Prevent-Teach-Reinforce: Addressing Problem Behaviors of Students with Autism in General Education Classrooms

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ABSTRACT: Children with autism and other disabilities are often prohibited from participating in inclusive educational environments due to the occurrence of problem behaviors. In this study, a standardized model for individualizing procedures of behavior support, Prevent–Teach–Reinforce (PTR), was evaluated in general education settings with three elementary school students with autism spectrum disorders and serious problem behaviors. A multiple baseline across students design was used to test the effects of PTR on the occurrence of problem behaviors and academic engagement. Results indicated that problem behaviors were reduced and engagement was increased for all of the participants. The findings are discussed in relation to the importance and the challenges of implementation fidelity and effective behavior support in general education settings.

Many authors have described benefits associated with educating students with autism spectrum disorders (hereafter referred to as ‘‘autism’’) in inclusive educational settings (Harrower & Dunlap, 2001; Fisher, 2006; Koegel & Koegel, 2006). However, promoting inclusive education for students with autism has been a considerable challenge, especially when the children display problem behaviors (Dunlap, Koegel, Johnson, & O’Neill, 1987; Koegel, Klein, Koegel, Boettcher, Brookman-Frazee, & Openden, 2006). Indeed, problem behaviors are known as the most common and conspicuous reasons for students to be excluded from educational programs. Problem behaviors, such as tantrums, aggression, and noncompliance, constitute substantial obstacles not only to general education placements but also to most opportunities for peer interaction and social development. Therefore, a high priority for enabling children with autism to benefit from inclusive educational placements is to develop and implement effective programs of behavior support that are feasible for use in general education placements (Dunlap, Strain, & Ostry, in press).

The basic elements of an effective approach for addressing problem behaviors have been known for many years (Bambara & Kern, 2005; Dunlap & Carr, 2007; Carr, Strain, Todd, & Reed, 2002; Umbreit, Ferro, Liaupsin, & Lane, 2007). These elements include: (a) a functional behavioral assessment that provides the individualized information needed to construct an effective and efficient behavior support plan (Repp & Horner, 1999); (b) environmental modifications that alter stimulus control exerted by antecedent and contextual (setting) events (Luiselli, 2006); (c) instructional strategies designed primarily to establish alternative responses (Carr, Levin, McConnachie, Carlson, Kemp, & Smith, 1994); and (d) careful arrangements of reinforcers and other consequences (Kern & Kokina, 2008). Interventions based on these elements have been demonstrated in numerous studies to be effective in reducing problem behaviors of children with autism and other disabilities (Crone & Horner, 2003; Dunlap & Carr, 2007; Carr et al., 1999).

Although the procedures for resolving problem behaviors are reasonably well established, implementing them in typical, complex settings has been a challenge. The vast majority of the research on effective intervention for problem behaviors has involved procedures implemented by researchers and highly trained specialists in controlled settings. There are very few data to indicate that the processes of functional behavioral assessment...
and assessment-based interventions can be carried out effectively by typical school personnel in typical school settings (Lane, Weisenbach, Phillips, & Wehby, 2007). As a result, a number of authors have called for the development and evaluation of standardized processes of behavior support that can be effective and feasible in typical school settings (Payne, Scott, & Conroy, 2007; Van Acker, Boreson, Gable, & Potterton, 2005).

The Prevent–Teach–Reinforce (PTR) model was developed to address this need. PTR was designed as a standardized model based on the principles and literature of applied behavior analysis and on the practical process of positive behavior support. The model was developed with the intentions of maximizing effectiveness and procedural fidelity. In order to increase the potential for effectiveness, PTR relies on research-based assessment and intervention strategies. In addition, to elevate the robustness of its effects, the model stipulates that individualized intervention strategies should be based on the functional assessment data and that behavior intervention plans must include at least one component each of antecedent manipulations (Prevent), instructional strategies (Teach), and arrangement of reinforcement contingencies (Reinforce). The logic underlying this requirement is that the probability of a favorable outcome is heightened if multiple strategies, any or all of which could be effective on its own, are implemented simultaneously (Dunlap, Iovannone, Wilson, Kincaid, & Strain, 2010).

In order to promote a high level of procedural fidelity, the PTR model is standardized and described in a detailed, step-by-step process in a published manual (Dunlap, Iovannone, Wilson, Kincaid, Christiansen, et al., 2010). Each step concludes with a self-evaluation that the school-based team completes before moving to the next step. The self-evaluation helps assure that the steps are implemented completely as intended. The functional behavioral assessment process is completed as a checklist for each core component (prevent, teach, and reinforce) and the selection of interventions for each component is menu-driven. These features are designed to make the process efficient, straightforward, and transparent.

The efficacy of PTR was evaluated in a randomized controlled trial in five school districts in Colorado and Florida with 247 students enrolled in kindergarten through eighth grade (Iovannone, Greenbaum, Wang, Kincaid, Dunlap, & Strain, 2009). All of the participating students were rated by their teachers as having the most serious problem behaviors among all of the students in their classrooms. Students from special and general education programs participated. Forty-eight percent of the total sample was identified as having disabilities. The results of this initial investigation of PTR’s efficacy revealed significant gains from pretest to posttest in social skills and academic engaged time for the group that experienced PTR. The experimental group (PTR) also had statistically significant reductions in problem behavior compared to the services-as-usual group. Data on the extent to which participating teachers used the PTR procedures were also encouraging, with over 80% of teachers demonstrating high fidelity.

The early data from PTR are encouraging, however it is important to note that the findings reported are for the overall study sample, and do not pertain to sub-populations or specific disability groups. For example, the data obtained thus far do not inform us of the potential effects of PTR when applied with students with autism. Therefore, the purpose of this investigation was to examine the influence of the PTR model on academic engagement and problem behaviors of students with autism. In addition, in order to evaluate the feasibility of PTR implementation to support inclusive educational opportunities, the model was tested in general education classrooms.

**Method**

**Participants**

The three children in this investigation were participants in a larger study of the efficacy of PTR (Iovannone et al., 2009). As such, they had been identified by their teachers as children who exhibited the most troublesome behaviors in their respective classrooms. Additional criteria for participation in this single-case design investigation were that the children: (a) had been classified by their school systems as having autism; (b) spent the majority of their school time in general education classrooms; and (c) were permitted by their parents to be observed repeatedly prior to and during the implementation of an individualized PTR intervention. The children chosen were the first three that met these criteria.

Josh (all names are pseudonyms) was 5 years old and was enrolled full time in a
regular kindergarten. He was European-American with an educational diagnosis of “high functioning autism.” Also, Josh had a prior diagnosis of autism using DSM-IV criteria. Josh was described by his teacher as having fluent verbal communication, and average intellectual functioning. His teacher reported that Josh had difficulty maintaining attention on tasks, that he was constantly in motion, and that he frequently ignored teacher requests and instructions. He had daily occurrences of serious problem behaviors that included aggression toward other students, property destruction, and obsessive-compulsive behaviors.

Alex was 8 years old and was enrolled in a general education second grade classroom in a school different from Josh’s. He was diagnosed with autism using DSM-IV criteria at age 4. He was European-American and qualified for free lunches. He had some verbal language, although his verbal communication tended to be ineffective when he was anxious or upset. His intellectual performance was described as significantly below average. He was supported in the general education classroom by a paraeducator during reading and science, and spent three hours per week in a special education resource room. Alex displayed serious problem behaviors, including loud disruptions and property destruction on a daily basis.

Rosalie was a 9 year-old Hispanic girl enrolled in a fourth grade classroom in yet another elementary school. Rosalie was diagnosed as having a specific learning disability as well as autism/Asperger Disorder using DSM-IV criteria. She had extreme difficulties with social interactions, including inappropriate social initiations and inappropriate responses with peers, which were often associated with problem behaviors. Like Alex, Rosalie also qualified for free lunches. Her cognitive development was described by her teacher to be in the average range and she was able to verbally communicate her needs and wants, although her attempts at communication were not always effective. The majority of her time was spent in her general education classroom, but she spent one hour per week in a resource room. Rosalie’s problem behaviors included outbursts and excessive crying and obsessive-compulsive behaviors. She appeared to be depressed and talked on occasion of killing herself. She was receiving services for these latter problems from the school psychologist.

Settings and Staff

The investigation took place in three classrooms in a large city in the western part of the country. Josh’s classroom was staffed with a lead teacher and a paraeducator who was not specifically assigned to any one student and was available to help with all classroom activities. Alex’s classroom was staffed with a lead teacher and one paraeducator who was assigned specifically to Alex. This provision was stated on his IEP. Rosalie’s classroom was staffed only with a lead teacher. The lead teachers were all certified to teach elementary school, and all had a bachelor’s degree. The teachers' experience ranged from 2 years to 10 years. None of the staff were special educators and none had any prior experience with autism. Prior to the study, none of the staff had experience with positive behavior support or with PTR. Each of the children’s schools had been a part of a statewide effort to develop high fidelity, school-wide PBS settings for 3 to 4 years.

General Procedures
(Prevent–Teach–Reinforce)

Following a varying period of baseline data collection in each classroom, the PTR model was implemented for each participating student in a staggered sequence consistent with a multiple baseline protocol. The implementation of PTR was facilitated by a PTR facilitator for 3 or 4 sessions, after which a follow-up period was introduced. The follow-up period involved PTR implementation but without the facilitation. The general procedures of the PTR intervention are described below, followed by specifics of the individualized intervention strategies, the research design, and the details of data collection.

The PTR model was developed for implementation by school-based teams in the contexts of general or special education, and in any placements agreed to by the team. Because the students’ problems are judged to be the most serious within a class, the process is intensive, involving multiple team meetings, so team members must understand the process and be committed to following the steps of the process. For this reason, support from the school’s administration must be obtained before undertaking the PTR process. The process is described in a reader-friendly manual that includes explicit directions for
conducting team meetings, implementing the steps of the process, and completing the forms and self-assessments that are included (Dunlap, Iovannone, Wilson, Kincaid, Christiansen, et al., 2010).

**Step 1: Teaming.** The first step in the PTR process is the establishment of a school-based team. Teams vary in size but they must include the individual who will be most responsible for implementing the intervention plan (usually the student’s primary teacher) and an individual who can facilitate access to resources, with an administrator (e.g., an assistant principal) being desirable. Others who may be key members are a parent or other family member, paraeducators, counselors, school psychologists, social workers, and at least one member who is knowledgeable and experienced with behavioral theory, functional behavioral assessment (FBA), intervention planning, and implementation of positive behavior support.

The first meeting is intended to ensure that all team members are familiar with the steps in the process and with the roles they will fill in team meetings (facilitator, note taker, etc.), and in the development and implementation of the intervention. A schedule of team meetings is established, as is a schedule of training and coaching sessions (as necessary) to ensure fidelity of the PTR interventions.

**Step 2: Goal setting.** The next step is referred to as goal setting and includes a number of specific objectives: (1) identifying three broad goals for the student to achieve in a designated period (semester; school year) related to academic, social and behavioral accomplishments; (2) selecting and operationally defining 3 to 5 behaviors of targeted concern, including at least one behavior to be targeted for reduction and one replacement behavior, and; (3) establishing a systematic strategy for daily measurement of the target behaviors. For the daily measurement of target behaviors, we recommend the use of a 5-point “behavior rating scale” (BRS) (cf., Dunlap, Iovannone, Wilson, Kincaid, Christiansen, et al., 2010; Kohler & Strain, 1992), with detailed anchor descriptions defining the range of anticipated responding. The process of developing anchors for the BRS is described in the PTR manual (Dunlap, Iovannone, Wilson, Kincaid, Christiansen, et al., 2010). Data collection is initiated in relevant school contexts as soon as Step 2 is complete. Data are obtained daily during baseline and throughout intervention.

**Step 3: PTR Assessment (Functional Behavioral Assessment).** The PTR Assessment is a form of FBA in which a total of 20 questions are answered in a checklist format in three categories relating to antecedent variables (Prevent), function and replacement variables (Teach), and consequence variables (Reinforce). The available response options are all commonly encountered in school settings, and an open-ended response option is always provided. Each team member completes one assessment protocol for each problem behavior identified in Step 2, and the answers are discussed and synthesized in a team meeting, which provides for a consideration and integration of team members’ different perceptions of environmental events related to the target behaviors. The objective is to arrive at a team consensus regarding: (1) the antecedent events that are associated with a high probability of the target behavior occurring, as well as a low probability; (2) the purpose or function of the target behavior, and (3) the events that have typically followed the occurrence of the target behaviors, and preferred stimuli or events that might be used as positive reinforcers during intervention. The results of the PTR Assessment are then used to develop an intervention plan.

**Step 4: Intervention.** When the assessment is completed, the team is responsible for developing a behavior intervention plan. The PTR manual provides guidance for the team in selecting intervention components that are based on the assessment data and that fit logically within the ongoing flow of the classroom routines. The manual provides menus of intervention strategies for each of the core components: Prevent, Teach, and Reinforce. In addition to the selection of strategies that comprise the intervention plan, the team is responsible for specifying who will manage implementation of the procedures in designated settings and time periods, and for determining a schedule of training and coaching teachers on the implementation of intervention strategies. Initially, implementation may be facilitated by a coach who helps guide the teacher or paraeducator in the use of the strategies as intended.

**Step 5: Evaluation.** The fifth key step in the PTR process consists of ongoing evaluation of the effectiveness of the intervention. Following from Step 2, measures of the magnitude of the target behaviors are obtained on a daily basis. It is expected that intervention should be associated with favorable trends in these
behaviors. If they are not, additional team meetings are called in order to identify and rectify the problem. Additional assessment data may be obtained, including fidelity and social validity data (Dunlap, Iovannone, Wilson, Kincaid, Christiansen, et al., 2010).

**Individualized Behavior Interventions Plans**

Each of the participants had school teams that followed the process indicated in the PTR manual. The processes were facilitated by a PTR researcher (the second author) who guided the teams as they proceeded through the five steps. Still, the teams were responsible for conducting the PTR assessment and designing and implementing the PTR intervention. The following paragraphs describe how this occurred for each participant.

**Josh.** The team for Josh consisted of the lead teacher and the PTR consultant; although there was a paraeducator in the classroom, she chose not to participate. It was quickly determined that the function of Josh’s problem behavior was attention seeking. The Prevent component of the intervention consisted of clear behavioral expectations that were established by the teacher in consultation with Josh. An index card was prepared and made available to Josh throughout the entire day. The card listed the four expectations: (1) stay in your seat, (2) raise your hand, (3) do your work, and (4) follow your expectations.

The Teach strategy chosen was self-management (Kern, Ringdahl, & Hilt, 2001). Josh was taught to look at his card, which listed his expectations, to remind himself of what he needed to do. For example, instead of the teacher reminding Josh to stay in his seat, she would remind him to look at his card and see what he needed to be doing. Josh would be reinforced for following his expectations. This enhanced Josh’s ability to manage his own behavior and created less dependency on teacher verbal behavior. The student and teacher reviewed the expectations multiple times throughout the day.

The Reinforce component consisted of several strategies. First, the teacher acknowledged Josh’s appropriate behaviors on multiple occasions during the day by punching a hole in his index card. In addition, reinforcement of desirable, replacement behaviors was implemented by the teacher using behavior specific praise such as “you are raising your hand, awesome, I am on my way,” and directly commenting on his following the behavioral guidelines. Punches on the index card could be exchanged for tangible items. Three punches could be traded in for a sticker, 5 punches a matchbox car, and 10 punches earned access to the classroom treasure box. Another element of reinforcement was a school-to-home system in which Josh took his punched index cards home to show his mother. This system initiated attention and conversation with Josh’s mother regarding his appropriate behaviors at school. This was a big change for Josh and his mom as most conversations regarding school prior to this intervention revolved around his misbehavior. When Josh engaged in problem behaviors these topographies were ignored and adults used a visual-only cueing system to redirect him to appropriate behaviors.

**Alex.** The team involved in the PTR process for Alex included the lead teacher, the paraeducator assigned to him, the PTR consultant, and Alex’s grandmother who was his primarily caregiver. Each team member was present at all meetings and participated in implementation of the intervention plan. In the third meeting, the team reviewed the PTR assessment data that each team member had completed prior to the meeting. The data were consistent across all team members from observations in school and home settings, indicating that the primary function of the targeted behaviors was related to delay or termination of non-preferred tasks and activities. The reinforcement section of the assessment also revealed two strong preferences: insects and seashells. Also noted at the PTR assessment meeting from both home and school settings was that less verbal direction was better, more verbal directions typically led to a power struggle that resulted in Alex shutting down or walking away. Therefore the intervention plan involved written steps for activities and written schedules that Alex would check off as he completed them. The reinforcement used was a combination of seashells and insects and these items were not available at other times.

The intervention plan had two main components. Training and implementation in both components were initiated immediately prior to the first intervention data point. The first component focused on the activity of writing which encompassed two of the targeted behaviors – shutting down and walking.
away. The Prevent strategy was an environmental support: a written schedule that stated (1) write one word; (2) pick a seashell from bucket. These steps were then repeated. The Teach strategy was a specific academic skill the student was taught to write the words in the blanks on his assignment paper and to cross off the steps he had completed. The Reinforce strategy involved reinforcement of Josh’s writing. He was able to choose a shell after each word he wrote on his paper, and when he had four shells (he had written four words) he earned two minutes to look at his shells.

Component 2 involved a social strategy that also addressed two targeted behaviors, walking away from peers during interactions and blurting out during large group times. The Prevent strategy was to provide social opportunities for pro-social behavior. Within large group times, a consistent, structured buddy time was embedded which provided social opportunity and gave Alex a chance to talk appropriately during large group activities. The Teach strategy involved instruction on specific social skills. The team developed three social phrases with Alex that he could use during these buddy times and with his grandmother at home. Team members practiced these phrases a few times with Alex and put these phrases on cards attached to a key ring that Alex could wear. The Reinforce strategy focused on reinforcing the desired social behavior. Alex earned stickers for using the key ring and participating in verbal exchanges with peers. This sticker reinforcement system was a classroom-wide system in which all students could earn access to a classroom treasure box. Three stickers earned access to the treasure box which was now stocked with sea shells and insects. These two items were identified as the top two reinforcers for Alex.

When Alex engaged in problem behavior the PTR plan called for adults to redirect him to appropriate behaviors using visual cues (e.g., pointing to a picture of him completing a task).

Rosalie. The team for Rosalie consisted of the lead teacher and PTR consultant. After the first two meetings, the paraeducator and school social worker joined the team and participated in meetings to determine the function of her problem behavior and designing and delivering the subsequent PTR plan. The PTR assessment completed by all team members, including the new members, clearly identified the function of these behaviors to be attention seeking from adults and peers. The strongest reinforcement appeared to be linked to attention; therefore the reinforcement strategy encompassed a strong component of appropriate attention from adults and peers which required teaching to the whole class.

As a result, the PTR intervention began with a classroom-wide strategy of providing pro-social opportunities, as the PTR assessment illustrated excessive attention was given when Rosalie would have an outburst. Shifting attention to focus on positive attention was identified by the lead teacher as important for her entire class. The teacher directly taught specific problem-solving skills to the entire class and Rosalie received an additional 20 minutes of direct teaching from the school social worker, whom she really enjoyed spending time with. During the first 5 minutes of a daily small group activity, all students participated in a structured sharing time, which began with each student answering a social question like, “What did you do this weekend that was really fun?” After success with general sharing, a common classroom problem would be introduced and students developed appropriate solutions within their group.

The Prevent strategy was the development of a visual aid for a solution kit; each group recorded their ideas on index cards and these cards were kept at their small group tables for reference. Rosalie added some additional ideas for her use which were developed with the social worker. The Teach component involved teaching problem-solving skills and reminding students to check their solutions first. Students were also taught responding skill, such as reminding your friend to use their good solutions, using a nice tone when talking to friends, and helping each other; these responding skills were included in the solution cards. Rosalie also began a journal to write down her feelings before she tried to choose a solution. The Reinforce strategy supported the entire class. All students earned CIA (Caught In the Act) tickets—a part of the school-wide Positive Behavior Support system for using good social solutions and helping their friends to use good solutions. Rosalie earned additional CIs for writing in her journal and calming herself in addition to using solutions from the solution kits.

Consistent with the functional analysis, when Rosalie engaged in problem behavior she was ignored.
Design

The efficacy of the PTR process was evaluated in the context of a concurrent multiple baseline across the participants’ design. Baseline consisted of “services as usual,” meaning that no changes to ongoing procedures were indicated or suggested. In general, services as usual involved an informal process of acknowledging appropriate behavior and consequences for serious problem behaviors. If a student was caught three times for not following the teachers’ instructions, the student was sent to the office for a conversation with the assistant principal and the student’s parents were called on the telephone. An act of aggression resulted in immediate removal from the class. Repeated aggressions could result in suspension.

Following a varying number of baseline sessions for each participant, the PTR intervention was introduced. This occurred following 4 days for Josh, 6 days for Alex, and 7 days for Rosalie. After 3 or 4 days of facilitated intervention, the facilitation was withdrawn for an additional 3 or 4 days of follow up observations.

Dependent Variables

Two primary dependent variables were assessed in this study. Problem behaviors were defined as behaviors that were disruptive or that interfered with instruction for the target participant or other students. Problem behaviors included aggression such as kicking, hitting, spitting, throwing objects, or property destruction. Problem behaviors also included elopement (i.e., leaving the assigned area and running out of classroom), tantrums, talking out, making noise during quiet time, cursing, using materials in a manner other than intended, stereotypic and perseverative behaviors, noncompliance (failure to follow instructions within 5 seconds), intentional refusals or physical resistance, pulling or taking materials from others, and hoarding objects or toys. Any occurrence of problem behavior during the recorded data interval was marked as an occurrence for that interval.

Task engagement was defined as working on assigned academic material for the entire interval. Engagement included eyes on the materials or task, making appropriate motor responses (e.g., writing, computing), and asking for assistance (where appropriate) in an acceptable manner. Task engagement was not recorded if there was any occurrence of problem behavior within the interval.

Video recordings were obtained for each session for each of the participants. Sessions lasted for 15 minutes. For Josh and Alex, sessions were recorded during seatwork and group instruction activities equally distributed in each phase in morning and afternoon periods. For Rosalie, data were obtained during small group activities because these were a natural time to teach problem-solving skills with peers. All 15 min sessions took place during morning group periods with some overlap into independent reading activities.

Observers of the video recordings used synchronized stopwatches to indicate 10 s intervals, yielding a total of 90 intervals per session. Each interval was recorded as an occurrence or nonoccurrence for each of the two dependent variables. For each variable, the number of occurrences was totaled and divided by 90 to give a percentage of intervals with an occurrence of the behavior (problem behavior or task engagement) in that session.

Reliability. In order to estimate inter-observer agreement, a second observer independently scored the video recorded sessions. A total of 42% of the sessions was assessed for reliability across the three participants, including 45% of baseline sessions, 36% of intervention sessions, and 45% of post-test sessions. The total number of intervals scored the same by both observers was calculated and divided by 90, the total number of intervals. The average reliability percentage from all 14 sessions was 96.5%. For Josh, reliability averaged 94%, for Alex 98%, and for Rosalie 96%.

Fidelity of implementation. For each team, the PTR consultant developed a fidelity checklist reflecting the fidelity of implementation of strategies for each component of the intervention. The strategy for each component was listed and rated for adherence and quality. For example, with Josh, the Prevent strategy was the card with his expectations written on it. Adherence was defined as the card being present, visible, and accessible for the child. Quality was defined as the teacher reminding the student to look at his expectations and reviewing those expectations with the child throughout the day before or in the absence of problem behavior. The PTR consultant scored the fidelity of strategy implementation after every three hours in the classroom after implementation began. If an intervention was observed, it received a score of 1. Components
not observed received a score of 0 (zero). The number of observed components was totaled and divided by the total number of components, and an implementation percentage was generated. Teams were expected to achieve a score of 80% fidelity before moving to the post-test stage. All teams achieved 100% fidelity of implementation within three rating periods, which equates to a maximum of 9 hours of consultant time within the classroom. One follow-up data point with the fidelity implementation checklist illustrated that all three teams were still exceeding 90% fidelity after the consultant was no longer providing classroom support.

**Social validity.** Team members involved in interventions completed a social validity scale at the completion of the PTR process. The social validity form, which was adapted from the Treatment Acceptability Rating Form–Revised (TARF–R) (Reimers & Wacker, 1988), consisted of 15 items related to how each team member felt about different aspects of intervention. A rating of 1 was the lowest, and 5 was the highest.

**Results**

The results for problem behavior are shown in Figure 1. This figure depicts the percentage of intervals with problem behavior in each session for each participant. Josh’s baseline showed 52% of the intervals contained problem behavior. When intervention was introduced on day 5, the level of problem behavior dropped immediately to 26%, and continued to decline throughout intervention and follow up. Alex and Rosalie also showed relatively high and stable baselines, followed by clear reductions in intervention and maintenance of zero or near-zero levels in the follow-up phase.

The results for task engagement are shown in Figure 2. The data tend to mirror the data presented in Figure 1. That is, baselines were stable and indicated low levels of engagement. PTR intervention produced immediate and stable increases, with those increases being maintained during follow-up.

Social validity data showed that team participants were quite positive about their PTR experience. Team members rated the experience on items including acceptability of the PTR behavior plan given the student’s behavior problems, which received a mean score of 4.3. Willingness to carry out the plan had a mean score of 4.76, and willingness to change routines in order to carry out the plan received a mean score of 4.46. Confidence that the intervention will be effective for the student received a mean score of 4.07; effectiveness in teaching appropriate behaviors, 4.25; and how well the intervention fits with the team’s goals, 4.45. The overall social validity rating was 4.11, indicating a high level of satisfaction among team members. Ninety-one percent of team members found the interventions to be reasonable, 83% found the PTR intervention to be effective in teaching appropriate behaviors, and 96% of team members—including families who participated—reported that the interventions were effective in helping the students reach their goals.

**Discussion**

The data from this study showed that implementation of the PTR process was effective in rapidly improving the behavior of the three children with autism. The primary dependent variables indicated that problem behavior was reduced and task engagement was increased for all three participants. As shown in Figures 1 and 2, the magnitude of behavior change was substantial, to the point that there was no overlap between baseline and intervention data. Furthermore, the follow-up data indicated that the behavior change was sustained after on-site assistance from the PTR consultant was withdrawn.

These data provide the first empirical evidence that the PTR process can be effective with students with autism. Previous published research on PTR involved a group design in which nearly 250 students with and without disabilities participated in a variety of general and special education settings (Iovannone et al., 2009). Another contribution of the current data is that all sessions were conducted in regular, ongoing general education settings. The fact that the children’s behavior improved as markedly as the data illustrate suggests that effective supports for children with autism in inclusive classrooms may be more feasible than has sometimes been appreciated.

Although PTR is both standardized and manualized, it is essentially a multi-component and assessment-based strategy for implementing positive behavior support (PBS) (Dunlap, Iovannone, Wilson, Kincaid, Christiansen, et al., 2010). As such, the present findings can be related to numerous precedents in the literature (Carr et al., 1999). In an article that

Figure 1. Percentage of intervals with problem behavior for each of the three students.
Figure 2. Percentage of intervals with task engagement for each of the three students.
are recommended as a treatment for school-based behavior problems. In this respect, the current data extend an ongoing line of documentation regarding the efficacy of PBS.

A major concern in the field, and a major emphasis of the PTR model, involves fidelity of implementation. All too often, evidence-based practices fare poorly in educational environments such as general education classrooms (cf., Fixsen, Naom, Blase, Friedman, & Wallace, 2005). A number of features of PTR were designed to enhance implementation fidelity of a function-based assessment and intervention process, thereby increasing the model’s effectiveness. Fidelity was measured in this study and the data indicate that the classroom teachers implemented the strategies as intended, even after the consultant’s assistance was removed. Fidelity was also shown to be high in previous research on PTR (Iovannone et al., 2009). However, it is still the case that relatively little is known about the variables that contribute to fidelity of the overall process and, especially, the variables that affect sustained implementation over extended periods of time. This is a crucial area of future research as it relates to the PTR model and to implementation in general (Fixsen, et al., 2005).

Although the data from this study are encouraging, there are also limitations. First, the study included only three participants, so it is impossible to make general statements about the efficacy or feasibility of the PTR model with students with ASD. Furthermore, the students were relatively high functioning and all data were obtained from classrooms in a single school district. It is possible that PTR interventions conducted in different contexts would yield dissimilar outcomes. Additional replications in different settings and with different participants will be important to indicate generality of the findings. Also, the delayed start of baseline for Rosalie may be seen as reducing the design strength, along with the limited number of follow-up points.

Despite the limitations, the findings of the study are clearly encouraging. The data show that children with ASD can be supported in general education classrooms with a scripted, standardized PBS process that produces individualized, assessment-based interventions. The results provide obvious implications for practice and suggest that additional research on the PTR model could solidify evidence regarding its effects with students with autism and related disabilities. Specific practice implications are as follows. First, the entire PTR process required less than 12 hours for each team and all teams felt that this “cost” was quite reasonable. Second, while this study focused exclusively on students with autism, the larger randomized trial on PTR included many participants with behavioral disorders, with all of them showing significant behavioral improvement. Finally, while typical school staff implemented all the PTR components they were carefully coached by the PTR consultant, an expert in PBS.

REFERENCES


**AUTHORS' NOTE**

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