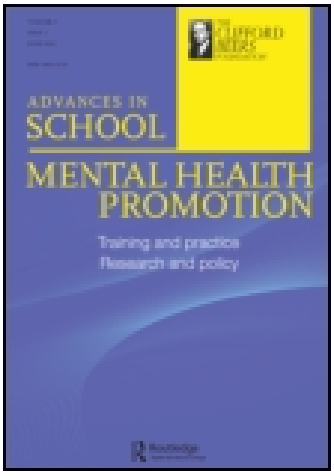

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Integrating school-wide Positive Behavioral Interventions and Supports with tier 2 coaching to student support teams: The PBIS*plus* model

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Schools continue to display an interest in, and efficiency with, the implementation of the universal level of Positive Behavioral Interventions and Supports (PBIS), but often struggle to integrate tier 2 supports to address the needs of students at risk for behavioural or academic difficulties. School practitioners and researchers are increasingly interested in optimizing programme implementation through coaching and integrating supports at the more advanced tiers of PBIS. The current paper describes one such model, called PBIS*plus*, which builds on the multi-tiered PBIS model by providing tailored training in the implementation of functional behavioural assessments, the student support teaming process, cultural proficiency, and evidence-based practices (e.g. Check-In/Check-Out) by a tier 2 coach. After describing the process for integrating these core elements with the universal PBIS model and the coaching model developed to facilitate that process, we summarize preliminary findings from a three-year group-randomized controlled trial of the PBIS*plus* model in 42 Maryland elementary schools. Significant effects were observed on teacher efficacy and student outcomes, including rates of special education service use and teacher-reported academic performance. Implications for future research aimed at integrating programmes within the three-tiered PBIS framework are discussed.

Keywords: school-wide PBIS; Tier 2; coaching; randomized controlled trial; evidence-based practices

To address concerns about student behaviour problems and promote a positive school climate, over 16,000 schools across the country have adopted the school-wide Positive Behavioral Interventions and Supports (PBIS; Sugai & Horner, 2006) prevention framework. The PBIS model uses an integrated framework to implement universal, selective, and indicated supports to students and school staff to reduce rates of behaviour problems, enhance school climate, and promote academic performance (Walker et al., 1996). Although there has been great interest in this three-tiered model among educators, policymakers, and researchers, current randomized controlled trials (RCTs) testing the effects of PBIS (e.g. Bradshaw, Mitchell, & Leaf, 2010; Horner et al., 2009) have focused on the implementation of the universal components rather than the more advanced tiers.

The current paper builds on research documenting several positive outcomes of the universal PBIS model (Horner, Sugai, & Anderson, 2010), by integrating tier 2 supports

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for students not responding adequately to the universal model (i.e. non-responders). Consistent with the three-tiered framework originally outlined by Walker et al. (1996; also see Sugai & Horner, 2006), we present preliminary findings from an RCT of this integration of a universal school-wide PBIS model with supports for tier 2 implementation. Referred to as PBIS*plus*, a coaching process helps to integrate advanced tier training – to staff and student support teams (SSTs) in the use of functional behavioural assessments, the teaming process, culturally responsive practices, and evidence-based programmes for non-responders – into to the universal PBIS programme.

Overview of the tiered PBIS model

PBIS, a non-curricular, universal prevention model, draws upon behavioural, social learning, and organizational principles, and targets staff behaviour (Sugai & Horner, 2006). The model aims to alter the entire school environment (i.e. classroom and non-classroom contexts) by creating improved systems (e.g. discipline, reinforcement) and procedures (e.g. office referral, training), which promote positive changes in staff and, in turn, student behaviour. The goal of PBIS is to prevent behaviour problems by implementing the three-tiered, public health framework that incorporates universal, targeted, and intensive systems of positive behaviour support (O'Connell, Boat, & Warner, 2009; Walker et al., 1996). Consistent with a Response to Intervention (RtI) approach to preventing behaviour problems (Hawken, Vincent, & Schumann, 2008), it is expected that the majority of the student population (approximately 80%) will respond positively to universal PBIS, 10–15% of students will require 'selective' (i.e. tier 2) preventive interventions, and the remaining 5–10% will require intensive 'indicated' supports and services (i.e. tier 3; O'Connell et al., 2009).

There is a growing evidence base for the effectiveness of the universal element of PBIS (Horner et al., 2010), referred to in this paper as school-wide PBIS (SWPBIS). Two recent RCTs of SWPBIS in elementary schools provided evidence of its effectiveness in reducing student office discipline referrals, suspensions, and behaviour problems, and in improving school climate (Bradshaw, Koth, Bevans, Ialongo, & Leaf, 2008; Bradshaw, Koth, Thornton, & Leaf, 2009; Bradshaw, Mitchell et al., 2010; Bradshaw, Waasdorp, & Leaf, in press; Horner et al., 2009; Waasdorp, Bradshaw, & Leaf, 2012). State-wide evaluations of SWPBIS also have demonstrated favourable outcomes (e.g. Barrett, Bradshaw, & Lewis-Palmer, 2008; Bradshaw, & Pass, 2011).

Components of the PBIS*plus* programme

Despite improvements achieved through the universal SWPBIS programme, by design, there remains a need for more intensive supports for non-responders (Walker et al., 1996). Though the PBIS framework emphasizes a three-tiered approach to reducing student behaviour problems, many states, such as Maryland, have only had resources to provide the universal components of the framework (Bradshaw et al., 2012). Thus, many schools struggle with how to address non-responders (Barrett et al., 2008). Developed to meet these needs, PBIS*plus* provides a testable model to document the impacts of an integrated effort (i.e. external coaching and training were provided to specifically address the implementation of tier 2 supports). Based on the three-tiered PBIS model and RtI approaches (Hawken et al., 2008), PBIS*plus* aims to prevent behaviour problems, student entry into special education, and improve student outcomes, by enhancing supports to teachers and staff in the use of evidence-based practices.

Functional behavioural assessment (FBA), function-based thinking (FBT), and the student support teaming process

SSTs in schools in the PBIS*plus* condition were provided training and ongoing coaching support on the traditional FBA process of assessing the purpose or 'function' of a student's behaviour in relation to its surrounding environment so that appropriate interventions could be designed to meet the unique needs of non-responders (Umbreit, Ferro, Liaupsin, & Lane, 2006). A more generalized model of FBT (Hershfeldt, Rosenberg, & Bradshaw, 2011) that encouraged teachers to consider the function of behaviour when designing selective interventions was implemented. Although less rigorous than a full functional analysis, the simplified FBA and generalized FBT approaches are powerful and 'user-friendly' methods for identifying environmental factors that influence problematic behaviours and the function of those behaviours among students at risk for disciplinary actions or referrals. Knowing how and why a behaviour problem occurs allows staff to predict and 'pre-correct' for the occurrence of more appropriate replacement behaviours (Umbreit et al., 2006).

The simplified FBA model used in the trial was developed and tested by Scott, Liaupsin, and Nelson (2005), and was directly tied to PBIS. The model was team-based, using the SST (4–5 staff), and was facilitated by at least one individual with extensive training in FBA procedures (e.g. FBA Team Leader; Sugai, Horner, & Sprague, 1999). The training included strategies for (1) identifying students in need of assessment; (2) referring students to SST; (3) creating and convening an ad-hoc, student-specific team organized around a specific student referred to the SST; (4) conveying and analysing information; (5) summarizing potential intervention roles and responsibilities; (6) developing a functional hypothesis; and (7) developing, implementing, and monitoring a function-based intervention. Additional training focused on efficient methods for collecting and using data in classroom and non-classroom settings to determine the need for interventions and to monitor programme impact. Teachers and SST members received training in FBT through didactic group and one-on-one professional development led by the PBIS*plus* coach.

Evidence-based practices

Schools received training in the implementation of tier 2 targeted interventions, such as Check-in/Check-out (CI/CO; Hawken & Horner, 2003), which aims to prevent behaviour problems and promote student engagement by providing regular feedback on behaviour. CI/CO provides prompts throughout the day for correct behaviour, and creates a system for linking students with at least one adult; the adult is responsible for increasing contingent feedback linked to the targeted behaviour, resulting in increased acknowledgement for appropriate behaviour. CI/CO also links school and home support by increasing feedback to families about student behaviour (Filter et al., 2007). Studies of CI/CO have demonstrated significant reductions in office discipline referrals (Todd, Kauffman, Meyer, & Horner, 2008).

Cultural proficiency using the Double Check model

Studies consistently find that certain groups of culturally and linguistically diverse students are overrepresented in several categories of special education, office disciplinary referrals, and suspensions (e.g. Bradshaw, Mitchell, O'Brennan, & Leaf, 2010); however, such disproportionality is often present despite exposure to SWPBIS (Bradshaw, Mitchell, O'Brennan, & Leaf, 2010). In response, the Double Check model of cultural proficiency

and student engagement was developed and integrated into PBIS*plus* to increase cultural proficiency among staff. Double Check includes five core features of reflective thinking, authentic relationships, effective communication, connecting with curricula, and sensitivity to situational messages (Bottiani et al., in press; Hershfeldt et al., 2011). Double Check training was provided with the goal of increasing awareness of cultural factors (e.g. code switching), which may influence students' behaviours, staff members' interpretation of them, and/or staff members' response.

Role of coaching to support implementation

In-service training alone is insufficient for sustainable changes in staff behaviours or student outcomes (Denton & Hasbrouck, 2009); therefore, there has been an emphasis on coaching as a strategy for optimizing programme implementation and enhancing outcomes achieved. Coaching and consultation models provide support for teachers' skill development, which may result in changes in their perceptions about their ability to teach and intervene successfully with struggling students (Han & Weiss, 2005). It is expected that changes in teacher attitudes and behaviours would translate into improved student outcomes. This could promote a feedback loop whereby enhanced student outcomes further increase teacher buy-in for, and implementation of, the programme (Han & Weiss, 2005). The available rigorous empirical research on coaching models has been mixed (Pas, Bradshaw, & Cash et al., in press), with findings generally demonstrating effects on teachers, but not student outcomes.

Given growing emphasis on the role of coaching in promoting implementation quality and student outcomes, we included an on-site coaching model in the PBIS*plus* programme. Experienced coaches provided training and consultation to staff on the SST and individual teachers in the implementation of evidence-based programmes and practices to reduce behaviour problems. The coaches provided support, technical assistance, and professional development to foster skill development, link the SSTs with the necessary resources, and guide data-based decision making. During the first year of the trial, coaches spent at least a half-day (i.e. 4 hours), in each intervention school each week, and then a half-day alternating weeks in Years 2 and 3, to promote sustainability. Coaches were critical in leading the initial and booster training efforts both within and across schools (for additional information on the PBIS*plus* coaching model, see Hershfeldt, Pell, Sechrest, Pas, & Bradshaw, in press). Importantly, the PBIS*plus* coach was separate from the SWPBIS coach (e.g. school psychologist, guidance counsellor), which was provided by the district.

Overview of the current study

Given the positive findings from previous trials of SWPBIS (Bradshaw, Mitchell, & Leaf 2010; Bradshaw et al., in press; Horner et al., 2009, 2010) and challenges regarding the implementation of advanced tier interventions, it seemed timely to conduct a rigorous RCT of the integration of tier 1 and 2 supports within the PBIS framework. Foremost, the PBIS*plus* model is not a 'new' or different model from SWPBIS, as SWPBIS integrates supports for students at across tiers and is often described as a continuum of supports (Sugai & Horner, 2006). However, our focus was on contrasting PBIS schools that receive traditional training and support in tier 1 implementation from the state and district (i.e. Comparison or SWPBIS), as compared to PBIS schools that receive these supports, in addition to tier 2 training and coaching from an external tier 2 coach (i.e. PBIS*plus*). The current paper presents preliminary findings from an RCT of the PBIS*plus* model. The

study was implemented in Maryland, where there is a strong state-wide infrastructure to support PBIS and great interest in its integration with other evidence-based programmes and initiatives (Bradshaw & Pas, 2011; Bradshaw et al., 2012; in press).

Method

Design

Using a group RCT design (Murray, 1998), elementary schools that had received prior training in and implementation of SWPBIS and demonstrated a need for tier 2 supports were eligible for enrolment in the study. Schools were stratified by district, and matched on baseline suspensions and select school demographics (e.g. free/reduced meals, school size), and then were randomized to either PBIS*plus* ($n = 20$ schools) or Comparison ($n = 22$ schools). Comparison schools continued to implement SWPBIS and receive 'support as usual' from the district and state; they are referred to hereafter as 'SWPBIS' schools. We enrolled schools in two cohorts (summers of 2007 and 2008) to ensure that intervention schools received high-quality training and support and to assist with overall project management. Schools were monitored for three years following enrolment in the trial (i.e. through the springs of 2010 and 2011). An open cohort design was used, whereby all students and staff who entered the participating schools were eligible for inclusion. We lacked sufficient resources to collect data on students or staff who left a study school. Student participation was covered through a passive parental consent process. Staff members participated on a voluntary basis and provided written consent at each data collection. All study procedures were approved by the Institutional Review Board.

Participants

A total of 42 Maryland elementary schools, previously trained by the PBIS Maryland State Team on SWPBIS (i.e. the Maryland State Department of Education [MSDE] and Sheppard Pratt Health System; Barrett et al., 2008; Bradshaw et al., 2012), were recruited to participate. Because the PBIS*plus* model builds on the PBIS programme, only schools that had been trained in universal PBIS by the state and had previously implemented the critical elements of the universal component (as indicated by a score of 80% or higher on the School-wide Evaluation Tool [SET; Sugai, Lewis-Palmer, Todd, & Horner, 2001], a validated measure of PBIS fidelity [Horner et al., 2004]), were eligible for participation. The second criterion was that the participating schools had at least 5% non-responders to SWPBIS in grades K-3 (i.e. students with two or more office discipline referrals), as indicated by office discipline referrals and suspensions. District and state partners from the MSDE participated in the recruitment and principals provided written consent for participation. Across the three years of the project, data were collected on 29,569 students and 3,202 staff. Demographic characteristics of the participating staff, students, and schools are provided in Table 1. The student participation rate ranged from 89% to 93%, whereas the average staff participation rate ranged from 71% to 74%.

Training

In the summer, following the randomization of schools to condition, the SSTs, comprising at least four school staff members (e.g. school psychologist, administrator), and district PBIS points of contact participated in a two-day initial training led by the PBIS*plus* coaches, the Principal Investigators, and external consultants. The training focused on the

Table 1. Student, teacher, and school demographic characteristics.

	Overall	PBIS*plus*	SWPBIS
Student characteristics ($N = 29{,}569$ students)	*N* (%)		
Gender – male	15,095 (52.0)		
Race/ethnicity			
American Indian/Alaskan Native	179 (0.6)		
African American	15,106 (54.3)		
Hispanic	2186 (7.9)		
Asian/Pacific Islander	1008 (3.6)		
White	9245 (33.2)		
Multi-racial	121 (0.4)		
Staff characteristics ($N = 3202$ staff)	*N* (%)		
Gender – female	2889 (91.0)		
Race/ethnicity (not White)	785 (24.8)		
Staff role (general educator)	1175 (36.9)		
Number of years experience (mean [SD])	7.48 (8.35)		
School characteristics ($N = 42$ schools)	Mean (SD)	Mean (SD) ($n = 20$)	Mean (SD) ($n = 22$)
School enrolment	476.24 (135.03)	472.95 (128.85)	479.23 (143.37)
School attendance (%)	95.19 (0.91)	95.27 (0.93)	95.30 (0.81)
Student mobility (%)	30.96 (23.53)	33.68 (31.88)	28.49 (12.16)
Free/reduced meals (%)	42.75 (19.22)	43.97 (19.03)	41.64 (19.77)
Special education services (IEP) (%)	5.19 (5.38)	4.55 (4.52)	5.71 (6.05)
Minority (%)	68.15 (24.90)	67.62 (29.37)	68.59 (21.48)
Years trained prior to enrolling in trial	2.88 (1.77)	3.35 (1.90)	2.45 (1.57)
Student/teacher ratio	20.64 (3.68)	20.44 (3.57)	20.82 (3.85)
Suspension rate	9.19 (7.13)	8.34 (6.28)	9.97 (7.89)
MSA math standardize test scores	77.40 (8.91)	76.29 (10.51)	78.40 (7.27)
MSA reading standardize test scores	78.67 (8.05)	77.97 (9.19)	79.32 (7.00)

Note: Suspension rate = total number of suspension events/enrolment × 100; Maryland School Assessment (MSA) scores reflect the percent of students scoring in the proficient and advanced ranges for each test, averaging across students in grades 3 and 5. A MANOVA indicated no significant difference between PBIS*plus* and SWPBIS schools on the school-level characteristics Wilks' $\Lambda = 0.535$, $F(11, 16) = 1.262$, $p = 0.327$.

core elements described above, including the implementation of FBAs and FBT, the student support teaming process, cultural proficiency, and evidence-based practices (e.g. CI/CO). These elements were framed as an extension of their universal SWPBIS programme. Each school received a binder and a CD containing materials to support the implementation process (e.g. action plans, forms to facilitate the FBA process, summaries of tier 2 evidence-based programmes, tip sheets). An annual one-day booster session was held each summer for the school teams, with the goal of expanding and sustaining competencies and providing opportunities for cross-site consultation. At the end of the trial, the SWPBIS schools received training in the intervention and all related programme materials.

Coaching

On-site coaching and technical assistance was provided by a team of project coaches (i.e. PBIS*plus* Liaisons). Three doctoral-level coaches with at least 15 years of school-based experience served as the coaches. One coach was assigned at random to each of the schools and worked with that school for the duration of the study. The coaches led the initial and booster training events and provided additional professional development to all school staff at the intervention schools. Over the course of the trial, the coaches spent a total of 4,234 hours across all the schools providing on-site technical assistance (for additional information, see Hershfeldt et al., in press). Training and supervision was provided to the coaches by the project Principal Investigators through bi-weekly supervision sessions and quarterly extended training sessions, which typically included state partners and national expert consultants.

Measures

SWPBIS and tier 2 supports

The *School-wide Evaluation Tool* (SET; Sugai et al., 2001) assessed and evaluated the degree to which the key features of SWPBIS were in place (see Horner et al., 2004). Prior research indicated that schools achieving an 80% or higher implementation on the SET had positive outcomes in terms of reduced discipline referrals, suspensions, and school disruptions (Bradshaw et al., 2008, 2009, in press; Horner et al., 2009, 2010). Each item was scored on a three-point scale (0 = not implemented, 1 = partially implemented, and 2 = fully implemented) and yielded seven subscale scores ranging from 0% to 100%, where higher scores indicated greater programme fidelity. An overall SET score (i.e. the average of all seven subscale scores) was calculated, which also ranged from 0% to 100% ($\alpha = 0.72$).

The *Individual Student Systems Evaluation Tool* (I-SSET; version 1.2; Lewis-Palmer, Todd, Horner, Sugai, & Sampson, 2005), a 23-item measure designed to assess the characteristics of second tier support services provided in SWPBIS schools, comprises three subscales: (1) Foundations, (2) Targeted Interventions, and (3) Intensive Individualized Interventions (see Table 2). A total I-SSET score was generated for each school, which also ranged from 0% to 100% with higher scores indicating stronger support systems ($\alpha = 0.72$).

The SET and I-SSET were administered during a single school visit by a trained assessor (e.g. teachers, special educators, and school counsellors working part-time or recently retired). The visit included brief interviews with school administrators, four staff members, teachers (minimum of eight), and students (minimum of 12 from each grade); observations of the school environment; and a review of intervention planning materials. All assessors

Table 2. Percentage and number of schools with the highest possible score on each I-SSET item ($n = 22$ SWPBIS and $n = 20$ PBIS*plus* schools).

	Baseline		Year 1		Year 2		Year 3	
I-SSET item	SWPBIS *N* (%)	PBIS*plus* *N* (%)	SWPBIS *N* (%)	PBIS*plus* *N* (%)	SWPBIS *N* (%)	PBIS*plus* *N* (%)	SWPBIS *N* (%)	PBIS*plus* *N* (%)
Foundations								
1. School has a Student Support Team (SST)	21 (95.5)	20 (100)	22 (100)	20 (100)	22 (100)	20 (100)	22 (100)	20 (100)
2. Culturally responsive teaching has been discussed this year	14 (63.6)	8 (40)	17 (77.3)	11 (55)	20 (90.9)	17 (85)	20 (90.9)	17 (85)
3. Process for including family in SST process	17 (77.3)	15 (75)	19 (86.4)	15 (75)	19 (86.4)	17 (85)	21 (95.5)	19 (95)
4. SST meets at least twice a month	15 (68.2)	12 (60)	26 (72.7)	15 (75)	18 (81.8)	10 (50)	18 (81.8)	18 (90)
5. System for staff to refer students to SST	17 (77.3)	17 (85)	19 (86.4)	18 (90)	20 (90.9)	18 (90)	21 (95.5)	20 (100)
6. SST referral forms lists pertinent information	1 (4.5)	1 (5)	1 (4.5)	0 (0)	2 (9.1)	1 (5)	3 (13.6)	2 (10)
7. Response to SST referral takes no more than 3 days	11 (50)	8 (8)	11 (50)	12 (60)	14 (63.6)	12 (60)	14 (63.6)	18 (90)
8. Process for monitoring student progress through data	12 (54.5)	15 (75)	16 (72.7)	16 (80)	18 (81.8)	16 (80)	21 (95.5)	19 (95.5)
9. Staff agree with administration on SST referral process	6 (27.3)	4 (20)	10 (45.5)	5 (25)	10 (45.5)	12 (60)	20 (90.9)	18 (90)
10. Functional behavioural assessment (FBA) intervention form lists pertinent information	18 (8.1)	11 (55)	17 (77.3)	12 (60)	15 (68.2)	14 (70	18 (81.8)	18 (90)
Targeted Interventions								
11. Written process for selecting evidence-based interventions for individual students	15 (68.2)	12 (60)	16 (72.7)	16 (80)	19 (86.4)	18 (90)	20 (90.9)	16 (80)
12. Interventions linked to school-wide behavioural expectations	22 (100)	19 (95)	22 (100)	20 (100)	21 (95.5)	20 (100)	22 (100)	20 (100)
13. Intervention continuously available to students	20 (90.9)	19 (95)	19 (86.4)	19 (95)	22 (100)	19 (95)	21 (95.5)	19 (95)
14. Intervention is implemented within 3 days	6 (27.3)	13 (65)	16 (72.7)	14 (70)	18 (81.8)	14 (70)	14 (63.6)	13 (65)

15. Data are used to monitor intervention	13 (59.1)	17 (85)	18 (81.8)	15 (75)	19 (86.4)	18 (90)	19 (86.4)	17 (85)
16. Student receives positive feedback pertaining to intervention	22 (100)	19 (95)	21 (95.5)	20 (100)	22 (100)	19 (95)	22 (100)	20 (100)
17. Intervention requires no more than 10 min per day	17 (77.3)	16 (80)	20 (90.9)	19 (95)	18 (81.8)	20 (100)	20 (90.9)	19 (95)
18. Written instructions for how to implement intervention	10 (45.5)	6 (30)	12 (54.5)	16 (80)	14 (63.6)	14 (70)	18 (81.8)	13 (65)
19. Description of intervention is provided to teacher	9 (40.9)	6 (30)	11 (50)	13 (65)	15 (68.2)	16 (80)	18 (81.8)	16 (80)
Intensive Individualized Interventions								
20. Staff member trained to conduct FBA	20 (90.9)	20 (100)	20 (90.9)	18 (90)	22 (100)	20 (100)	22 (100)	20 (100)
21. Student's teacher is on FBA team	20 (90.9)	20 (100)	22 (100)	20 (100)	21 (95.5)	20 (100)	22 (100)	20 (100)
22. Staff with FBA knowledge is on FBA team	19 (86.4)	20 (100)	22 (100)	20 (100)	22 (100)	20 (100)	22 (100)	20 (100)
23. Process used to lead FBA	18 (81.8)	20 (100)	21 (95.5)	20 (100)	22 (100)	20 (100)	21 (95.5)	20 (100)

Note: The individual I-SSET items are abbreviated for reporting in table.

attended a half-day group training session, shadowed a lead staff trainer in conducting a full SET/I-SSET in a non-project SWPBIS elementary school, and conducted a second SET/I-SSET with a second lead trainer at another non-project school. Inter-observer agreement for each pair was calculated (range of item-level Kappas for the SET was 0.64–1.00 [$M = 0.82$] and 0.84–1.00 [$M = 0.92$] for the I-SSET). Assessments were conducted in the fall of 2007 for cohort 1 and fall of 2008 for cohort 2 and each subsequent spring for three years. (See Debnam, Pas, & Bradshaw, 2012 for additional information on the content and psychometric properties of the SET and I-SSET from this study.)

Staff outcomes

A variety of *self-report measures* were administered to staff members. The five-item measure of *teacher efficacy* (Hoy & Woolfolk, 1993) addressed perceptions of one's efficacy in handling student behaviour problems (e.g. I can effectively work with defiant or disruptive students; I can manage almost any student behaviour problem; $\alpha = 0.84$). Staff also completed a three-item measure of *teacher preparedness*, taken from the teacher-report version of the Schools and Staffing Survey (SASS; National Center for Education Statistics [NCES], 2007), which indicated teachers' preparation for handling a range of classroom management and disruptive behaviour concerns, selecting and adapting curriculum and instructional materials, and providing culturally responsive instruction ($\alpha = 0.82$). The *Burnout* scale was composed of four items from the emotional exhaustion component of the Maslach Burnout Inventory (Maslach, Jackson, & Leiter, 1996) and included items such as 'I feel emotionally drained from my work' and 'I feel like I am at the end of my rope' ($\alpha = 0.90$). *Perceptions of the school environment* were provided using the 31-item Organizational Health Inventory (OHI; Hoy & Feldman, 1987), which included scales of Collegial Leadership (10 items, e.g. The principal conducts meaningful evaluations; The principal treats all faculty as his or her equal; $\alpha = 0.94$); Teacher Affiliation (9 items, e.g. There is a feeling of trust and confidence among the staff; Teachers identify with the school; $\alpha = 0.88$); and Academic Emphasis (5 items, e.g. Students respect others who get good grades; Students neglect to do homework; $\alpha = 0.68$). Item responses on the staff-report measures were based on a four-point Likert-type scale, which ranged from *rarely occurs* to *frequently occurs*. Finally, teachers completed a six-item measure of *Parent and Student Involvement*, which was adapted from the SASS (NCES, 2007) and addressed areas such as parent involvement, student tardiness, and poor student health ($\alpha = 0.87$). In all cases, scale scores were created by taking the average of responses across items.

All teaching- and non-teaching staff (collectively referred to as staff) were asked to complete ratings of these constructs at four time points: during the fall of the first year of the trial and the three subsequent springs. Surveys were sent to each school containing individually addressed survey packets for all staff and distributed to their school mailboxes. To ensure confidentiality, staff returned the surveys directly to the researchers through a self-addressed, stamped envelope. Each staff questionnaire packet included a small incentive for participation (e.g. pen).

Student outcomes

Teacher ratings of student behaviour, academics, and referrals were conducted using the Teacher Observation of Classroom Adaptation-Checklist (TOCA-C; Koth, Bradshaw, & Leaf, 2009) at the same four time points the staff submitted staff surveys (i.e. fall of Year

1, and spring of Years 1–3). Teachers rated each student's academic performance (i.e. on a five-point scale from poor to excellent). They also indicated whether the student had received the following referrals or types of school-based services: (1) referral to the principal's office, (2) an in- or out-of-school suspension, (3) referral to the Child/Student Support Team, (4) referral to be assessed for special education, (5) received special education services, (6) received additional classroom-based educational programmes, (7) received additional classroom-based behavioural services or supports, and (8) received additional counselling or psychological services. These data were examined both as student-level data (i.e. with individual student ratings as the outcome) and as teacher-level data (i.e. with aggregated data at the classroom level as the outcome). In addition, school-level data were obtained from the MSDE to examine standardized test performance for math and reading (i.e. the Maryland School Assessment [MSA]), attendance rates, and suspension rates.

Results

Implementation of SWPBIS and tier 2 supports

The SET and I-SSET scales were analysed using two-level growth models in HLM 7.0 (Raudenbush, Bryk, Cheong, & Congdon, 2004). The repeated measures of each outcome were modelled at Level 1 with time, which was nested within school at Level 2. The intervention status variable (i.e. 0 = SWPBIS and 1 = PBIS*plus*) was initially tested at the intercept to rule out the possibility of baseline differences, but in all cases was non-significant as expected (i.e. given the random assignment of schools to condition) and therefore removed. Similarly, a series of MANOVAs indicated no significant differences in the SET and I-SSET scores across the two conditions at baseline ($p > 0.05$). In subsequent analyses, treatment was modelled only for the slope at Level 2. At Level 2, school characteristics (i.e. enrolment, mobility rates, and percent of students receiving free and reduced meals [FARMs]) were modelled simultaneously at the intercept and slope (i.e. linear growth) of the outcome. The HLM analyses indicated that there were no significant treatment effects on fidelity, as measured by the SET or I-SSET. However, schools in both conditions evinced significant growth on both the SET and I-SSET over time ($p < 0.05$) (see Table 2).

Staff outcomes

Each of the staff self-report scales was examined as an intervention outcome using three-level growth models in HLM. The repeated measures of each outcome were modelled at Level 1 with time, which was nested within staff at Level 2, and nested within school at Level 3. At Level 2, staff characteristics (i.e. gender, race, age, and whether the staff was a general educator) were modelled on the intercept and slope (i.e. linear growth). Treatment was modelled for the slope at Level 3, and school characteristics (i.e. school size, mobility rates, and percent of students receiving FARMs) were modelled for the intercept and slope of the outcome. Intervention status was tested at the intercept to rule out the possibility of baseline differences, but in all cases was non-significant as expected and therefore removed.

The multi-level analyses indicated that there was a significant treatment effect on efficacy, such that staff in the PBIS*plus* condition showed improvements in their ratings of efficacy as compared to those in the SWPBIS condition, where ratings appeared flat across time (coefficient [coeff.] = 0.02, $p = 0.05$). This suggests that school staff felt more

efficacious in handling behavioural concerns after being exposed to the PBIS*plus* intervention, which specifically targeted their skills in addressing students at risk for additional behavioural and academic challenges. The effects on ratings of academic emphasis (coeff. $= 0.02$, $p = 0.08$) and student and parent involvement (coeff. $= 0.03$, $p = 0.07$) approached significance. Inspection of the trends suggested that while staff in SWPBIS schools reported that academic emphasis and student and parent involvement declined over time, the staff in PBIS*plus* schools provided more consistent ratings across time; this suggested a potential trend for intervention effects on both academic emphasis and student and parent involvement.

Student outcomes

Three sets of HLM models were used to analyse the student outcomes: (1) two-level models where students were nested within schools and the outcomes were whether a student ever or never received an endorsement of the TOCA-C academic or behavioural concerns, referrals, or services (e.g. ever received a poor rating for achievement or an office referral) across the four time points; (2) three-level models where the repeated measures were nested within teachers who were nested within schools; and (3) two-level models where the repeated measures of school-level outcomes (i.e. the MSDE data on math and reading proficiency, attendance, and suspensions) were nested within schools.

The student-level models had dichotomous outcomes and therefore used a multi-level logistic regression approach; thus, the results are reported in terms of adjusted odds ratios (AOR). At the student-level, gender and race were modelled, whereas treatment, school size, mobility, and FARMs rates were modelled at Level 2. The student-level models revealed that students in PBIS*plus* schools were less likely to receive classroom-based behavioural services or supports as compared to students in the SWPBIS condition (AOR $= 0.79$, $p = 0.03$). This was the only significant finding when analyses were conducted at the student level.

The repeated measure teacher-level models examined the percent of students in each teacher's class with academic difficulties, the percent receiving referrals, and the percent using each service as the continuous outcomes. The modelling procedures and covariates used were the same as those described in the teacher outcomes section (i.e. teacher characteristics at Level 2 and treatment and school covariates at Level 3). The teacher-level analyses revealed that the teachers rated students in PBIS*plus* schools as showing improvements in achievement over time as compared to the students in SWPBIS schools (coeff. $= -0.02$, $p = 0.05$; i.e. there was a decrease in the percent of poor achieving students). Teachers also reported that significantly fewer students received special education services in the PBIS*plus* schools than in SWPBIS schools over time (coeff. $= -0.59$, $p = 0.03$). Sensitivity analyses were conducted to further explore this effect and, importantly, the special education finding remained marginally significant when the model was restricted to just include general educators. There were no other significant findings for any of the other referral and services outcomes.

Finally, the repeated measure school-level models used continuous outcomes of (1) academic performance (i.e. percentage of students who scored in the proficient or advanced range on the reading and math achievement measures), (2) attendance (i.e. those who were present in school for at least 94% of the school days), and (3) out of school suspensions as collected from the MSDE. At Level 1, only time was modelled, and at Level 2, treatment, school size, mobility, and FARMs rates were modelled as covariates; however, there were no significant treatment effects on these school-level outcomes.

Discussion

The PBIS*plus* project offered a unique opportunity to build on existing, high fidelity universal PBIS efforts in Maryland to conduct the first rigorous RCT of the integration of the tier 1and 2 elements of the three-tiered PBIS model. Findings revealed some positive student outcomes (e.g. receipt of classroom-based supports and teacher-reported special education services and ratings of academic performance) and more proximal impacts on staff factors (i.e. efficacy to handle behavioural disruptions). Results suggest promising effects of the PBIS*plus* model on proximal factors, which likely serve as essential mediators to more distal student outcomes. Findings are consistent with the results from recent effectiveness trials of coaching and consultation models, including promising impacts on proximal factors, and some mixed or null findings on distal factors, such as student outcomes (see Pas et al., in press).

According to the theory of change model for PBIS*plus* and other coaching and consultation models, by supporting teachers' skill development, their perceived ability to intervene successfully with struggling students will change, as will their instructional practice (Han & Weiss, 2005). In turn, student achievement and behaviour will be enhanced. It is expected that changes in teachers' efficacy and their student-related perceptions would precede changes in student outcomes (Han & Weiss, 2005; Hoy & Woolfolk, 1993). It is possible that additional student outcomes would emerge with more time. Research has shown that systematic school reform efforts can often take at least three to five years to demonstrate impacts (Borman, Hewes, Overman, & Brown, 2003; Hall & Hord, 2010).

Although there were several positive impacts of the programme, there were some unexpected findings. All schools demonstrated significant improvements on the SET and I-SSET measures, thereby indicating a trend of improvement across all participating schools. We had anticipated that schools in the intervention condition would experience greater gains on these measures than the comparison schools. The process of being evaluated may have made schools in both conditions more aware of, and focused on, enhancing the quality of supports. Also, there have been some concerns raised regarding the extent to which the SET is precise and specific enough to differentiate the quality of supports provided when a school has been implementing PBIS for multiple years (Vincent, Spaulding, & Tobin, 2010); this was the case in the current study, as the schools had been implementing universal PBIS for nearly three years on average, and for up to eight years by some schools. However, these findings are promising, as they suggest high levels of sustainability of SWPBIS among all schools.

The I-SSET is a relatively new measure and its psychometric properties are still under investigation by its developers (e.g. Anderson et al., 2011). When the trial was initiated, a well-validated measure of the quality of supports at the advanced tiers was not available, and thus our team used an early version of the I-SSET (i.e. Lewis-Palmer et al., 2005). A recent paper by Debnam et al. (2012) discusses some of the psychometric and substantive findings related to the I-SSET from this trial; items and scales related to FBA and other state-mandated processes (e.g. SSTs) are largely influenced by state and district policies and procedures. Thus, there was limited variability in some of the subscales and items on the I-SSET reflecting these types of supports (see Table 2), and little opportunity for improvement in these indicators as a result of the training and support provided by PBIS*plus*.

Nevertheless, the I-SSET appears to be a promising measure for examining the use of multiple preventive interventions (Debnam et al., 2012), whereas nearly all

implementation measures developed to date are intervention specific, and thus provide limited utility for assessing a range of programmes simultaneously. Similarly, intervention-specific implementation measures are difficult to administer in comparison conditions because they may not be sensitive to other programmes which have similar foci or activities to the target intervention. This is a great concern within the field of implementation research and one which is in need of considerable attention, as schools are attempting to implement integrated programmes without valid and reliable implementation measures to guide their work.

Within the context of the current study, we are unable to determine which particular elements of the multi-component PBIS*plus* model accounted for the improvements in staff and student outcomes. This is a common concern in preventive interventions where multiple activities are integrated, resulting in a 'package' of components, each of which could independently or synergistically account for the programme's impacts (Domitrovich et al., 2010). Additional research is needed on PBIS*plus* to determine which elements or combinations of components are most impactful.

Importantly, all schools in the trial were implementing the universal SWPBIS programme, and thus the only element tested was the additional training and support provided to schools related to tier 2 interventions. Therefore, it may be difficult to discern school-wide impacts when these tier 2 intervention activities are really only intended to benefit a small subset of students. The schools, on average, had low rates of 'non-responders' to the universal SWPBIS programme at baseline (i.e. the suspension rate was about 9% on average, and the baseline referrals to the SST ranged from 6.7% to 8.2%); therefore, there was relatively little room for improvement. Stronger effects will likely be elucidated when subgroup impacts are examined. We intend to examine variation in the impact of PBIS*plus* on students with certain characteristics, such as those at risk for entry into special education at baseline or among students referred to the SST, and similarly those at baseline who displayed a pattern of at-risk behaviour problems (e.g. elevated aggressive behaviour). We anticipate that the effects of the PBIS*plus* programme will be strongest for those students at greatest need.

Further, most studies that have tested the impact of coaching or consultation models have conceptualized them as school-wide programmes, and therefore have analysed the effects at a school-level, rather than as an individual/student-level programme. This may be one reason why the effects are relatively modest, as not all students are exposed to or benefit from the programme (Pas et al., in press). However, not all students were exposed to, or perhaps needed, the PBIS*plus* supports, but yet a school-wide effect was explored because the random assignment occurred at the school level. Unfortunately, we were not able to track which individual students in the PBIS*plus* schools received the tier 2 supports. The extent to which consultation and coaching models have a school-wide impact is not clear (Frank & Kratochwill, 2008); this is an important issue to consider when designing and analysing coaching trials.

Conclusions and implications

These preliminary findings on the effects of PBIS*plus* generally suggest promising effects of the integrated tier 1 and 2 programme on staff and students. Future studies will examine whether the effects are stronger for subgroups of students – namely those who displayed an at-risk status at baseline. We also plan to explore several aspects of the coaching process, including how the coaches spent their time within the schools, the activities they focused on, and the engagement of the school staff and leadership in the coaching process

(Hershfeldt et al., in press). These factors can all be explored in relation to student and staff outcomes. Such analyses will allow us to begin 'unpacking' the integrated intervention and inform future studies of coaching involved in integrated interventions. This is particularly important given the increased focus on tailored interventions, such as RtI and PBIS, and the integration of multiple interventions (Domitrovich et al., 2010).

Results have implications for school-based psychologists and clinicians. The schools appear to have strengths around the implementation of state and federally mandated programme elements, such as FBA and SST; however, additional work is needed to better link those processes and the tiered PBIS framework. The I-SSET may serve as a tool for determining the implementation of supports at the advanced tiers; this may also inform decision making regarding the need for professional development and integration of other complementary programmes (e.g. CI/CO). The findings also highlight the importance of having sustainable systems to encourage the implementation of tier 2 supports, and the challenges associated with monitoring school-wide impact of tier 2 practices.

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