

*CLASSWIDE PEER TUTORING: AN INTEGRATION
STRATEGY TO IMPROVE READING SKILLS AND PROMOTE
PEER INTERACTIONS AMONG STUDENTS WITH AUTISM
AND GENERAL EDUCATION PEERS*

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A multiple baseline design across subjects with a reversal was used to examine the effects of classwide peer tutoring relative to traditional reading instruction on reading skills and social interaction time for 3 high-functioning students with autism and their typical peers in integrated, general education classrooms. Traditional reading instruction consisted largely of teacher-led instruction with individual student participation and seat work. Classwide peer tutoring consisted of 25 to 30 min of well-specified instruction in which tutor-learner pairs worked together on a classwide basis on reading fluency and comprehension skills. All students participated in 15- to 20-min unstructured free-time activities immediately following reading instruction. Results of reading assessments demonstrated that classwide peer tutoring increased reading fluency and correct responses to reading comprehension questions for students with autism and their peers. The procedure further increased the total duration of free-time social interactions for students with autism and typical peers, with individual variation in performance.

DESCRIPTORS: peer tutoring, autism, integration, reading, social interaction

There is currently a strong educational movement to integrate students with autism and other disabilities with their general education peers. Research suggests that successful integration depends on the careful planning, development, and implementation of programs that emphasize both the academic and the social needs of students with disabilities (Gaylord-Ross, 1989; Gresham, 1986; Sailor et al., 1989). In addition, for integration

procedures to be successful, they must be easily incorporated into classroom routines and enhance or minimally maintain learning of nondisabled students (Kamps & Carta, 1989). These guidelines have directed an increased focus on less intrusive, less costly procedures and those that improve the academic and social skills of all students involved.

The literature regarding effective integration procedures for students with mild disabilities has been much more extensive than integration strategies for students with autism and developmental disabilities. Peer-mediated strategies, such as cooperative learning groups and tutoring, are interventions that have been widely used to enhance learning in several curriculum areas for students with mild handicaps in mainstream settings (see Greenwood, Carta, & Kamps, 1990; Miller, 1992, for reviews). Cooperative learning is generally defined as the instructional use of small groups so that students work

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together to maximize their own and each other's learning (Johnson, Johnson, & Holubec, 1990). Cooperative learning has been used across a wide range of curricular areas (e.g., mathematics, social studies, language arts, reading, science, English, and geography) with varying levels of student success compared to traditional instruction (see Lloyd, Crowley, Kohler, & Strain, 1988; Slavin, 1989; Tateyama-Sniezek, 1990, for reviews).

Classwide peer tutoring (CWPT) is a peer-mediated teaching strategy that has proven to be effective across a variety of subjects and grade levels in increasing academic achievement for students with and without disabilities. CWPT programs are those in which all students work together in tutor-learner pairs on a classwide basis (Carta, Greenwood, Dinwiddie, Kohler, & Delquadri, cited in Greenwood, 1991). Components of CWPT include alternating tutor-learner roles, verbal and written practice of skills (e.g., reading aloud, writing spelling words, reciting math facts), praise and awarding of points for correct responses, and announcing winning teams. CWPT and other tutoring strategies (e.g., cross-age tutoring) have been used with students with and without disabilities in regular classroom settings, with positive effects on academic achievement (Barbetta, Miller, Peters, Heron, & Cochran, 1991; Berliner, 1990; Cooke, Heron, Heward, & Test, 1982; Fowler, 1988; Franca, Kerr, Reitz, & Lambert, 1990; Greenwood *et al.*, 1984; Maheady, Sacca, & Harper, 1988). For example, peer tutoring has been used to teach spelling to third and fourth graders (Delquadri, Greenwood, Stretton, & Hall, 1983; Maheady & Harper, 1987; Mallette, Harper, Maheady, & Dempsey, 1991); to teach reading, math, and spelling to students identified as at risk for academic failure (Greenwood *et al.*, 1984, 1987; Kohler & Greenwood, 1990); and to teach social studies to junior high students (Maheady, Harper, & Sacca, 1988).

Both cooperative learning and peer tutoring have been successful in increasing and maintaining high levels of academic performance for all students. In addition, cooperative learning groups and CWPT are strategies that require high levels of student

interactions, and therefore provide ample opportunity for students with and without disabilities to practice appropriate social skills.

For students with more severe disabilities, such as autism and retardation, research on integration strategies is much more restricted, both in the range of proven procedures and settings utilized in investigations. A strong case has been made for peer-involved procedures such as modeling, prompting, and cross-age tutoring (e.g., Charlop, Schreibman, & Tryon, 1983; Egel, Richman, & Koegel, 1981; Kamps, Locke, Delquadri, & Hall, 1989). In addition, various investigations have demonstrated peer strategies to be an appropriate vehicle for improving social skills and development. Carr and Darcy (1990), for example, used peer instruction and imitation training to improve play behaviors for students with severe autism. Others have demonstrated the effectiveness of peer- and teacher-directed training to increase social skills of students with autism as well as to improve peer acceptance (see Odom, McConnell, & McEvoy, 1992; Shores, 1987; Simpson, Smith-Myles, Sasso, & Kamps, 1991, for reviews). Procedures include (a) the use of multiple peer exemplars (Fox, Shores, Lindeman, & Strain, 1986); (b) peer initiation, prompting, and reinforcement strategies (Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Knapczyk, 1989; Odom, Chandler, Ostrosky, McConnell, & Reaney, 1992; Odom & Strain, 1986; Sasso, Hughes, Swanson, & Novak, 1987; Shafer, Egel, & Neef, 1984); and (c) group social games and affection activities (Brown, Ragland, & Fox, 1988; McEvoy, Twardosz, & Bishop, 1990).

Although the research to date on peer-mediated social strategies for students with autism and developmental disabilities has shown promising results in skill development and improved social interaction, a majority of the studies have been conducted in preschool and day-care environments (e.g., McEvoy *et al.*, 1990; Odom, Hoyson, Jamison, & Strain, 1985; Odom *et al.*, 1992). Other restrictions or limiting characteristics of academic and social investigations have included (a) the use of peers that are much older than the students with disabilities, (b) the use of "reverse mainstreaming"

(i.e., bringing the general education peers to the special education classrooms or isolated environments), or (c) significant modifications of the general education program or costly, intensive training for the students with disabilities (e.g., Almond, Rodgers, & Krug, 1979; Carr & Darcy, 1990; Egel et al., 1981; Haring, Breen, Pitts-Conway, Lee, & Gaylord-Ross, 1987; Kamps et al., 1989). Therefore, additional research is needed to determine the effects of peer-mediated strategies on academic and social skills of children with autism in integrated classroom settings.

One population of increasing interest regarding the use of peer-mediated strategies within inclusionary programs is the subgroup of high-functioning elementary-aged students with autism. This subgroup of children is often of normal intelligence and is able to function academically with minimal support. However, these children's lack of social competence often seriously interferes with their success in the general classroom. Dysfunctional social behaviors that interfere with their performance include a rigid adherence to structure and schedules; a general disinterest in others, especially peers; and perseveration on objects and/or topics (Autism Society of America, 1990). These characteristics suggest that high-functioning students with autism are prime candidates for programs designed to facilitate both academic and social functioning to ensure successful inclusion in general education classrooms.

The purpose of the present study was twofold: (a) to measure the effects of a CWPT program on the reading skills of 3 high-functioning students with autism and their general education classroom peers, and (b) to measure the effects of CWPT on the frequency and duration of social interactions that occurred during unstructured free time following CWPT. The present study extended a previous study in that 2 of the 3 students with autism served as subjects in both studies, and both studies involved implementation of a classwide intervention (Kamps, Leonard, Vernon, Dugan, & Delquadri, 1992). The earlier intervention consisted of a classwide social skills program, whereas the intervention in the present study was CWPT, an academic skills program that measured the direct effects on the

students' academic skills (reading) and the indirect effects on students' social interactions.

METHOD

Participants and Setting

Participants were 3 male students with autism and their peers who were enrolled full time in general education classrooms in three suburban elementary schools. The students with autism (Mike, Adam, and Pete) were considered to be high functioning, as indicated by intellectual capabilities, language skills, and academic performance, but were lacking in social skills (e.g., few interactions with peers, frequent periods of isolation, limited spontaneous speech, few initiations of conversation). Formal diagnosis of autism for each of the students was completed by psychiatrists or psychologists at area hospitals.

Mike was 8 years old, had a full-scale IQ score of 101, and performed at or above the second-grade reading level. He was placed in a split first/second-grade classroom with 11 students without disabilities, 1 student with behavior disorders, and 3 students with learning problems. Mike's language skills were appropriate in that he used complete sentences and would make spontaneous requests or comments; however, he often used rote or "canned" phrases to communicate and perseverated on inappropriate topics. When changes in routine occurred, Mike occasionally whined and complained in a loud, disruptive voice. During unstructured free time, he preferred to play independently, initiated limited numbers of interactions with peers, and frequently ignored peer initiations.

Adam was 8 years old and had a full-scale IQ of 71. He generally performed at the second-grade reading level, but he did have some difficulties in reading comprehension and task completion. Adam was placed in a second-grade classroom with 17 nondisabled students and 1 student with learning disabilities. Language characteristics included frequent initiations of irrelevant topics, with perseveration on the weather, dates, geography, and so forth. Adam displayed some appropriate social skills,

such as smiling and requesting to play with a variety of peers. He was popular with several students and typically responded to peer initiations; however, he spent more time alone than with peers during free-time activities and at recess.

Pete was 9 years old and was enrolled in a third-grade classroom with 19 typical peers and 2 students with learning disabilities. He performed at grade level on most academic tasks, but he was slow in making transitions. Pete responded to peer and adult initiations with brief, one- or two-word responses and limited eye contact. He preferred to spend time alone during groups and at recess, and when he interacted with peers it often occurred in a negative manner.

All students enrolled in each of the three classrooms participated along with the 3 students with autism in CWPT and the unstructured free-time activities. Academic and social skills performance data were collected for the 3 target students and 14 of their peers (5 females and 9 males, 4 to 5 from each class). Peers were selected from class rosters to demonstrate effects for children with learning disabilities (6 of the peers) and for typical classmates (8 peers selected by the teachers as average performers in reading).

All study sessions took place in the students' regular classrooms, with the experimenters and classroom teachers serving as peer tutoring monitors. Social and academic performance measures were collected by the experimenters.

Dependent Measures

Rate of words read correctly and reading errors. Immediately following peer tutoring, students independently read that session's reading passage for a 2-min timed reading. As the student read, the experimenter recorded reading errors, including substitutions, omissions, additions, and 4-s hesitations. No positive or corrective feedback was provided to the student during the timed reading. Number of words read correctly per minute was determined by totaling the number of words read correctly and dividing by two. Number of reading errors per minute was determined by totaling the number of errors and dividing by two.

Responses to reading comprehension questions. Immediately following each 2-min timed reading, the experimenter asked five comprehension questions (who, what, where, when, why), and the student responded orally. Questions were developed during the assessment by the experimenter, and thus may or may not have been practiced during tutoring. Accuracy of student responses to these questions was recorded, and percentage correct was determined.

Social interaction. Observations were conducted during unstructured free-time activities that occurred immediately after reading instruction to determine the frequency and duration of social interactions between peers. Data were collected using the Social Interaction Code developed by Niemeyer and McEvoy (1989) on NEC 8300® laptop computers using 5-min random samples. This code is a computerized system to record social interactions with variables consisting of initiations, responses, and duration of interactions. Initiations were defined as motor or vocal behavior (e.g., sharing, assisting, touching) that was clearly directed to a peer and that attempted to elicit a social response. Responses were defined as motor or vocal behavior that acknowledged an initiation within 3 s. Interactions were thus defined as reciprocal social behaviors that occurred as a result of an initiation-response sequence. Duration data were analyzed as (a) mean duration per condition, determined by dividing the total interaction time by the number of sessions per condition, and (b) mean length of interaction, determined by dividing total duration of interactions by frequency of interactions per condition.

Experimental Design and Conditions

A multiple baseline design across subjects with a reversal was used to determine the existence and extent of any differential effects of baseline reading instruction and CWPT on reading skills and social interaction.

Baseline. Reading instruction consisted of teacher-directed lessons using a basal reading series with individual variation in activities among the three classrooms. Activities such as vocabulary reviews, reading aloud by individual students, story starters,

workbooks, and independent reading were frequently used in each of the classrooms. Reading instruction in Mike's and Pete's classrooms occurred daily in three to five small groups determined by students' reading abilities. Adam and his peers participated daily in whole-class reading instruction.

Classwide peer tutoring. All students were trained for three 45-min sessions on CWPT procedures (see Greenwood, Delquadri, & Carta, 1988, for a complete program description). CWPT consisted of 25 to 30 min of peer-mediated instruction that occurred 3 to 4 days a week as a supplement to baseline reading instruction. Some activities that occurred during baseline reading instruction were eliminated to make available the time needed for CWPT (e.g., teacher-student discussion, reading aloud by individual students to the class).

Components of CWPT included reading of passages by students, feedback from peers for oral reading, correction of errors, and public posting (Greenwood et al., 1988). Specifically, each week, students were assigned a tutoring partner and were then assigned to either the red or blue tutoring team. During tutoring, the learner read for 8 to 10 min from the same reading materials used in baseline while the tutor scored points on a point sheet for correctly read sentences. The tutor also provided positive and corrective feedback to the learner as he or she read. The passages were sufficiently short so that they could be read at least twice during each tutoring session. Following reading with feedback, the tutor asked 3 min of comprehension questions (who, what, where, when, and why). Tutor-learner roles were reciprocal; thus, roles were reversed and the tutoring procedures repeated. Teachers monitored tutor-learner performances throughout the tutoring sessions and gave students bonus points on their point sheets for appropriate tutor-learner behaviors. At each session's end, students orally read scores to the teacher, who publicly posted and announced a "grand total."

Unstructured free-time groups. Immediately following reading instruction during baseline and tutoring conditions, students engaged in 15 to 20 min of social time. Three to five classroom areas were set up with activities selected by the teacher to promote social interactions (e.g., games, art pro-

jects, pantomime activities). Students chose areas in which to participate. Some general rules were announced to the class prior to free time (e.g., "be nice to your friends," "no more than 4 or 5 to a group," and "every student must join a group").

Reliability of Data

An independent observer recorded each student's performance on all dependent measures to determine agreement for number of words read correctly, errors, and number of correct and incorrect comprehension responses. Percentage of agreement was calculated by dividing the lower number of correct words and errors and correct comprehension questions from one recorder by the higher number noted by the second recorder and multiplying by 100%. Interobserver agreement measures were taken for 37% of timed reading assessments, resulting in an overall reading fluency mean agreement score of 99.5% across conditions and a mean agreement score of 96.1% on reading comprehension (range, 92.9% to 99.2%). For errors per minute, the mean agreement score was 83.9% (range, 79.4% to 88.4%).

Interobserver agreement using the same procedure was calculated for social interaction measures (i.e., percentage agreement for number of interactions, and total duration time and mean length of interactions for number of seconds) for 41% of unstructured free-time sessions. Agreement percentage for frequency of social interactions was 91.5% (range, 89.5% to 93.5%); for duration of social interaction it was 90.6% (range, 89% to 92.2%); and for mean length of interactions it was 85.7% (range, 85.4% to 85.9%).

RESULTS

Words Read Correctly and Errors Per Minute

Table 1 shows each student's mean number of words read correctly per minute per condition. CWPT produced an increase in reading rates for Mike, Adam, and Pete of 19, 31, and 12 words, respectively. A return to baseline resulted in a decrease in mean reading rates for Adam and Pete,

Table 1
Mean Number of Words Read Correctly per Minute

Student	Baseline	CWPT1	Baseline	CWPT2
Mike	106	125	124	132
P1 ^a	61	86	75	97 ^b
P2	49	71	71	93 ^b
P3	74	77	82	85
P4	118	137	123	115
Adam	96	127	104	122
P5	36	55	43	59 ^b
P6	90	105	102	108
P7	45	85	79	96
P8	50	69	67	81 ^b
P9	113	125	115	133
Pete	117	129	107	128
P10	65	86	58	96 ^b
P11	68	81	55	— ^b
P12	126	143	144	166
P13	144	181	177	186
P14	183	161	164	177

^a P = performance of regular classroom peers.

^b Peers with learning disabilities.

whereas Mike maintained his improved performance. Mean reading rates increased for all 3 students when CWPT was reinstated. Initial implementation of CWPT resulted in a decrease in the mean number of errors per minute for Mike (Baseline 1, six; CWPT 1, two), with maintenance of improved performance throughout the remaining two conditions (Baseline 2, three; CWPT 2, two). Adam maintained a mean of three errors per minute, and Pete had a mean of two to three errors per minute throughout all phases of the study.

Reading rates for 13 of 14 peers increased with initial implementation of CWPT by an average of 20 more words read correctly per minute (range across students, 12 to 40). One peer had a drop in reading rate with CWPT (from 183 to 161 words per minute), but continued to be one of the most fluent readers in his classroom. A small majority of peers maintained an increased reading rate during a return to baseline. When CWPT was reinstated, most peers' mean reading rates increased to levels higher than in any prior phase. As a group, the mean number of errors per minute during initial baseline was 2.6 (range across students, 1 to 4) with a reduction in mean errors to 1.7 (range, 0 to 5) when CWPT was implemented. Individually,

a decrease in the mean number of errors per minute was observed during initial CWPT for 8 of 14 students, with 4 students making the identical number of errors and 2 students making more errors. With a return to baseline, the group made 2.9 errors per minute (range, 1 to 6), and the final CWPT phase resulted in an overall mean of 2.2 errors per minute (range, 0 to 5).

Reading Comprehension

Figure 1 shows Mike's, Adam's, and Pete's performances on reading comprehension questions taken during individual assessments (see Method). Implementation of CWPT resulted in superior performances for Mike, Adam, and Pete from baseline performances of 47%, 24%, and 67% to initial CWPT performances of 76%, 68%, and 90%, respectively. A return to baseline resulted in a decrease in mean performance to 50% correct responses for both Mike and Adam. Pete maintained a high percentage of correct responses (93%) during a return to baseline. Improved performances were again observed during CWPT 2, with Mike, Adam, and Pete averaging 85%, 85%, and 100% correct, respectively.

As shown in Table 2, initial implementation of CWPT resulted in a higher mean percentage correct for 13 of 14 peers. One peer averaged 80% to 100% correct on reading comprehension questions across all conditions. With a return to baseline, a decrease in the mean percentage correct was observed for 9 of 14 peers. Eleven of 13 peers' performances during CWPT 2 were improved over prior baseline performances, with 2 peers maintaining 90% to 100% correct.

Total Duration of Interactions

Figure 2 shows the total duration of social interactions during unstructured free time for Mike, Adam, and Pete. CWPT produced higher mean social interaction times for all 3 students. The baseline duration means per 5-min sample (300 s) for Mike, Adam, and Pete were 50 s, 40 s, and 25 s, respectively. Social interaction time averaged 144 s, 120 s, and 145 s during CWPT 1. A return to baseline resulted in a decrease in mean social in-

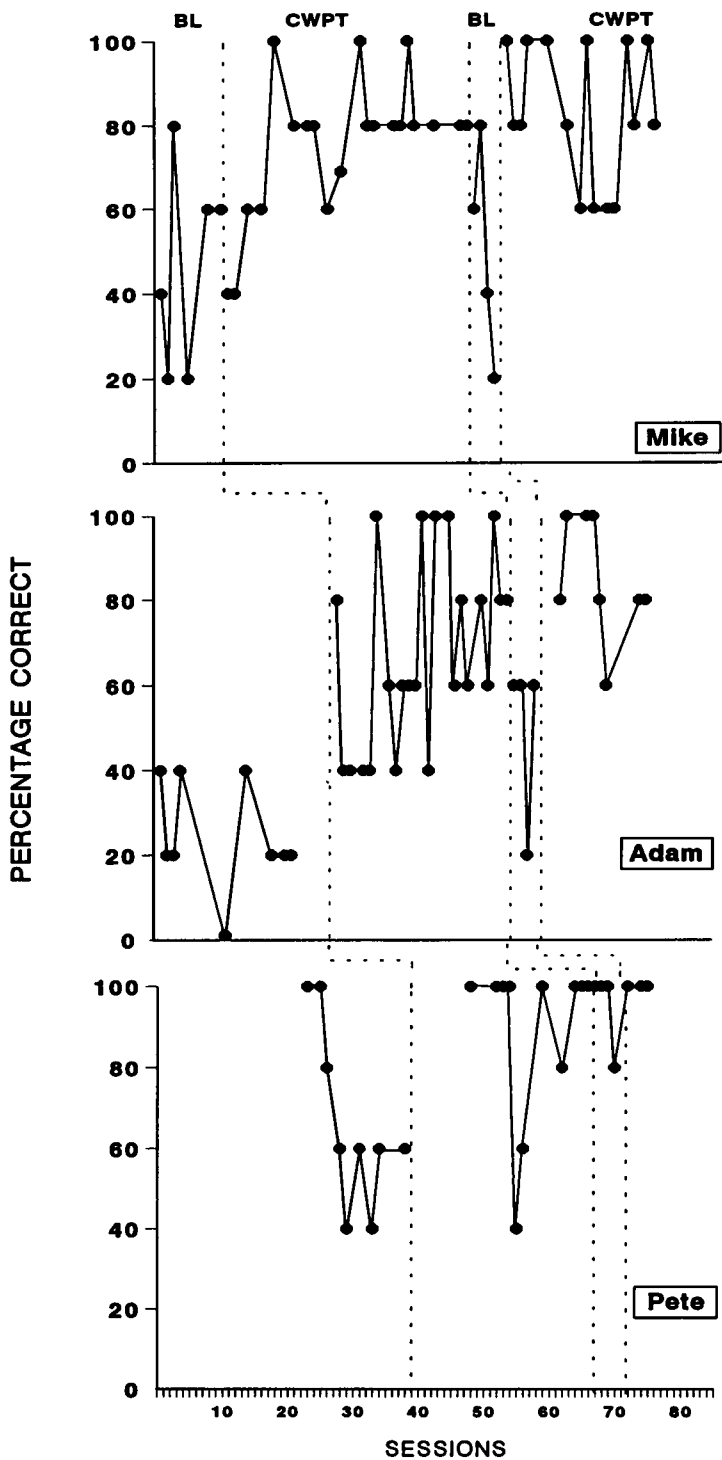


Figure 1. Percentage correct comprehension questions following peer tutoring for the 3 students with autism.

Table 2
Mean Percentage Correct on Reading Comprehension Questions

Student	Baseline	CWPT1	Baseline	CWPT2
Mike	47	76	50	83
P1 ^a	66	94	70	88 ^b
P2	68	86	95	98 ^b
P3	73	87	60	92
P4	80	93	100	90
Adam	24	68	50	85
P5	60	90	60	91 ^b
P6	85	99	87	100
P7	80	97	90	98
P8	80	91	80	100 ^b
P9	78	97	75	90
Pete	67	90	93	100
P10	82	95	100	100 ^b
P11	78	84	80	— ^b
P12	69	93	100	100
P13	66	100	90	90
P14	100	90	80	100

^a P = performance of regular classroom peers.

^b Peers with learning disabilities.

teraction time for all 3 students (46 s, 59 s, and 41 s), whereas social interaction time during CWPT 2 increased to 203 s, 157 s, and 138 s, respectively.

Implementation of CWPT produced increases in mean social interaction time for 11 of 12 peers. On the average, this increase in mean interaction time from Baseline 1 to CWPT 1 was 92.9 s (range of increase across students, 27 s to 175 s). A return to baseline resulted in an overall decrease of 54.6 s (range of decrease across students, 3 s to 92 s) in mean social interaction time for 9 of 13 peers. Three peers increased interaction time (14 s to 48 s) during Baseline 2. There was an increase in mean social interaction time for all peers during CWPT 2, with a mean increase of 58.5 s (range of increase across students, 3 s to 172 s).

Mean Length of Interaction

CWPT resulted in an increase in mean length of interaction (MLI) over initial baseline levels for Mike, Adam, and Pete, with increases of 48 s, 17 s, and 23 s, respectively. A decrease in MLI was observed for all 3 students upon return to baseline, with decreases of 42 s, 17 s, and 31 s, respectively, followed by a subsequent increase when CWPT

was reinstated, with increases of 65 s, 33 s, and 17 s, respectively.

Overall, CWPT resulted in an increase in MLI for peers. Specifically, a mean increase of 38.3 s was observed for 11 students from baseline to initial CWPT (range of increase across peers, 14 s to 106 s). With CWPT 1, 2 peers decreased the average length of interactions (6 s and 14 s). A decrease in MLI was observed for 9 peers with a return to baseline (mean decrease = 29.6 s; range, 8 s to 105 s), and 3 peers had an increase in MLI. An increase in MLI was observed in 11 peers during CWPT 2 (mean increase = 57.7 s; range, 2 s to 220 s), with a decrease in MLI of 11 s for 1 peer.

DISCUSSION

These findings indicated that classwide peer tutoring was an effective and efficient strategy for increasing the academic achievement and social interactions of students with autism and their non-disabled peers. Specifically, CWPT positively affected academic achievement for the majority of students by increasing reading fluency (rate of words read correctly) and correct responses to reading comprehension questions. Mixed results, however, were noted for error rates across conditions. An additional positive finding was that the occurrence of CWPT appeared to influence students socially by increasing the duration of social interaction time during unstructured free-time activities immediately following sessions.

Students were generally favorable regarding the use of CWPT based on follow-up interviews. Mike indicated that he liked tutoring and that he would like to participate in CWPT again. He enjoyed being tutored and earning points from his peers and bonus points from his teacher. He stated that CWPT improved his comprehension skills and helped him get along better with his peers. Pete indicated that CWPT did not improve his reading skills or teach him how to get along better with his peers. He did, however, indicate that he had fun when he was tutored and that he liked earning points. No survey data are available on Adam. When reviewing peer survey data, 69% stated that

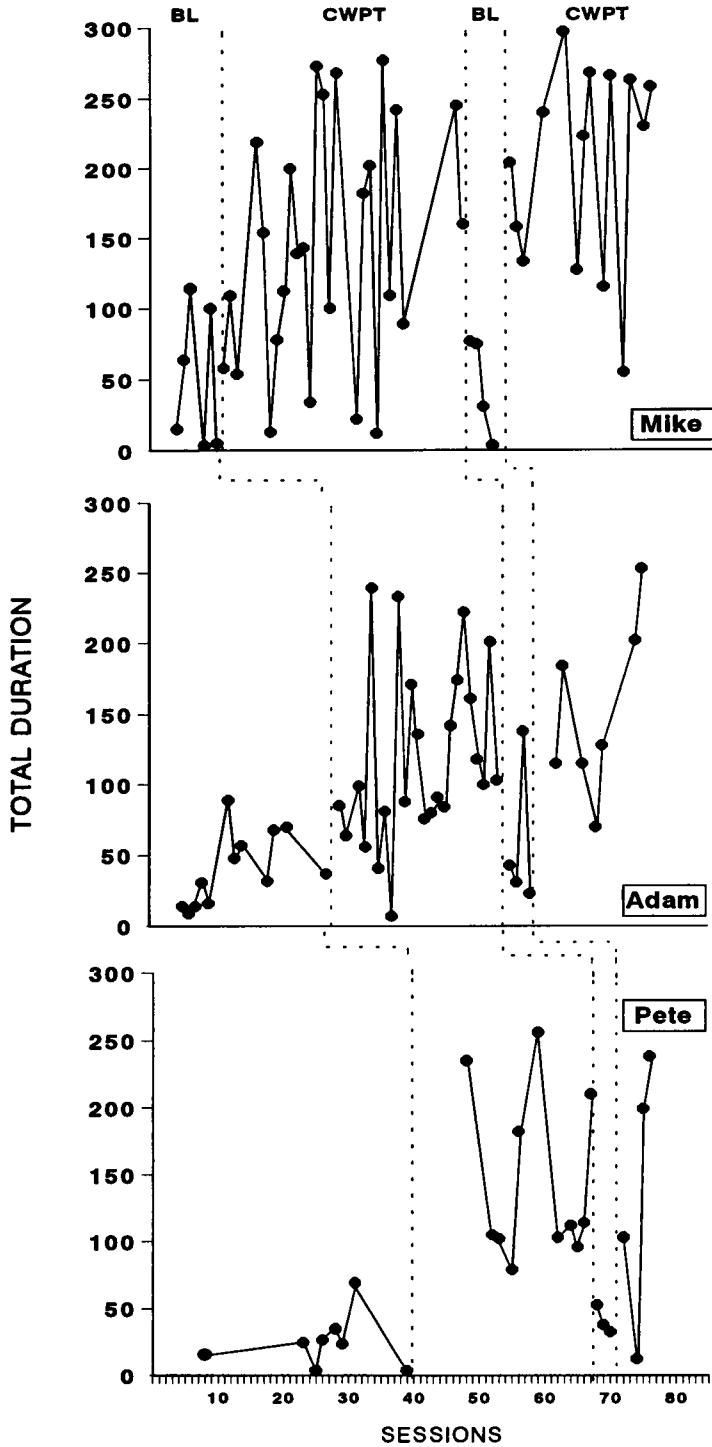


Figure 2. Total duration (seconds) of social interaction during free-play sessions following peer-tutoring sessions for the 3 target students.

they liked being tutored a lot; 25% indicated that they liked it somewhat. Peers also reported that CWPT promoted reading fluency and comprehension skills. Eighty-eight percent of the peers indicated that CWPT helped them get along better with their peers, and that they would participate again.

During interviews, each of the three classroom teachers "strongly agreed" that CWPT was easily implemented, that students with autism and their regular classroom peers benefited academically and socially from the program, and that students enjoyed earning tutoring points. Mike's teacher rated his and his peers' tutoring performance as very good to excellent. Adam was viewed by his teacher as a good tutor, although she indicated that he was poor at correcting his partner's reading errors. Pete was rated by his teacher as a fair tutor. Both Adam's and Pete's peers were rated excellent on all tutoring responsibilities.

These results and anecdotal reports extend the current research in a number of ways. First, the study replicates previous research that has documented CWPT as an effective peer-mediated strategy for enhancing academic achievement. More important, however, is the demonstration of the indirect effects CWPT had on improving social interactions during the unstructured free time following tutoring. Hence, the study suggests that a highly interactive academic intervention can serve two purposes; that is, a positive academic and a positive social outcome. The opportunity to interact and actual increases in social interaction are especially important for students with autism who often have limited interactions with their peers.

The present study also provides follow-up social interaction data for 2 of the students with autism. CWPT resulted in increases in the duration of social interactions for Mike and Adam, similar to the increases that resulted from social skills training (Kamps *et al.*, 1992). Thus, treatment effects were similar in both studies, lending support to the notion that social skills training and CWPT may be equally effective in producing increases in social interactions for students with autism. Given that CWPT followed social skills training, however,

possible sequencing or compounding effects must be considered. It may be less likely that sequence effects played a significant role, given that CWPT resulted in increases in social interactions for 1 student (Pete) who did not participate in the social skills training. A second related point is that the initial baseline durations of social interactions were higher for both Mike and Adam in the present study than in the prior study. These data suggest that the effects of the social skills intervention from the previous year were maintained somewhat for Mike and Adam, yet had decreased from the levels seen during the follow-up probes (Kamps *et al.*, 1992). The slightly increasing baseline trend for Adam raises a concern that grouping itself (2 to 4 peers) may have facilitated some of the increase in interaction time. Further, the decrease during reversal conditions in the present study suggests a need for ongoing programming, generalization strategies, and a variety of interventions to address the social competencies of children with autism, including those fully integrated in general education settings. The findings of this study further suggest that teachers need to continue to address social goals for students, in much the same way as they do for academic content areas such as math, reading, and science. That is, ongoing programming builds from one skill to the next in a cumulative fashion, with students benefiting from repeated practice as they add to their repertoire of social skills and competence. CWPT offers an additional strategy to accomplish this.

In sum, these findings suggest that CWPT was an effective strategy for increasing the academic and social skills of students with autism and their regular education peers within their elementary school classroom. The peer-tutoring program improved reading skills for most students and was easily adaptable to the regular classroom routine. This supports previous findings in the use of peer-mediated strategies to increase academic performance within heterogeneous classroom environments (e.g., Barbetta *et al.*, 1990; Greenwood *et al.*, 1987; Johnson *et al.*, 1990), with additional collateral social benefits (Eiserman, 1988; Kohler & Greenwood, 1990; Polirstok & Greer, 1986). Of utmost

importance, the study adds to the growing body of literature that supports continued opportunities for peer interactions and programmed activities within integrated environments to promote social acceptance by typical peers and general education personnel (Guralnick & Groom, 1988; Haring et al., 1987; Sailor et al., 1989).

Limitations of the study include the small number of target students, minimal effects for some peers, and few data points in the second baseline condition. Although an experimenter was present to monitor quality in the majority of tutoring sessions, no data were collected for treatment fidelity or to record specific teacher prompts. Thus, additional measurement and analyses of the nature of interaction and specific contextual variables during academic and social sessions are warranted to address remaining questions. For example, what variables of CWPT (e.g., points earned, praise for tutoring interactions, length of sessions) contribute to increased interaction following sessions? Do prior sustained, structured interactions establish momentum of interactions in the subsequent activity? Is reading to a peer a facilitative behavior, particularly when reading is a preferred activity (or at least a successful, rote behavior) for many students with autism? Further, would the results be different for lower functioning students with autism who are less stimulated by academic materials? What other setting events are influential (e.g., schedule changes, transition-time prompts, free-time materials, peer characteristics)?

Future research should concentrate on these issues in examining the quality of interactions, extending the social repertoires, and promoting the maintenance and generalization of social interactions throughout the school day. Additional studies are necessary to determine the effects of highly interactive academic interventions on both the academic and social outcomes for students with disabilities and their peers.

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