JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2007, **40,** 353–357 NUMBER 2 (SUMMER 2007)

THE EFFECTS OF SCRIPTED PEER TUTORING AND PROGRAMMING COMMON STIMULI ON SOCIAL INTERACTIONS OF A STUDENT WITH AUTISM SPECTRUM DISORDER

ANNA-LIND PETURSDOTTIR, JENNIFER MCCOMAS, AND KRISTEN MCMASTER

UNIVERSITY OF MINNESOTA

AND

KATHY HORNER

MINNEAPOLIS PUBLIC SCHOOLS

This study examined the effects of scripted peer-tutoring reading activities, with and without programmed common play-related stimuli, on social interactions between a kindergartner with autism spectrum disorder and his typically developing peer-tutoring partners during free play. A withdrawal design with multiple baselines across peers showed no effects of peer tutoring on social interactions. A withdrawal design with 1 peer and continuing baselines across the other 2 peers showed that adding play-related common stimuli to the peer-tutoring activity increased social interactions during free play.

DESCRIPTORS: autism, generalization, peer tutoring, programming common stimuli, social interaction

One of the defining characteristics of children with autism spectrum disorders (ASD) is impaired social interaction. Poor social skills are related to negative outcomes such as rejection by peers, mental health problems, and dropping out of high school (Pollard, 1998). Thus, increasing social interactions is an important goal in the education of children with ASD. A number of researchers have used scripts successfully to promote social interactions (e.g., Krantz & McClannahan, 1993, 1998; Sarokoff, Taylor, & Poulson, 2001). In these studies, interactions generalized across activities or settings after scripts were gradually faded.

Another approach that often involves scripted interactions is peer tutoring, in which students work together in pairs with reciprocal roles. Peer tutoring has been found to increase interactions of students with autism with typically developing peers during reading activities in third grade (Kamps, Barbetta, Leonard, & Delquadri, 1994). Peer incidental teaching has also been found to increase peer interactions of preschoolers with autism (McGee, Almeida, Sulzer-Azaroff, & Feldman, 1992). However, Kamps et al. observed generalization of interactions across settings, whereas McGee et al. did not.

One approach to facilitating generalization is to ensure that "there are sufficient stimulus components occurring in common in both the training and generalization settings" (Stokes & Baer, 1977, p. 360). For example, programming common stimuli increased generalization of question-asking skills of a 5-year-old child with autism (Esbenshade & Rosales-Ruiz, 2001). The purpose of the present study was to explore the effects of scripted peer tutoring in

This research was conducted in partial fulfillment of the doctoral degree in educational psychology by the first author at the University of Minnesota. We thank the participants in the study as well as their parents. We also thank Lesley Craig-Unkefer for her helpful suggestions and Molly McLoone for assistance in conducting the study.

Correspondence can be addressed to Anna-Lind Pétursdóttir, Reykjavik City Department of Education, Frikirkjuvegi 1, 101 Reykjavik, Iceland (e-mail: annalind.petursdottir@reykjavik.is).

doi: 10.1901/jaba.2007.160-05

reading activities, with and without programmed common play-related stimuli, on social interactions between a young student with ASD and his typically developing peer tutors during free play that followed peer tutoring.

METHOD

Participants and Setting

Max was a 5-year-old boy with ASD and developmental delay. He attended a special education class but also attended a general kindergarten class. Max functioned within the normal academic range. Despite fluent language skills, he rarely interacted socially with his peers. Three typically developing 5-year-olds from the kindergarten class, Rick, Joe, and Bob, who had no history of playing with Max, were chosen as target peers because their teacher thought they might work well with Max. Sessions took place in the special education class, when its 5 students were joined by about 10 kindergartners.

Materials

Participants used Peer-Assisted Learning Strategies for Kindergartners (K-PALS; Fuchs, Fuchs, Thompson, Al Otaiba, Yen, McMaster, et al., 2001) worksheets during peer tutoring. Programmed common stimuli were toys with at least 20 pieces that could be put together, such as a marble run, that were typically available during free play. Treatment integrity was assessed with K-PALS checklists (Fuchs, Fuchs, Thompson, Al Otaiba, Yen, Yang, et al., 2001) and a checklist to assess verbal prompts and responses related to the common stimuli.

Data Collection and Interobserver Agreement

Event recording was used to assess frequency of social interactions between Max and his peers during 20-min free-play sessions immediately following reading sessions once to twice per week. *Social interaction* was defined as any verbal utterance Max directed to any of the three target peers or they directed to him. Interactions were considered directed to a peer if the speaker looked at or turned his head towards him at any time while emitting the utterance, or if it was a response to something said or done by a peer. Each separate play sound, laughter, and partial or whole sentence was counted. For example, "Don't take—; leave it!" counted as two interactions.

Two observers independently scored 33% of free-play sessions from all phases from videotapes. Total agreement on dependent measures was calculated by dividing the smaller frequency count for each peer and category by the larger frequency count and multiplying by 100%. Interobserver agreement averaged 98% (range, 75% to 100%).

Independent Variables

K-PALS activities included identifying letter sounds, decoding, reading sight words, and reading sentences (Fuchs, Fuchs, Thompson, Al Otaiba, Yen, McMaster, et al., 2001). During peer tutoring, Max and his peer took turns being the tutor, prompting the reader to identify sounds and read words on a worksheet using verbal prompts (e.g., "What sound [word]?" "Read it slowly." "Sing it and read it.") and praise every 5 to 10 sounds. The tutor systematically corrected errors (e.g., "Stop, that sound is—; what sound?"). During a typical session, each student engaged in 30 to 60 interactions, either as tutor or reader. Teaching staff provided prompts to stay on task, praised on-task and cooperative behaviors, and awarded points that could be traded in for a reward. When common play-related stimuli were programmed into the K-PALS activities, the tutor praised the reader after each line of text and asked him to take one toy item and place it in an appropriate spot (e.g., one piece of a marble run on top of another).

Treatment integrity. Average K-PALS integrity was 81% (range, 56% to 92%) and 91% for common stimuli activities (range, 86% to 96%). Average interobserver agreement on

treatment integrity was 89% for K-PALS and 93% for common stimuli activities. Most integrity failures simply involved failure to complete the entire K-PALS lesson.

Design and Procedure

Max worked with each target peer on K-PALS activities during 15-min peer-tutoring sessions, four times per week, for 4 to 5 consecutive weeks. During the 20-min free-play periods, participants could choose among a variety of activities (e.g., puzzles, art work, board games, and assembly toys). Teaching staff encouraged Max and the 3 target peers to play together in the same area (e.g., at a table), but they were free to leave the designated area or play with other children at all times. No explicit prompts or reinforcement for social interaction were programmed during any condition.

The effects of peer tutoring on social interactions during free play were assessed with a combined ABA withdrawal and multiple baseline across peers design. A CBC withdrawal design was used to examine the effects of programming common stimuli in the peer-tutoring reading activity and free-play time on the frequency of social interactions during free play with 1 target peer (Rick) while baseline measures continued for the other 2 target peers.

Baseline (A). Baseline sessions consisted of 20-min free-play periods immediately following reading sessions that occurred when Max and a target peer were not partnered for peer-tutoring reading activities.

Scripted peer tutoring (B). These sessions involved 20-min free-play periods immediately following reading sessions that occurred when Max and a target peer were partnered for peer-tutoring reading activities (i.e., 4 to 5 consecutive weeks per target peer).

Scripted peer tutoring with common stimuli (C). These sessions involved 20-min free-play periods immediately following reading sessions in which play-related stimuli were programmed into the reading activities. After the reading activity was completed, participants were given additional parts of the same toy and were encouraged to continue playing with it. This encouragement was similar to the general prompts to play together (with specific toys or in certain play areas) provided to Max and the target peers during free-play sessions in other phases.

Social Validity

Teaching staff completed a 14-item questionnaire on the acceptability, effectiveness, and other factors related to programming play-related stimuli into the reading activity. Each statement was evaluated on a 6-point Likert scale (1 = *strongly disagree*; 6 = *strongly agree*).

RESULTS AND DISCUSSION

Figure 1 shows the frequency of social interactions across baseline, scripted peer tutoring, and scripted peer tutoring with common stimuli. The initial phases show that engaging in scripted interactions during K-PALS reading activities did not lead to increases in social interactions between Max and any of the 3 typically developing peers during the subsequent play sessions. These findings differ from Kamps et al.'s (1994) observation that social interactions increased during free time following academic peer-tutoring sessions, which might be due to several differences between the studies. Possibly, peer-tutoring tasks in Kamps et al.'s study were less scripted than K-PALS, providing more potential for social interactions, making social interactions in other settings more likely because only stimulus generalization was required, compared to both stimulus and response generalization in this study. Also, Kamps et al. included nonverbal interactions when scoring social interactions, whereas we measured only verbal utterances in this study. Moreover, Kamps et al. enhanced positive interdependence among partners by assigning students to competing teams and posting team points earned for cooperation, whereas the current study did not employ such procedures.

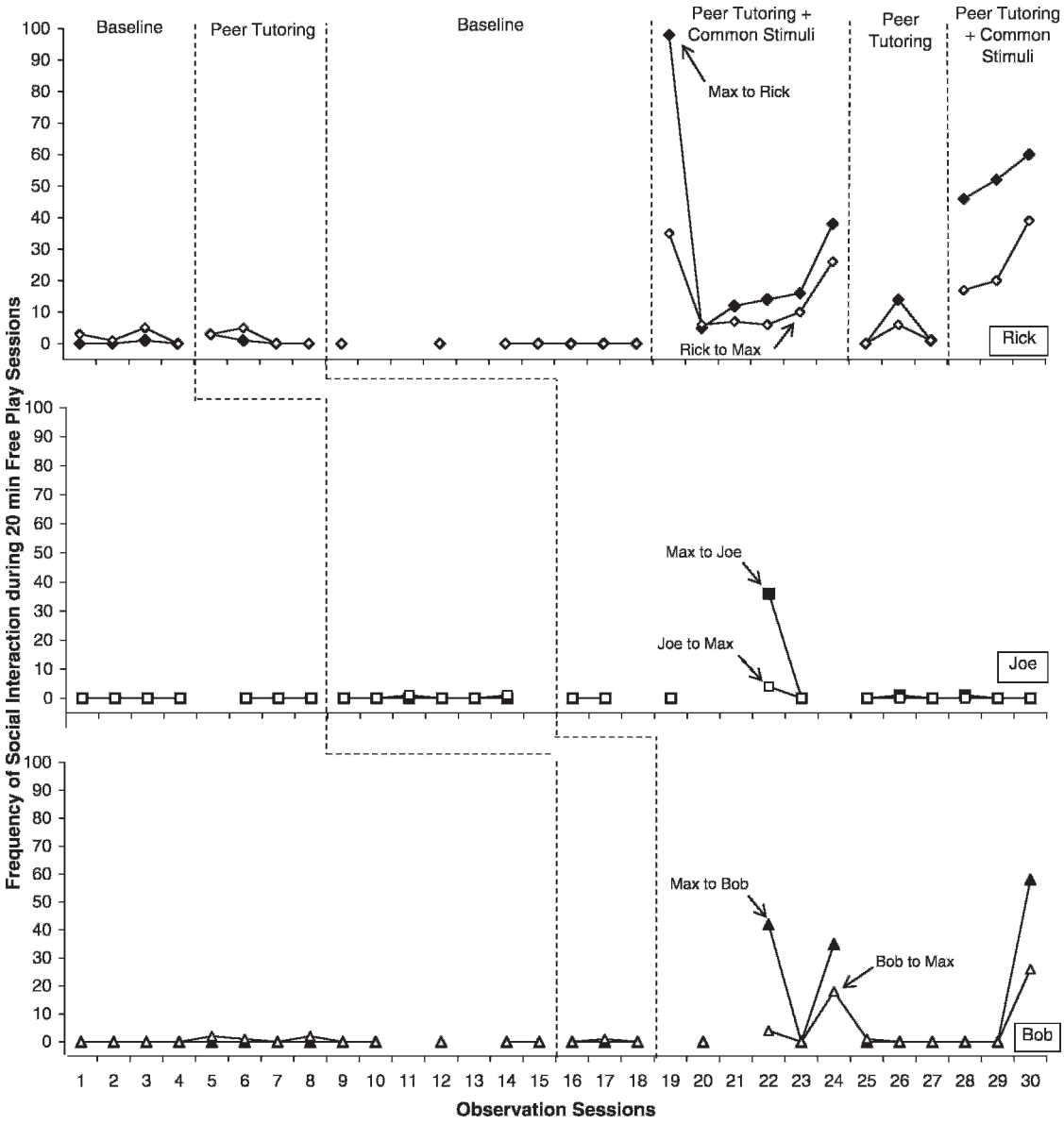

Figure 1. Frequency of social interactions between Max and his peers during 20-min free-play periods following baseline, peer tutoring, and peer tutoring with common stimuli.

The observed lack of generalization of peer-tutoring interactions to other settings is more consistent with McGee et al.'s (1992) findings, in which incidental teaching by typically developing preschoolers increased their interactions with peers with autism during free play but not during lunchtime. Possibly, verbal interactions were under tight stimulus control of the setting in which they were taught and practiced, thus not generalizing to settings that lacked common stimuli. In the current study, verbal interactions were likely under stimulus control of aspects of the reading activity (e.g., worksheets) that were not present during free play, therefore necessitating added common stimuli across settings to promote generalization.

When play-related common stimuli were programmed into Max's and Rick's peer-tutoring activities, social interactions during free-play sessions increased markedly in each phase of peer tutoring with common stimuli. Even though Max was not partnered with Joe and Bob during those phases, slightly increased social interactions with them were observed. When play-related common stimuli were removed from the peer-tutoring activities, participants' social interactions during free play decreased. Thus, programming play-related common stimuli into the peer-tutoring reading activities led to modest increases in generalization but not to maintenance of verbal interactions from the academic setting to the free-play setting. Teaching staff found programming common stimuli to be acceptable ($M = 6$), effective ($M = 6$), and simple ($M = 6$).

The findings suggest that adding play-related common stimuli to academic peer tutoring may increase social interactions between young students with ASD and their peers. However, it should be noted that when play stimuli were incorporated into the peer-tutoring activity, some of the reading time was spent playing, resulting in slightly less time to practice reading. Also, time constraints (end of school year) allowed testing the effects of programming common stimuli with only 1 peer over a short time period. Further research is needed to establish the generality of the effects with more participants, more varied participants, and across settings. Future research should also determine how long common stimuli need to be programmed in academic and play activities to achieve a high, stable rate of interactions during free play and how common stimuli can be faded without decreases in social interactions.

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Received November 1, 2005
Final acceptance December 22, 2006
Action Editor, Iser G. DeLeon