Variables Associated with Enhanced Sustainability of School-wide

Positive Behavioral Interventions and Supports

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Abstract

Practice sustainability is important to ensure that students have continued access to evidence-based practices. In this study, respondents from a national sample of 860 schools at varying stages of implementing school-wide positive behavioral interventions and supports (SWPBIS) were administered a research-validated measure of factors predicting sustained implementation of school-based practices. School demographic characteristics and specific school team actions were assessed to indicate which variables were most strongly associated with the four sustainability factors. Findings showed that in general, school demographic characteristics were not significantly related to sustainability. School team actions, especially the frequency of sharing data with the whole school staff, were statistically significantly related to sustainability. Implications for enhancing sustainability of school-based practices are discussed.

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In a recent study of directions for school psychology research (McIntosh, Martinez, Ty, & McClain, 2013), prominent researchers indicated the growing need for empirical research in implementation science, the study of how practices are adopted, implemented, and sustained (Forman et al., 2013) . Within implementation science, practice sustainability represents a significant challenge worthy of study. Practice sustainability can be defined as "a practice's potential for durable implementation with high fidelity, when considering features of the practice, its implementation, and the context of implementation" (McIntosh & Turri, 2014, p. 2062). Hence, sustainability references elements (including features of the practice itself, activities in the practice's implementation, and the context of the implementation site) that make the practice more durable (Durlak & DuPre, 2008). As such, an important facet of measurement in implementation science is the difference between *sustained implementation*, which is the outcome, and *sustainability*, which is the presence of variables that predict sustained implementation. The literature base indicates a range of variables linked to sustained implementation (Domitrovich et al., 2008; Fixsen, Blase, Duda, Naoom, & Van Dyke, 2010; Gersten, Chard, & Baker, 2000; Han & Weiss, 2005; McIntosh, Filter, Bennett, Ryan, & Sugai, 2010). However, it is important to identify which of these variables are most strongly related to the potential for durable implementation at strong fidelity. Identifying these pivotal variables can help researchers and practitioners predict and prevent practice abandonment, which is costly in terms of resources, morale, and most importantly, student outcomes (Hume & McIntosh, 2013).

School Demographic Characteristics as Potential Predictors of Sustained Implementation

One set of variables that have been noted as potentially important to sustainability (and therefore worthy of further study) are school demographic characteristics, particularly those related to racial or socioeconomic diversity, or differences in school structure, such as school size or grade levels served (Forman et al., 2013). School demographic characteristics are hypothesized as important because some characteristics (e.g., low community socioeconomic status [SES]) are associated with greater risk of inconsistent implementation or abandonment (Bradshaw & Pas, 2011), and practices developed or tested with primarily white, middle class student samples may not be as effective for the diverse student populations seen in many U.S. schools (Durlak & DuPre, 2008; Forman et al., 2013; D. C. Gottfredson, 2001). In addition, high schools are often regarded as more challenging contexts for implementing school-wide interventions, based on their structure, staff size, and strong content focus (Flannery, Sugai, & Anderson, 2009).

The limited empirical research on school characteristics as predictors of sustained implementation is inconsistent. One study found that both low SES and high minority student body composition were factors related to low implementation and sustainability of a school-based cognitive-behavioral intervention (G. D. Gottfredson, Jones, & Gore, 2002). A national study of school violence prevention interventions found that high enrollment (i.e., school size), urbanicity (i.e., community population density), and low SES were significant predictors of low levels of implementation but were no longer significant when considering program characteristics, such as standardization of materials and integration into typical operating practices (Payne & Eckert, 2010).

In addition to research regarding school-based interventions in general, a number of recent studies have specifically examined predictors of implementation of school-wide positive

behavioral interventions and supports (SWPBIS; Sugai, Horner, & McIntosh, 2008). SWPBIS is

a widely used approach for promoting prosocial behavior and reducing problem behavior.

Bradshaw and Pas (2011) found that high student enrollment (but not low SES) was a significant

barrier to SWPBIS implementation. Molloy and colleagues (2013) found that grade levels served

(i.e., high schools), high enrollment, and low SES were negatively related to implementation.

Frank and colleagues (2009) found that SES was unrelated to implementation, but

implementation was higher for schools with moderate racial diversity (25 to 50% non-white)

than for schools with high or low diversity. Given these inconsistent findings to date, school

demographic characteristics deserve further study as potential predictors of sustained

implementation.

School Team Actions as Potential Predictors of Sustained Implementation

Even considering the small research base on school demographic characteristics, there is

even less research on school implementer actions as they relate to SWPBIS implementation.

Existing research has focused more on provider characteristics (e.g., levels of training, self-

efficacy of school personnel) or the importance of a team-based approach in general than specific

strategies that school teams can take after adoption (Durlak & DuPre, 2008; Payne & Eckert,

2010). Research investigating school team access to coaching as predictive of implementation is

inconclusive (Bradshaw & Pas, 2011; Domitrovich et al., 2008). Some research has indicated

that simply whether the school team uses data for decision making is a particularly important

predictor of sustainability of SWPBIS (Coffey & Horner, 2012; McIntosh, Mercer, et al., 2013),

but effects of the frequency of specific team actions (as opposed to whether they are used at all)

has not been assessed to date. It is possible that the frequency of these actions--rather than their

presence--are stronger predictors of sustained implementation.

Purpose of the Study

The purpose of this study was to assess the extent to which school demographic characteristics and frequencies of school team actions were associated with increased likelihood of sustained implementation of SWPBIS. Such research has the potential to inform researchers and practitioners regarding the most important variables to target to enhance implementation and sustainability of school-based interventions. The current study used a large sample, a research-validated measure of contextual elements predicting sustained implementation, and a range of predictors to extend previous sustainability research into what structural and functional facilitators are most related to sustainability. The use of multiple predictors within a structural equation modeling approach allowed assessment of each variable's unique association with potential for sustained implementation.

Method

Participants and Settings

The study assessed a total of 860 schools across 14 states implementing SWPBIS. One individual with knowledge regarding each school's SWPBIS systems (e.g., School SWPBIS team member, district coach) participated for each school. Table 1 presents the most recent National Center for Education Statistics demographic data available for schools (99%, $n = 851$).

Measures

Practice sustainability. The *School-wide Universal Behavior Sustainability Index: School Teams* (SUBSIST; McIntosh, Doolittle, Vincent, Horner, & Ervin, 2009) is a measure of factors predicting sustained implementation of school-wide behavior support interventions that has been validated for this purpose. Respondents rate the extent to which each variable is present at that time in their school for 39 items, with responses in a 4-point Likert-type scale (e.g., 1 =

not true, 4 = *very true*). The SUBSIST's psychometric properties have been studied extensively,

including a content validity study with an expert panel (content validity index = .95), a pilot

study (α = .87, interrater reliability = .95, two-week test-retest reliability = .96), factor analytic

studies with two separate samples, and studies with three separate samples showing strong

prediction of sustained SWPBIS implementation (r range = .45 to .68; McIntosh et al., 2011;

McIntosh, Mercer, et al., 2013; Mercer, McIntosh, Strickland-Cohen, & Horner, 2014; Runge,

Gorlaski, & Wagner, 2013). Factor analyses have shown a four-factor structure, with two school-

level factors, School Priority (20 items, α = .94) and Team Use of Data (11 items, α = .94) and

two district-level factors, District Priority (5 items, α = .71) and Capacity Building (3 items, α =

.74).

School demographic characteristics. Data on school demographic characteristics were

used to assess associations with SUBSIST factors. Self-reported years implementing SWPBIS

was divided into groups of 0 to 1 years, 2 to 4 years, and 5 or more years to indicate stages of

implementation identified by Adelman and Taylor (initial implementation, institutionalization,

and ongoing evolution; 1997). Data from the National Center for Education Statistics included

grade levels served (elementary, middle, or high school), enrollment, urbanicity (on a scale of 1

to 4, using the federal categories of rural, town, suburb, and city), percent of non-white students,

and percent of students receiving free and/or reduced price lunch.

School team actions. As part of the SUBSIST administration, respondents were asked to

self-report the frequency of three sets of actions. These actions were (a) frequency of SWPBIS

team meetings (on a 5-point scale from every other month to weekly), (b) frequency of sharing

data with the whole school staff (on a 10-point scale from less than once per year to weekly), and

(c) hours of SWPBIS coaching received (on a 7-point scale from none to more than 5 hours per week).

Procedure

Data for the current study came from the first year of a 3-year project examining implementation and sustainability of SWPBIS. For recruitment, state SWPBIS teams shared details at training events or sent emails to schools either implementing or preparing to implement SWPBIS through state or district training events. A member of each school team participated by completing the SUBSIST online. Demographic data were obtained through the NCES website.

Data Analyses

Structural equation modeling in M*plus* 7.1 (Muthén & Muthén, 2012) was used to assess each variable's unique association with the four latent factors of the SUBSIST, using the mean- and variance-corrected weighted least squares (WLSMV) estimator. Standard errors were corrected for nesting of schools within districts using the M*plus* COMPLEX command (Asparouhov, 2005), and continuous predictors were centered at the grand mean. Model fit was assessed through examining the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA), using the common criteria of CFI > .95, TLI > .95, and RMSEA < .06 (Hu & Bentler, 1999). Missing data (6% of the data, including "don't know/NA") were handled using multiple imputation with 1000 M*plus* datasets. Given the large sample size, and 4 DVs, the alpha level was set conservatively at $\alpha = .001$.

<div align="center">

Results

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Intercorrelations among predictors are provided in Table 2. Fit for the structural equation model was adequate on all indicators other than chi-square, χ^2 (1011) = 2098.026, $p < .001$, CFI = .923, TLI = .914, RMSEA = .035. Table 3 presents the unstandardized beta weights for the

regressions for each latent SUBSIST factor. For School Priority, significant predictors included years implementing SWPBIS, grade levels served, and frequency of data sharing with staff. For Team Use of Data, significant predictors were years implementing SWPBIS, grade levels served, frequency of team meetings, and frequency of data sharing with staff. For District Priority, the significant predictor was frequency of data sharing with staff. For District Capacity Building, significant predictors included frequency of data sharing with staff and access to coaching.

Discussion

In this study, school demographic characteristics and school team actions were assessed for their relation with a research-validated measure of sustainability for 860 schools implementing SWPBIS. Although grade levels served and years implementing were both significant predictors of school-level factors, other school demographics, such as percent of students receiving free or reduced lunch and percent of non-white students, were not significantly related to sustainability. Frequency of team meetings and access to coaching were each related to one sustainability factor, whereas the frequency of teams sharing data with all school staff was significantly related to all four sustainability factors.

Results regarding school demographics were consistent with existing SWPBIS research indicating little to no effects of these variables on implementation. It is possible that challenging contexts (e.g., low SES) may provide the motivation to adopt and sustain effective practices because they are seen as instrumental in achieving valued outcomes and avoiding experiences of failure (Andreou, McIntosh, Ross, & Kahn, in press; Baker, Gersten, Dimino, & Griffiths, 2004). In support of this hypothesis, Bradshaw and Pas (2011) found that schools experiencing higher rates of suspension, mobility, and academic failure were significantly more likely to adopt SWPBIS. In addition, the non-standardized framework of SWPBIS allows adaptation for

culturally and linguistically diverse student bodies, with substantial decreases in problem

behavior in schools with large non-white populations (Bohanon et al., 2006; McIntosh, Moniz,

Craft, Golby, & Steinwand-Deschambeault, 2014; Scott, 2001) Additional support for this point

comes from research showing statistically significantly lower discipline disproportionality for

schools implementing SWPBIS (Vincent, Swain-Bradway, Tobin, & May, 2011).

The findings that high schools in particular had lower scores on school-level

sustainability factors is consistent with descriptive literature regarding the challenges associated

with implementing SWPBIS in high schools, such as cultivating and maintaining staff support

(Flannery et al., 2009). However, recent research indicates that implementation to criterion is

possible and leads to significant reductions in problem behavior compared to control schools

(Flannery, Fenning, Kato, & McIntosh, 2014). Interestingly, high schools had much higher

district-level sustainability factor scores. Because high schools are often the last schools in a

district that implement SWPBIS, we hypothesize that this delay in implementing may benefit

high schools because there are already solid district SWPBIS systems in place, leading to district

policies, resources, and training and coaching structures that support school level

implementation. As a result, high school SWPBIS teams may be able to rely on more solid

district systems to overcome challenges in their implementation.

In contrast to school demographic characteristics, school team actions were more strongly

associated with sustainability, especially the frequency of sharing of data with the entire school

staff, the only significant predictor of all four sustainability factors. In addition to continuing to

document the importance of the use of data for sustainability (Coffey & Horner, 2012; McIntosh,

Mercer, et al., 2013), these results point to the importance of a specific action for teams to take to

enhance sustainability. In addition to the team's general use of data (which is one of the

sustainability factors), the actual frequency of sharing the data and the decisions based on them with the entire staff on a regular basis may enhance sustainability.

Although the SUBSIST's Team Use of Data factor includes an item assessing whether data are presented to all school personnel at least quarterly, the strong association between the actual frequency of sharing data with staff and all four sustainability factors is important to note. As seen in Figure 1, this frequency was strongly related to overall sustainability. This finding points to a potential mechanism in sustainability. By sharing data frequently with school staff, the school team may enhance not just data-based decision making, but also the priority of the practice for staff and administrators and strengthen perceptions that implementation leads to valued outcomes. However, it is important to note that although sharing data with staff may seem like a pivotal strategy in sustainability, more research is needed, due to the correlational nature of this study. It is possible that sharing data with staff is more accurately regarded as an outcome of administrator support, collection of data, and skills in interpreting data than an effective intervention in of itself. As a result, further research is needed to assess whether data sharing itself is causally related to sustainability.

[Insert Figure 1 about here]

Access to coaching was a significant predictor for District Capacity Building, which is logical because coaching is a primary method of supporting schools in implementation, but it was not a predictor of the school-level factors. This finding is consistent with some previous SWPBIS research, in which in general, the amount of coaching is related to sustained implementation, but not when other factors are considered (Bradshaw & Pas, 2011; Mathews, McIntosh, Frank, & May, 2014). One interpretation is that coaching is only a strong predictor when it is effective (e.g., related to improved implementation quality by the team), but not when

it does not improve practices. For example, schools that are struggling may receive additional coaching, which may falsely indicate that coaching is negatively related to outcomes.

Limitations and Future Research

These results should be interpreted in light of a few key limitations that should be validated through future research. Although three previous studies have shown the SUBSIST factors to be strongly related to actual fidelity of implementation of SWPBIS, the outcome was the potential for sustained implementation, not sustained implementation itself. These results should be viewed as tentative until they are further replicated with longitudinal fidelity of implementation. In addition, relying on schools that elect to participate in a national study may have biased the responses. Finally, these results are most applicable to sustainability of SWPBIS, and they may not generalize to other school practices. Future research should assess the relations among school demographics, school team actions, and sustainability for a range of school-based interventions, such as academic RTI initiatives, social-emotional learning programs, and school mental health practices. It may be possible that different school characteristics or team actions are more predictive of sustainability for these practices.

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Table 1

School Demographic Data

Demographic Variable	*n* (N =860)	*Mean* or % (SD)
Enrollment	851	537.18 (341.801)
% of Students Receiving FRL	847	49.7% (23.4%)
% of Non-white Students	849	39.9% (30.5%)
Grade Level	825	
Primary	562	68.1%
Middle	165	20.0%
High	98	11.9%
Urbanicity	851	
Rural	211	24.8%
Town	122	14.3%
Suburb	279	32.8%
City	239	28.1%
Years Implementing SWPBIS	860	
0 to 1 Years	212	24.7%
2 to 4 Years	410	47.7%
5 or more	238	27.7%

Note. School demographic data obtained from National Center for Education Statistics for 99% of schools. * FRL = free and/or reduced lunches.

Table 2

Intercorrelations among Predictor Variables

	1	2	3	4	5	6	7	8	9
1. Years Implementing	--	-.053	.050	.081*	.050	-.070*	-.102**	-.003	.041
2. Grade Levels		--	.371**	-.109**	-.048	-.106**	.068	.029	.004
3. Enrollment			--	.183**	.196**	-.172**	-.059	-.084*	.082
4. Urbanicity				--	.550**	.219**	-.077*	-.113**	-.027
5. % Non-white					--	.512**	-.143**	-.148**	-.025
6. % Free/Reduced						--	-.001	-.029	-.077
7. Team Meetings							--	.154**	-.035
8. Data Sharing								--	.052
9. Coaching									--

Note. n range = 776-860. $^{*}p < .05.$ $^{**}p < .01.$ $^{***}p < .001.$

Table 3

Results of Latent Regression Analyses Predicting Each Sustainability Factor

| | Sustainability Factor | | | |
Predictor	School Priority B	Team Use of Data B	District Priority B	District Capacity Building B
Years Implementing	0.103*	0.166*	0.018	0.028
Grade Levels	-0.150*	-0.157*	-0.073	-0.111
Enrollment	-0.066	-0.028	-0.002	-0.106
Urbanicity	-0.034	-0.062	-0.095	-0.108
% of Non-white Students	-0.036	-0.126	0.279	0.279
% of Students with Free/Reduced Meals	-0.017	-0.031	-0.132	-0.411
Frequency of Team Meetings	0.038	0.114*	0.021	0.112
Frequency of Sharing Data with Staff	0.073*	0.162*	0.064*	0.079*
Access to Coaching	0.001	0.006	0.045	0.094*
Variance Explained	R^2	R^2	R^2	R^2
	.223*	.367*	.137*	.211*

Note. n = 860. *p < .001. Unstandardized beta weights presented.

Figure 1. Associations between Frequency of Data Sharing and Overall Sustainability