

Pivotal Response Teaching in the Classroom Setting

Aubyn C. Stahmer, Jessica Suhrheinrich, Sarah Reed, Cynthia Bolduc, and Laura Schreibman

ABSTRACT: Pivotal response teaching (PRT) is an empirically supported naturalistic behavioral intervention proven to be efficacious in the education of children with autism. This intervention involves loosely structured learning environments, teaching during ongoing interactions between student and teacher, child initiation of teaching episodes, child choice of teaching activities or materials, prompting, providing reinforcers directly related to the child's behavior, and providing reinforcement for child goal-directed attempts to respond. PRT has been widely studied and has been effective in increasing verbal communication, joint attention, play skills, peer social interactions, and homework skills. Although the use of PRT in classroom settings has not yet been empirically studied, work is underway to develop PRT-based procedures for such settings. The authors discuss barriers to PRT translation to classroom settings and strategies for improving such implementation.

KEYWORDS: *behavioral intervention, children with autism, pivotal response teaching*

PIVOTAL RESPONSE TEACHING (PRT; i.e., *pivotal response training or pivotal response treatment*) is a form of naturalistic behavioral intervention based on the principles of applied behavior analysis (ABA), which is soundly supported in the scientific literature (National Research Council, 2001). ABA is the design, use, and evaluation of environmental modifications and interventions to produce socially significant improvement in human behavior. ABA uses antecedent stimuli (things that happen before a behavior occurs, such as a teacher asking a child what color a crayon is) and consequences (events that happen after a behavior occurs, such as giving the child the crayon after he or she names the color), to produce changes in behavior. ABA is based on the belief that we can shape an individual's behavior by altering environmental events that surround a behavior. Treatments based on ABA represent a wide range of intervention strategies for children with autism, from highly structured programs conducted in one-on-one settings to naturalistic strategies that use the child's preferred activities to build skills. Researchers have

developed naturalistic interventions to address some of the limitations associated with highly-structured programs such as Discrete Trial Training (Lovaas, 1987). Thus, researchers developed PRT to facilitate stimulus and response generalization (helping children respond to different cues, people and instructions, in multiple places) increase spontaneity, reduce prompt dependency, and increase motivation while still relying on the principles of ABA.

Since their conception, naturalistic behavioral intervention techniques have undergone a variety of changes and improvements yielding several similar intervention techniques, including incidental teaching (Hart & Risley, 1995; McGee, Krantz, Mason, & McClannahan, 1983), mand-model (Rogers-Warren & Warren, 1980), time delay (Halle, Marshall, & Spradlin, 1979), milieu teaching (Alpert & Kaiser, 1992), and PRT (Koegel, O'Dell, & Koegel, 1987; Koegel et al., 1989). Although researchers have developed specific techniques in different laboratories, these approaches are similar because they all share the following basic components: (a) the learning environment is loosely structured; (b) teaching occurs within ongoing interactions between the child and the adult; (c) the child initiates teaching episodes by indicating interest in an item or activity; (d) teaching materials are selected by the child and varied often; (e) the target behavior is explicitly prompted; (f) a direct relationship exists between the child's response and the reinforcer; and (g) the child is reinforced for attempts to respond, not only correct responses or successive approximations (Delprato, 2001; Kaiser, Yoder, & Keetz, 1992).

PRT was designed based on a series of empirical studies identifying important treatment elements that address pivotal

Address correspondence to Aubyn C. Stahmer, Rady Children's Hospital, Child and Adolescent Services Research Center, 3020 Children's Way, MC 5033, San Diego, CA 92123, USA; astahmer@casrc.org (e-mail).

areas of development affecting a wide range of functioning. To date, three pivotal areas have been identified: motivation, responsivity to multiple cues, and child self-initiations. According to Koegel, Koegel, Harrower, and Carter, 1999, when these pivotal behaviors are enhanced, improvement in autonomy, self-learning, and generalization follows. Specific elements of PRT include clear and developmentally appropriate instructions; shared control, including providing the child a choice of activity or materials and taking turns; interspersal of maintenance tasks (tasks the child has already mastered); responding to multiple cues; contingent reinforcement; a direct response–reinforcer relationship; and reinforcing goal-directed attempts (see Table 1).

PRT Elements

Presenting the Cue

Each interaction begins with the teacher providing some type of cue for the student to elicit a response. A cue can be very specific, such as asking a question (e.g., “what color is this?”) or very open-ended (e.g., placing a student’s favorite snack in a difficult to open container to encourage

asking for help). Regardless of the type of cue presented, PRT provides specific guidelines for setting up the teaching opportunity.

1. *Gain attention and provide a clear, appropriate instruction.* It is important that a cue or instruction is presented only when the child is paying attention and that the cue is clear and unambiguous. The cue or instruction should be at the child’s developmental level, using language or play the child can understand. Last, the instruction should be relevant and appropriate to the task.
2. *Child choice and shared control.* To maximize the child’s interest in the learning situation, he or she is given a great deal of input in determining the specific stimuli and the nature of the learning interaction. In the classroom, this may mean that a variety of materials (e.g., toys, games, snacks) are available during free play (choice of activity) or that the child is allowed to select a topic, book, or color of marker for a specific learning activity (choice of materials). A teacher may alter the curriculum to include a child’s specific interest in the activity (e.g., during a geography lesson about China, the teacher discusses the types of cars made in China because his or her student is highly motivated by cars). The teacher is alert to the child’s changing interests and allows the child to switch to another preferred activity, or embeds the child’s interests into existing activities (e.g., using numbered SpongeBob stickers to complete addition on a mathematics worksheet). During the teaching interaction, the teacher and child (or several children) take turns with the materials and activity, thus sharing control. This allows the child to become accustomed to the back-and-forth nature of verbal and social interaction while allowing opportunities for the teacher to model appropriate and more sophisticated behavior with the materials.
3. *Intersperse maintenance tasks.* To enhance motivation by keeping the overall success and reinforcement level high, previously mastered (maintenance) tasks are interspersed frequently among new (acquisition) tasks that are more difficult for the child. This may include asking the child to use language at varying levels to request help or toys (e.g., “Block,” “Green block,” “I want that block, please”); interspersing easier problems with new harder problems (e.g., interspersing addition problems with multiplication problems on a multiplication practice worksheet), or mixing simple, concrete questions with more abstract or lengthy inquiries (e.g., alternating between questions such as “What is the main character’s name?” and “How did Sam feel when he lost his dog?” or “What happened in the story?”). This strategy keeps children motivated by ensuring frequent success and reducing frustration during the teaching interaction.

TABLE 1. Pivotal Response Teaching Elements

| CUE |
|--|
| Child Attention Gain child’s attention before providing cue |
| Clear & Appropriate Provide related, clear and developmentally appropriate cues |
| Child Choice Allow child a choice of activity or materials |
| Take Turns Take turns by modeling appropriate behavior |
| Maintenance Tasks Intersperse tasks the child has already mastered |
| Multiple Cues Provide cues that require responding to multiple elements <i>Child Behavior (correct, incorrect, attempt)</i> |
| RESPONSE |
| Contingent Provide appropriate consequences based on child’s behavior |
| Direct Reinforcement Provide reinforcement directly related to the child’s behavior |
| Good Trying Reinforce child’s goal directed attempts |

4. *Responsivity to multiple cues.* Research has indicated that for children with autism who are overselective in their responding, training on a series of successive conditional discriminations teaches them to accurately respond to simultaneous multiple cues. A conditional discrimination is one that requires attention and response to more than one descriptive element of the item (Koegel & Schreibman, 1977; Schreibman, Charlop, & Koegel, 1982). For example, asking a child to find a red marker in a mixed box of crayons and markers is a conditional discrimination task. The child must attend to the descriptive element red (and not another color) and the element marker (and not a crayon) to respond correctly. Accurate responding depends on attention to both color and object. Failure to attend to both elements may lead to an incorrect response: The child may retrieve a marker but one that is a different color or something that is red but not a marker; both of these responses are incorrect. If there were red markers in the box but no crayons that were red, the task would not require responding to multiple cues because the child could identify the red item and respond correctly.

To enhance the child's responsivity to multiple cues, the teacher regularly presents the child with tasks involving conditional discriminations. For example, the teacher who provides utensils for snack in a large bin full of different sized utensils and asks the child to retrieve a big fork to eat snack is addressing responsivity to multiple cues. The child must attend to the elements big (not small) and fork (not a spoon or knife) to correctly select a utensil and thus receive the reward of eating his or her snack. As the children learn to respond on the basis of multiple cues their attention is more normalized, allowing for more environmental cues to become functional. Because stimulus control of behavior is no longer as restricted, enhanced generalization should result. At present, research is being conducted to determine at what developmental level it is appropriate to target multiple cues.

Providing a Response

Once the student has responded to the cue provided by the teacher, the teacher provides feedback to the student. The feedback will vary based on the student response (e.g., Was the student correct? Was the student incorrect? Was the student trying hard?).

5. *Contingent consequence.* *Contingent* means that the consequence should be presented immediately after a behavior occurs and must depend on the child's response. It is the case that the strength and effectiveness of a consequence is directly related to its timing. The sooner the consequence is delivered after a response, the stronger its effects. The more delayed the consequence after a

response, the weaker its effects. Because the immediacy of the consequence is so important, it is the case that one must always realize that the behavior occurring just before the consequence is the behavior most affected by it. A reinforcer that is presented randomly (i.e., long after a behavior occurs, or not dependent on a behavior) is ineffective. Saying "Good talking" to a child at random intervals, independent of the child's behavior, will not increase the likelihood that the child will speak. Giving the child a toy car after the child hit the teacher, even if the child correctly asked for a car as well, may increase hitting instead of appropriate language. Therefore, to ensure that children are increasing play and communication skills using PRT, it is important to reward appropriate behavior immediately after it occurs.

6. *Direct and natural reinforcers.* Direct, rather than indirect, reinforcers are used in PRT. *Direct reinforcers* are consequences that are directly related to the response they follow. For example, a direct reinforcer for the verbal response "car" may be access to a toy car, as opposed to a food or token reinforcer. Access to a toy car is a direct and natural consequence of saying "car" that is likely to occur outside the specific learning situation, whereas food is not. Integrating direct reinforcers in the classroom may include requiring children to use language to request the next activity at circle time or to ask for specific materials for an art project. In addition, a child may be asked to clean up the materials from his or her mathematics program before being dismissed to go outside for free play. Access to the next highly motivating activity is a direct reinforcer and natural consequence for completing clean up. As in all behavioral interventions, the reinforcement should be contingent on the child's behavior.

7. *Reinforcement of attempts.* To maximize reinforcement and therefore enhance the child's motivation to respond, teachers reinforce reasonable attempts made by the child in PRT. Thus, reinforcers depend on attempts that are within a broader range of correct responses, although they may not be completely accurate or as good as previous attempts. For example, a teacher may respond to a child's pointing and approximation of *buh* for bubbles by blowing bubbles for the child, even if the child has previously said the entire word *bubble*, because *buh* is a goal-directed attempt. Also, if a student who is working on understanding reading content made a strong effort towards writing a chapter summary but did not use punctuation or sentence structure accurately, the teacher may still praise him or her and accept the work as complete, rather than forcing the student to correct the assignment. The student is thus more likely to be motivated to complete future writing assignments, rather than be discouraged by a long process of being exactly correct in every instance.

TABLE 2. Examples of Using Pivotal Response Teaching in the Classroom

Language
Activity:
 Group Snack
Current Level:
 Michael -
 Nonverbal
 requests
 Carter -
 Single-word
 requests

Susan is a special education teacher who wants to maximize teaching opportunities throughout the day. She uses snack time to teach various communication skills to the children in her class by having all the children sit at a table for snack and controlling access of the snack items, with help from her assistant. One student, Michael, is just learning to communicate verbally. He can easily request what he wants by reaching toward an object or signing "more" (maintenance skills). Susan is targeting verbal communication with Michael, specifically, imitating sounds and simple words (acquisition skills). While at snack, Susan provides a choice of juice, milk, crackers, and banana (child choice) and waits for Michael to direct his attention toward one food item. Michael reaches for the banana and Susan immediately provides the cue, "Buh." (gains attention; clear, appropriate cue). Michael responds by imitating her "Buh" and so he immediately receives a piece of banana (contingent, direct reinforcement). While Michael is eating the banana, Susan responds to another student, Carter, who regularly uses single words to make requests and is working on using phrase speech. Carter says "Milk." and points toward the carton on the table (gains attention). Susan has previously modeled the phrase "drink milk" for Carter when reinforcing his use of single words (maintenance skill), so this time she looks at him and provides an expectant look (clear, appropriate cue). Carter then says "get milk" (acquisition skill) and she rewards his attempt by giving him the drink while modeling appropriate language by saying "drink milk" (rewarding attempts; contingent, direct reinforcement). Next, Susan returns her attention to Michael and holds up the milk and juice and waits for him to respond. Michael reaches toward the milk, and his teacher reinforces this maintenance skill by giving him a drink of milk. Susan and her assistant are able to encourage communication at varying levels, teach the children to wait for their turn, and expand the complexity of the children's language during the group snack time using PRT.

Language
Activity:
 Free play
Current Level:
 Single-word
 requests, imi-
 tative phrases

One of Jamie's language goals is to combine adjectives and nouns to make requests. Tasks that are easy for Jamie (maintenance skills) include labeling items with single words and repeating 2-3 word phrases. Jamie is learning to use phrases spontaneously and to use adjectives (acquisition skill). Using PRT at playtime, Jamie's teacher holds up two colored balls for the ball tower and asks, "what you want?" (child choice). Jamie responds, "ball" and points toward the red ball (gains attention). Her teacher provides the cue, "red ball" and Jamie repeats, "red ball." (clear, appropriate cue). The teacher rewards this maintenance skill by giving Jamie the red ball (direct, contingent reinforcement) and modeling the more sophisticated response "red ball, please." Next, the teacher holds up the red ball and waits for Jamie to respond with an expectant look. Jamie says, "red ball" spontaneously (acquisition skill). Her teacher immediately gives her the red ball (direct, contingent reinforcement) and provides enthusiastic verbal praise to reinforce Jamie's use of the acquisition skill. The teacher takes turns throughout the play with the balls, modeling more complex speech, such as "I want red ball," whenever she takes a turn (turn taking). This familiarizes Jamie with phrase speech and prepares her to use phrase speech while she is still acquiring word pairing. The teacher continues to vary her cues and expect spontaneous and imitative responding from Jamie to ensure that Jamie learns more complex language while minimizing frustration.

Play Activity:
 Free play
Current Level:
 Independent
 play

While playing with a set of cars, Carl enjoys rolling the cars down a tube, which serves as a track. He prefers to play alone but will allow peers to play near him. Carl is also able to take turns with an adult during play (maintenance skills), but has difficulty with a peer (acquisition skill). Because Carl has a play goal for turn-taking with a peer, the teacher facilitates the car play with Carl and another student, Juan, to target this goal. The teacher places the cars into a clear container with a screw-top lid and shows the container to the boys. Carl, in an excited voice shouts, "Cars! Give me!" (gains attention). The teacher holds the cars higher and says, "Wait. We share and take turns." She asks Juan "Which car do you want, Juan?" Juan responds by asking for the "Blue car, please." The teacher gives him the blue car, which he places in the tube and watches roll down. Next, she asks, "Which car, Carl?" (child choice). Carl replies that he wants the "Blue one, too!" The teacher tells him to ask Juan to give him the blue car (clear, appropriate cue). Carl turns to Juan and says, "car." Juan gives him the car (direct, contingent reinforcement) while the teacher praises his response by saying, "You asked Juan for a car!" The teacher then asks Carl to give her a turn (maintenance skill; turn taking). Carl gives the teacher the car to roll down the tube. "Thank you Carl! Rolling car!" The next time, she has Juan ask for a car from Carl, who gives it to him with the teacher's help (acquisition skill). She comments, "Carl gave Juan the car!" The teacher continues the play using various cues and rewarding Carl's appropriate responses while continually pausing to allow spontaneous responding to occur.

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TABLE 2. Examples of Using Pivotal Response Teaching in the Classroom (*Continued*)

| | |
|---|--|
| Play Activity: Free play Current Level: Exploratory play | <p>Allison enjoys animal figurines but has very limited play skills. She prefers to hold the animals (maintenance skills), and is learning to follow basic play commands with the figurines, such as jump, sleep, and eat (acquisition skills). Allison's teacher provides several animals and allows her to select one from the group (child choice). Allison's teacher takes another figurine of the same animal and models the play behavior, "cow eats" (turn taking), then provides the cue to Allison, "make the cow eat." (clear, appropriate cue). Allison imitates her teacher's behavior (acquisition skill), and then she is allowed to hold the animals and interact with them however she prefers (contingent; direct reinforcement; maintenance skill). Allison's teacher knows that developmentally, children learn to do simple actions with multiple 'actors' before sequencing actions, so she continues with a variety of other basic play commands (e.g., chicken sleeps, rabbit jumps), modeling each behavior (turn taking) then providing a cue for Allison to imitate her. After imitating her teacher's behavior, Allison is always reinforced by playing with the animals on her own (direct, contingent reinforcement).</p> |
| Social Activity: Greeting Current Level: Non-verbal greetings | <p>Emily has a social goal for greeting others appropriately by waving and saying, "hello" or "good-bye." Emily already waves in greeting (maintenance skill), but does not vocalize "hello" or "goodbye" (acquisition skill). Because Emily enjoys riding the bus and is very motivated to get on the bus each afternoon, her teacher has selected bus rides as a naturally occurring reinforcer for teaching greeting. When Emily and her teacher approach the bus, her teacher kneels, blocking the entrance to the bus, waves and says, "goodbye." (turn taking; clear, appropriate cue). Emily lifts her hand in a wave and imitates, "goodbye." The teacher steps out of the way and Emily boards the bus (direct, contingent reinforcement). After several days of teaching "goodbye," Emily now spontaneously waves and says, "goodbye" to her teacher when they approach the bus on a regular basis. Now "goodbye" is a maintenance skill for Emily and "hello" is an acquisition skill. Emily's teacher modifies the lesson to require Emily to say, "hello" to the bus driver each day before boarding the bus. The teacher continues the lesson by presenting naturally occurring opportunities for Emily to greet other adults and peers at school.</p> |
| Social Activity: Board games Current Level: Directive peer interaction | <p>When Thomas plays with other students he often directs their play with instructions like, "I'll be red and you'll be blue." Interacting with his peers in this way is a maintenance skill for Thomas. However, he also makes anti-social comments like, "I won. You're the loser." Thomas's acquisition skills during play include asking his peers questions during play interactions and making positive, prosocial comments about his peers. Thomas's teacher facilitates his play with peers during a game center rotation. While playing Candyland, she gives Thomas the instruction "Ask Jennifer which color she wants." Thomas asks Jennifer, and she selects red. Thomas's teacher reinforces this behavior by allowing him to choose his own color (direct, contingent reinforcement) and providing verbal praise. When Thomas reaches the end of the game before the other students, his teacher provides an opportunity to target an acquisition skill, commenting in a positive way, "Thomas reached the end first, but everyone did a great job. Good game!" (turn taking). She looks expectantly at Thomas to encourage him to respond in a pro-social way as well (gains attention; clear, appropriate cue). "Good game!" Thomas says, imitating his teacher. She reinforces this behavior by providing praise and asking him, "Should we play again?" (direct, contingent reinforcement).</p> |
| Academic Activity: Reading Current Level: Site word reading | <p>Marco is 6 years old and loves Spiderman and other super heroes. His goals include learning to read (acquisition task). Marco says he hates to read and "just can't do it!" His teacher decides to use PRT to help him learn to read and make it fun. She sits with Marco and a small group of other students who are learning at the same reading level. She has made several sets of Spiderman flash cards with the site words she wishes to teach printed on them (child choice). Marco already knows more than half of the words (maintenance tasks) and half the words are new (acquisition). She shows Marco the first card and asks, "What word is Spiderman saying?" Marco answers correctly, and is rewarded by being given the card (direct, contingent reinforcement) and the teacher saying, "You got the word right!" She continues with the cards by asking different children to respond and gives them a card for correct answers and allows another child to try if the first child responds incorrectly (turn taking). They continue until Marco is able to recognize all the words. After this, she gives each student a book which contains the site words they just reviewed. Children get to choose the book they want (child choice). They take turns reading aloud to a partner and Marco is told, "Marco, you read the first page and if you are able to get all the site words correct, your friend will read the next page!" (direct reinforcement and turn taking).</p> |

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TABLE 2. Examples of Using Pivotal Response Teaching in the Classroom (*Continued*)

Academic Activity:
Color identification
Current Level:
Cannot identify colors

Julie, Sarah, and Simon are working on color identification. Julie can identify red and blue. Sarah and Simon cannot identify any colors correctly. Julie and Sarah are using phrase speech while Simon is nonverbal, but can point and use pictures to request preferred items. The teacher decides to work in a small group on color identification. She gathers a variety of toys that the children enjoy that are red, blue and green including a ball drop toy, toy cars, and crayons. She asks the children to choose together which toy they want to play with first. They choose the ball drop, although Julie wants the crayons, she agrees to start with the balls first, then do the crayon play (child choice with shared control). The teacher shows the children the balls and identifies the color of each ball. She asks Simon to show her the red ball (acquisition task) and assist him by visually placing the red ball closer to him to increase his success. He correctly chooses the red ball and is allowed to place it in the ball drop (direct, contingent reinforcement). She asks Julie to show her the blue ball (maintenance task) since this is not her preferred activity and she can model the correct behavior for Sarah (turn taking). Julie also puts a ball in the drop. Sarah then identifies the blue ball and gets her turn. Next, she asks Simon to choose the ball he wants using a point (maintenance task). They take turns together while the teacher uses both difficult and easy tasks for the children, helping them with graduated prompts when needed. When the children tire of the game, she moves to the crayons and uses the drawing activity to help the children learn colors. Because they have had a great deal of exposure to the three colors during the ball game, Julie and Sarah are now able to choose the color they want from the three they have just learned. Simon begins to learn how to use his pictures to request specific colors.

Table 2 shows examples of using PRT in the classroom to target a variety of language, play, social, and academic skills.

PRT Research

In contrast with other naturalistic procedures that have focused mainly on communication, PRT has been used to teach a variety of skills, including symbolic play (Stahmer, 1995), sociodramatic play (Thorp, Stahmer, & Schreibman, 1995) peer social interaction (Pierce & Schreibman, 1995) self-initiations (Koegel, Carter, & Koegel, 2003), and joint attention (JA; Rocha, Schreibman, & Stahmer, 2007; Whalen & Schreibman, 2003). An independent review of the PRT research base recommends PRT as an efficacious, evidence-based intervention for children with autism (Delprato, 2001; Humphries, 2003).

Teaching Communication Using PRT

Spoken language has been a primary target behavior in much of the research on PRT and it is clear that this technique is effective at increasing verbal communication in children with autism (Humphries, 2003). PRT has resulted in profound language improvements and concurrent decreases in inappropriate and disruptive behaviors (Koegel, & Surratt, 1992). Compared with other, more structured techniques, researchers have found PRT to be more effective for increasing verbalizations and language use (Koegel et al., 1992; Koegel et al., 1987). PRT is effective for improving speech imitation (Koegel, Camarata, Valdez-Menchaca, & Koegel, 1998; Laski, Charlop, & Schreibman, 1988), labeling

(L. K. Koegel et al., 1998), question asking (L. K. Koegel et al., 1998), spontaneous speech (Laski et al., 1988), and conversational communication (Koegel, Camarata, Koegel, Ben-Tall, & Smith, 1998), as well as promoting rapid acquisition of functional speech in previously nonverbal children (Sze, Koegel, Brookman, & Koegel, 2003). PRT increases use of language across settings and people, and these behaviors have shown maintenance over time (Humphries, 2003; Schreibman, Kaneko, & Koegel, 1991). As part of teaching communication, pre-academic skills such as colors, numbers, letters, and shapes can be easily included as additional targets of the intervention (Koegel & Koegel, 2006).

Teaching JA Using PRT

In typical development, JA skills are considered to be pivotal behaviors leading to collateral changes in language (Bakeman & Adamson, 1984; Baron-Cohen, 1987; Bates, Benigni, Bretherton, Camaioni, & Volterra, 1979; Loveland & Landry, 1986). JA is one of the core deficits in autism, and improving JA may improve other areas of development (Kasari et al., 2005). PRT has been used to directly teach JA skills to young children with autism (Pierce & Schreibman, 1995; Whalen & Schreibman, 2003) including increased responding to JA bids, increased JA initiations, and related improvements in positive affect, social initiations and language.

Teaching Play Skills Using PRT

PRT has been proven to be structured enough to help children learn simple and complex play skills, while flexible

enough to teach children to play creatively. Research has indicated that children with autism who are developmentally ready to engage in symbolic and sociodramatic play can learn, through PRT, to play spontaneously and creatively with an adult at levels similar to those of language-age matched peers (Stahmer, 1995; Thorp et al., 1995). In addition, social behaviors, such as positive responding, increase after play training. Generalization to new toys and new adults is also impressive with this approach, and these behavioral changes remain stable over time (Stahmer, 1995). When rated by naive observers for creativity, spontaneity, and typical play, children with autism improved significantly after play focused PRT; however, their play remained qualitatively distinguishable from the play of typically developing children (Stahmer, Schreibman, & Powell, 2006). An area of ongoing difficulty for the children after play training was initiating and sustaining play with a peer, which did not improve. It seems that specific interaction training is needed to address this particular deficit and increase play with peers (Yang, Huang, Schaller, Wang, & Tsai, 2003).

Teaching Peer Social Interaction Using PRT

Research shows that complex social behaviors, such as initiating play and conversation, typically are difficult to address using highly structured interventions. However, results from several PRT research projects indicate that it is an effective technique for teaching children with autism to both respond to peers, and to initiate interaction with others (Koegel et al., 1999; Pierce & Schreibman, 1997). For example, children with autism who participated in a PRT program targeting social interactions had improved spontaneous social initiations and developed social circles of typically developing peers after treatment (Koegel et al., 1999). In Pierce and Schreibman's study, two 10-year-old boys with autism with poor social skills and moderate developmental delays learned to engage in social interactions through peer-implemented PRT. Before treatment, the children engaged in low levels of interactions and no initiations with peers. However, after several weeks of training, both children maintained interactions with peers over 75% of the time, and initiations increased to levels ranging from 0% to 35% per session. This study further showed that peer-implemented PRT resulted in collateral changes in behaviors including language and play that generalized across settings, stimuli, and peers.

Using PRT to Improve Homework Skills

PRT has also been used to facilitate homework completion. Examples include using choice of location to complete homework, choice of order of completion, interspersing simple problems (maintenance) with more difficult problems (acquisition), and rewarding attempts by praising the

child for completing portions of a worksheet or part of a difficult problem. Data from a recent study indicate that PRT procedures decrease disruptive behaviors, increase positive affect of the children and improve homework performance (Koegel, Tran, Mossman, & Koegel, 2006).

Using PRT in the Classroom

PRT was initially developed for use in parent education and has been primarily studied in one-on-one settings. Although PRT has not been systematically studied in public school settings, there are some preliminary examples of classrooms using these procedures as part of their overall educational program. For example, the Alexa's PLAYC (located at the Rady Children's Hospital in San Diego), an inclusive classroom for toddlers with autism, uses PRT with other interventions in daily programming. Teachers use PRT throughout the school day to encourage language, social, and preacademic skills (see Stahmer & Ingersoll, 2004). The use of PRT is incorporated with the use of other strategies such as Discrete Trial Training (Lovaas, 1987), the Picture Exchange Communication System (PECS; Bondy & Frost, 1994), floor time (Greenspan & Wieder, 1997), visual strategies (Schopler, Mesibov, & Hearsey, 1995), and sensory integration techniques (Baranek, 2002). Although 50% of the children entered the program with no functional communication skills, 80% percent of children graduating from this program at the age of 3 years had functional language. In addition, approximately half of the children exited the program with conversational speech and cooperative symbolic play (Stahmer & Ingersoll, 2004). Similarly, researchers in Oregon have been working with the State Department of Education to implement evidence-based practices in public school programs. PRT was one part of their program, which also included Discrete Trial Training and teaching within functional routines. Research studies (Arick et al., 2003) of more than 100 children with autism participating in the program showed that the majority of children made significant progress in the areas of social interaction, expressive speech, and use of language concepts.

Our research examining usual care in the southern California region indicates that more than 70% of 80 teachers surveyed reported using PRT, or some variation of PRT in their programs (Stahmer, 2007; Stahmer unpublished data). Approximately 35% of these teachers did not know that the technique was evidence based. They reported using the technique with 75 to 100% of their students in both classroom and one-to-one settings. It is interesting to note that only two of the seven teachers who stated PRT was their primary intervention reported using all aspects of the intervention. The rest of the teachers indicated that they used parts or used PRT in conjunction with other treatment methodologies. Teachers may not be using all aspects of

TABLE 3. Pivotal Response Teaching Goal Development Form

Curriculum Area: LanguageChild: Steven

Date Started:

October, 2008

Date Goal Met:

IEP Goal: Steven will produce 3–5 word phrases for a variety of communicative purposes (e.g., to request, label, greet), across 3 activities (e.g., circle time, structured play, therapy), given 1 verbal or visual cue, on 5/5 school days, as measured by SLP/teacher observations.

Current level of skill (Maintenance tasks): Steven currently uses 2–3 word phrases consistently, across activities to request or label with only a verbal or visual cue. Greeting using single words with maximal prompting.

Next Steps (Acquisition tasks): Using 3–5 word phrases to request or label. Greeting with minimal prompting. Spontaneously using phrase speech in any activity.

Activities appropriate for meeting goal: Circle time-choosing songs, requesting puppets, requesting a turn, greeting peers; free play; outside time; snack time, entering and exiting the classroom (when he comes and goes or when others do to practice greeting). Steven does not like art activities so those are not a good time to work on increased language.

Direct Reinforcers: Toys (trucks, trains or balls), books about vehicles, sweet or salty snacks, swinging, sliding, labeling items in books during circle, getting to leave the room to go outside, chase with friends.

Other information: Be sure to require Steven to ask for anything he wants with a full sentence. Use varied phrases for him to repeat, or use a sign as a visual prompt. He likes to play with Joey, so that is a great time to have him practice greeting.

PRT because they do not understand the individual aspects, because it is difficult to train classroom staff, or because PRT needs to be adapted to meet the needs of classroom teachers before it is maximally useful in the classroom.

Suhrheinrich, Stahmer, and Schreibman (2007) investigated the accuracy of PRT implementation in the classroom by observing special education teachers in their programs. Teachers reported receiving various types of training, including reading a PRT manual, observation of someone using PRT, didactic instruction, and feedback from a professional. None of the 10 participating teachers met the criteria for correct implementation for all areas of PRT. Teachers used PRT correctly more often in one-on-one teaching situations than in groups. The fidelity of implementation appeared to vary systematically according to the type of training received. Specifically, teachers who received feedback from a professional, in combination with other types of training, used PRT more accurately than those who received no feedback. These data indicate the need for effective procedures, materials, and assessment of PRT implementation as well as specialized training in how to use PRT for group-based instruction.

Adapting PRT for Use in the Classroom

We are currently working with a team of teachers and school administrators to adapt PRT for use in group settings. We began by bringing together groups of teachers using PRT in their programs and those not using PRT in their classrooms to ask them about the benefits and barriers associated with this intervention. Preschool and elementary special education teachers find PRT to be an intuitive, effective teaching strategy for children with autism. Many teachers reported that PRT fit with their idea of good teaching

and it made sense to them. In addition, they reported that it helped children with autism generalize new skills to broader environments. The teachers liked some of the specific steps of PRT, including keeping instructions and opportunities clear, simple, and relevant to the child; the use of maintenance tasks to keep child frustration low; the direct relationship between reinforcer and behavior; the ability to honor approximations and goal-directed attempts; and the use of explicit turn taking.

However, teachers also reported important barriers to the use of PRT in their classrooms. They found it difficult to take the skills they learned in one-on-one training and use them with groups of multiple children, especially in settings such as circle time, in large classrooms, and without proper support. At times, they found it difficult to keep the multiple points straight and felt that having preliminary knowledge of ABA principles was an important prerequisite to understanding PRT. Teachers found data collection difficult and were unsure how to address specific individual education plan (IEP) goals using PRT strategies. They felt that this was especially important given that both parents and schools are becoming more data-driven and want programs to be determined by the IEP goals. Teachers asked for more information on how to train paraprofessionals in PRT. In addition, they felt that it was not always appropriate or possible for the child to choose the activity or to use direct reinforcement in the classroom.

On the basis of this feedback, we are currently working on an adaptation for PRT that would help teachers use these naturalistic strategies in group settings and link PRT strategies to specific IEP goals. We have begun by developing simple handouts to remind teachers and paraprofessionals of the PRT steps (Table 1). Our preliminary findings

indicate that this can increase the use of specific PRT steps that teachers often forget (e.g., turn taking). In addition, a worksheet for tailoring PRT to address specific IEP goals and an example are provided in Table 3.

This line of applied research is consistent with a broader line of inquiry addressing the need to translate empirically based interventions founded in the laboratory to real-life community settings. Efficacious treatments such as PRT can only be considered truly effective if they reach the individuals for whom they are developed. Children with autism who are likely to benefit from PRT should be able to receive this treatment in easily accessible community settings. In addition to the home, the classroom is the most important community setting where learning takes place. Our goal is thus to maximize the chance that teachers will use this proven effective method of intervention and to develop a successful method of translating evidenced-based practices into community programs. Additional information and resources regarding the use of PRT, including training manuals, can be found at psy.ucsd.edu/autism and education.ucsb.edu/autism.

AUTHOR NOTES

Aubyn C. Stahmer is a research scientist at the Child and Adolescent Services Research Center (CASRC) at Rady Children's Hospital. Her research interests are early intervention in autism and translating evidence-based practices to community settings. **Jessica Suhrheinrich** is a doctoral candidate in the Department of Psychology at the University of California, San Diego. Her research interests are training parents and teachers to use behavioral interventions with children who have autism and assessing intervention implementation in school settings. **Sarah Reed** is a project coordinator at CASRC. **Cynthia Bolduc** is a special education teacher in the San Diego Unified School District who worked on the present study to translate PRT into classroom environments. **Laura Schreibman** is a distinguished professor of psychology at UCSD. Her research interests are applied behavior analysis, autism, development of individualized treatments, and parent training.

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