Using Pivotal Response Training with Peers in Special Education to Facilitate Play in Two Children with Autism

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Abstract: This study evaluated the ability of peers in special education to implement pivotal response training (PRT) with two students with autism in order to increase social interactions. Peers were taught the strategies using modeling, role-playing, and feedback. After training, peers implemented PRT strategies with the children with autism. Picture prompts were provided to assist peers in recalling the strategies, but were completely faded until peers could implement the procedures with no instruction from observers. Increases in opportunities to respond were observed, as well as responses and initiations of social interaction by the children with autism.

In his original description of autism in 1943, Leo Kanner described problems related to the development of social relationships as inherent in the disorder (McConnell, 2002). Since this finding in 1943, researchers have thoroughly explored this characteristic, suggesting multiple forms of interventions to enhance social interactions among children with autism.

A significant body of research has focused on peer-mediated interventions (Goldstein, Kacamarek, Pennington, & Shafer, 1992; Stahmer, 1999; Goldstein & Ferrell, 1987; Garrison-Harrell, Kamps, & Kravits, 1997). Peer-mediated interventions involve teaching peers specific strategies to direct, respond, and reinforce children with autism (Goldstein et al., 1992). These strategies enhance the communicative interaction among children with autism, while minimizing the need for adult implementation and prompting. Additionally, the peers learn appropriate social behavior while assisting other peers in developing a communicative repertoire. However, many peer-mediated interventions include specific scripts with limited toys or activities, which make generalization of these skills to new settings difficult.

A specific peer-mediated strategy developed by Koegel, Schreibman, Good, Cerniglia, Murphy, and Koegel (1989) has been effective in increasing play behaviors in children with autism (Pierce & Schreibman, 1995; Thorp, Stahmer, & Schreibman, 1995). Pivotal response training provides a more naturalistic approach to peer-mediated intervention (McConnell, 2002). This strategy does not include specific scripts with limited toys or activities. Rather, it promotes a variation of peer prompts to elicit a larger range of responses from children with autism, thus promoting generalization and maintenance of interactions. Children with autism often engage in repetitive behaviors with toys rather than the toy’s common uses (Terpstra, Higgins, & Pierce, 2002), but with the implementation of PRT children possess little opportunity to isolate themselves and engage in repetitive behaviors. Furthermore, initiating play is a behavior not often observed among these children and research has demonstrated that PRT increases initiating behaviors (Pierce, 1993).

Pierce and Schreibman (1995) suggest that PRT is effective in the enhancement of social interactions among children with autism when implemented in a school setting by typical peers. However, without an intervention in place with adult supervision, typical peers are most likely to select other typical peers as playmates (Goldstein et al., 1992). Furthermore, due to the need for a continuum of

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placements for students with disabilities, some children with autism are included in a typical classroom for part of the day and spend the remainder of the day in a special education setting, while others may spend the bulk of the day in a special education classroom.

The purpose of this study was to evaluate the ability of peers in special education to implement PRT in the special education setting. Across-the-day interventions implemented by typical peers are promising (Strain & Hoyson, 2000). Thus, if PRT is implemented in both the regular and special education classrooms, the student(s) with autism will have opportunities to engage in social interactions in both classes throughout the entire day.

Method

Participants

Participants were Colin, an 8-year-old Caucasian male, diagnosed with autism, and Wilson, a 7-year-old Caucasian male diagnosed with autism, and the treatment agents: five peers in special education (two in group one, three in group two). As pre-determined by the Battelle Developmental Inventory (BDI), Colin obtained a total standard score of 65 on the communication domain, indicating deficits in both receptive and expressive language skills. These results were obtained when Colin was age 3 years, 4 months. More current test results were unavailable. Colin’s educational placement was the special education classroom for the majority of the school day.

As determined by Project Memphis, a criterion-referenced instrument that assesses a child’s level of development in several areas including language, Wilson’s expressive language skills were the equivalent of a child of 14 months when in fact he was at the age of four. On the BDI, Wilson obtained a standard score of 65 on the communication domain, equivalent to a child aged 15 months. More current test results were unavailable. Wilson also attended special education classes all day.

Of the peers chosen to participate in the study, one peer had an educational diagnosis of mild mental retardation, three had diagnoses of specific learning disabilities, and one had a diagnosis of developmentally delayed (see Table 1). Four of the peers chosen attended the same special education class as the two children with autism. Three spent the bulk of the day in the setting, while one peer attended only morning classes in the same special education classroom.

The research took place in an empty classroom in the children’s school in a rural southeastern town. The special education teacher reported that the two students with autism engage in some self-stimulation and repetitive behaviors if not under direct supervision, but engage in little to no social interactions unless prompted by the teacher or other peers.

Materials

Training materials included a variety of toys with which a small group of children could play. Toys included Legos®, cars and trucks, airplanes, blocks, and dinosaurs. These toys were used during baseline and treatment sessions. Six picture prompts were used to teach peers the strategies. Rewards (i.e., sticker chart and candy) were used when peers were cooperative in learning the strategies and successful at implementing the strategies during treatment. A video camera was used to tape all sessions.

Dependent Measures

Interaction opportunities. Opportunities to interact, or peer prompts, were provided by

<table>
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<tr>
<th>Child</th>
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1 Educational Diagnosis
2 Time in Special Education Classroom
3 Mild Mental Retardation
4 Specific Learning Disability
5 Developmental Delay
the trained peers during the sessions. Number of prompts provided were observed and recorded.

Responses. The target children’s responses to peer prompts were observed and recorded. A response was defined as a verbal, gestural, or physical indication that the child understood and/or answered the peer (e.g., answered a peer’s question, made eye contact when prompted by peer, nodded to answer a peer’s question, etc.).

Rate of responses to prompts. Rate of responses to prompts was defined as the number of responses divided by the number of prompts presented.

Initiations. Initiations were defined as beginning a conversation with a peer without a prompt, or approaching a peer to play with a peer without a prompt (e.g., handing a peer a toy, helping a peer with an activity, etc.).

Data Collection and Experimental Design

Data collection was completed individually for Wilson and Colin by reviewing video-taped sessions. Protocols included opportunities to record target children behaviors (verbal and physical responses, initiations) and whether or not prompts were provided by peers.

A multiple baseline design across peer groups was implemented. This design was used to control for reactivity, such that target children’s behavior did not change as a result of an increased number of play sessions during baseline. Additionally, differences in behavior among peer groups can be analyzed using this design.

Data Collectors

Two investigators were present at all sessions. Both were graduate students supervised by a faculty member. The faculty member reviewed all video-taped sessions for inter-rater agreement. All investigators were trained in pivotal response training, data collection procedures, and procedures for collecting treatment integrity and inter-rater agreement.

Inter-rater Agreement and Treatment Integrity

Inter-rater agreement was calculated for 100% of the intervals. Reliability was calculated by percent of agreement on each event (total number of agreements divided by total number of agreements plus disagreements). Video-tapes of sessions were reviewed by all investigators for reliability. Percentage agreement for all intervals of each behavior was 92%. Treatment integrity was assessed using a checklist of each step in the treatment (e.g., prompts were provided by observers, prompts were faded, reinforcement was provided by observers contingent upon each peer prompt). Treatment integrity was assessed on 33% of the sessions by reviewing the videotapes. Treatment was implemented with 98% integrity.

Procedure

The pivotal response techniques that were implemented by peers of children with autism in the special education classroom were derived and defined from the sets of procedures developed by Pierce and Schreibman (1995) and Koegel et al. (1989). The strategies were modified to facilitate comprehension by all students in the study. Prior to training, peers to be included in the study were chosen based on functioning level and compliance.

During baseline, all toys were placed in the middle of an empty classroom in the children’s school. Several different rooms were used, dependent upon the school’s schedule of activities. The rooms did not have desks; thus play space was blocked off in the center of the rooms with cones or with a large rug. Students (two children with autism and groups of two or three peers) were told to play with the toys. Other than the boundaries of the play space, no other instructions or prompts were delivered during baseline. Baseline sessions lasted for ten minutes. At the end of the probe, students were instructed to help put the toys away before they returned to class.

Peer Training

For the next several weeks, peers of the children with autism participated in 20-minute intensive training sessions, two to three days per week. Training ended when observers noted mastery of strategies among the children, or demonstration of skills correctly 80% of time. The following behaviors and modified
definitions were selected by the authors from Pierce and Schreibman (1995) to teach the peers to implement:

1. *Paying attention*. Ensure that the target child is attending before delivering a prompt (i.e., “Wilson, look at me.”).

2. *Child’s choice*. Offer an option of different activities to the child in order to maintain his interest (i.e., “Would you like to play with the airplane or the dinosaur?”).

3. *Reinforce attempts*. Verbally reinforce the child after attempts at play or social interaction (i.e., “I like the way you’re playing with that car”).

4. *Extend conversation*. Ask questions or talk about topics related to play (i.e., “Do you have Legos® at home?”).

5. *Turn taking*. Model appropriate play and then offer the child a turn (i.e., “This is how you play with the car. Now, it’s your turn.”).

6. *Narrative play*. Provide descriptions of play actions (i.e., “I’m flying this airplane to the airport.”).

The observer(s) held a picture prompt in front of the peers demonstrating each action prior to modeling the behavior. After the peers observed the prompt and the behavior, they practiced. Feedback was provided by the observers until students demonstrated the behavior correctly. They role-played with each other and took turns playing the peer who was to initiate an interaction with the child with autism. During each training session, strategies were reviewed until the peers could look at the prompt and explain what he was supposed to do. Training lasted for eight 20-minute sessions. One peer moved to a different school and was replaced with another peer in Group A. Thus, Peer 1 of Group A received twice the training that Peer 2 and the peers in Group B received.

**Implementation**

Peers then began to generalize strategies to a play setting for treatment implementation. As in baseline, the group was told to play together with the same toys. Observers prompted peers with the picture prompts from training when needed. Ten prompts were delivered during the first session. Then prompts were gradually faded until peers could implement strategies independently by the final treatment sessions. Contingent upon each occurrence in which a peer engaged in an interaction and/or delivered a prompt to a child with autism, he received a sticker on a chart. At the end of the session peers received a prize for earning ten stickers, which is an average of one interaction per minute. Treatment steps were identical for group two, except there were three peers in Group B instead of two. As in baseline, the sessions were ten minutes in length and were videotaped.

**Results**

Results of the study indicate improved social interaction for target students and peers. Positive changes were noted for number of opportunities for interactions, responses to peer prompts, and initiations of conversation and play.

Results of the number of peer prompts, or interaction opportunities, presented to Wilson and Colin during baseline and treatment with Groups 1 and 2 are presented in Figure 1. For Wilson, opportunities to interact occurred an average of less than one time per session during baseline with Group A. During treatment, peers offered prompts for social interactions an average of 16 times per session. Group B offered an average of less than one opportunity for interaction per session during baseline, even though baseline was extended for Group B. During treatment, the group increased prompts to approximately four per session. Opportunities to interact, or peer prompts, were exhibited to Colin an average of two to three times per session in baseline and 18 times during treatment with Group A. Group B offered approximately two prompts per session in baseline, and increased prompts to over three per session during treatment.

Results of Wilson’s and Colin’s responses to peer prompts are exhibited in Figure 2. With Group A, Wilson responded to peers only once during baseline. During treatment, Wilson responded an average of 13 times per session. Colin responded to prompts from Group A less than once per session during baseline and over 13 times per session during treatment. He responded to prompts from
Group B between one and two times per session during baseline, and two to three times during treatment.

Wilson’s and Colin’s rates of responses to prompts appear in Figure 3. Wilson responded to peers an average of 20% of the
time prompts were presented during baseline with Group A. The rest of the prompts were ignored by Wilson. During treatment, Wilson responded to prompts an average of 84.16% of the time prompts were presented. Colin responded to prompts 18.7% of the time they were presented during baseline with Group A, and 73.8% of the time during treatment. Dur-
ing play sessions with Group B, Colin responded to 41.3% of the prompts during baseline and 70% during treatment.

Initiations of interactions exhibited by Wilson and Colin are presented in Table 2. Wilson exhibited only two total initiations across
five sessions during baseline of Group A. During treatment, he exhibited a total of five initiations across only three sessions. With Group B, an increase of initiations was not exhibited. During baseline, Wilson initiated an interaction only once across seven sessions. He did not initiate play at all during the three treatment sessions. Colin initiated only one interaction during baseline of Group A, and increased to eight initiations during treatment. Colin displayed an increase in initiations after PRT implementation of Group B by an average of one initiation more per session. During baseline, Colin initiated interactions an average of two times per session. During treatment, he exhibited an average of 3.25 initiations per session.

Discussion

Results indicate that some peers with disabilities can successfully implement pivotal response training with children with autism. Particularly with Group A, consisting of one peer diagnosed with a specific learning disability and one with mild mental retardation, social interactions increased among target children and peers. The teacher described Group B peers as lower functioning and less cooperative than Group A peers. This factor may contribute to the difference in results between Groups 1 and 2. Wilson experienced more significant gains with Group B than did Colin. This finding may be explained by the difference between functioning levels of Wilson and Colin. Colin was described as more sociable and higher functioning than Wilson, possibly higher functioning than a couple of the peers in Group B. Thus, one explanation for Colin’s lack of significant gains with Group B is that he possessed more social skills initially than one or two of the peers in Group B. Another explanation may be that Group B contained one more peer than did Group A. Perhaps the numbers of peers in the groups influenced the social gains of the target children. Future research should examine the differences in social interactions contingent upon peer group size.

A reason for the increases in rates of responding may be attributed to the fact that peers were taught to use different levels of prompts: verbal, gestural, and physical. Thus, if a target child did not respond to an opportunity during baseline, the peer ceased to try to interact. However, during treatment if the target child did not respond to a verbal prompt the peer continued to prompt him by repeating the prompt, using a gesture, or physically helping the target child to respond.

These findings indicate that peers with disabilities can be successful at implementation of pivotal response training. Thus, children with autism who attend both regular and special education classes can receive the training across a school day. Perhaps lower functioning peers selected to implement PRT need more intensive training and more programming for generalization from training setting to play setting. Perhaps some peers would benefit from more learning trials during the training of steps for implementation. Research related to the different methods of training for peers with different disabilities would contribute to present PRT research so that practitioners may individualize peer training sessions.

After training implementation was terminated, the peers were observed in their classroom and continued to implement PRT with the children with autism. A limitation of this study is that more generalization data was not collected. Thus, the long-term effects of PRT are not available. Future research should evaluate the effects of PRT over time.

Teacher training of PRT strategies may benefit the peers and children with autism in that booster sessions could be conducted to enhance the generalization and maintenance of play and social skills. Peers and children with autism both benefited from PRT in that they

<table>
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<th>Child</th>
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<td>Wilson</td>
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</tr>
<tr>
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<td>Group A</td>
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1 Baseline
2 Treatment
learned to interact with others in order to enhance play and social skills.

References


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