

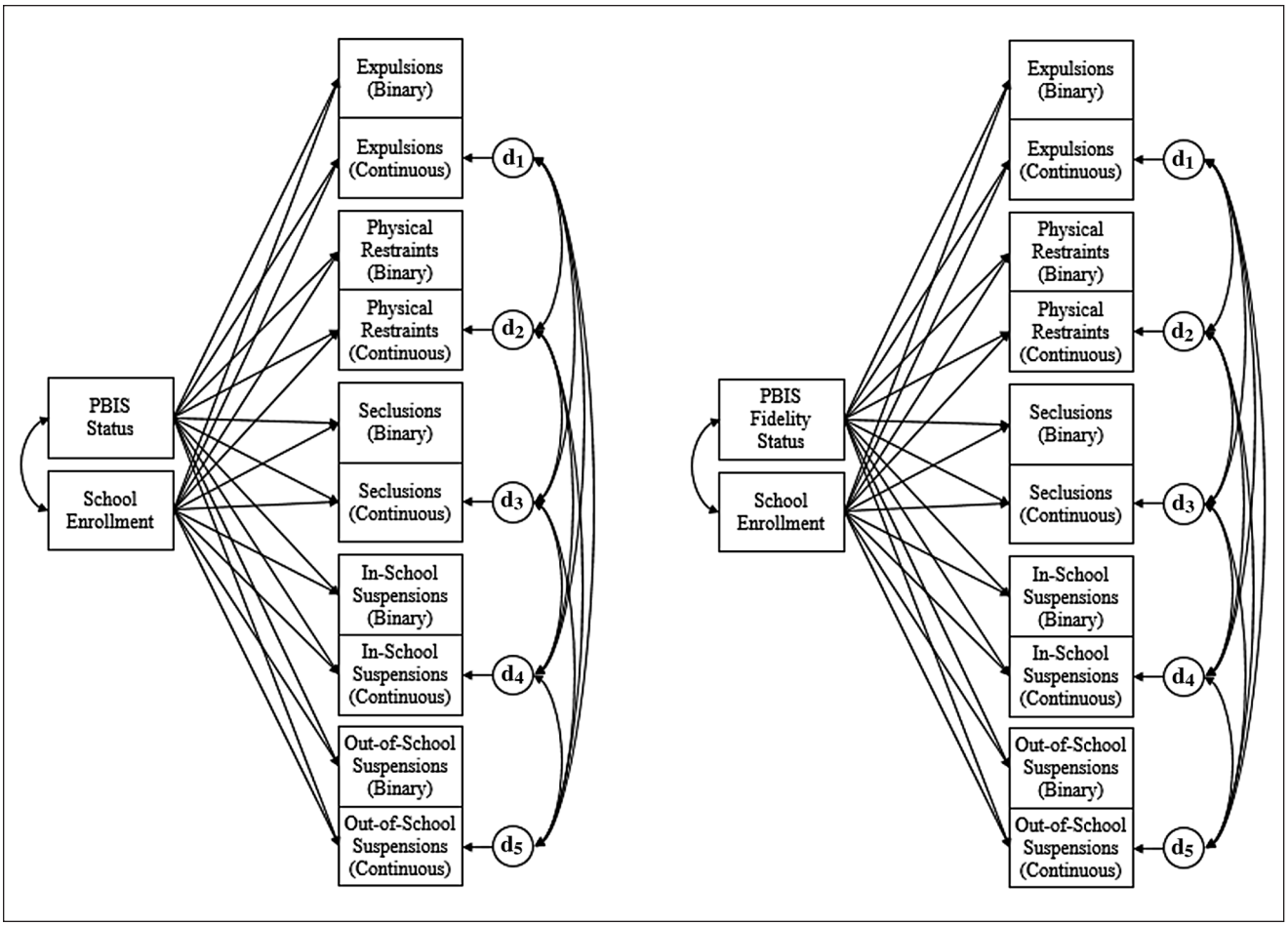

Figure 1. Path diagrams of two-part path analysis models within each year.
Note. PBIS status represents known PBIS exposure (i.e., schools in the PBIS data set), and PBIS fidelity status represents schools meeting fidelity criterion on at least one fidelity measure. Paths to the binary parts of outcomes represent logistic regression, paths and paths to the continuous parts of outcomes represent log regression paths. PBIS = positive behavioral interventions and supports.

Table 5. Intraclass Correlation Coefficients for Schools' Outcomes Nested Within U.S. Districts by Year.

	ICCs for district clustering		
Outcome	2011–2012	2013–2014	2015–2016
Having students with disabilities with expulsions	0.380	0.442	0.422
Having students with disabilities with physical restraints	0.469	0.551	0.555
Having students with disabilities with seclusions	0.613	0.667	0.679
Having students with disabilities with in-school suspensions	0.298	0.326	0.321
Having students with disabilities with out-of-school suspensions	0.311	0.374	0.370
Proportion of students with disabilities with expulsions	0.391	0.476	0.394
Proportion of students with disabilities with physical restraints	0.174	0.206	0.237
Proportion of students with disabilities with seclusions	0.168	0.242	0.273
Proportion of students with disabilities with in-school suspensions	0.171	0.204	0.224
Proportion of students with disabilities with out-of-school suspensions	0.191	0.219	0.234

Note. The proportion variables were log-transformed prior to modeling. ICCs = intraclass correlation coefficients.

Table 6. Predictions Based on Two-Part Path Analysis Model Results for 2011–2012 for a School of Average Size.

	Known PBIS exposure		Tier I PBIS fidelity	
Outcome	Not in data set	In PBIS data set	Not at fidelity	At fidelity
Binary model: probability of having students with disabilities with nonzero				
Expulsions	0.076*	0.062*	0.086***	0.048***
Physical restraints	0.131***	0.233***	0.240	0.272
Seclusions	0.038***	0.080***	0.076	0.082
In-school suspensions	0.537***	0.590***	0.629	0.598
Out-of-school suspensions	0.722***	0.797***	0.860**	0.799**
Continuous model: proportion of students with disabilities with nonzero				
Expulsions	0.047	0.046	0.050	0.054
Physical restraints	0.049	0.049	0.047	0.048
Seclusions	0.053	0.052	0.046	0.048
In-school suspensions	0.112*	0.106*	0.120*	0.103*
Out-of-school suspensions	0.118	0.125	0.161***	0.122***

Note. Known PBIS exposure reflects whether a school was represented in the PBIS data set, regardless of implementation fidelity. Tier I PBIS fidelity indicated whether they met at least one fidelity criterion on an established PBIS fidelity measure (School-wide Evaluation Tool, Benchmarks of Quality, and/or Tiered Fidelity Inventory). PBIS = positive behavioral interventions and supports.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 7. Predictions Based on Two-Part Path Analysis Model Results for 2013–2014 for a School of Average Size.

	Known PBIS exposure		Tier I PBIS fidelity	
Outcome	Not in data set	In PBIS data set	Not at fidelity	At fidelity
Binary model: probability of having students with disabilities with nonzero				
Expulsions	0.064*	0.052*	0.046	0.050
Physical restraints	0.116***	0.199***	0.136***	0.215***
Seclusions	0.037***	0.084***	0.068	0.087
In-school suspensions	0.518***	0.579***	0.629	0.610
Out-of-school suspensions	0.694***	0.782***	0.878**	0.824**
Continuous model: proportion of students with disabilities with nonzero				
Expulsions	0.050	0.049	0.046	0.049
Physical restraints	0.052	0.050	0.046	0.043
Seclusions	0.053	0.052	0.049	0.046
In-school suspensions	0.105***	0.092***	0.097*	0.086*
Out-of-school suspensions	0.115	0.113	0.136***	0.106***

Note. Known PBIS exposure reflected whether a school was represented in the PBIS data set, regardless of implementation fidelity. Tier I PBIS fidelity indicated whether they met at least one fidelity criterion on an established PBIS Fidelity measure (School-wide Evaluation Tool, Benchmarks of Quality, and/or Tiered Fidelity Inventory). PBIS = positive behavioral interventions and supports.
*$p < .05$. **$p < .01$. ***$p < .001$.

PBIS data set. First, across all waves of data, schools implementing PBIS with fidelity were less likely to report any students with a disability receiving out-of-school suspensions than schools not implementing with fidelity ($p < .01$; binary model); however, findings for other outcomes were inconsistent. When compared with schools not implementing with fidelity, schools implementing PBIS with fidelity were less likely to report any students with disabilities experiencing out-of-school suspension ($p < .01$), but they were more likely to report at least one student with a disability experiencing physical restraint or seclusion (binary model; statistical significance varied by year; see top right quadrant of Tables 6–8). Second, among schools reporting data (continuous model), findings consistently indicated that schools implementing PBIS with fidelity were less likely to suspend students with disabilities than schools not implementing PBIS with fidelity ($p < .05$); however, the relationship between fidelity and other discipline outcomes was less clear (see Figure 2 and bottom right quadrant of Tables 6–8).

Table 8. Predictions Based on Two-Part Path Analysis Model Results for 2015–2016 for a School of Average Size.

	Known PBIS exposure		Tier 1 PBIS fidelity	
Outcome	Not in data set	In PBIS data set	Not at fidelity	At fidelity
Binary model: probability of having students with disabilities with nonzero				
Expulsions	0.071**	0.052**	0.050	0.041
Physical restraints	0.141***	0.218***	0.179	0.217
Seclusions	0.044***	0.088***	0.051**	0.085**
In-school suspensions	0.533***	0.596***	0.652	0.622
Out-of-school suspensions	0.717***	0.790***	0.848**	0.802**
Continuous model: proportion of students with disabilities with nonzero				
Expulsions	0.046*	0.041*	0.049	0.042
Physical restraints	0.052**	0.049**	0.042	0.044
Seclusions	0.053**	0.048**	0.039	0.045
In-school suspensions	0.104***	0.092***	0.104***	0.085***
Out-of-school suspensions	0.113	0.109	0.124***	0.100***

Note. Known PBIS exposure reflected whether a school was represented in the PBIS data set, regardless of implementation fidelity. Tier 1 PBIS fidelity indicated whether they met at least one fidelity criterion on an established PBIS Fidelity measure (School-wide Evaluation Tool, Benchmarks of Quality, and/or Tiered Fidelity Inventory). PBIS = positive behavioral interventions and supports.
*$p < .05$. **$p < .01$. ***$p < .001$.

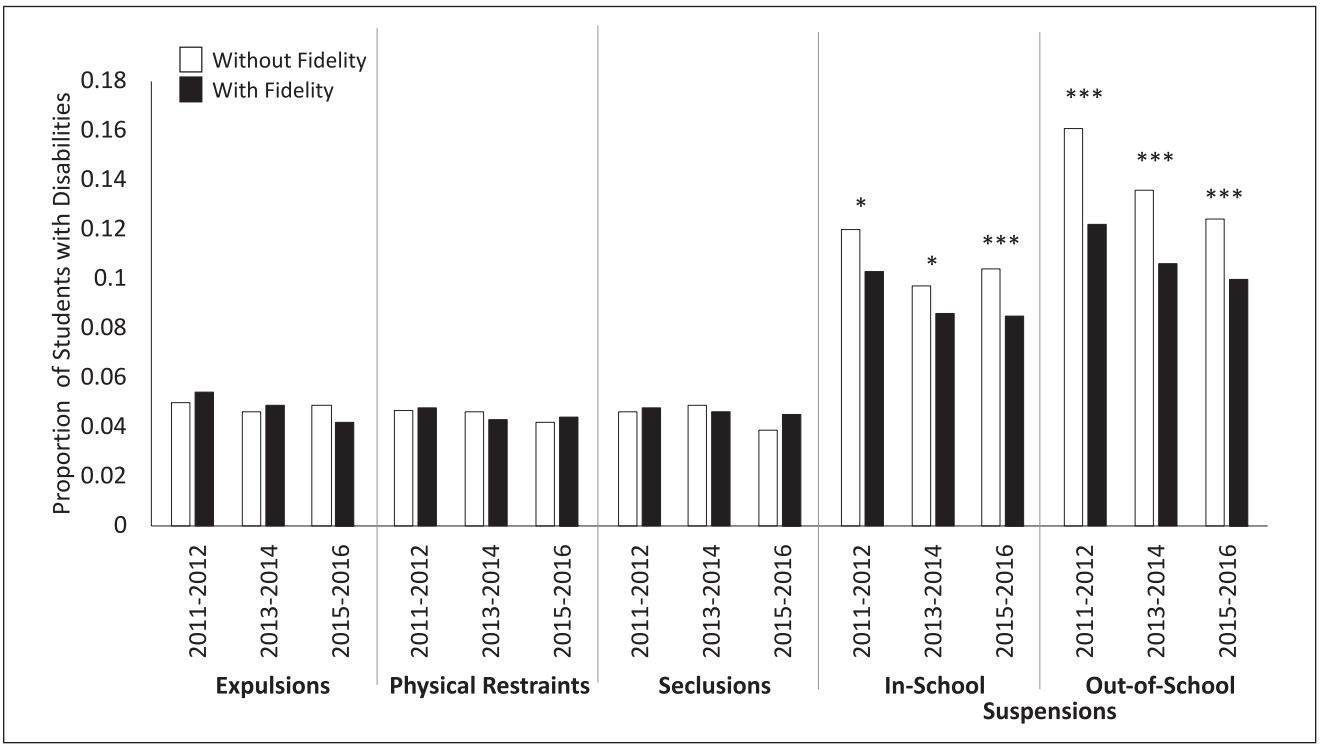

Figure 2. Proportion of students with disabilities experiencing reactionary and exclusionary discipline in U.S. schools implementing PBIS with and without fidelity across three waves of CRDC data.
Note. PBIS = positive behavioral interventions and supports; CRDC = Civil Rights Data Collection.
*$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

In this preliminary evaluation, we explored the relationships between (a) known PBIS exposure and fidelity (EQs 1 and 2, respectively) and (b) exclusionary discipline for students with disabilities. We briefly discuss study findings, limitations, and implications.

Summary of Findings

There are three key findings. First, schools in the PBIS data set were more likely to report data indicating at least one student with a disability experienced exclusionary discipline (binary model) for every disciplinary outcome except expulsions. Similarly, schools implementing PBIS with fidelity were more likely to report data indicating at least one student with a disability experienced restraint and seclusion across all waves of data, though findings only reached statistical significance in 1 year for each outcome. One interpretation of these findings is that schools exposed to PBIS are more likely to use some types of exclusionary discipline for students with disabilities, potentially because schools with higher discipline rates pursue PBIS (e.g., Pas et al., 2019). However, given the known issues of schools underreporting discipline outcomes for students with disabilities (U.S. GAO, 2019; National Council on Disability, 2015, June), another explanation is that schools implementing and sustaining PBIS may be more likely to collect, use, and report discipline data (e.g., McIntosh et al., 2013), as PBIS is a problem-solving framework that emphasizes data-based decision making as a core feature (Center on Positive Behavioral Interventions and Supports, 2021).

Second, among schools reporting data (continuous model), students with disabilities appeared less likely to experience in-school suspension in schools exposed to PBIS; however, the relationship was less clear for other outcomes. As Gage, Lee, et al. (2018) demonstrated, schools implementing PBIS at "emerging" fidelity levels may decrease their use of in-school suspension, whereas other outcomes (e.g., out-of-school suspension) may improve further with higher, "operational" fidelity levels (p. 222).

Third, among schools reporting data (continuous model) and consistent with prior research (e.g., Gage, Grasley-Boy, et al., 2019), students with disabilities were consistently less likely to experience in-school or out-of-school suspensions in schools implementing Tier 1 PBIS with fidelity. Findings were again less clear for other discipline outcomes. In prior research linking PBIS to decreased crisis intervention (e.g., restraint), schools implemented the full continuum of PBIS support (e.g., Simonsen et al., 2010); thus, implementation of targeted (Tier 2) and intensive (Tier 3) support may be necessary to reduce these disciplinary outcomes for students with disabilities. In sum, PBIS (known exposure and fidelity) may be associated with fewer suspensions for students with disabilities; however, more research is needed to refine our understanding of this and other relationships between PBIS and discipline outcomes for students with disabilities.

Limitations of the Study

Although promising, study results should be interpreted in light of the following limitations. First, this study explored the association but did not attempt to document a causal relation, between PBIS (known exposure and fidelity) and student outcomes. Second, there are known concerns with underreporting in CRDC data set, especially for indicators of restraint and seclusion (cf. U.S. GAO, 2019; National Council on Disability, 2015, June). We attempted to account for this using a two-part model to look into the binary (whether schools reported any outcome data) and continuous (outcomes among schools reporting data) aspects of these outcome data. Within this approach, however, we used FIML to address missing data, and it is possible that data were not MAR (e.g., schools with higher rates of exclusionary discipline may have been less likely to report). Therefore, we encourage caution with interpreting exploratory findings.

Third, although complex modeling of large national data sets provides an important opportunity to conduct large-scale analysis, it involves a series of data transformation and modeling decisions. Although we made every attempt to (a) make unbiased decisions, (b) address known issues in each data set, and (c) transparently describe those decisions in the Method section, different modeling approaches may have resulted in different outcomes. For example, although supported by past research (e.g., Mercer et al., 2017), establishing a single categorical cut point between implementing and not implementing PBIS with fidelity across multiple measures may not accurately capture the true level of fidelity at which Tier 1 PBIS is effective for improving student outcomes. For the purposes of this study, however, this categorial approach matched how schools conceptualize fidelity (i.e., criterion is met or not met) and allowed exploration of outcomes related to established criteria across measures.

Fourth, although many schools implementing PBIS report data to the National or FL PBIS Centers, it is possible that (a) these schools made errors in their assessment and/or fidelity reporting and (b) additional schools, not in the PBIS data set, had been exposed to PBIS or were implemented with varying levels of fidelity. Furthermore, there are other unmeasured variables that may have influenced discipline outcomes.

Finally, we do not have data on the extent to which students with disabilities participated in or benefited from Tier 1 PBIS within the existing data sets. Because prior research indicates variability in the participation of students with disabilities (Shuster et al., 2017), the data on implementation fidelity may overestimate, or inaccurately reflect, the level of implementation students with disabilities experienced in some schools. Furthermore, because students with disabilities have individualized needs, they may require targeted (Tier 2) and/or intensive (Tier 3) supports. Therefore,

future studies should explore the effects of implementing a full continuum of support on discipline outcomes.

Implications for Practice and Research

Despite limitations, this study suggests important implications for practice and research. First, given noted limitations in the national CRDC data set, we recommend districts, states, and federal agencies improve guidance and accountability to ensure schools consistently collect and report accurate data on exclusionary discipline for all students, including students with disabilities (U.S. GAO, 2019). Second, this exploratory study provides promising evidence that students with disabilities may be less likely to experience in-school and out-of-school suspensions in schools implementing Tier 1 PBIS. Therefore, we suggest schools consider implementing support within a PBIS framework to create safe, positive, and predictable environments for all students, including students with disabilities.

Third, further research is needed to (a) explore specific strategies to differentiate and intensify Tier 1 PBIS practices to more effectively support students with disabilities, (b) examine the effects of implementing a full continuum of PBIS support for students with disabilities, (c) explore differences among subgroups of students with disabilities (e.g., race/ethnicity, gender, language status, school level), and (d) examine additional approaches to reduce exclusionary discipline for students with disabilities. Although rigorous experimental research is necessary to document the effects of PBIS implementation on disciplinary outcomes for students with disabilities, the field would also benefit from state-level or national exploratory studies of the full continuum of PBIS support (e.g., schools implementing Tiers 1, 2, and 3 with fidelity) and outcomes for students with disabilities. Furthermore, we encourage researchers to routinely collect, report, and examine data disaggregated by student demographics (e.g., disability, race/ethnicity, gender, language status) to consider equitable outcomes among subgroups in addition to overall effects (cf. Bradshaw et al., 2012).

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ORCID iD

Brandi Simonsen https://orcid.org/0000-0002-1561-1686

Note

1. CRDC does not report data annually (see https://www2.ed.gov/about/offices/list/ocr/data.html).

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