

Randomized Controlled Trial of the Prevent–Teach–Reinforce (PTR) Tertiary Intervention for Students With Problem Behaviors

Preliminary Outcomes

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Although there is literature supporting the effectiveness of tertiary behavioral supports, the majority of the studies have been conducted with single-subject designs. The Prevent–Teach–Reinforce (PTR) model is a standardized model of a school-based tertiary intervention. This study reports initial results from a randomized controlled trial to compare whether the PTR model, as implemented by typical school personnel, is more effective than interventions typically used (i.e., services as usual). To date, 245 students in Grades K-8 have been enrolled in the study, and preliminary results show that students who received the PTR intervention had significantly higher social skills and academic engaged time and significantly lower problem behavior when compared with students who received services as usual. Teachers gave high social validity ratings to the intervention. Implications for widescale school adoption are discussed.

Keywords: *behavioral interventions; functional behavioral assessment; randomized controlled trials*

Serious problem behaviors continue to be identified as perhaps the greatest factor interfering with students' ability to learn (Emerson, Kiernan, & Alborz, 2001; Rose & Gallup, 2005). Disruptive behaviors of students with, and at risk for, disabilities have a wide-reaching effect on teachers, schools, and society including a high drop-out rate leading to poor job outcomes, limited income, and a pattern of failure persisting into adulthood (U.S. Department of Education, 2000; Wagner et al., 2006). Moreover, disruptive behavior puts students at risk for academic failure (Nelson, Benner, Lane, & Smith, 2004; Rosenblatt & Attkisson, 1997) and contributes to their exclusion from typical school and community settings (Emerson et al., 2001; National Longitudinal Transition Study–2, 2004; Schalock, Baker, & Croser, 2002). Disruptive student behavior has been credited with teacher job dissatisfaction and is a major factor leading to teacher attrition (Egyed & Short, 2006; Liu & Meyer, 2005; Public Agenda, 2004).

Although schools have attempted to put evidence-based interventions in place to address behavioral needs, school personnel's use of typical behavior support strategies (i.e., services as usual) primarily consist of reactive, nonfunction-based, punitive strategies such as reprimands, physical and verbal redirects, and removal from settings (Blood & Neel, 2007; Skiba & Rausch, 2006; Sprague & Horner, 2006). It is regrettable that the strategies rarely result in improved outcomes and may actually serve to strengthen the problem behaviors that were

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targeted for intervention (Hyman & Perone, 1998; Skiba & Rausch, 2006; Skiba, Ritter, Simmons, Peterson, & Miller, 2006; Turnbull et al., 2002). This situation persists, even in light of the increasing adoption of a systems-level, three-tiered proactive intervention approach adapted from the public health/prevention model in which supports and culture are established to improve the social and academic behavior of all students (Anderson & Kincaid, 2005; Scott, Liaupsin, Nelson, & McIntyre, 2005; Sugai, Sprague, Horner, & Walker, 2000). The first or primary tier is a universal intervention that addresses the needs of all students by defining, teaching, and reinforcing expected behaviors (Sugai et al., 2000). Secondary or targeted group interventions are provided to a smaller group of students who do not respond to primary interventions in order to prevent the need for more intensive supports (Crone, Horner, & Hawken, 2004; Scott et al., 2005). Last, the third tier or tertiary level provides interventions to the smallest group of students who require the most individualized and intensive supports and is intended to prevent larger problems such as placement in increasingly segregated settings or exclusion (Scott et al., 2005). Thus, there continues to be an urgent need for evidence-based tertiary behavior support interventions, such as the functional behavior assessment (FBA) process, to improve problem behavior of students who are underserved by primary and secondary tier interventions (i.e., students with emotional and behavioral disorders; students with developmental disabilities).

To date, an extensive body of research has established the efficacy of the FBA process that leads to the development and implementation of an individualized behavior intervention plan (BIP) directly related to data from the FBA. Although there has been a growing collection of studies showing efficacy of the process for students with and without disabilities (Blair, Umbreit, & Bos, 1999; Burke, Hagan-Burke, & Sugai, 2003; Duda, Dunlap, Fox, Lentini, & Clarke, 2004; Dunlap & Carr, 2007; Lane, Weisenbach, Phillips, & Wehby, 2007), the process is not yet being used as a standard of practice for effectively resolving problem behaviors for students with the greatest need (Blood & Neel, 2007; Payne, Scott, & Conroy, 2007). Recent literature, including special issues of the *Journal of Behavioral Education*, Volume 14, 2005, and *Behavioral Disorders*, Volume 32, 2007, has focused on the use of FBA in schools and found that FBA strategies are not commonly used for students with intensive problem behaviors and are completed as a compliant exercise rather than a tool that would individualize and deliver effective supports.

Problems consistently identified by researchers in the field (Benazzi, Horner, & Good, 2006; Blood & Neel, 2007; Scott, Anderson, & Spaulding, 2008; Scott et al., 2005; Van Acker, Boreson, Gable, & Potterton, 2005) include the following: (a) absence of logical connections between FBA data and BIP strategies; (b) omitted or poorly defined target behaviors; (c) missing, incomplete, or inaccurate hypotheses; (d) no identification of replacement behavior(s); (e) no existence of measures to evaluate teacher fidelity; (f) limited teacher input to the process; and (g) inadequate follow-up and evaluation.

Current limitations affecting the widescale use of the FBA process by schools are three-fold. First, most of the FBA research has been conducted in carefully controlled settings with heavy involvement of the researchers; thus, there is minimal evidence showing that the process can be practical for use in typical school environments and still be implemented with high quality (Lane et al., 2007; Sasso, Conroy, Peck-Stichter, & Fox, 2001). Second, although many researchers have examined the efficacy of FBA processes in improving student behavior, most have been single-subject methodologies and not subjected to the rigor of randomized controlled trials (Dunlap, Iovannone, Wilson, Kincaid, & Strain, in press). Third, there continues to be a dearth of well-trained school personnel who can conduct FBAs with quality and fidelity, and current training efforts are not showing success in building the necessary skills for implementation (Blood & Neel, 2007; Scott et al., 2008; Van Acker et al., 2005). These limitations contribute to, and are affected by, systems factors at the district, school, and personnel levels that perpetuate resistance of school personnel to use function-based interventions. There is a need, therefore, for (a) developing a standardized model of individualized function-based behavior support that is feasible for use by typical school personnel in everyday school settings and (b) evaluating the model's efficacy by conducting randomized controlled trials.

Prevent–Teach–Reinforce Model

The foundation of the Prevent–Teach–Reinforce (PTR) model is aligned with the principles of applied behavior analysis (Carr et al., 2002; Skinner, 1953) and the procedures of individual positive behavior support (Koegel, Koegel, & Dunlap, 1996; Sugai & Horner, 2002), both of which provide substantiation for developing function-based interventions that include manipulating antecedent and consequence variables, along with teaching new behaviors (Bambara & Kern, 2005; Crone & Horner, 2003; Dunlap & Carr, 2007). Thus, the PTR

Table 1
Prevent–Teach–Reinforce (PTR) Menu of Interventions

Prevent		
Providing choices	Curricular modifications	Setting event modification
Transition supports	Noncontingent positive reinforcement	Peer support
Environmental supports	Classroom organization management	Peer modeling
Teach		
Replacement behavior	Specific social skills	Delayed gratification
Functional	Teacher pleasing behaviors	Independent responding
Desired or prosocial	Learning skills strategies	Increased engaged time
Specific academic skills	Self-management	
Problem-solving strategies		
General coping strategies		
Reinforce		
Reinforce replacement behavior	Group contingencies	Home to school reinforcement system
Functional	Increase ratio of positive to negative responses	Establish crisis intervention
Desired or prosocial		
Discontinue reinforcement of problem behavior		

model incorporates key evidence-based features including a FBA that leads to an intervention “package” plan that consists of antecedent manipulations (i.e., Prevent), instructional strategies for replacing problem behavior (i.e., Teach), and consequence manipulations (i.e., Reinforce). In developing the model, it was decided that if the process were to be feasible for use in typical schools, and if teachers were to accept and implement the process, the approach must be collaborative and team driven rather than consultant driven.

The collaborative model (Dunlap, Iovannone, English, et al., in press) was developed to be implemented through a series of meetings of key personnel. The intervention is intended to address the needs of students at the tertiary level who present intense, chronic, and durable problem behaviors. The five-step process uses a systematic collaborative approach, allowing teachers to guide the development and implementation of the intervention with the assistance of a university-based research consultant (PTR consultant) and a reader-friendly manual. The manual includes background content related to each step and provides clear directions for activities that should be occurring in each meeting. Embedded in the manual are homework assignments that are completed by each team member between meetings and provided to the PTR consultant at an agreed-on due date so that input can be synthesized and presented at meetings for refinement and consensus. Assignments include identifying goals of intervention, completing a FBA, and selecting a minimum of three interventions, one from each of the PTR categories (i.e., Prevent, Teach, Reinforce).

Step 1: Teaming establishes the membership of the school-based team and an agreement on how the team functions, including methods of gaining consensus and assignment of responsibilities. Teams can vary in size depending on student needs; however, at a minimum, teams include the primary teacher and a PTR consultant.

Step 2: Goal Setting focuses on identifying and operationally defining the social, behavioral, and academic targets that include at least one problem behavior to be reduced and one prosocial and/or proacademic replacement behavior to be taught. Within this step, a teacher-friendly data gathering instrument is used daily to collect information about the occurrence of student problem and prosocial behaviors in an efficient method.

Step 3: PTR Assessment (FBA) uses an indirect checklist format that covers three categories relating to antecedent variables (Prevent), function and replacement variables (Teach), and consequence variables (Reinforce). Each team member completes one assessment for each problem behavior identified in Step 2, and responses are synthesized and discussed in subsequent team meetings until a consensus is reached on a function-based hypothesis.

Step 4: Intervention assists the team in selecting strategies from an intervention menu (see Table 1) and ensures that the strategies are aligned with the agreed-on hypothesis and interventions within each category (i.e., P-T-R). The manual provides descriptions of each intervention, implementation examples, and issues for consideration in selecting strategies, including the complexity and time required for implementation. Each team member rank orders two to four intervention strategies from

each of the three PTR categories. A consensus is reached on the interventions that are most likely to be implemented by the teacher within the classroom context. During this meeting, the behavior support plan is developed that includes precise descriptions of the selected interventions and a task analysis of each strategy so that teachers and other intervention agents can easily apply the steps with the student in the classroom.

Step 4 also includes a plan for training and coaching the teacher to provide support in implementing the plan as intended and methods of measuring fidelity. Training activities are provided to the teacher by the PTR consultant and are scheduled during a time in which students are not present. Each intervention strategy included in the plan is task analyzed into the specific steps necessary for implementation. Each step is included in a training checklist that is used for scoring by the PTR consultant. Training methods used include role playing, discussion, and question and answer. As teachers demonstrate each step of the plan, the PTR consultant indicates the training method(s) used and scores their performance with a “yes” or a “no.” A total training score is calculated by dividing the total number of yes checks by the total number of “yes” and “no” checks and dividing by 100. Teachers scoring at least 80% then begin implementing the plan with the student. Teachers scoring lower than 80% receive another coaching session. If scores continue to be below 80%, the consultant and teacher decide whether to (a) modify the strategies that received “no” checks so that they are more feasible for teacher implementation, (b) select a different strategy for replacement that may be more easily implemented, or (c) proceed with implementation of the plan with the student. If the strategies are modified or replaced, time is scheduled to train the teacher to do the revised plan. After teachers begin implementing the plan with the students, they are provided up to 12 hours of follow-up support by the PTR consultant. The support includes a minimum of three direct observations of each teacher by the PTR consultant, who also evaluates intervention implementation fidelity. Assistance continues until teachers achieve 80% implementation fidelity or until the 12 hours are exhausted.

Step 5: Evaluation uses the data from the measurement scale developed in Step 2 to make decisions about the plan’s effectiveness and future steps. At this point, teachers complete a social validity scale assessing the extent of their acceptance of the PTR intervention.

This Study

Given that recent literature has shown that school staff do not implement effective FBA/BIP processes and

given the dearth of rigorous research using large samples to test the efficacy of behavioral interventions, a randomized controlled trial investigating the efficacy of function-based behavior support plans is well justified. The purposes of this study were to investigate whether a tertiary function-based intervention, aligned with the principles of applied behavior analysis and the foundations of positive behavior support, could be (a) standardized and simplified so that it could be implemented by typical school personnel and (b) shown to be more efficacious in decreasing student problem behavior and increasing prosocial behaviors than the typical models of selection and implementation of interventions used in schools (i.e., services as usual). The primary research questions examined in this article were as follows:

Research Question 1: Is the PTR intervention more efficacious than control conditions defined as “services as usual” in decreasing the problem behaviors of students?

Research Question 2: Does the PTR intervention result in improvements in students’ social skills and engagement in learning?

Method

Participants

Student participants in Grades K-8 were recruited from five public school districts, three in Central Florida and two in Colorado, during the 2005–2006 and 2006–2007 school years. The five school districts were diverse in size, with enrollment ranging from 20,500 to 194,000. Students recruited into the study came from 65 schools across the five school districts, of which 52 were elementary (K-5), 7 were middle (6-8), and 6 were alternative/special schools.

Prior to recruiting students, central office administrators in each of the school districts were contacted to obtain support and identify school principals who would be interested in hearing about the research project. Contact information of principals indicating interest was forwarded to project staff who then scheduled meetings to explain the study further. After receiving approval from principals, a brief presentation of the PTR intervention was made to campus faculty, and individual teachers were invited to volunteer for the study.

Teachers electing to participate signed informed consent and were asked to select potential students for the study by completing a Student Nomination Form and Stages 1 and 2 of the *Systematic Screening for Behavior Disorders* (SSBD; Walker & Severson, 1990), a multiple-stage screening process that identifies students at risk for

developing emotional and behavioral disorders. Stage 1 asked teachers to list and rank order five students in their classrooms who displayed the highest level of externalizing behaviors. If the participating teacher had a special education class, Stage 1 was not required. For the three students who were ranked the highest, and for all students in special education classes, teachers completed Stage 2, consisting of a checklist of critical behavioral events exhibited in the previous 6 months and ratings of adaptive and maladaptive behaviors. A Student Nomination Form was developed by the project to collect additional information about the behaviors of the nominated students, including the behavior's frequency (i.e., 1 to 3 times a month, at least one time a week, almost every day) and durability (i.e., 6 months or longer, less than 6 months), along with an estimate of the number of absences the student had in 1 month (i.e., rarely absent, 1 to 3 absences, once a week, more than once a week). Students were considered eligible for the study if they (a) had a minimum of five critical events on Stage 2 of the SSBD, (b) had behaviors occurring a minimum of one time a week had been in existence for 6 months or longer, and (c) were absent less than one time a week.

Due to the labor intensiveness of the PTR intervention activities, each teacher could have only one student go through the study during one time period. Therefore, the student who had the highest ranking and who met the additional eligibility criteria was selected for inclusion in the study, and parental informed permission was sought for that student. If the parent of the top-ranked student did not give consent, then the family of the second-ranked student was approached, followed by the third-ranked (as necessary). After parental consent was obtained, students were randomly assigned to the intervention or comparison group. Teachers were given the option of taking additional students through the intervention at a later time; however, only 42 of the 218 teachers did so.

Of the 245 participating students, 200 (82%) were male. Students ranged in age from 4 to 15 years ($M = 8.17$, $SD = 2.08$), with 34 (14%) kindergartners, 53 (22%) first graders, 53 (22%) second graders, 41 (17%) third graders, 30 (12%) fourth graders, 16 (6%) fifth graders, and 18 (7%) middle schoolers (sixth through eighth grade). Student placement data showed that 118 (48%) had Individualized Education Plans (IEPs) indicating special education status, 7 (3%) had 504 plans, 111 (45%) were in general education (i.e., no IEP), and 13 (5%) were unknown or missing. Of the 118 students with IEPs, 81 (33%) received their instruction in special

education self-contained classrooms, and 4 (1.6%) in resource rooms (i.e., less than 15 weekly hours in special education). Lunch status of the sample showed that 77 students (31%) received free lunches, 18 (7%) received reduced-price lunches, 132 were not enrolled in the meal program (54%), and 18 (7%) were unknown. Fifty percent of the sample was White ($n = 123$), with 29% Hispanic ($n = 72$), 18% African American ($n = 43$), and the remaining 3% American Indian ($n = 2$), Asian ($n = 2$), and Other ($n = 5$).

Of the 218 teachers in the study, 138 (63%) were general educators, 77 (35%) were special educators, 1 was a long-term substitute (0.1%), and 2 failed to respond (0.1%). The majority of the teachers was female (83%), and the primary ethnicity was White ($n = 183$, 75%). Ten teachers (4%) were Hispanic, 9 (4%) were African American, and the remainder were Asian ($n = 2$, 1%), Other ($n = 6$, 2%), or declined to provide ethnicity information ($n = 7$, 3%). Years of teaching experience ranged from 0 to 41 years ($M = 11.62$, $SD = 9.23$). Educational levels completed showed 80 teachers (33%) with a bachelor's degree, 51 (21%) with 1 year post-bachelor's degree, 75 (31%) with a master's degree, and 10 (4%) with 1 year post-master's degree or a doctorate.

Procedures

Randomization. Although recruitment activities occurred throughout each school year (i.e., September 2005 to March 2006 and September 2006 to March 2007), the majority of the sample was enrolled at the beginning of each school year (i.e., September). In an attempt to achieve balance between intervention and comparison groups in which some students would be recruited continuously throughout the school year, assignment occurred by using a combination of stratified block randomization and *Biased Coin Design* techniques (Efron, 1971). After obtaining parental informed consent, students were placed within blocks that were stratified by two categories: (a) age (including 10 levels from 5 years 0 months to 14 years 6 months) and (b) language ability (including two levels, low and average/high). An estimate of each student's language skills was provided by the nominating teacher using a 5-point Likert-type scale with 1 representing *no effective verbal or nonverbal communication system*, 2 representing *minimal, primarily nonverbal communication system*, 3 representing *use of effective nonverbal system with some verbal ability*, 4 representing *verbal being the primary communication mode*, and 5 representing *a fluid verbal system*. The

stratification resulted in 12 blocks with 6 to 12 students contained within each for each of the two school years. Computation of possible combinations of intervention/comparison assignments were made for each block, and each combination was assigned a number. A randomized number table was used to select the combination that would be applied for randomization assignment of students within each specific block.

The *Biased Coin Design* (Efron, 1971) was used to randomly assign students who were enrolled after September of each school year. The design was used in the attempt to continue having randomization of assignments while striving for equivalent balance between groups. The technique involves tossing a hypothetical coin that was biased toward the condition needing participants. As students entered the project and were placed within a stratified block, poker chips were placed in a container with red representing the intervention condition and white representing the comparison condition. If the block was balanced (i.e., 50/50), one white chip and one red chip were placed in the container. If the block was unbalanced, three chips would be placed in the container, two of which would be favoring the condition that was underrepresented. The director of the project would pull out a chip and assign the student to the group represented by the chip's color. This method provided relatively equal number of participants in each group; however, higher value was placed on true randomization rather than a 50/50 balance between groups. That is, even though the coin was biased toward the condition needing a participant, the coin selected did not always yield the desired outcome.

PTR intervention. Teachers of students allocated to the intervention condition were notified of their status and were assigned a PTR consultant. The intervention included all of the process activities, such as team meetings, training and coaching of the teacher, modifying interventions if necessary, and evaluating the process. Prior to starting the intervention process, teachers were asked to identify relevant people to form a team. Team members were given PTR manuals and meeting times were scheduled to engage in the process. Each of the five steps of the process typically involved a meeting that was scheduled at the teacher's preferred time, ranging in duration from 30 minutes to 2 hours. The length of time between the start and the end of the intervention process varied by each team's unique circumstances; however, the average length of time was 2½ months. Between each meeting time, teachers and other team members were told to read the manual chapter that related to the

topic of the upcoming meeting and complete the assignment. Completed assignments were given to the project consultant by faxing or e-mailing the documents by a specified due date. Upon receiving the documents, the project consultant summarized the information in a visual format and presented it at the next meeting to get feedback and consensus.

Students assigned to the comparison condition received the usual interventions and processes that schools and districts provided to students having problem behaviors. There were no restrictions to the interventions they received, thus, they were not a *no-treatment* comparison group because many were, or should have been, receiving some form of behavioral interventions. In fact, information from the teachers indicated that 40% of the comparison students had a formal BIP suggesting that they were receiving behavioral strategies. Per teacher report, the typical behavior practices that students received were diverse in content and quality; however, the majority appeared to be consequential in nature and consisted of social and tangible reinforcement, response cost, verbal reprimands, and time-out.

Data collectors external to the schools administered all of the assessments except for measures of fidelity. Because each intervention was unique for the team and student, the PTR consultant assigned to the team was deemed the most appropriate person to evaluate the adherence and quality of intervention component implementation. All data, including fidelity scores, were entered into a database by the data collectors and analyzed using SPSS version 16.0 (SPSS, 2008). To ensure data accuracy, visual checks along with double data entry were performed.

Measures

Demographic information about students, teachers, and schools was gathered using surveys created by the National Behavior Research Coordination Board and included a *Student Enrollment Survey*, *Student Record Survey*, a *Classroom/Teacher Characteristic Survey*, and a *School Characteristic Survey*. The measures provided descriptive information about participants and were administered at baseline for both treatment and comparison conditions. Measures of student outcomes included the *Social Skills Rating System* (SSRS; Gresham & Elliott, 1990) and *Academic Engaged Time* (AET) adapted from Stage 3 of the SSBD (Walker & Severson, 1990). All of the student outcome measures were administered at three time periods for each student: baseline, posttest, and follow-up. An average of 71 days occurred

between administration of baseline and posttest measures across both groups. Follow-up measures occurred 6 to 8 months after posttest. Because follow-up data are still in the process of being collected for a proportion of the sample, this article will not present data from follow-up intervals. Two additional measures were collected from teachers participating in PTR at posttest and included implementation fidelity and a social validity scale adapted from Reimers and Wacker (1988).

Social Skills Rating System. The SSRS (Gresham & Elliott, 1990) is a standardized instrument with three subscales (social skills, problem behaviors, and academic competence) that uses a 3-point Likert-type scale (*never, sometimes, very often*) to measure the frequency of students' skills and behaviors. The SSRS is appropriate for use with students between the ages of 3 and 18, with versions differentiated by developmental levels (preschool, elementary, and secondary). The elementary level contains 57 items and is intended for Grades K through 6, whereas the secondary level consists of 51 items and is intended for students in Grades 7 through 12. Subscale standard scores have a mean of 100 and a standard deviation of 15. Reliability for the SSRS ranges from .78 to .94 for internal consistency, and test-retest reliability ranges from .84 to .93. The teacher version of the SSRS was completed by each student's primary teacher.

Academic Engaged Time. The AET is an observational tool that measures the duration of time a student spends being actively engaged during independent instructional time. Each student was observed by a trained data collector for two 15-minute sessions at each measurement interval (baseline, posttest, and follow-up). Observers used a stopwatch to record the duration of time the student was engaged. The AET rate was calculated by dividing the total engaged time by the length of the observation session. Data collectors were trained by the project data coordinator and the project director. Each data collector received instruction in AET definition examples and nonexamples prior to viewing a DVD that consisted of several classroom examples for practice AET scoring. After viewing the DVD, data collectors compared and discussed their recordings with each other and with the answer key accompanying the DVD. After achieving interrater agreement, the project director or the data coordinator accompanied the data collector to a school and both conducted an AET observation. Interobserver agreement was calculated and feedback was provided by the director or the data coordinator.

Throughout the study, 20% of the AET observations were targeted for interrater reliability. Interrater reliability ranged from .93 to .99 across all time intervals.

Social validity. The social validity questionnaire is a 15-item scale based on the *Treatment Acceptability Rating Form* (TARF-Revised; Reimers & Wacker, 1988). The measure was completed by each teacher of an intervention student at posttest using a 5-point Likert-type scale with 1 indicating *lowest magnitude* (i.e., not at all acceptable, not at all willing) and 5 indicating *highest magnitude* (i.e., very acceptable, very willing). To ensure that teacher responses were not influenced by their desire to please the PTR consultant, a data collector gave the measure to the teacher in a sealed envelope with instructions to complete it and place it back into a sealed envelope.

Fidelity. Fidelity measures for each intervention teacher were collected by PTR consultants after the teacher had been coached. Fidelity was conducted by directly observing teachers implementing intervention components to ensure that teachers were implementing the strategies as intended and to evaluate the plan's contextual fit and effectiveness. Teachers were scored on two fidelity dimensions: Adherence (i.e., implementing the core components of the interventions) and Quality (i.e., completeness and/or competence of implementation). Because each intervention plan was unique, a *PTR Fidelity Implementation Intervention Guide* was developed by the director of the project that identified the core observable components of each strategy on the menu for the purpose of ensuring consistency. For example, if "Providing Choices" was selected as a Prevention strategy, the core components would include the presentation of a valid choice prior to the demand and honoring the choice made within a specified time frame. For each intervention strategy on the support plan, the PTR consultant would prepare a fidelity checklist that included the core observable components. During fidelity observations, the PTR consultant would score a "yes" if the teacher implemented the component, a "no" if the teacher did not implement the component, or "n/a" if there was no opportunity to implement the component (e.g., fire drill). Fidelity scores were computed by summing all of the "yes" responses and dividing them by the total possible number of components, with scores ranging from .00 to 1.00. Fidelity measures were taken after the teacher began implementing the intervention and continued until the teacher obtained a score of .80 or received 12 hours of coaching support from the PTR

consultant. The maximum of 12 hours was selected to control for variations of coaching support time across teacher participants and the potential causal inferences that an inordinate amount of coaching might have on student outcomes.

Analytic Approach

The study examined the comparative effects of PTR and services as usual for children in kindergarten through Grade 8 who exhibited problem behavior. This comparison was conducted using a two-way (treatment condition by time) repeated-measures intent-to-treat design. The differential treatment effects in reducing problem behavior and increasing social skills and AET were examined. The analyses proceeded in three steps. First, the success of randomization or group equivalence was tested by comparing treatment and comparison groups at entry into the study for equivalence on child characteristics and the outcome variables. Student *t* tests and chi-square tests for independent groups were used to test this assumption. Next, differential attrition during the course of the study was examined by comparing child characteristics and baseline outcome scores for those who completed the study with those who had only baseline measures. Finally, for each of the three outcome variables, the intervention effect was tested using a two-way (treatment condition by time) repeated-measures analysis of variance (ANOVA). In these analyses, adjustments to the testing statistics and the degrees of freedom were made for the nonindependence of participants produced by the clustering effect of 29 of the 206 teachers having been assigned more than one student in the sample. The adjustment is a multiplicative factor depending on the total sample size, the cluster size, and the intraclass correlation ρ (Hedges, 2007).

Results

Baseline Comparisons and Retention

Randomization. The effectiveness of the randomization procedure to produce equivalent groups at entry into the study was tested using either an independent sample *t* test or a chi-square test for independent samples. Results revealed no significant ($p > .05$) difference on any outcome measure for either problem behaviors ($t = 0.40$, $p = .69$), social skills ($t = 1.05$, $p = .29$), or AET ($t = 1.41$, $p = .16$). Baseline differences between treatment conditions on child characteristics indicated only one significant difference: There was a greater percentage

of White children in the intervention group (57% vs. 42%), $\chi^2(1, 227) = 4.81$, $p < .05$. None of the other child characteristics differed between intervention and comparison groups.

Retention. Of the 245 children who entered the study, between 224 and 228 (depending on the particular outcome) completed the posttreatment assessment approximately 2 months later ($M = 70.78$ days, $SD = 35.57$) on social skills, problem behavior, and AET, for a retention rate of 92% to 93%. Comparisons of those who were retained versus those who had attrited indicated that there were no significant differences ($p > .05$) on gender, age, enrollment in special education, ethnicity (White vs. non-White), and treatment group.

Treatment Outcomes

Social skills. By the end of the intervention, children in the PTR group had significantly higher social skills scores than children in the comparison group. The difference in standard scores from baseline to posttreatment for the intervention group versus the comparison group was $M = 7.38$ ($SD = 12.76$) versus $M = 1.25$ ($SD = 7.10$), respectively, $F(1, 200.65) = 16.24$, $p < .001$. The effect size for the treatment difference as measured by Hedges's *g* (Hedges, 1981) equaled .52 (see Table 2).

Problem behavior. Students in the PTR intervention had significantly lower problem behavior scores at posttest than the comparison group. Children in the PTR group declined 5.30 points ($SD = 10.08$) on average compared with 0.76 point ($SD = 7.37$) in the comparison group, $F(1, 216.40) = 13.24$, $p < .001$, corresponding to an effect size of .44 (see Table 2).

Academic engaged time. Similar to the outcomes for social skills and problem behavior, there was a main effect for treatment with children in the PTR group having significantly higher rates of AET at posttest than their counterparts in the comparison group, $M = .13$ ($SD = .23$) versus $M = .04$ ($SD = .19$), respectively, $F(1, 205.66) = 14.41$, $p < .01$, corresponding to an effect size of .51 (see Table 2).

Fidelity. The mean fidelity score of .83 ($SD = .21$) was obtained from 122 intervention teachers, with scores ranging from .07 to 1.00. There were differences in mean scores between the two fidelity domains, with an adherence mean of .88 ($SD = .10$; range = .14 to 1.00) and a quality mean of .78 ($SD = .27$; range = .00 to 1.00). Of

Table 2
Means and Effect Sizes for Student Outcomes

Measure	Intervention			Comparison			g^a
	Baseline	Posttest	n	Baseline	Posttest	n	
SSRS Social Skills	77.08 (11.67)	84.46 (12.55)	123	78.75 (12.20)	80.00 (12.02)	104	.52*
SSRS Problem Behavior	124.40 (9.33)	119.10 (10.60)	123	123.87 (9.65)	123.10 (9.92)	105	-.44*
AET ratio	0.47 (0.23)	0.60 (0.18)	126	0.43 (0.23)	0.45 (0.22)	98	.51*

Note: Numbers in parentheses are standard deviations. SSRS = *Social Skills Rating System*; AET = *Academic Engaged Time*.

a. Hedges's g = intervention effect size of change from baseline to posttest.

* $p < .001$.

the 122 teachers, 94 (75%) achieved a final fidelity score of .80 or higher.

Social validity. The social validity measure was collected from 124 teachers of intervention students. A mean social validity score of 4.20 ($SD = .52$) was obtained, indicating high to very high overall acceptance of the PTR intervention. Individual item score means ranged from a low of 3.24 ($SD = 1.27$), on the item related to time needed to do intervention, to a high of 4.80 ($SD = .42$), on the item related to willing to carry out procedures (see Table 3).

Discussion

The purpose of this study was to use a randomized controlled trial to examine the efficacy of the PTR tertiary intervention for students in Grades K through 8 by comparing it to services as usual. This article focused on preliminary results to address two major research questions about whether the PTR intervention improves the social skills and the problem behaviors of students. Preliminary results from the SSRS showed that, overall, the intervention was efficacious in producing significantly higher social skills and lower problem behaviors for students who received the PTR intervention than for those in the comparison group who received the typical behavior supports provided in schools. In reviewing the change in the standard scores from baseline to posttest, students in the intervention group showed movement in the desired directions, that is, social skills increased by approximately 7.5 standard score points, and problem behaviors decreased by approximately 5.5 standard score points. It is interesting that the comparison group showed minimal or no change in their baseline to posttest performance with a small standard score increase (+1.25) in social skills and only a 0.77 decrease in

Table 3
Social Validity Mean Rating Scores

Social Validity Item	M^a	SD
1. How acceptable do you find the PTR plan?	4.39	0.81
2. How willing are you to carry out this behavior plan?	4.80	0.42
3. To what extent do you think there might be disadvantages in this plan?	3.79	0.98
4. How much time will be needed each day for you to do the plan?	3.24	1.27
5. How confident are you that the behavior plan will be effective?	4.14	0.84
6. How likely is this behavior plan to make permanent improvements?	3.89	1.03
7. How disruptive will it be to carry out this behavior plan?	3.84	1.06
8. How much do you like the procedures used in the behavior plan?	4.46	0.64
9. How willing will other staff members be to help implement the plan?	3.98	1.08
10. To what extent are undesirable side effects likely to result from the plan?	3.94	0.93
11. How much discomfort is this student likely to experience during the plan?	4.51	0.85
12. How willing would you be to change your routines to carry out the plan?	4.38	0.75
13. How well will carrying out the plan fit into the existing routine?	4.31	0.81
14. How effective will the plan be in teaching the student appropriate behavior?	4.29	0.80
15. How well does the goal of intervention fit with the team's goals to improve the student's behavior?	4.52	0.74
Total social validity score	4.16	0.52

Note: Items 3, 4, 7, 10, and 11 were recoded so that 1 always indicated *lowest magnitude* and 5 always indicated *highest magnitude*.

PTR = Prevent-Teach-Reinforce.

a. $n = 124$.

problem behavior. This suggests that services as usual are not, in general, resulting in improved outcomes for students needing tertiary supports. This is an issue of concern given that the students in the comparison group were

not no-treatment-comparison students; that is, they were receiving, or should have been receiving, some form of behavioral support to address their problem behaviors.

It has been more than a decade since the Individuals with Disabilities Act (1997) first mandated the use of FBA for students with problem behaviors, and the expectation would be that students in special education would have a function-based behavior support plan. The findings here echo the concerns expressed in the field related to interventions that are typically provided in schools, especially the inadequate use of FBAs and function-based strategies (Blood & Neel, 2007; Conroy, Clark, Fox, & Gable, 2000; Ervin, Ehrhardt, & Poling, 2001; Scott et al., 2008). The positive results of PTR underscore the importance of using FBA data to develop hypotheses that lead to function-based multicomponent plans that include at least one intervention to address antecedent events, one new skill to teach so that the problem behavior is replaced, and one consequence manipulation that increases the likelihood that new appropriate behavior will be repeated and problem behavior will no longer be effective.

The PTR intervention did have a significant effect on the academic engagement of students when compared with students in the services as usual condition. The higher rates of engagement may not necessarily result in increased reading or math skills. It may, however, create a situation in which students are able to actively engage in academic instruction. Indeed, high academic engagement is one of the best predictors of school success (Furrer & Skinner, 2003) and school completion (Connell, Spencer, & Aber, 1994). The higher AET of students who received PTR is interesting considering that many of the intervention plans may not have specifically targeted increasing on-task performance.

The implementation fidelity results show that almost all teachers in the intervention group were able to implement the PTR interventions with high (i.e., $> .80$) fidelity. The literature has identified that most FBA processes done in schools neglect to provide plans for measuring fidelity or for providing ongoing support to assist teachers in applying intervention strategies. The authors of this article felt that the coaching support provided to the teachers would be one of the key features that would differentiate the PTR intervention from services as usual. Certainly, teachers in the project often cited the support that the consultants provided as one of the components that made the difference in their implementation of the intervention plan. Although the project protocol allowed up to 12 hours of coaching time for teachers, there were very few teachers who required that

amount of time. It is critical for the field to begin to explore how this support can be provided in authentic school environments.

Finally, teachers found the intervention highly acceptable and efficacious, as indicated by their social validity ratings. Of particular interest is that the item achieving the highest mean rating was related to the teacher's willingness to implement the PTR intervention. This is particularly important due to the implementation research citing teacher resistance to implement BIPs as a key impediment to effective tertiary processes. It is possible that a collaborative process that allows the teachers to take the lead and provides them the necessary support to implement strategies will result in higher willingness to do behavior strategies.

Limitations and future directions. The preliminary findings of this study suggest that PTR is an effective tertiary intervention for students with problem behaviors and can be implemented by typical school personnel in a wide variety of school settings with the facilitation of a consultant. Still, there are a number of limitations to the study. Perhaps the most significant is the extent to which PTR can be replicated in authentic school environments. The study included the involvement of highly skilled university consultants who brought substantial behavioral and consultation expertise to assist the teachers and teams. Further research needs to determine the level of expertise that is required for typical school personnel to implement PTR effectively, the training that would be needed to ensure proper implementation, and the systemic supports that might be required to encourage fidelity of implementation.

The analysis conducted for this article used ANOVA comparisons between the treatment and comparison groups. In the future, more advanced analyses need to, and will, be performed. The possibility of interaction effects, in particular gender interactions, needs to be explored along with mediators and moderators that affect teacher implementation and effectiveness. In addition, fidelity and its relation to social validity and student outcomes are other areas needing further investigation.

A third limitation is the issue of sustainability. The duration of the PTR intervention was, on average, approximately 2 months. It is not known whether the intervention sustains once the researchers depart. The possibility that the teacher discontinues implementing an intervention is a serious challenge that currently confronts school-based behavioral consultants (e.g., school psychologists, behavior specialists). For this reason, fidelity measures were collected again during the follow-up

interval that occurred during the subsequent school year. The information is still being collected and analyzed; however, preliminary results indicate that teachers discontinue implementing the interventions after problem behavior decreases or the study is ended. It is not clear why teachers do not sustain behavior interventions that show evidence of being efficacious and have high social validity. The difficulties in sustaining intervention plan implementation are not novel (Kovaleski, Gickling, Morrow, & Swank, 1999; Noell, Duhon, Gatti, & Connell, 2002; Noell, Gansle, & Allison, 1999) and remain an important research need for the field. It is possible that teachers do not view behavior as a skill requiring continuous instruction as does reading, math, or writing. Furthermore, sustaining function-based behavioral interventions does focus more on changing the behavior of the teacher or intervention agent rather than the student, and it is possible that teachers are somewhat resistant to changing their practices. Exploration of teacher philosophy of behavior and how it relates to sustained implementation of strategies could yield invaluable information that is urgently needed.

An additional limitation is the lack of fidelity measures collected on teacher implementation of interventions with comparison students. Data collection of this scope would have presented a great challenge to the research project. Teacher, classroom, and student survey data indicated that most teachers were not consistently implementing well-defined or developed interventions. As mentioned previously, most of the teachers reported the use of reprimands or redirects as their main strategy. There was minimal report of the use of multicomponent intervention plans, similar to PTR, on a consistent basis. In fact, recent literature cites that FBAs and function-based BIPs are not being implemented in schools by school personnel or are being implemented inadequately (Scott & Kamps, 2007; Scott et al., 2005). This finding was confirmed in the descriptive data we received from the participants.

The duration of the PTR intervention was short (i.e., an average of 71 treatment days), and this may have contributed to the relatively small magnitude of change in student outcome measures. However, attention needs to be focused on the fact that the comparison students, who should be receiving behavioral interventions, showed minimal to no change. Moreover, the SSRS may not be the most accurate measure of behavior change at the tertiary level. The PTR intervention is intended to address specific and unique problem behaviors, rather than a broad range of skills. That is, teachers would nominate students who displayed one to three problematic behaviors that would represent one or two items on

the SSRS scales. For example, students with autism spectrum disorders may have had interventions that focused on reducing screaming episodes. The target behavior of screaming is addressed in one item on the SSRS Problem Behavior scale (i.e., "Has temper tantrums"). The teacher may consider the intervention to be extremely effective in reducing the screaming behavior; however, it may not have had any effect on changing other behaviors included on the scale. Conducting an item analysis of the SSRS may be a worthwhile endeavor in determining whether behaviors that were targeted showed a significant magnitude of clinical change.

The difference between statistical significance and meaningful change is an important issue. Although the PTR intervention showed significant differences in three major outcome areas, the posttest scores of the intervention group still fall within at-risk ranges. Inspection of the SSRS Social Skills and Problem Behavior mean standard scores show that the intervention students score more than one standard deviation above or below the mean, although the Social Skills mean standard score is approaching the average level ($M = 84.46$). Certainly, replications and variations of the study need to occur in further research to confirm the outcomes and to provide more data on variables that contribute to greater clinical significance, including length of intervention.

In conclusion, the PTR intervention, even with its limitations, provides initial data that can begin to inform policies and procedures concerning the implementation of tertiary interventions in schools. The intervention represents an effort to address the considerable needs of schools for behavioral interventions that are (a) standardized, so that steps of processes are explicitly described and can be used with a wide range of students; (b) individualized, with interventions developed based on the student's FBA and the context and preferences of the teacher; and (c) efficacious, so that the intervention will benefit students and teachers. In the future, the intervention process will continue to be refined so that the model can be made more efficient and practical for typical school personnel to implement; however, the current version is one that deserves consideration by schools in their efforts to find behavioral intervention programs that can be used in their settings to address the problem behaviors of the students who need the most intensive level of supports.

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