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Examining the Evidence Base for School-Wide Positive Behavior Support

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As the field of education embraces the task of adopting evidence-based practices, ongoing discussion will be appropriate about the standards and format for determining whether an intervention is supported by data on its effectiveness. We propose here six criteria that may be useful in this discussion and apply these criteria to assessment of School-wide Positive Behavior Support (SWPBS). Because multiple systems and practices are combined within a three-tiered behavior support framework, SWPBS presents a complex, though useful, example. We propose that a sufficiently rigorous and voluminous body of scholarship establishes SWPBS as an evidence-based practice for use in public schools, by typical educational personnel, to decrease problem behavior and promote prosocial behavior. Further research is needed, however, to better assess the breadth, interaction effects with effective intervention, and sustainability of SWPBS implementation and outcomes.

After decades of productive research on the development of effective educational practices, the focus is expanding from transforming practices that "work" as part of isolated demonstrations into practices that receive broad, practical use (Carnine, 1997; Fixsen, Naoom, Blase, Friedman, & Wallace, 2005; Flay et al., 2005). A part of this process requires establishing professional consensus about the data supporting the effectiveness of specific educational practices. Multiple federal, state, and professional groups are now identifying practices as evidence-based, and each is using slightly different standards (Coalition for Evidence-based Policy, 2003; Flay et al., 2005; ; Wilczynski et al., 2009).

The purposes of this manuscript are to propose core features that may apply to any practice or set of practices that proposes to be evidence-based and to extend these features to the assessment of SWPBS. The impetus for this analysis stems from the increasing breadth with which SWPBS is being adopted (as of August, 2009 over 10,000 schools in the United States are adopting SWPBS), recent publication of randomized control trials assessing SWPBS (Bradshaw, Koth, Thornton & Leaf. 2009; Horner et al., 2009), and an emerging emphasis on the technology of large-scale implementation of evidence-based practices (Flay et al., 2005; Fixsen et al., 2005; Fixsen, Blase, Horner & Sugai, 2009).

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DEFINING EDUCATIONAL PRACTICE

An educational practice is a procedure (or set of procedures) designed for use in a specific context (or set of contexts) by a specific set of users to achieve defined outcomes for a defined population or populations. A practice may be small in scope (e.g., the use of positive reinforcement during literacy instruction), a modest bundle of procedures that address a narrow outcome (e.g., time out from reinforcement to reduce playground aggression), or a large package of procedures that collectively target a major social issue (e.g., Direct Instruction to improve early literacy). Regardless of the size or scope of the practice, six criteria help to define a practice prior to assessing whether the practice is evidence-based:

1. *The practice is operationally defined*. An operational definition illustrates the specific elements of the practice that can be observed and counted. This definition will allow documentation of implementation integrity and accuracy of replication.
2. *The settings (or contexts) in which the practice is expected to be effective are defined*. If a practice is designed for a specific setting, the relevant features of that setting should be stipulated. Practices that are uniquely designed for preschool contexts, for example, may not be appropriate for high school. If a practice is expected to be effective across a number of settings, the common or unique features of those settings also should be stipulated.
3. *The target population (or populations) for whom the practice is effective is defined*. Some practices will target all learners, others will focus only on learners with specific characteristics (e.g., children with autism, students who do not reliably complete homework). If a practice is designed primarily to address the needs of a specific population of students, the specific characteristics of that population should be indicated in the description of the practice.
4. *The qualifications of people who may use the practice with success are defined*. Some practices may be used by anyone, while other practices (e.g., instructional assessment, functional analysis of behavior) are intended to be used only by individuals with specific training. If the successful use of a practice requires specific training or expertise, the qualifications of implementers should be clearly defined, tools or measures for assessing intervention integrity should be available, and their technical adequacy should be described.
5. *The outcomes that may be expected from using the practice are defined*. Among the most important criteria for an evidence-based practice is designation of the measurable outcomes that can be expected if the practice is used with integrity. These outcomes can include effects assessed by proximal measures (e.g., functionally linked observed behavior), distal measures (e.g., social ratings in nontraining settings or later in time), or both. When appropriate, benchmarks or mastery criteria (e.g., 80% of students) as well as corollary benefits, contraindications, or adverse side effects (e.g., escape-related behaviors) should be described.
6. *The conceptual theory and basic mechanisms framing the practice are defined*. Defining the conceptual theory underlying a practice provides a framework for assessing why a practice works. Defining a practice in terms of a conceptual body of knowledge (e.g., behavior analysis) also guides ongoing development, adaptation, and continuous improvement.

The basic message is that all practices should be described thoroughly so implementers know (a) what they

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look like, (b) where they can be used, (c) who should benefit from them, (d) how to implement them well, (e) what outcomes to expect, and (f) why they should expect them to work. At one level, the definition of a practice as ubiquitously evidence-based is unreasonable. A practice should be defined as evidence-based only within the constraints of the intended contexts and outcomes. This does not mean that a practice need be defined in an overly narrow manner. Many practices, such as positive reinforcement, are intended for use in a wide variety of settings, with a wide variety of populations, and with a wide variety of expected outcomes. But even a versatile practice like positive reinforcement is not intended to produce all outcomes for all individuals under all conditions.

ESTABLISHING A PRACTICE AS EVIDENCE-BASED

A well-defined practice allows systematic interpretation of the research supporting it. A major conversation is currently going on about the standards of evidence that should be used to define a practice as evidence-based (Flay et al., 2005). Nearly all practices have evidence supporting their use. The question is seldom "is there evidence?" but "is there sufficient evidence to allow unequivocal documentation that a practice is effective?" Questions used to assess whether an adequate level of evidence exists focus on the (a) number of studies documenting an experimental effect, (b) methodological quality of those studies, (c) replicability of the findings, (d) size of the documented effect, and (e) durability and generalizability of the observed effect.

Current trends suggest that practices will be judged not by a dichotomous standard (e.g., evidence-based vs. non-evidence-based), but within a continuum, such as strong, promising, emerging, insufficient, or weak levels of evidence for effect. Current trends also suggest that for a practice to be defined as having a strong or promising evidence base, it will need to be assessed within multiple experimental studies (randomized control trials or rigorous single-case analyses) that allow both documentation of a valued effect and demonstration of experimental control (e.g., documentation that the valued effect was causally related to use of the practice) (Flay et al., 2005). The use of randomized control trials (RCT) is held as the gold standard for documenting evidence base (Shavelson & Towne, 2002), but proposals for using single-case experimental designs are gaining increasing support (Horner et al., 2005; Kratochwill et al., in press; Shadish, Rindskopf & Hedges, 2008; Swaminathan et al., under review).

While the number of studies, methods of documenting research design rigor, and standards for assessing the size and durability of effects will continue to be debated, agreement is emerging that any practice claiming to be evidence based must be defined with precision and demonstrated to be effective across multiple rigorous experimental research studies. One elegant set of criteria for documenting the evidence base for an educational practice has been offered by Flay et al. (2005) representing the Society for Prevention Research (SPR). They propose the following:

> Recognizing that interventions that are effective and ready for dissemination are a subset of effective programs and policies, and that effective programs and policies are a subset of efficacious interventions, SPR's Standards Committee developed overlapping sets of standards. We designed these Standards to assist practitioners, policy makers, and administrators to determine which interventions are efficacious, which are effective, and which are ready for dissemination. Under these Standards, an efficacious intervention will have been tested in at least two rigorous trials that (1) involved defined samples from defined populations; (2) used psychometrically sound measures and data collection procedures; (3) analyzed their data with rigorous statistical approaches; (4) showed consistent positive effects (without serious iatrogenic effects); and (5) reported at least one significant long-term follow-up. An effective intervention under these Standards will not only meet all standards for efficacious interventions, but also will have (1) manuals, appropriate training, and technical support available to allow third parties to adopt and implement the intervention; (2) been evaluated under real-world conditions in studies that included sound measurement of the level of implementation and engagement of the target audience (in both the intervention and control conditions); (3) indicated the practical importance of intervention outcome effects; and (4) clearly demonstrated to whom intervention findings can be generalized. An intervention recognized as ready for broad dissemination under these Standards will not only meet all standards for efficacious and effective interventions, but will also provide (1) evidence of the ability to "go to scale"; (2) clear cost information; and (3) monitoring and evaluation tools so that adopting agencies can monitor or evaluate how well the intervention works in their settings." (p. 151)

While Flay et al. (2005) choose to ignore the contributions of single-case methods, and under-emphasized the need for fidelity measures, the basic messages are of great value for anyone attempting to build an approach for defining practices with strong, promising, and emerging empirical support. The research supporting a practice should (a) provide a replicable description of the practices and participants, (b) report information from valid and reliable measures, (c) be assessed within rigorous research design and analysis procedures (we would include single-case practices in this effort), (d) document consistent positive effects, and (e) provide documentation that effects are durable. We turn now to a description of SWPBS and examine the extent to which evidence exists to establish it as a practice with strong, promising, emerging, insufficient, or contraindicated empirical support.

SCHOOL-WIDE POSITIVE BEHAVIOR SUPPORT

SWPBS is a set of intervention practices and organizational systems for establishing the social culture and intensive individual behavior supports needed to achieve academic and social success for all students (Sugai, Horner, & Lewis, 2009). SWPBS is not a formal curriculum but a 2–3 year process of leadership team training intended to establish local or school capacity for adoption of effective and preventive behavioral interventions, high implementation integrity, continuous use of data for decision making, embedded professional development and coaching to establish predictable, consistent, positive and safe social contingencies at the whole school level. The conceptual model for SWPBS links (a) principles of applied behavior analysis, (b) the multi-tiered prevention logic from community health (Walker et al., 1996), (c) rigorous use of universal screening and progress monitoring (Fairbanks, Sugai, Guardino, & Lathrop, 2007; Fuchs & Fuchs, 1986; Shinn, Walker & Stoner, 2002), (d) integration of behavioral and education practices for improving behavior and learning (Algozzine & Algozzine, 2009; Anderson & Scott, in press; McIntosh, Horner, Chard, Boland, & Good, 2006), and (e) the implementation technology needed to apply effective practices at large scales (Fixsen et al., 2005).

The core features of SWPBS are not new. In fact they draw from several decades of systematic research, demonstration and innovation in education, mental health, and behavior analysis (Biglan, 1995; Colvin, Kame'enui, & Sugai, 1993; Gottfredson, Gottfredson, & Hybl, 1993; Knoff, 2000; Mayer, 1995; Mayer & Butterworth, 1979; Nelson, 1996; Sprick, Garrison, & Howard, 1998; Wilson, Gottfredson, & Najaka, 2001). SWPBS emphasizes familiar procedures, such as operational definition of behavioral expectations, active instruction, consistent positive reinforcement, a continuum of consequences that minimize reinforcement of problem behavior, and data use within ongoing problem solving (Anderson & Scott, in press; Sugai & Lewis, 1999; Sugai et al., 2009). The real contributions of SWPBS lie in focusing on the whole school as the unit of analysis; emphasizing multiple tiers of support in which a student's needs are assessed regularly, support levels are tied to need, and supports are delivered as early as possible; tying educational practices to the organizational systems needed to deliver these practices with fidelity and sustainability; and the active and cyclical use of data for decision making (Sugai et al., 2009).

To define SWPBS as having the elements of a practice requires recognition that SWPBS is a large constellation of systems and practices implemented at three tiers of intensity. As a result, documenting the evidence base for SWPBS is complex. To provide a starting point for understanding this complexity, we describe briefly the component practices at each tier of SWPBS, assess the extent to which the six criteria for defining a practice are met, and then consider the empirical evidence for SWPBS to determine whether SWPBS should be considered an evidence-based practice.

Continuum of Supports in SPWBS

SWPBS consists of three tiers of interventions: All students receive basic preventive support, and moving up the tiers results in increasingly intensive interventions that match the level of support to the needs of students. The three tiers within SWPBS are primary prevention (often referred to as universal supports or Tier I), secondary prevention (targeted interventions or Tier II), and tertiary prevention (intensive supports or Tier III). Each tier consists of specific practices and systems features used to guide implementation. (A thorough review of the systems and practices at each tier is beyond the scope of this manuscript, but see Anderson & Scott, in press; Sailor, Dunlap, Sugai, & Horner, 2009; Sugai et al., 2009).

Primary Intervention

Primary prevention is implemented across the entire school, for all students, in all settings. One of the core intervention features is clearly articulated behavioral expectations that are taught using direct instructional procedures. In addition, all students receive frequent acknowledgement (positive reinforcement) for meeting school-wide expectations and a continuum of logical consequences for problem behavior. Data about problem behavior are collected, summarized, and used for regular decision-making by teams. Systems features at this level of support include team organization, data use to guide implementation, and incorporation of SWPBS training and orientation as part of annual staff development. Primary prevention is implemented across the entire school, and all adults in the school participate in its delivery. This includes not just teachers and administrators but playground supervisors, custodial staff, cafeteria workers, and bus drivers.

Secondary Intervention

Secondary prevention is designed for students who are not responding to the primary level of support. It is important that students receiving secondary supports continue to participate in the primary intervention; they simply are receiving additional supports to help them succeed in school. Secondary prevention practices are conceptualized as intervention strategies made up of efficient behavior change strategies that are implemented in a similar manner across all students receiving the intervention. Examples of frequently implemented secondary interventions are Check and Connect, Check-in/Check-out, First Step to Success,

Think Time, and social skills groups such as skill-streaming. In addition to these "manualized" interventions, a number of other interventions have been documented to be effective for small groups of students. Examples include using schedules to increase daily structure, implementing contingencies across groups of students, and providing closer supervision. When choosing secondary interventions, schools consider the needs of their students as well as resources available and the existing skills of staff. Systems-features necessary for implementation include the use of data to select students who may benefit from a particular secondary intervention (e.g., having a child receive a social skills intervention vs. homework club) and monitor progress of all students receiving secondary interventions. At Tier II, data collection is more frequent so that interventions can be adjusted quickly if a student is not meeting predetermined behavioral goals. In addition to progress monitoring, SWPBS at this level of support includes a team charged with selecting secondary interventions appropriate for a school and monitoring the fidelity of implementation across all students as well as for specific students. In addition, schools designate one or more intervention coordinators who have time allocated to the oversight and management of secondary interventions.

Tertiary Intervention

Tertiary prevention supports are for students whose behavior has not responded (or is unlikely to respond) to the primary or secondary interventions in a school. Tertiary supports are individualized to the multiple and unique needs of each student. They require a significant investment of time and resources as well as a high level of expertise to guide implementation. At this level of support, a functional behavior assessment (FBA) is generally conducted to determine factors in the environment that are affecting a student's behavior. Results of the FBA are integrated with other academic and social information to build a comprehensive behavior support plan. The support plan typically consists of multiple components, including strategies to influence the larger social context around a student, prevent the occurrence of problem behavior, teach new skills, ensure that appropriate behavior is reinforced, and minimize the likelihood that problem behavior is reinforced. Even at this level of intensity, students continue to access the primary prevention intervention. As with secondary supports, school-wide behavioral expectations and rules are embedded in the intervention. Tertiary supports require frequent progress monitoring to ensure that a student is making adequate progress and that the intervention is being implemented as designed. In addition, schools need access to personnel with expertise conducting FBAs and developing support plans.

Using the six criteria above for documenting an educational practice, SWPBS can be viewed as a whole-school approach to behavior support with three clusters of practices organized by the three tiers of intervention intensity. SWPBS addresses the six criteria for being an educational practice as follows.

1. *Operational Definitions*: A summary of the defining elements that make up SWPBS is provided in Table 1 with operational definitions of each procedure and system provided in companion publications (Anderson et al., 2008 [ISSET]; Sugai et al., 2009; Sugai, Lewis-Palmer, Todd & Horner, 2001 [SET]). In addition, recommended practices implemented at each tier (e.g., check-in/check-out at Tier II) have clearly defined elements.
2. *Settings*: The targeted settings in which SWPBS is relevant are public elementary, middle, and high schools. When SWPBS is applied in alternative education settings, juvenile justice settings, prisons, work environments, homes, hospitals, or community contexts adaptations to the practices should be expected.
3. *Target Population*: SWPBS targets all students in a school. The emphasis on prevention encourages investment in teaching behavioral expectations to all students. The multiple tiers of support intensity, however, extend SWPBS support to those students with the most extreme problem behaviors and disabilities.
4. *Qualification of Users*: SWPBS is designed for use by all adults within a school. Not only are teachers, administrators, and related services personnel intended to use SWPBS, but playground supervisors, cafeteria and custodial staff, and bus drivers are part of the intended user group. Recognition is given, however, to the need for more skilled personnel to implement behavioral procedures in the secondary and tertiary tiers of behavior support.
5. *Outcomes*: The outcomes of SWPBS focus on reduced levels of problem behavior, increased perception of school safety, increased levels of staff satisfaction, and improved academic outcomes when SWPBS is used with effective instruction.
6. *Conceptual Theory*: The conceptual foundation for SWPBS lies in applied behavior analysis, organizational behavior management, community health, positive behavior support, and implementation science.

EVIDENCE BASE FOR SWPBS

The multiple tiers of integrated practices and systems used to define SWPBS make it not only complex to define but also complicated to assess. We argued earlier that at least five criteria are useful in determining whether the empirical

TABLE 1
The Procedures and Systems Defining Tiers of SWPBS Implementation

Tiers of Implementation	Procedures: Practices Focused on Students	Systems: Practices Focused on Faculty and Staff
Primary Prevention	-School-wide implementation -Behavioral expectations for whole school defined and taught -Rewards for appropriate behavior -Continuum of consequences for problem behavior -School-wide classroom management practices -Family involvement practices -Collection and use of data for decision-making about student-focused interventions	-Team-based implementation -Administrative commitment -Clear policies focused on student social behavior -Staff annual orientation to SWPBS -Universal screening for behavior support. -Use of fidelity data to guide implementation and sustained use -District commitment to SWPBS implementation
Secondary Prevention	-Direct instruction on skills related to daily organization, social interaction and academic success. -Increased structure -Increased frequency and precision of adult feedback. -Assessment and intervention linked for academic and behavioral challenges -Reward for problem behavior minimized. -Home–school communication and collaboration increased	-Early identification and support development -Progress monitoring and reporting -Regular team meetings to build implement and assess interventions -Allocation of FTE to coordinate intervention implementation -Administrative and team process for selecting secondary prevention interventions -Use of fidelity data to guide implementation and sustained use
Tertiary Prevention	-Strengths based assessment -Functional behavioral assessment -Applied behavior analysis -Intensive instruction -Self-management	-Behavior support team -Progress monitoring system *intervention fidelity *intervention impact -Reporting process for families, students, faculty, administration -Access to behavioral expertise -Use of fidelity data to guide implementation and sustained use

results for a practice demonstrate strong, promising, emerging, insufficient, or weak support. Here, we revisit each of these five criteria to assess the overall SWPBS approach and then summarize main empirical messages for each the three tiers of SPWBS. Research reports considered for this assessment were drawn from peer-reviewed articles published between 2000 and 2009 that included primary-source experimental analyses of SWPBS or component practices and were published in *Behavior Disorders, Journal of Applied Behavior Analysis, Journal of Emotional and Behavior Disorders, Journal of Positive Behavior Interventions, Journal of School Psychology, Prevention Science, School Psychology Quarterly,* or *School Psychology Review.* In addition, articles that referenced the initially identified articles were obtained and included in the analysis. We did not attempt to provide a comprehensive review of the literature on SWPBS published over the past 20 years. Rather, the goal was to identify a sample of current research results that address directly the issue of SWPBS implementation and effectiveness. We reviewed 46 articles that met these criteria. Twenty focused on Tier I Primary prevention, 13 focused Tier II Secondary prevention, and 13 focused on Tier III Tertiary Prevention.

The five criteria for examining the evidence base for any practice apply primarily to the consideration of individual studies. When viewed in concert, however, the criteria provide a useful organizational framework for assessing whether

the constellation of practices in the three tiers of SWPBS has sufficient empirical support to warrant consideration:

1. *The practice and participants are defined with operational precision*. To be included in this assessment, each study needed to define the practice (or component practices) with sufficient precision to allow replication. In each case, the study also provided replicable description of the participating adults, students, or both. At this point, a set of procedures exists to distinguish SWPBS that can be defined with replicable precision.
2. *The research employs valid and reliable measures*. The research reports employ a mix of standardized assessment measures and direct observation of student behavior to assess effects. Two additional measurement trends are the use of office discipline referrals as an index of school-wide social culture (Irvin et al., 2006; Irvin, Tobin, Sprague, Sugai & Vincent, 2004; Kaufman et al., 2010) and the development of measures of SWPBS fidelity (ISSET: Anderson et al., 2008; SET: Sugai et al., 2001). Together the measures used to assess SWPBS implementation and impact offer valid and reliable indices of fidelity and effect.
3. *The research is grounded in rigorous designs*. A major advance in the past 3 years has been the publication of multiple randomized control trials documenting improvement in student outcomes when SWPBS is implemented (e.g., Bradshaw, Koth, Bevans, Ialongo, & Leaf, 2008; Bradshaw, Koth, Thorton, & Leaf, 2009; Horner et al., 2009). Recent randomized control trials also have been reported for Tier II practices (e.g., Walker et al., 2009). The majority of studies examining Tier II and Tier III practices, however, have employed single-case methods (e.g., Beard-Jordan & Sugai, 2004; Carr et al., 1999; Sprague & Perkins 2009). The combination of randomized control trials and single case studies allow strong documentation of experimental effects. Within the past 5 years, a sufficient body of randomized control-group designs combined with existing single-case designs have been published to allow assessment of initial effects related to SWPBS practices.
4. *The research documents experimental effects without iatrogenic outcomes*. Together, results from randomized control studies (Bradshaw, Mitchell, & Leaf, 2009; Horner et al., 2009), quasi-experimental designs (Safran & Oswald, 2003; Sprague et al., 2002), and systematic evaluation designs (Lohrman-O'Rourke et al., 2000; Muscott, Mann, & LeBrun, 2008; Taylor-Greene et al., 1997) form a pattern demonstrating that SWPBS implementation is possible and associated with improved student behavior. Negative effects to implementation of SPWBS have not been reported to date.
5. *The research documents effects*. Sustaining both implementation fidelity and student effects is a focus that is gaining increasing attention (Adelman & Taylor, 2003; McIntosh, Horner & Sugai, 2009). To date, the majority of studies examining sustained effects have been descriptive in design and documented that SWPBS was sustainable with continued levels of office discipline referral reduction (Barrett, Bradshaw, & Lewis-Palmer, 2008; Taylor-Green et al., 1997). Doolittle (2006) reported an unpublished dissertation in which 285 schools adopting SWPBS were monitored over a 3-year period. Sixty five percent of the schools demonstrated sustained high fidelity, and Doolittle's analysis identified the presence of an ongoing reward system and consistent administrative support from the building principal as the key factors distinguishing schools that successfully sustained implementation.

If the collective body of scholarship examining SWPBS is appropriate for consideration, we propose that it is useful to summarize the main messages from this research for each of the three tiers of SWPBS.

School-Wide Primary Prevention

1. *The primary prevention tier of SWPBS can be implemented with fidelity in a wide range of contexts and by typical implementation agents.*

Recent research indicates that the Primary Prevention elements of SWPBS can be implemented with high fidelity in typical school settings. Horner et al. (2009) provided an effectiveness analysis within a randomized waitlist-controlled design documenting that training in SWPBS provided by typical state personnel using available state resources was effective in establishing SWPBS Primary Prevention practices with acceptable fidelity. Using the School-Wide Evaluation Tool (SET; Horner et al., 2004), the authors demonstrated that elementary school teams receiving 4–6 days of distributed training were successful in their implementation of SWPBS Primary Prevention practices with an 80% or better level of SET integrity. Fidelity of SWPBS implementation has been replicated by Safran (2006) and Bradshaw et al. (2009) who also used randomized control trial protocols, and the SET to demonstrate implementation with ≥80% fidelity. These recent randomized control trials lend support to earlier quasi-experimental and evaluation reports of high fidelity implementation

(Barrett et al., 2008; Putnam, Luiselli, & Sunderland, 2002; Sprague et al., 2002).

2. *Implementation of the primary prevention tier of SWPBS is associated with improved organizational health.*

Bradshaw, Koth, et al. (2008) provided a randomized control analysis of the impact of implementing SWPBS on the organizational operations of schools. They found that school personnel reported that SWPBS implementation was associated with improved clarity of purpose, predictable coordination, and perceived impact on student outcomes. These results are consistent with links between the implementation of SWPBS and a reduction in requests for school-based counseling services (Bradshaw, Mitchell, & Leaf, 2009; Bradshaw, Koth, et al., 2009; Bradshaw, Reinke, Brown, Bevans, & Leaf, 2008).

3. *Implementation of the primary prevention tier of SWPBS is associated with a reduction in reports of problem behavior and improved perception of school safety.*

A primary focus of SWPBS is the reduction of problem behaviors that result in office discipline referrals, disruption, and reduced academic engagement. An increasing body of evidence supports the finding that implementation of SWPBS is associated with reductions in problem behavior (Colvin et al., 1993; Horner et al., 2009; Nelson, 1996; Nelson, Hurley, Synhorst, & Epstein, 2008; Nelson, Martella, & Galand, 1998; Nelson, Martella, & Marchand-Martella, 2002; Safran & Oswald, 2003). Most recently, Bradshaw, Mitchell, and Leaf (2009) reported a randomized controlled effectiveness trial with 37 elementary schools. Data reported across a 5-year longitudinal study demonstrate that (a) schools were able to implement SWPBS with high fidelity, (b) office discipline referrals associated with problem behavior were reduced, and (c) the proportion of students receiving out-of-school suspensions was reduced when SWPBS was implemented.

Horner et al. (2009) provided similar results using the School Safety Survey (SSS; Sprague, Colvin, & Irvin, 1995) within a randomized control trial with 63 elementary schools drawn from Illinois and Hawaii. The SSS Risk Factor score for experimental schools was not different from control schools at Pretest and statistically significantly different at Posttest, Time X Condition interaction (-.064), $t(35) = -2.55$, $p = .0154$ with a large effect size ($d = -.86$).

4. *Implementation of the primary prevention tier of SWPBS is promisingly (but not definitively) associated with increased academic outcomes.*

Nelson, Duppong Hurley, Synhorst, and Epstein (2008), Nelson, Martella, and Marchand-Martella (2002), and Kellem et al. (1998) emphasized the inverse relationship between problem behavior and academic performance, a theme recognized in research on academic, mental health, and behavior support analyses (Hawkins, Farrington, & Catalano, 1998; Maguin & Loeber, 1996; McIntosh, Flannery, Sugai, Braun, & Cochrane, 2008; Verdugo & Schneider, 1999). The expectation is that improving social behaviors leads to more student time in instruction and greater academic engagement during instruction. Algozzine, Putnam, and Horner (under review) built on this logic, arguing that good teaching is linked to both improved academic outcomes and reduction in problem behavior. Their point was that focusing on behavior support may improve academic engagement and that focusing on effective teaching may improve social behavior. While the basic mechanisms remain to be isolated, the link between implementation of SWPBS and combined improvement in both behavior and academic performance was documented not just in descriptive reports (Luiselli, Putnam, Handler, & Fienberg, 2005; McIntosh, Chard, Boland & Horner, 2006; McIntosh, Horner, et al., 2006; Metzler, Biglan, Rusby, & Sprague, 2001; Musscot et al., 2008;) but also in randomized controlled trials (Bradshaw Koth, Thornton, & Leaf, 2009; Horner et al., 2009). It is premature to claim that investing in SWPBS is causally associated with improved academic outcomes. In fact, the conceptual logic does not support the expectation that building social support would lead to improved reading, math, or writing skills. Rather, the expectation is that establishing a predictable, consistent, positive, and safe social culture will improve the behavioral engagement of students in learning, and that if this engagement is coupled with a functional curriculum and effective teaching, academic outcomes will be more likely.

Secondary Prevention

Strategies that can be conceptualized as secondary prevention within SWPBS have existed for many years, and ample evidence supports their effectiveness (Anderson & Borgmeier, in press; Crone, Hawken, & Horner, in press; Crone, Horner, & Hawken, 2004). What SWPBS adds is a framework within which these interventions can be implemented with efficiency and with data-based decision-rules to aide in (a) selecting students most likely to benefit from a particular intervention and (b) determining whether any particular student is successful on an intervention. Because a review of all interventions that could fit at Tier II is beyond the scope of this paper, we summarize below the evidence base for four commonly used interventions at Tier II in SWPBS: Check and Connect, Check-in/Check-out, First Step to Success, and Think Time.

Check and Connect

The Check and Connect program was developed at the University of Minnesota and has strongly demonstrated that

effective implementation is related to reduction in student drop-out (Anderson, Christenson, Sinclair, & Lehr, 2004; Lehr, Hansen, Sinclair, & Christenson, 2003; Sinclair, Christensen, Evelo, & Hurley, 1998). The core components of Check and Connect include relationship building, routine monitoring, individual intervention, long-term commitment, persistent support, problem solving, and affiliation with school and learning. School personnel nominate students for Check and Connect based on social risk, academic risk, or both. The program involves a systematic structure for linking students to supportive adults in the school and adapting that support to meet the each student. Both student reports and observational data document improved student engagement, improved social and academic outcomes, and reduced likelihood of dropout.

Check-in/Check-out

Check-in/Check-out (CICO) is a daily report card intervention designed to improve daily structure (e.g., prompts), social links with adults, access to academic support, and coordination between home and school. In CICO, a student (a) checks in with an adult upon entering school, (b) checks in and out with each teachers to receive feedback on his or her performance on school-wide expectations during each major academic period of the day, (c) checks out with an adult at the end of the school day, (d) carries the daily report card home, and (e) has daily data recorded and used for decision making by a school-based behavior support team. This intervention has also been implemented as the Behavior Education Program (BEP) and employs elements of daily evaluation that have long been part of school-based behavioral interventions (Chafouleas, Christ, Riley-Tillman, Briesch, Chanese, 2007; Chafouleas, Reiley-Tillman, Sassu, LaFrance, & Patwa, 2007; Crone et al., in press; Crone et al., 2004).

The research support for CICO is strong and comes largely from single-case research documenting functional relations between the implementation of CICO and a reduction in problem behavior (Campbell & Anderson, 2008; Crone et al., in press ; Hawken, 2006; Hawken & Horner, 2003; Hawken, MacLeod, & Rawlings, 2007; March & Horner, 2002; McCurdy, Kunsch, & Reibstein, 2007; Todd, Kaufman, Meyer, & Horner, 2008)

First Step to Success

First Step to Success (FSS) is an intervention designed for use in elementary schools to reduce problem behavior. An identified student is assigned an FSS coach who sits with the student and provides one-to-one training in appropriate behavior. As the student's behavior improves, the coach fades back and allows the teacher to continue implementation of the prompts and consequences needed to sustain the student's improved level of behavior. FSS also includes training for parents, but this component is implemented with sporadic fidelity.

The research support for FSS is strong. Randomized control trials of FSS demonstrate that FSS can be implemented with fidelity and is functionally related to a reduction in problem behavior (Golly, Stiller, & Walker, 1998; Walker et al., 1998; 2009). These effects have been replicated in single-case studies (Beard-Jordan & Sugai, 2004; Carter & Horner, 2007; Rodriguez, Loman & Horner, in press; Sprague & Perkins-Rowe, 2009).

Think Time

The Think Time intervention (Nelson & Carr, 2000) is designed to enable the teacher and student to stop a negative social exchange and provide the student feedback and an opportunity to plan. Used in the classroom and common areas for minor problem behaviors, the strategy involves one teacher labeling a problem behavior and sending the student to the room of a collaborating teacher, who allows the student time to think and reflect on his or her behavior. A formal protocol is then used by which the student is allowed to reenter his or her original room. Think Time can (a) interrupt escalating behaviors, (b) reduce attention for problem behavior, (c) provide the student a quiet period regain self-composure, (d) provide the student with feedback and an opportunity to plan for subsequent performance, and (e) provide a predictable process for resolving classroom conflict. The U.S. Department of Education's Expert Panel on Safe, Disciplined, and Drug-Free Schools has designated the Think Time Strategy as promising. Think Time has also been used as a component of primary prevention efforts (Nelson et al., 2008).

Tertiary Prevention

As described above, tertiary prevention involves individualized supports developed through an FBA. An existing robust literature documents the effects of function-based supports on problem behavior in school and community contexts (Carr et al., 1999; Didden, Duker, & Korzilius, 1997; Scotti, Ujcich, Weigle, Holland, & Kirk, 1996). We focus here on a brief review of the status of FBAs and the implementation of function-based support plans in schools.

FBA is a label applied to any technology used to identify variables that occasion or maintain a student's behavior. Methods of FBA range from interviews and direct observations, which generally are efficient to conduct, to experimental analyses that require a significant commitment of time and expertise. In schools implementing SWPBS, the type of FBA conducted is matched to the intensity of the student's need. School-based personnel conduct interviews and brief observations for most students who require an FBA, and district personnel with extensive training in this level of support conduct more intensive FBAs or functional analyses

for students whose behavior is severe or has not responded to other interventions (Anderson & Scott, in press; Scott, Anderson, Mancil, & Alter, 2009).

The primary purpose of an FBA is to guide the design of a comprehensive intervention. The literature base on effects of function-based support consists almost entirely of single-subject studies documenting rigorous functional control, which is not surprising given that interventions are individualized for each student. Function-based support is among the areas with strongest empirical support (Carr et al., 1999; Didden et al., 1997; Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994; *Journal of Applied Behavior Analysis* 1968-2009). This research shows that interventions guided by FBAs can be implemented with fidelity and result directly in a reduction in problem behavior and improvement in desired behaviors (Brooks, Todd, Tofflemoyer, & Horner, 2003; Burke, Hagan-Burke, & Sugai, 2003; Crone, Hawken, & Bergstrom, 2007; Ervin, DuPaul, Kern, & Friman, 1998; Ervin, Kern, Clarke, DuPaul, Dunlap, & Friman, 2000; Fairbanks et al., 2007; Grow, Carr, & LeBlanc, 2009; Ingram, Lewis-Palmer, & Sugai, 2005; Kern, Childs, Dunlap, Clarke, & Falk, 1994; Kern, Hilt, & Gresham, 2004; Lucyshyn et al., 2007; Newcomer & Lewis, 2004; Preciado, Horner, & Baker, 2009; Smith & Sugai, 2000).

In sum, a broad examination of the individual studies that document the effectiveness and efficacy of practices generally included in an SWPBS approach reveals an integrated continuum of practices that (a) increase in intervention intensity based on the degree of behavior unresponsiveness, (b) are linked such that a universal or primary tier of intervention support for all students serves as the foundation for more intensive behavior support at the individual student level, (c) bases intervention decision making on student responsiveness to intervention, (d) facilitates the essential academic mission of classrooms and schools, and (e) gives priority to the assessment and establishment of high levels of intervention implementation integrity. The evidence base for individual practices is sound, and the documentation of the interactive effects of combined interventions and procedures along the continuum is emerging.

OUTSTANDING ISSUES

The evidence base for any practice will be continually emerging and subject to refinement. Considering SWPBS as a practice or set of practices, four issues may be fruitful to guide ongoing research efforts: sustainability, cost, educational levels of implementation, and interactive effects.

Sustainability refers to the durability with which a practice is used with fidelity and impact (McIntosh, Horner, & Sugai, 2009) and is a function of a host of variables. One of the enticing features of SWPBS has been the evaluation reports of sustained SWPBS implementation (Coffey & Horner, 2010; Colvin & Fernandez, 2000,). It is encouraging to note that SWPBS has been sustained for extended time periods, but identification and documentation of the variables specifically responsible for sustained and failed implementation would increase the efficiency of SWPBS implementation.

A second area of scholarship lies in better documentation of costs. Implementing evidence-based practices carries both initial changeover costs, and ongoing operation costs (Blonigen et al., 2008). An initial cost analysis of SWPBS by Blonigen et al. (2008) has been useful but served to whet the appetite of policy makers for more comprehensive cost–benefit analyses. The methodology for conducting cost analyses and cost–benefit analyses is well developed in business contexts but not in the context of the assessment of educational practices.

A third area of interest for SWPBS lies in documentation of how the practice can be applied in high schools (Bohannon-Edmonson, Flannery, Eber, & Sugai, 2004). Nearly 1000 high schools in the United States in 2009 reported efforts to adopt SWPBS, but a consistent finding has been that these high schools have had a greater difficulty in achieving implementation at high fidelity. In their monograph, Flannery and Sugai (2010) described 12 examples of promising high school implementation of SWPBS and discussed the features of high schools that make implementation challenging. These descriptive evaluations are useful and should serve as a stimulus for more experimental demonstration in the future.

A fourth area in need of demonstration and study is the interaction effects that occur when multiple tiers of support are integrated. A basic assumption of this approach is that secondary and tertiary tier practices are more likely to be implemented with fidelity and effective in producing improved student outcomes when they are used in the context of Tier I primary prevention practices. At this time, the research evidence allows more confidence about the independent effects of practices at each Tier in SWPBS than about the interaction effects that are presumed to exist when the full three tier approach is implemented.

SUMMARY

A reasoned, conceptually sound, and important discussion is now occurring within education around the process for identifying evidence-based educational practices. We proposed here criteria for defining a practice and for considering the degree to which the practice is evidence based. We have applied these criteria to SWPBS and conclude that as an approach, SWPBS does not fit easily and conveniently into past delineations of a practice. We also believe that the overall approach carries sufficient experimental documenta-

tion to be classified as evidence based and to warrant large-scale implementation. The current emphasis on defining evidence-based practices is useful and has identified an array of issues that will help guide future research, refine our adoption and implementation of practices, and evaluate our sustainability and scaling efforts.

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