Article

Hammill Institute on Disabilities

Journal of Positive Behavior Interventions
2014, Vol. 16(3) 168–178

DOI: 10.1177/1098300713484065
jpbi.sagepub.com
SAGE

Critical Features Predicting Sustained Implementation of School-Wide Positive Behavioral Interventions and Supports

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Abstract

The current study explored the extent to which a common measure of perceived implementation of critical features of Positive Behavioral Interventions and Supports (PBIS) predicted fidelity of implementation 3 years later. Respondents included school personnel from 261 schools across the United States implementing PBIS. School teams completed the Positive Behavioral Interventions and Supports Self-Assessment Survey to self-assess fidelity of implementation in different PBIS settings (school-wide, nonclassroom, classroom, individual). These scores were then analyzed to assess whether certain items predicted the fidelity of PBIS implementation, as assessed through another fidelity of implementation measure, the School-Wide Benchmarks of Quality, 3 years later. Regression analyses indicated that self-reported fidelity of implementation of Classrooms Systems significantly predicted sustained implementation and student outcomes, as assessed through levels of Office Discipline Referrals. Within Classroom Systems, regular acknowledgment of expected behaviors, matching instruction to student ability, and access to additional support were the strongest predictors of sustained implementation. Results are discussed in terms of critical areas for focusing PBIS training to increase the likelihood of sustained implementation.

Keywords

positive behavior support, prevention, sustainability, implementation science

Schools are complex host environments that serve a diverse student population with unique skills, strengths, and challenges (Kame'enui, Simmons, & Coyne, 2000). Because students spend more than 14,000 hr in the school environment from Kindergarten to Grade 12, school personnel have prime opportunities to implement and sustain practices that promote academic, social-emotional, and behavioral success of their students. School-Wide Positive Behavioral Interventions and Supports (PBIS; Sugai & Horner, 2006) is a preventive approach that has been adopted by more than 14,000 schools in the last 15 years (Center on Positive Behavioral Interventions and Supports, 2012) and has been associated with valued outcomes such as (a) decreases in office discipline referrals (ODRs), suspensions, and expulsions; (b) increases in classroom instructional time, positive student–teacher interactions, academic achievement, and social and emotional competency; and (c) improvement in social climate (e.g., Algozzine & Algozzine, 2007; Bradshaw, Mitchell, & Leaf, 2010; Bradshaw, Waasdorp, & Leaf, in press; Luiselli, Putnam, Handler, & Feinberg, 2005; Nelson, 1996; Scott & Barrett, 2004). Typical implementation of PBIS includes addressing the school-wide, nonclassroom, classroom, and individual settings (Sugai, Horner, & Todd, 2000). All school personnel are involved in establishing the school-wide framework of behavior support, which provides a common foundation that is then incorporated into classroom and nonclassroom settings (Lewis & Sugai, 1999). However, implementation is often dependent on individual classroom teachers, whose regular interactions with students are intended to be consistent with the critical features of the approach (Han & Weiss, 2005).

The Importance of Sustaining Effective School-Wide Interventions

Han and Weiss (2005) defined sustainability as the continued implementation of a practice with ongoing fidelity of

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Action Editor: Lori Newcomer

implementation to the core program principles, after supplemental resources used to support initial training and implementation are withdrawn. The continual reimplementation of different interventions every few years is costly (e.g., loss of money, time) and breeds negative attitudes and resistance in school personnel in implementing new practices (Greenberg, Weissburg, & O'Brien, 2003). Thus, sustained implementation of effective, multiyear, school-based preventative practices should be identified as a key goal at the onset of planning activities (Pluye, Potvin, Denis, Pelletier, & Mannoni, 2005).

Because fidelity of implementation (the extent to which the intervention is delivered as intended) is the mechanism by which valued outcomes are obtained, fidelity becomes critical in sustainability. Without adequate fidelity, the practice will no longer be capable of achieving those outcomes, and continued implementation will no longer be reinforced in this way (Andreou & McIntosh, 2013; McIntosh, Horner, & Sugai, 2009). Accordingly, identifying variables that influence fidelity of implementation represents an important area for sustainability research. When such variables are malleable, they represent important targets for researchers and practitioners alike in enhancing the sustainability of effective interventions.

Variables Related to Fidelity and Sustainability

A few recent studies have identified variables that appear to be important to sustained fidelity of PBIS implementation, such as staff buy-in, administrative support, implementer skill, effective teaming, the use of data for decision making, and ongoing technical assistance (Coffey & Horner, 2012; McIntosh, Mercer, et al., 2013; McIntosh, Predy, et al., in press).

Staff Buy-In

Implementer acceptance and commitment to the practice is an essential feature contributing to PBIS sustainability (Coffey & Horner, 2012). Practices that are time-efficient (Witt, Martens, & Elliott, 1984), address an identified gap in existing services (Han & Weiss, 2005), and meet the diverse needs of all students in the classroom (Gersten, Chard, & Baker, 2000) are more likely to be seen as acceptable. However, implementers may refuse to implement the practice with fidelity if they deem it unacceptable to their values or those of the recipients, regardless of whether the practice is empirically proven to improve student outcomes (Witt et al., 1984). For example, some educators may believe that they are already meeting the behavior needs of their students without needing to change their practice (McKevitt & Braaksma, 2008) or that positive reinforcement for appropriate behavior is unacceptable and possibly harmful (Lohrmann, Forman, Martin, & Palmieri, 2008). Sugai and Horner (2006) have suggested that PBIS implementation only be undertaken with 80% commitment from all school staff, with all parties agreeing to sustain implementation efforts for at least 3 years.

Administrator Support

One of the strongest predictors of PBIS sustainability is administrator support at the school- and district level (Coffey & Horner, 2012). A recent study assessing school personnel perceptions of critical features important to PBIS sustainability found that perceived administrator support had the strongest impact on sustainability (McIntosh, Predy, et al., in press). Administrator support assures school staff that implementation will be supported by allocating resources (e.g., time, incentives, training), communicating expectations, and addressing competing practices that may decrease resources (Blase & Fixsen, 2004). A state or district leadership team that secures resources and political support, in addition to coordinating training, coaching, and evaluation, also highlights the importance of PBIS at the district level (Sugai & Horner, 2006).

Implementer Skill

The potential for effectiveness is dependent on whether the practice is evidence-based and implemented with a high degree of fidelity (McIntosh, Mercer, et al., 2013), PBIS practices have been formulated over the past 50 years from a strong foundation of empirically validated research (Horner, Sugai, & Anderson, 2010). However, if school personnel are only taught the procedures of the practice without understanding why it works and how it differs from their original beliefs and underlying assumptions about how students learn, teachers may either modify surface features (e.g., activities, materials) or merely add the new practice onto existing efforts without changing classroom norms (Coburn, 2003). High fidelity can then transform procedural understanding into conceptual understanding, as implementers learn how to integrate the practice into the local school culture while retaining the features critical to its effectiveness (Vaughn, Klingner, & Hughes, 2000).

Teaming

Recent studies have noted effective team functioning as an important variable predicting PBIS sustainability (Coffey & Horner, 2012; McIntosh, Mercer, et al., 2013; McIntosh, Predy, et al., in press). A representative school-based leadership team of 6 to 10 individuals responsible for leading PBIS implementation is recommended (Sugai & Horner, 2002). Team members attend annual training events, develop materials to support implementation, provide continued staff development, evaluate the fidelity of PBIS

implementation, and regularly meet to analyze school-wide behavior management systems and data (Lewis & Sugai, 1999). In addition to team expertise, McIntosh, Predy, and colleagues (in press) also reported that school personnel rated organized and regular meetings to be a critical feature of sustained implementation.

Use of Data

The use of data-based problem solving has been identified in the literature as an essential feature promoting PBIS sustainability, as it provides a concrete and visible framework for systematically assessing the usefulness, effectiveness, and efficiency of a practice (Coffey & Horner, 2012; McIntosh, Mercer, et al., 2013). Observing visible change in student behavior is often a powerful motivator in influencing teachers' attitudes toward a practice (Guskey, 1986). School personnel can also maintain the priority and relevance of the practice in the midst of a changing school environment as the practice is adapted to fit within the local culture of the classroom, is extended into novel areas (e.g., stakeholders, settings; Han & Weiss, 2005), or is made more efficient by allocating resources based on ongoing assessment of the costs of the process (McIntosh et al., 2009). PBIS emphasizes the importance of systematic and ongoing documentation of the needs of school personnel, the fidelity of PBIS implementation, and the impact of PBIS on student behavior. It is recommended that data be regularly reviewed at each team meeting, used to guide planning and decision making, and frequently reported to all school personnel and other stakeholders (McIntosh et al., 2009).

Ongoing Technical Assistance

Initial and ongoing technical assistance (i.e., training and coaching) has been identified as a critical factor in achieving high fidelity and sustainability (Coffey & Horner, 2012; McIntosh, Mercer, et al., 2013). Access to this support allows the continued refinement of implementation, as school personnel can successfully contextualize the practice when responding to the demands of a changing host environment (Baker, Gersten, Dimino, & Griffiths, 2004). Initial training can generally involve a district coach involved in monthly meetings with the school team to build the knowledge of school personnel in PBIS implementation. In addition, school teams from different schools and districts can create a professional community to support PBIS implementation efforts.

Efficient Measurement of Variables Important to Sustainability

The previous studies yielded important information regarding variables that can be targeted to enhance sustainability, but these studies utilized external evaluations or additional measures to identify these variables. A more efficient approach would involve existing measures that school teams already use in PBIS implementation, if such measures identify specific critical features that are most strongly related to future fidelity of PBIS implementation. This type of approach might also indicate more efficient strategies to promote sustainability, such as modifying initial or ongoing training to provide an additional focus on the PBIS critical features that are most predictive of sustained implementation.

Purpose of the Study

The purpose of this study was to investigate the extent to which critical features from an existing measure of fidelity of PBIS implementation predicted sustained fidelity of implementation and student outcomes. This study evaluated the predictive power of a self-report measure of fidelity of implementation in different PBIS systems (school-wide, nonclassroom, classroom, individual) on the levels of overall PBIS implementation and problem behavior 3 years later. Although technical assistance focusing on all aspects of PBIS implementation may be effective, it would be especially useful to identify whether specific aspects of PBIS are more predictive of sustainability and therefore could receive additional focus and resources to maximize sustained implementation. Two research questions were addressed:

Research Question 1: To what extent do school personnel ratings of implementation of PBIS *systems* significantly predict sustained implementation and levels of problem behavior?

Research Question 2: Within any statistically significantly predictive PBIS systems, which *critical features* of these systems significantly predict sustained implementation?

Method

Participants and Settings

The respondents included school personnel from 261 schools across the United States who reported PBIS fidelity data during a 3-year period. Although no definitive data regarding the first year of PBIS implementation for each school were available, the median first year of reporting any implementation or student outcomes data to the National Center on Positive Behavioral Interventions and Supports (a proxy for minimum years of PBIS implementation) was 2004–2005 (range = 2000–2001 to 2006–2007), 3 years before the start of the study, and 27% of the sample were in their first year of implementation at the start of the study. Criteria for inclusion in this study specified that schools were administered the PBIS Self-Assessment Survey (SAS)

in 2006–2007 and the School-Wide Benchmarks of Quality (BoQ) in 2009–2010. In addition, 188 schools (72%) had ODR data that were used in a supplemental analysis. School demographic data from the National Center for Education Statistics were available for 98% of the sample. Of the demographic data available, most schools were located in Illinois (68%) and Oregon (23%), with the rest of the schools located in Colorado (3%), Idaho (2%), Michigan (2%), New York (1%), South Carolina (1%), and North Carolina (1%). Thirty-eight percent of the schools were Title 1 eligible, and an average of 47% of the students in each school was receiving free or reduced price meals. Most schools had fewer than 300 students (69%), and the sample contained 70% elementary schools, 22% middle schools, 6% high schools, and 2% unspecified. The schools represented a range of communities (15% urban, 25% small/large city, 28% suburban, 4% semirural, 11% rural, and 18% unspecified). The average ethnic makeup of each school was 54% European American, 23% Hispanic, 17% African American, 5% Asian American, and 1% American Indian students.

Measures

PBIS SAS. The SAS (Sugai, Horner, & Todd, 2003) was completed by school personnel to self-report fidelity of implementation of PBIS in four settings in their school. It is a 43-item survey with four sections: School-Wide Systems (across all settings in the school; 15 items), Nonclassroom Systems (in settings such as cafeterias, playgrounds, and hallways; 9 items), Classroom Systems (in classrooms; 11 items), and Individual Systems (support for individual students with chronic problem behaviors; 8 items). A critical PBIS feature in a particular setting is measured by a single item on the SAS. Respondents self-report the implementation status of each critical feature (in place, partially in place, or not in place) to identify their perceptions regarding whether it is currently in place at their school. Individual responses are aggregated to provide school-level data in terms of percent of features in place at the individual item and systems (i.e., subscale) level.

Psychometric data for the SAS are available from two studies. Hagan-Burke and colleagues (2005) reported strong internal consistency for the overall scale. Safran (2006) further reported strong internal consistency for the overall measure and moderate to strong internal consistency for the PBIS setting subscales. Furthermore, the results provided a valuable means of facilitating staff participation, generating discussion, and linking results to action planning. In the current study, SAS subscale scores were used to measure prior implementation for each of the PBIS settings (i.e., School-Wide, Nonclassroom, Classroom, Individual) in 2006–2007. Prior implementation was indicated through the percent of critical features self-reported as in place at each school. Sample reliability for the SAS subscale scores was strong, as indicated by high alpha coefficients (α range = .86 to .97).

BoQ. The BoQ (Kincaid, Childs, & George, 2005) is a 53-item evaluation of fidelity of PBIS implementation. The BoQ consists of 10 subscales: PBS Team (4 items), Faculty Commitment (3 items), Effective Discipline Procedures (7 items), Data Entry (5 items), Expectations and Rules (5 items), Reward System (8 items), Lesson Plans (6 items), Implementation Plans (7 items), Crisis Plans (3 items), and Evaluation (5 items). A coach who is external to the school (e.g., district-level personnel) completes the BoQ using his or her knowledge of the school and the scoring guide, which provides operational definitions of the ratings for each item. The maximum possible BoQ total score is 100. A BoQ total score of 70 or more indicates adequate fidelity of PBIS implementation.

Psychometric properties for the BoQ were examined by R. Cohen, Kincaid, and Childs (2007), who reported strong 1-week test-retest reliability (r = .94) and 2-week interrater reliability (r = .87). The total score correlation of the BoQ with the School-Wide Evaluation Tool (SET; Horner et al., 2004), a widely used research-based PBIS fidelity of implementation tool, was .51, indicating moderate concurrent validity. High predictive validity for the BoQ was established, as schools with higher BoQ total scores (>70%) for 2 years of implementation had significantly decreased rates of ODRs. The BoQ total score was used in this current study as a measure of sustained PBIS fidelity of implementation. Sample reliability for the BoQ total score was strong, as indicated by a high coefficient alpha (α = .90).

ODRs. In a supplemental analysis of a subset of the sample, levels of problem behavior at each school were indicated by ODRs, standardized forms that are completed by school staff to document incidents of behavior. Previous research has shown ODRs to be valid indicators of overall levels of problem behavior in schools (Irvin, Tobin, Sprague, Sugai, & Vincent, 2004). In this study, ODRs were used to indicate sustained student outcomes of implementing PBIS.

Procedure

Data extracted for this study included SAS scores in 2006–2007, BoQ scores in 2009–2010, and ODR data in 2009–2010 from an extant database from Educational and Community Supports at the University of Oregon (University of Oregon, 2011). These schools had signed agreements with the Center on PBIS to allow their data to be available for research.

Table 1. Descriptive Statistics for BoQ Total Score and SAS Subscale Scores.

Measure	*M* (%)	*SD*	Range (%)
BoQ (2009–2010)	83	11.40	38–100
SAS (2006–2007)			
School-wide	61	19.30	7–100
Nonclassroom	56	20.28	8–100
Classroom	62	16.18	15–100
Individual	42	18.27	3–100

Note. BoQ = School-Wide Benchmarks of Quality; SAS = Self-Assessment Survey.

Analyses

Three sets of regression analyses were conducted to investigate the extent to which self-reported prior implementation predicted sustained PBIS implementation and student outcomes. In all analyses, subscale or item scores from the SAS administered in 2006–2007 served as predictor variables, and either the BoQ total score or school-level number of ODRs in 2009–2010 served as the outcome variable. Before the main analyses, a preliminary analysis assessed whether the first year of reporting data to the Center on PBIS significantly predicted either outcome variable. It was not a statistically significant predictor, and as a result, it was not included in subsequent analyses. Next, a multiple regression analysis was conducted to evaluate the extent to which prior implementation of each PBIS setting (i.e., School-Wide, Nonclassroom, Classroom, Individual) predicted sustained implementation, as measured by the BoQ total score in 2009–2010, and sustained student outcomes, as measured by the number of ODRs at a subset of schools in 2009–2010. Finally, a multiple regression analysis was conducted to analyze specific critical features of any PBIS setting identified in the first analysis that significantly predicted sustained implementation. Outliers were removed from the analysis if the scores exceeded the critical *Mahalanobis Distance* (a statistical test for extreme outliers; Tabachnick & Fidell, 2007). Evaluations of the *Trimmed Mean and Cook's Distance* did not reveal any further problems with outliers. All predictor variables were mean-centered to enhance interpretability of results and mitigate the effects of high predictor intercorrelations.

Results

Descriptive statistics for the BoQ total score and the SAS subscale scores for each of the PBIS settings presented in Table 1 indicate that sustained PBIS implementation in 2009–2010 was adequate for most schools ($M = 83\%$, $SD = 11.40$, range = 38% to 100%). There were strong, statistically significant intercorrelations between all the SAS setting subscales. Each of the SAS setting subscales had weak to moderate, statistically significant positive correlations with subsequent sustained implementation.

Results of the multiple regression analyses displayed in Table 2 indicate that the overall model involving self-reported fidelity of prior implementation in all PBIS settings was statistically significant, $F(4, 254) = 8.18$, $p < .001$, and explained 10% of the variance in sustained implementation. When evaluating the individual predictors, only prior implementation in Classroom Systems was a statistically significant predictor, $\beta = .28$, $p < .05$. Similarly, the only statistically significant predictor of level of ODRs was Classroom Systems, $\beta = -.43$, $p < .05$

For the second research question, the critical features of the Classroom Systems subscale (the only statistically significant predictor) were examined. Descriptive statistics for the SAS prior implementation (Classroom Systems) critical features displayed in Table 3 indicate that defining ($M = 83\%$) and teaching ($M = 76\%$) expected behaviors were rated as strongly implemented overall. The other critical items had weak to moderate implementation ($M = 47\%$–67%). There were statistically significant small to medium positive correlations between each Classroom Systems feature and the overall BoQ score. There were strong, statistically significant intercorrelations between all Classroom System features.

Table 4 indicates that multiple regression results for the overall model predicting sustained implementation from the critical features of the Classroom Systems subscale was statistically significant and explained 14% of the variance, $F(11, 234) = 4.61$, $p < .001$. Significant predictors at the .05 level included the following: (a) expected behaviors are acknowledged regularly ($\beta = .29$), (b) instruction and curriculum materials are matched to student ability ($\beta = .22$), and (c) teachers have opportunities for access to assistance and recommendations ($\beta = -.21$). The negative beta weight for access to assistance, combined with its positive correlation to the outcome, may be an artifact of regression or may potentially indicate the effects of net suppression (J. Cohen & Cohen, 1975).

Discussion

The current study explored the extent to which implementer perceptions of their implementation of critical PBIS features predicted sustained implementation 3 years later. The sample was composed of 261 schools implementing PBIS practices for a range of years. Self-reported fidelity of implementation was assessed using the PBIS SAS. The BoQ was administered 3 years later as an indicator of sustained fidelity of PBIS implementation, and ODRs were assessed in a subsample of schools as an indicator of sustained student outcomes. Results of multiple regression analyses indicated that the SAS was a statistically significant predictor of sustained implementation, and prior

Table 2. Prediction of Sustained PBIS Implementation and ODRs in 2009–2010 from Prior Implementation (All PBIS Systems) in 2006–2007.

	b	*SE b*	β	R^2	Adjusted R^2
Implementation model (*n* = 261)				.11***	.10***
Constant	83	.68			
School-wide	−.16	.11	−.26		
Nonclassroom	.14	.10	.25		
Classroom	.19	.09	.28*		
Individual	.05	.07	.08		
ODR Model (*n* = 188)				.04	.02
Constant	819.51	70.83			
School-wide	11.13	11.42	.23		
Nonclassroom	.68	10.17	.02		
Classroom	−24.63	10.21	−.43*		
Individual	3.54	7.42	.07		

Note. PBIS = Positive Behavioral Interventions and Supports; ODRs = Office Discipline Referrals.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3. Descriptive Statistics for SAS Prior Implementation (Classroom Systems) Critical Feature Scores in 2006–2007.

SAS Prior Implementation (Classroom Systems; 2006–2007)	*M* (%)	*SD*
1. Expected student behavior and routines in classrooms are stated positively and defined clearly	83	15.38
2. Problem behaviors are defined clearly	67	19.19
3. Expected student behavior and routines in classrooms are taught directly	76	19.71
4. Expected student behaviors acknowledged regularly (positively reinforced; >4 positives to 1 negative)	59	22.77
5. Problem behaviors receive consistent consequences	50	21.23
6. Procedures for expected and problem behaviors are consistent with school-wide procedures	57	23.70
7. Classroom-based options exist to allow classroom instruction to continue when problem behavior occurs	52	21.24
8. Instruction and curriculum materials are matched to student ability (math, reading, language)	61	19.28
9. Students experience high rate of academic success (≥75%)	47	22.54
10. Teachers have regular opportunities for access to assistance and recommendations	48	20.05
11. Transitions between instructional and noninstructional activities are efficient and orderly	55	20.79

Note. SAS = Self-Assessment Survey.

implementation in Classroom Systems was a small but statistically significant unique predictor of sustained PBIS implementation and levels of problem behavior. Within the individual features of the Classroom Systems subscale, acknowledging expected student behaviors regularly and positively, instructionally matching curriculum to student need, and access to additional support were also small but statistically significant unique predictors of sustained implementation.

Practices Predicting Sustained PBIS Implementation

School-wide versus classroom practices. The finding that the Classroom Systems subscale was a stronger predictor of school-wide implementation and student outcomes than the School-Wide and Nonclassroom Systems subscales may be somewhat surprising to general audiences but is supported by the theory that the actions of individual teachers are most important to sustainability (Han & Weiss, 2005). Students spend the vast majority of their school day in the classroom. As core PBIS implementers, classroom teachers have regular and ongoing opportunities to implement PBIS practices in their classrooms by creating environments that increase the likelihood of students learning academic and behavioral skills. Although PBIS is a school-wide approach, the quality and durability of implementation may be contingent on the extent to which individual teachers implement PBIS classroom practices with high fidelity.

However, the strong correlations between each of the SAS subscales show that implementation in each area is strongly linked to implementation in the others. Thus, an

Table 4. Prediction of Sustained PBIS Implementation in 2009–2010 from Prior Implementation (Classroom Systems) Critical Features in 2006–2007.

	b	*SE b*	β	R^2	Adjusted R^2
Model				.18***	.14***
Constant	83	.70			
Expected behaviors defined	−.05	.10	−.07		
Problem behaviors defined	.10	.09	.16		
Expected behaviors taught	−.11	.09	−.16		
Expected behaviors acknowledged	.16	.07	.29*		
Consequences	−.09	.07	−.16		
Procedures	−.01	.08	−.02		
Options exist	.11	.07	.18		
Instruction/materials match ability	.14	.06	.22*		
Academic success	−.03	.05	−.06		
Access to assistance	−.13	.06	−.21*		
Transitions efficient	.12	.07	.21		

Note. PBIS = Positive Behavioral Interventions and Supports.
*$p < .05$. **$p < .01$. ***$p < .001$.

overwhelming focus on classroom implementation to the detriment of school-wide implementation is not supported by these findings. Creating a common school-wide framework of expectations, values, and systems of support is critical in developing the school into an effective host environment by building internal capacity within the school environment and school personnel to implement effective interventions in all PBIS settings, including classrooms. As a result, although developing a common underlying framework of PBIS values and expectations is critical, it may also be effective to focus on helping school personnel translate these core values into their everyday classroom teaching practices, which may improve fidelity of implementation and student outcomes, both of which enhance sustainability.

Regular positive reinforcement. The results of the current study highlight the critical importance of regular acknowledgment of expected student behaviors as a key instructional variable that predicts sustained PBIS implementation. Although defining and teaching expected behaviors were not significant unique predictors of sustained implementation, these two features had the highest implementation scores in the Classroom Systems subscale. Positive acknowledgment of appropriate behavior, a central tenet of PBIS practices (Sugai & Horner, 2006), is the next step in increasing the likelihood of the desired behavior in the future while also fostering positive student–teacher interactions. However, despite consistent recommendations for increasing ratios of positive to negative statements in the classroom (e.g., four positive acknowledgments for each error correction; Sugai, 2002), research regularly shows higher ratios of negative to positive statements for social behavior (Jenson, Olympia, Farley, & Clark, 2004). Within a PBIS approach, many schools implementing PBIS use tangible rewards (e.g., tickets that can be exchanged for school supplies or social activities) as a *systems-level intervention* for increasing the *implementer-level behavior* of specific verbal praise. Thus, using a school-wide acknowledgment system with a continuum of varied, age-appropriate strategies provides a consistent and effective mechanism to increase rates of positive reinforcement (Sugai, Horner, & McIntosh, 2008). Reviews of research have indicated that the use of rewards is only associated with a decrease in intrinsic motivation when they are expected, provided only once, and not directly tied to the level of performance (Akin-Little, Eckert, Lovett, & Little, 2004; Cameron, Banko, & Pierce, 2001). Witzel and Mercer (2003) further noted that explicit acknowledgment of the student's behavior may be more important than the reward itself. Hence, a system of tangible rewards may be most effective when it promotes regular and specific teacher acknowledgment of student behaviors. Consistent with research (Andreou & McIntosh, 2013), the focus on positive reinforcement and visible improvement seen by teachers when using acknowledgment systems effectively seems to be a critical mechanism in sustaining PBIS.

Matching instruction and materials to student ability. Matching academic instruction and curriculum materials to the needs of the students was also a significant unique predictor of sustained implementation. For example, teachers using differentiated instruction are able to adapt their curriculum and materials to the varying levels of student skill in their classroom with the goal of maximizing the potential of each learner in a given subject area (Tomlinson, 2005). In addition, matching instructional demands to student skill levels has been shown to reduce problem behavior, even in the

absence of additional behavior support (Filter & Horner, 2009; Lee, Sugai, & Horner, 1999; Preciado, Horner, & Baker, 2009). An appropriate match between instructional materials and student skills is pivotal for sustainability because it can prevent student frustration and subsequent problem behavior while maximizing student success. Thus, supporting teachers' academic instructional skills can be effective in preventing problem behavior, ensuring academic success, and creating a positive context in which PBIS can be sustained. When a range of valued student outcomes (i.e., academic and behavior performance) and teacher outcomes (i.e., facing fewer instances of problem behavior) are maximized, the priority for sustaining the practice is enhanced (Han & Weiss, 2005).

Access to assistance and recommendations. Findings from the current study show that access to additional support was significantly positively correlated with sustained implementation, but had a negative relationship when controlling for the previous two instructional practices. The positive bivariate correlation between access to assistance and sustained implementation obtained in this study is consistent with findings that receiving additional support, in the form of coaching or peer networking, is associated with improved teaching (Rose & Church, 1998). However, when positive reinforcement and instructional matching were held constant in the final model, access to additional support was associated with lower levels of implementation. One potential explanation for the negative relation may be that it is a spurious artifact of the regression. However, the results may also be interpretable if there is a plausible theoretical explanation for the relation (Messick & Van de Geer, 1981). One potential hypothesis is that access to additional support is predictive of sustained PBIS implementation when it focuses on improving key instructional practices, but simply providing access to additional support that does not improve these key instructional practices may not enhance sustainability. For example, receiving ineffective coaching (either focused on less relevant teaching variables or coaching that did not result in improved instruction) may have been a barrier to subsequent sustained efforts. In addition, some schools may also have been receiving additional, mandated instructional support (e.g., as a persistently underperforming school) that indicated potential external challenges in classroom management or school culture. However, future research must be conducted to evaluate this hypothesis.

Limitations

One important limitation was the limited variability in BoQ total scores, as most schools had reached adequate fidelity of implementation by 2009–2010. Schools that did not report fidelity of implementation data during the 3-year period were not included in the sample, as their outcomes data were not available. As such, these results may not be applicable to predicting whether schools abandon PBIS entirely. In addition, different variables affect fidelity of implementation at different time points (McIntosh, Predy, et al., in press). Self-reported fidelity scores may have been influenced by social desirability or lack of knowledge of quality implementation. Finally, because the second research question used single items to assess implementation of critical features, results of the classroom systems analysis should be interpreted with caution.

Future Research

Current findings indicate that the level of PBIS implementation in classrooms significantly predicts sustained PBIS efforts and student outcomes, but it is also clear that other variables facilitate sustained implementation. More studies that use additional (nonextant), more comprehensive measures of contextual variables related to sustainability are needed to capture the full range of variables predicting sustained implementation. Research may also investigate factors predicting PBIS abandonment. Future studies could also track fidelity of implementation across multiple years to identify different facilitators or barriers to sustained implementation at different phases of implementation.

Implications for Practice

Development of school-wide and classroom practices. A relatively common approach to PBIS implementation includes implementing systems to define, teach, and acknowledge school-wide expectations in school-wide and nonclassroom settings and then leaving it to classroom teachers to extend these common school-wide practices to their classrooms (McKevitt & Braaksma, 2008). The logic behind this approach is that classroom teachers may be more likely to implement PBIS in the classroom if they see positive effects in shared areas, where it is easier to build consensus. The danger is that classroom teachers may never implement practices in their classrooms without a collective endeavor and specific Classroom Systems consultation. Or worse, they may believe that PBIS practices are intended only for nonclassroom areas and not the classroom. Training that focuses on improving the understanding of key principles of the practice, in addition to information on the intervention's effectiveness, may improve teacher acceptability of the practice by increasing expectations, intentions, and motivation to implement the practice (Han & Weiss, 2005). Yet building teacher acceptance of PBIS may not be enough, as school personnel may also need to be shown how to translate the core PBIS components into their daily routines. These findings provide initial support for building consensus to implement PBIS in classroom settings as soon as it is implemented

in nonclassroom settings. Access to additional support to address PBIS implementation in the classroom may also promote full classroom implementation when associated with improved teaching practices. However, this recommendation requires research validation.

Ongoing data collection and visibility of results. PBIS emphasizes the importance of systematic documentation of the needs of school personnel, fidelity of implementation, and its effects on valued outcomes (Sugai & Horner, 2006). Regular data collection and interpretation of student performance facilitates accurate identification of student needs and the development of quality instructional practices to maximize academic and behavioral student success. In addition, generating charts and figures linking changes in student behavior directly to fidelity of implementation would help build consensus to implement PBIS in classroom settings. Comparing the results of self-reported fidelity of implementation and independent evaluations of PBIS can also provide important information regarding the level of implementation and school personnel understanding of core PBIS principles. Completion of a yearly needs assessment, such as the SAS, allows for implementer-level ownership in action planning for sustained implementation. In addition, although fidelity of implementation in schoolwide settings is commonly assessed, some PBIS fidelity of implementation measures have recently been revised to include more classroom-specific items (Kincaid, Childs, & George, 2010; Sugai, Horner, Lewis-Palmer, & Rossetto Dickey, 2011). These measures may be more effective in measuring sustainability in classroom and nonclassroom areas.

Authors' Note

This study served as the first author's master's thesis, while the second author was affiliated with the University of British Columbia. The opinions expressed are those of the authors and do not represent views of these agencies or the U.S. Department of Education.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article .

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R324A120278, to University of Oregon, and the Office of Special Education Programs, U.S. Department of Education, through Grant H326S03002, to the University of Oregon.

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