The Effects of Implementing a Classwide Peer Tutoring Model on Social Approvals and Disapprovals Emitted During Unstructured Free Time

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Abstract

This study tested a classwide peer tutoring model using rule-governed responding to teach tutors to accurately present learn units during social studies instruction using a multiple baseline across participants with pre and post intervention probes. Three students, aged 8 to 10, in a self-contained 3rd/4th grade CABAS® classroom participated in this study to test the effects of peer tutoring on the social interactions of the students during unstructured free time and accurate implementation of learn units during tutoring. The results showed an increase in social approvals and accurate learn unit presentations and a decrease in social disapprovals after the introduction of rule-governed peer tutoring. Additionally, the results showed a classwide (and individual participant) increase in social approvals and a decrease in social disapprovals during unstructured free time.
Keywords: Classwide peer tutoring, Learn units, Teacher Performance Rate and Accuracy (TPRA).

Classwide peer tutoring is an instructional tactic where peers function as each others teachers to teach academic and social behaviors. Each student in a tutor-tutee pair gets an opportunity to function as tutor and tutee. Peer tutoring is easy to implement and "permits the efficient application of the teacher's and peer tutor's skills in the process of individualizing instruction and managing students' classroom behavior" (Kohler & Greenwood, 1990, p.307). Classwide peer tutoring uses peer-mediated contingencies and teacher feedback to increase opportunities to respond by allowing peers to teach each other (Delquadri, Greenwood, Whorton, Carta & Hall, 1986).

Tutors are trained to accurately present learn units. Learn units are the foundation of learning and are the initial tactic for most teaching. The learn unit consists of interlocking three-term contingencies between teacher and student (Greer, 2002). During peer tutoring learn units consist of at least two three-term contingencies for the tutor and one potential three-term contingency for the tutee. The student's potential three-term contingency consists of an antecedent, a behavior and a consequence. The tutor is taught to appropriately present antecedents, record correct and incorrect responses and deliver appropriate consequences. These consequences involve delivering verbal approvals for tutees correct responses and participating in a correction for tutees incorrect responses. No disapprovals are given for incorrect responses, because "disapprovals function as attention for undesirable behavior and interfere with the development of positive classroom practices" (Singer-Dudek & Keohane, in press).

One method to teach tutors accurate peer tutoring is using rule-governed responding. Rule-governed behavior is behavior that is controlled by verbal rather than nonverbal contingencies (Greer, 2002). A term that expands on Skinner's (1957) rule-governed behavior is verbal mediation. "Verbal behavior that governs or guides nonverbal behavior in lieu of the natural contingencies is an incidence of behavior under the control of verbal mediation…Individuals performing a series of operations under verbal mediation can perform those operations without having ever experienced the direct contingencies" (Greer, 2002, p.353). Studies have shown that rule governed responding increases correct responding (Marsico, 1998; Singer, 2000; Taylor & O'Reilly, 1997). Marsico (1998) implemented rule governed responding with

6 students by giving them scripts that contained the steps to correctly solve long division and multiplication problems. The results showed an increase in the amount of time the student spent working independently without seeking help or stopping for all 6 students. The rates of correct responses also increased across all participants during the intervention phase.

To insure accuracy of rule-governed responding, an observer records the tutor's behavior using the Teacher Performance Rate and Accuracy (TPRA) data sheet (Ingham & Greer, 1992). The TPRA is used to collect data on the accuracy of learn unit presentations by the teacher. It is a way to evaluate teacher behavior, whether evaluating an actual teacher or a tutor in a peer tutoring pair. Research shows that the TPRA increases teacher effectiveness and as a result increases the student or tutee's rate of correct responding (Ingham & Greer, 1992).

Prior research reported that peer tutoring is an effective method to increase the academic achievement of both the tutee and tutor [Greer & Polirstok, 1982; Greenwood, Dinwiddle, Terry, Wade, Stanley, Thibadeau, & Delquadri, 1984; Scruggs, Mastropieri & Richter, 1985; Delquadri et al., 1986; Dineen, Clark & Risley, 1977; Greer, et al. 2004]. In a series of experiments, Greer (2004) identified the key components of effective tutoring as high levels of engaged academic time, an increase in opportunities to respond and most importantly the presence of the learn unit (p.296). All of these components are also present during accurate peer tutoring, thus making peer tutoring a highly effective method of instruction. Most importantly the presence of the learn unit during peer tutoring can result in the acquisition of new materials by the tutee, tutor and, if present, an observer.

Greer and Polirstok (1982) also identified that "teaching (students) to use social reinforcement techniques for tutees on-task behavior might have the potential for developing new social behaviors for tutors" (p.123-124). Their study explored the effects of peer tutoring in a remedial reading program for adolescents. In their study, they collected data for the reading responses of tutees, tutor on-task behavior, tutor reading scores and tutor-to-tutee social reinforcement for low achieving students in 7th thru 9th grade. During intervention, tutors were given tokens for contingent approvals during peer tutoring sessions. In addition to increases in on-task behaviors and reading scores for both the tutor and the tutee, there was a significant increase in the number of social approvals emitted. The data showed that training tutors and delivering positive reinforcement to tutors results in an increase in the use of social approvals by the tutors (Greer & Polirstok, 1982). In a replication of this study, Polirstok and Greer (1986) found significant increases in the number of social approvals and decreases in the number of disapprovals emitted for four 9th grade low achieving students when tokens were implemented with peer tutoring.

These social interactions were identified by Greer and Polirstok (1982) as collateral behaviors of peer tutoring. Collateral behaviors are behaviors that are topographically different from the target behavior. The target behavior in the case of peer tutoring is increasing the tutees correct responding. Both the increase in tutor's academic achievement and the increase in social approvals by tutors are collateral behaviors of peer tutoring.

Kohler and Greenwood (1990), who implemented classwide peer tutoring with 3rd and 4th graders, found that peer tutoring procedures, compared to teacher-mediated instruction, "increased the opportunities for appropriate social interactions among peers" (p.307). Similarly, Blake, Wang, Cartledge and Gardner (2000) identified an increase in social approvals as a result of peer-directed instruction as opposed to teacher-directed instruction. Scruggs, Mastropieri and Richter (1985) reported that during peer tutoring, positive interactions between tutor and tutee increased, while negative social interactions between tutor and tutee decreased. Kamps, Barbetta, Leonard and Delquadri (1994) also identified an increase in social interactions during unstructured free time.

This study implemented a classwide peer tutoring model during the social studies period in a self-contained 3rd/4th grade CABAS® classroom to test the effects of peer tutoring on the social interactions of the students during unstructured free time.

Method

Participants

The classroom consisted of 8 third and fourth grade students. Three students participated in this study. Participant A was an 8-year-old female with reader/writer repertoires. Participant B was an 8-year-old male reader-writer and Participant C was an 8-year-old female reader-writer. These three participants were chosen because they had emitted high rates of disapprovals and/or low rates of approvals during baseline. Table 1 displays information about the participants. All 8 students in the classroom participated in Classwide Peer Tutoring. The other students were 8 to 10 years old and all students had a diagnosis of a learning or developmental disability.

Table 1

Information about Participants A, B and C

	Participant A	Participant B	Participant C
Age/Gender	9-year-old female	8-year-old male	8-year-old female
Level of Verbal Behavior	Listener/Speaker	Reader/Writer	Reader/Writer
Capabilities	Listener Capabilities Self-Monitoring	Listener Capabilities Self-Monitoring Full Naming	Listener Capabilities Self-Monitoring Full Naming
Grade	4th grade	3rd grade	4th grade
Functioning Grade Level	Kindergarten/ 1st grade	3rd grade	3rd grade Reading 1st grade Math
Test Scores: Full Scale IQ	Stanford Binet Intelligence Scale: 60	Wechsler Preschool & Primary Scales of Intelligence: 83	Wechsler Intelligence Scale for Children: 65

The classroom teacher and two teaching assistants functioned as observers during unstructured free time, implemented rule-governed responding to teach the tutors how to peer tutor during social studies and also conducted Teacher Performance Rate/Accuracy Observations (TPRAs) (Ingham & Greer, 1992) of the tutors during all phases of peer tutoring.

Setting

The setting was a self-contained CABAS® classroom in a public elementary school just outside a large metropolitan area. The classroom was carpeted and divided into a main instructional area, a specials area with a long table and a variety of 3-5 student sized blue metal chairs, a play area, a small computer area and an area for 2 teacher desks and 3 teacher chairs. The instructional area had a blackboard with 8 student desks each with its own student sized metal chairs set up in 3 rows (3 desks in the first 2 rows and 2 desks in the last row). The play area was carpeted with a bookshelf with books, a doll house, a tool play set, a box with crystals, a box with animals and other miscellaneous small toys like trains and trucks.

The materials used during peer tutoring were sets of 5 index cards with social studies questions about Geography and the state of New York. Each index card had a question on one side and the answer on the other side. The questions were based on the New York State 3rd and 4th grade Social Studies Standards. Each student had their own chair at all times during peer tutoring and an observer sat on either a teachers chair or a student chair close enough to the tutoring pair to be able to observe and record the tutor and tutees behavior using a TPRA (and reinforce or correct the tutor when appropriate). The tutor was given a written checklist that described to them how to collect data on the tutee's behavior (correct or incorrect response), as well as their own behavior (presenting an accurate antecedent and appropriately reinforcing or correcting the tutee's response). Figure 1 shows an example of the rule governed checklist used to teach accurate peer tutoring.

Did I hold up the coin quietly? OR Did I ask the question nicely?	Did my friend get it right or wrong?	If they got it right, did I say good job? If they got it wrong, did I tell them the answer and they tell me the answer back?

*Figure 1.*Figure 1 shows the rule governed checklist used during the intervention phase to teach the tutors accurate peer tutoring.

During unstructured free time, students were required to stay in the free-time area and observers recorded the students behaviors from either a teacher chair or a student chair placed close enough to the play area to be able to observe all students, while at the same time enough avoiding interference with the students' free time activities.

Dependent and Independent Variables

The independent variable was the implementation of peer tutoring as a tactic to teach social studies. The experimenters taught peer tutoring through the implementation of rule-governed responding (i.e., a written checklist). The experimenter provided verbal instructions and the rules at the start of each session. The students were given the peer tutoring rules, and the experimenters faded out the rules systematically so the participants independently functioned as a peer tutors (Figure 2). The experimenters sat with the peer tutoring dyad and provided immediate feedback to the tutor for correct and incorrect implementation of learn units. Criterion was set at 90% correct responding for 2 consecutive sessions.

Peer Tutoring Rules

1. **Hold up the card so that your friend can see the question and you can see the answer.**
2. **Read the question to your friend and listen to their response.**
3. **Write down a "+" if they get it right.**
   Write down a "-"if they get it wrong.
4. **If your friend got it right, say good job, great, nice work, etc.**
   If your friend got it wrong, tell them the correct answer and wait for them to repeat it.

Figure 2. Figure 2 shows the peer tutoring rules.

The dependent variables were social approvals and social disapprovals during peer tutoring sessions and unstructured free time. A social approval was defined as a positive vocalization and reinforcement directed to the tutee during peer tutoring sessions and a positive vocalization directed to peers during unstructured free time. Vocalizations during unstructured free time included statements like, 'yes, sure,' 'thanks!' and 'you can play with this one.' A social disapproval was defined as a negative vocalization during peer tutoring and during unstructured free time. Examples include 'No!' 'You're wrong,' 'Hey, I'm playing with that,' 'He can play, but you can't.'

Data Collection Procedure

Data were collected for the daily responses of tutees, learn unit presentation of tutors, tutors' approvals and disapprovals of tutees during tutoring sessions, and approvals and disapprovals during free-play time. Daily responses of tutees were recorded by the tutors on their data sheets and by observers on TPRA forms as the tutee pairs peer tutored each other. The tutors recorded a plus (+) for a correct response and a minus (-) for each incorrect response. Learn unit presentation of tutors and tutors approvals and disapprovals were also recorded on TPRA forms while the pairs peer tutored each other. An accurate learn unit presentation was recorded with a check for accurate presentation of the antecedent. Accurate recording of the response was recorded with a plus (+) for a correct tutee response or a minus (-) for an incorrect tutee response. The appropriate consequence was recorded as an R if reinforcement was appropriate and a C if a correction was given and the tutee participated in the correction procedure. Any incorrect steps were identified by circling the check, +/- or R/C.

During unstructured free time data were collected on the frequency of approvals and disapprovals during 10-minute sessions. Each observer collected data for each individual student on approval/disapprovals data sheet. At the end of each 10-minute session the total number of approvals and disapprovals was calculated. Pre-probe data were collected before the onset of peer tutoring and post-probe data were collected once all students in the classroom had met criterion on peer tutoring.

Experimental Design

The study used a multiple baseline design across participants during peer tutoring and a pre-probe/post-probe design for approvals and disapprovals during unstructured free time. During the pre-probe sessions, data were taken on the number of approvals and disapprovals for each participant and classwide during unstructured free time. The intervention phase was rule governed responding to teach accurate peer tutoring which was implemented using a multiple baseline design across participants. Then during the post-probe data were once again collected on the number of approvals and disapprovals for each participant and classwide during unstructured free time.

Procedure

Pre-probe data were collected on the number of social approvals and disapprovals during 10-minute free play sessions. The students were all in the play area and the observers sat within 5 feet of the students. The students interacted independently with one another and had limited or no interaction with the teachers during this time. If a student left the designated free time area, they were redirected by the teacher, but no other feedback was given.

During peer tutoring, phase 1 for all participants was the baseline phase. During baseline, participants were split into tutor-tutee pairs with the social studies materials. The experimenters gave the tutor-tutee pairs instructions to teach each other, but did not provide any additional feedback. Data were collected by observers on accurate learn unit presentations and the number of approvals and disapprovals emitted by participants.

The second phase shows the introduction of rule-governed peer tutoring measured in 60 learn unit blocks. An experimenter sat with the peer tutoring dyad. The experimenter provided the tutor with rules at the start of each session. The experimenter gave the tutor the written checklist (Figure 1) and reviewed the self-monitoring checklist with the tutor. Observers reinforced tutors for appropriate behavior and provided the tutor with immediate feedback. During each learn unit presentation for the tutee, the experimenter recorded the tutors learn units for accurate peer tutoring. Each presentation consisted of 3 learn units for the tutor: one for accurate presentation of the antecedent, one for accurately recording the tutee's response and one for accurately providing consequences for the tutee's response. Data were also collected on the tutees responses and the number of approvals and disapprovals emitted by the participants.

In phase 3, the rules and checklist were removed and data were collected in 20 learn unit blocks instead of 60 learn unit blocks. Each learn unit presentation for the tutee was one learn unit presentation for the tutor. Therefore, the size of the response for the tutor increased after meeting criterion with the rules. Criterion was set at 90% accurate peer tutoring for 2 consecutive sessions. Decisions were made according to the CABAS® Decision Protocol (Greer, 2001) and instructional tactics were implemented for two of the participants to teach them to mastery. After the students met criterion as tutors on independent accurate peer tutoring, the post-probes for collateral effects was conducted in the same manner as pre-probe sessions.

Interobserver Agreement

Data were collected independently by the teacher and teaching assistants in the classroom. Interobserver agreement was calculated by dividing the number of agreements by the number of agreements and disagreement and multiplying by 100%. Play area pre-probe interobserver agreement data were taken for 100% of sessions with a mean interobserver agreement of 81% and a range of 50%-94%. During peer

tutoring, the observer TPRA functioned as observer agreement with tutor's data. During the play area post-probe interobserver agreement was taken for 40% of the sessions with a mean of 95% and range 94%-96%.

Results

Figure 3 shows the results of implementing rule-governed responding to teach accurate peer tutoring during social studies for the three participants during social studies. Both participant A and B have an extra phase. Participant A's phase 3 indicates a change in the form used by the tutor. Participant B's phase 4 indicates the introduction of prompt fading as the rules were re-introduced and faded out after 5 correct LU presentations.

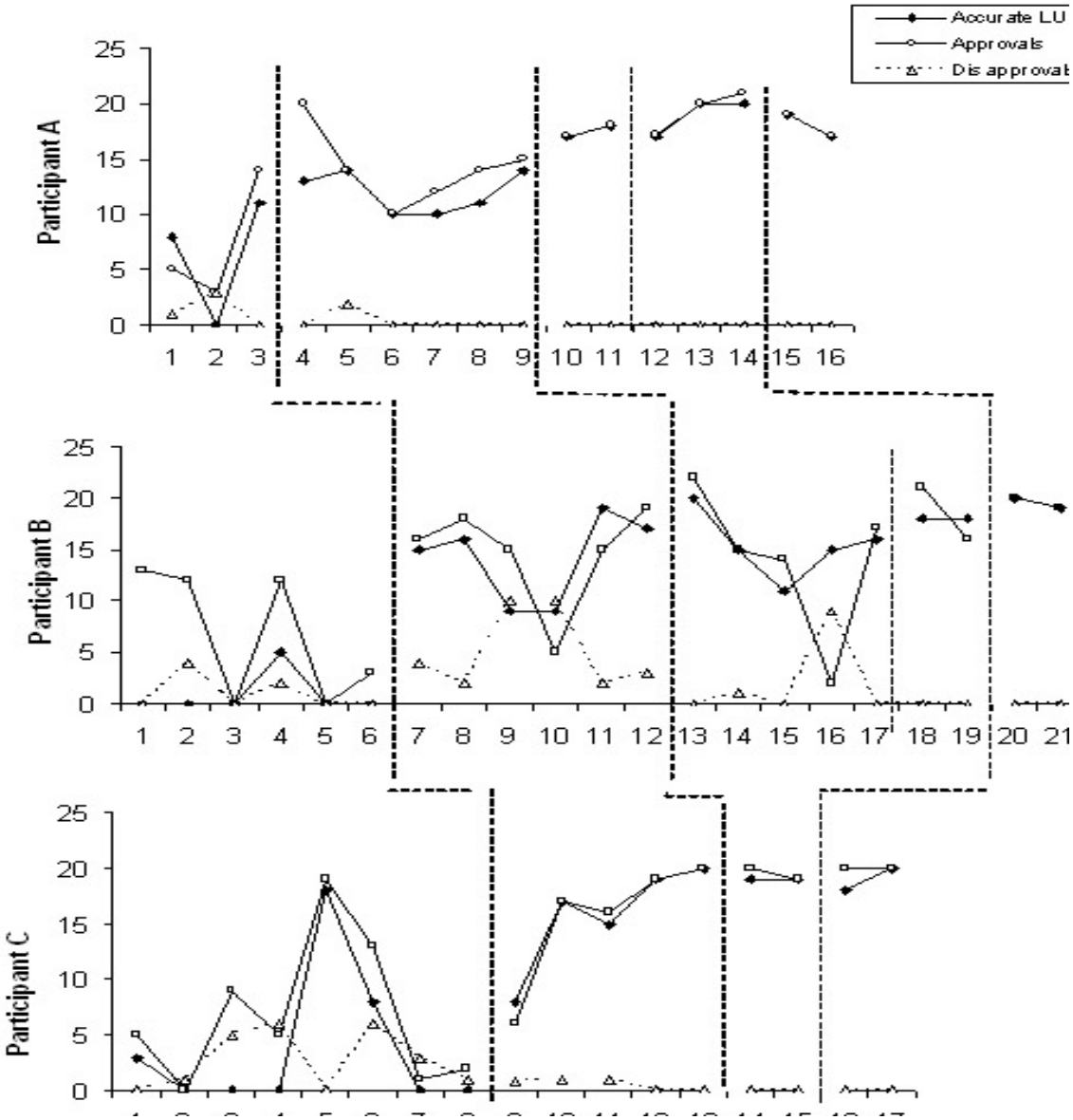

Figure 3. Figure 3 shows the peer tutoring data for Participants A, B and C when functioning as the tutor in a tutor-tutee pair.

During peer tutoring sessions, participant A had a mean number of 6 accurately presented learn units, a mean number of 7 approvals and a mean number of 1.3 disapprovals during baseline. The mean

number of disapprovals decreased to a final mean of 0, the number of approvals and accurate learn unit presentations increased to a final average of 18 each. For participant B, the mean number of accurately presented learn units during baseline was 0.8, the mean number of approvals was 8.2 and the mean number of disapprovals was 1. Disapprovals for participant B also decreased to a mean of 0, mean number of accurately presented learn units and mean number of approvals increased to 19.5. Participant C's mean number of accurate learn unit presentations during baseline was 4.8, mean number of approvals was 6.8 and mean disapprovals were 2.8. Participant C's disapprovals also decreased to a mean of 0, accurate learn unit presentation increased to a mean of 19 and approvals increased to a mean of 20. These data are displayed in Figure 3.

Figure 4 shows the approval and disapproval data that were collected during the pre- and post-probes. Participant A had a mean number of approvals of 0.8 with a range of 0-2 and a mean number of disapprovals of 0.33 with a range of 0-3. Participant B had a mean number of approvals of 0.5 with a range of 0-1. Mean disapprovals for Participant B were 1.5 with a range of 0-5. Participant C's mean number of approvals was 1 with a range of 0-4 and disapprovals were 0.5 with a range of 0-2.

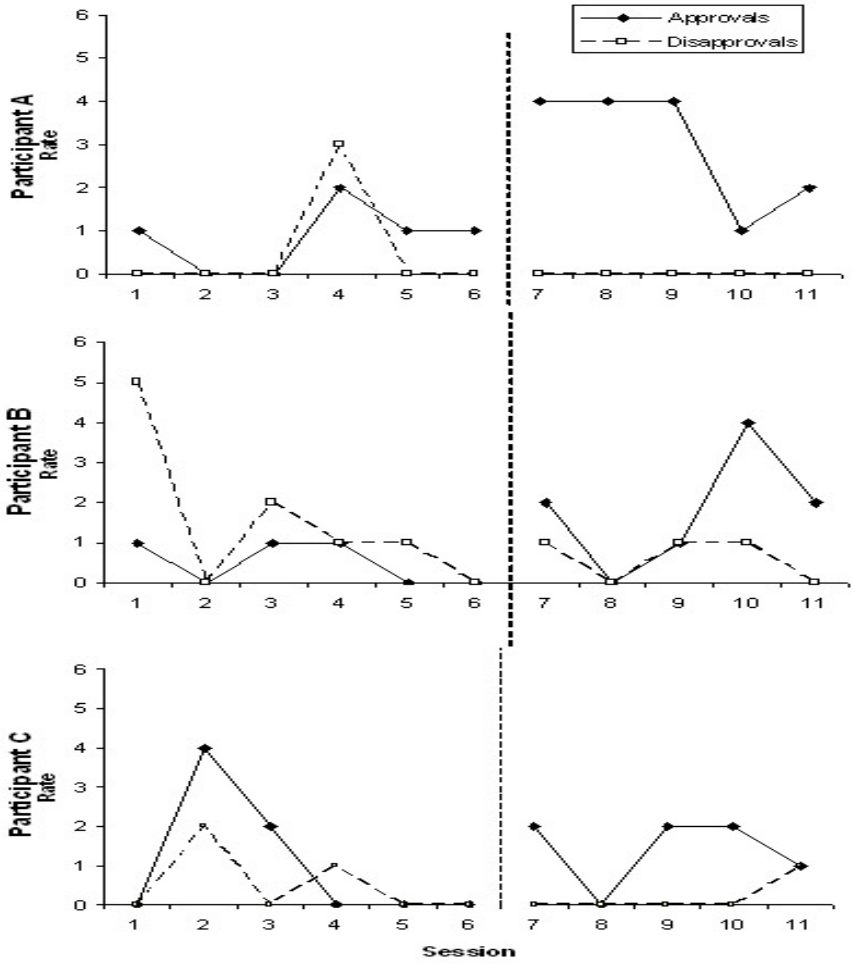

*Figure 4.*Figure 4 shows the unstructured free time social approval and disapprovals data for Participants A, B and C.

After the participants mastered peer tutoring, the mean number of disapprovals dropped and the mean number of approvals increased for all participants. Participant A had a mean number of approvals of 3 with a range of 1-4 and a mean number of disapprovals of 0. Participant B had a mean number of approvals

of 1.8 with a range of 0-4. Mean disapprovals for Participant B were 0.6 with a range of 0-1. Participant C's mean number of approvals was 1.2 with a range of 0-2 and disapprovals were 0.2 with a range of 0-1.

Classwide social approval and disapproval data also showed an overall increase in approvals and decrease in disapprovals (Figure 5). The mean number of approvals during the pre-probe was 4.8 and the mean number of disapprovals was 6.8. The post-probe showed the mean number of approvals at 14 and the mean number of disapprovals at 5.8.

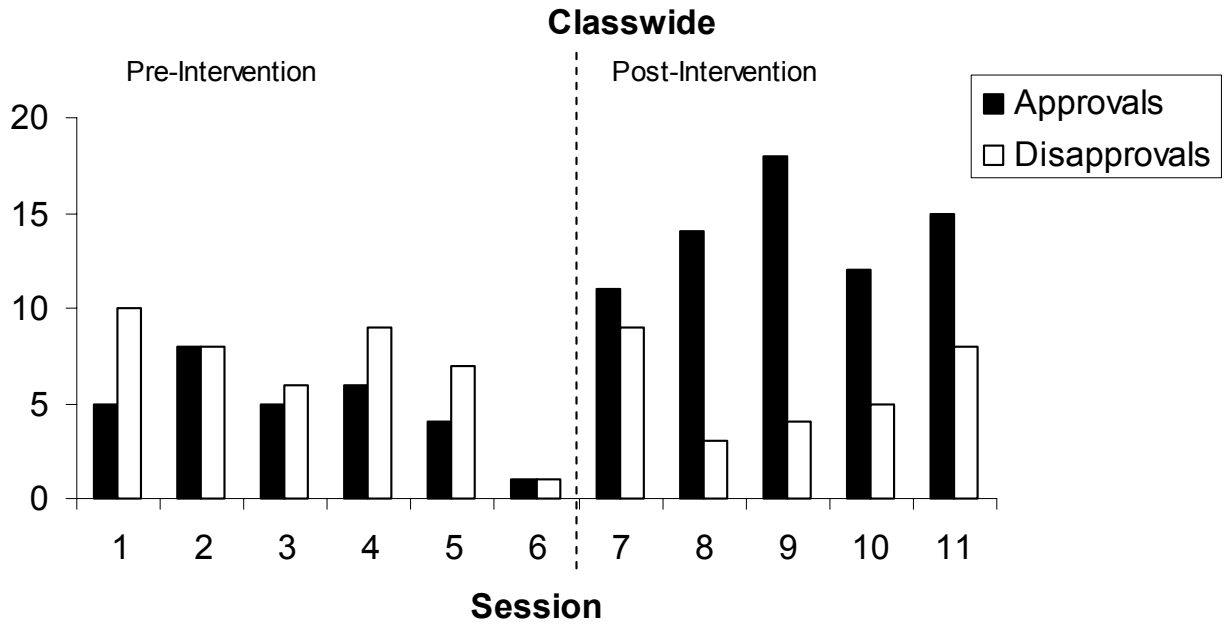

*Figure 5.*Figure 5 shows the class wide social approvals and disapprovals data taken during unstructured free time.

Discussion

The results show that peer tutoring was an effective tactic to increase the number of social approvals delivered by peers during both instructional and unstructured free time settings. The authors propose that this may be due to teaching the students appropriate ways to gain peer attention. The tutors (and the tutees) learn to use social approvals as opposed to inappropriate behavior to obtain attention from their peers during unstructured free time. Additionally, the positive reinforcement provided to the tutees by the tutors may serve to condition the tutors as reinforcers. As a result the tutees may seek out the tutors' attention in settings other than the teaching session, thus resulting in higher levels of positive interactions during unstructured free time.

One limitation in this study is the variability in the data. The number of approvals emitted during peer tutoring sessions varied from 5 to 20 per session. During peer tutoring it is natural for the data to fluctuate. If the tutee is getting more answers incorrect than correct you would not expect the number of approvals to be high, because that would indicate that the tutor was reinforcing inappropriate responding. Although the data are variable from session to session, the means show results that are significant.

The data show variability in data from session to session in the play area, another limitation to this study. Some of this variability is due to the varying materials available in the play area. If a student decided to read a book for all or most of the 10-minute session, it was understandable that the data collected

were lower than on days when none of the children was reading. A future study might include collecting data on the activities the students participated in.

Another limitation to this study was the low percentage for interobserver agreement during free play sessions. The experimenters collected data on the number of approvals and disapprovals for all students in the class. The low percentage of agreement may have been due to the experimenters' subjectivity in the definition of an approval or disapproval. In addition, with all students in the play area, it was difficult at times to hear what each student was saying above the other chatter. In addition, it was difficult for the experimenters to collect data on several students simultaneously. Future studies should control for these limitations.

Data on the number of social approvals and disapprovals emitted were only collected for 3 participants. Future studies should replicate these methods with more students with similar repertoires in order to test for the generality of findings.

These limitations aside however, the data showed a significant relationship between peer tutoring and an increase in social approvals and a decrease in social disapprovals both during peer tutoring and during unstructured free time.

As described by Greer & Polirstok, the "data showed that tutoring without training did not result in increases in dependent variables, nor were tutors naturally using approval" (Greer & Polirstok, 1982, p.130). In addition to showing that the participants were not naturally approving, it can be said that the students are naturally more disapproving.

After intervention and during the post-probe however the data showed an increase in social approvals and accurate learn unit presentations and a decrease in social disapprovals during peer tutoring. Additionally, data showed the effects of peer tutoring on the collateral behaviors of peer tutoring. In this study the collateral behaviors were defined as social approvals and disapprovals during unstructured free play time. Data showed a classwide (and individual participant) increase in social approvals and a decrease in social disapprovals.

The observers noted that before peer tutoring was introduced students mostly played independently, rarely interacting with their peers. During the post-probe sessions, however, students were all playing in pairs or small groups. A future study should focus on the effects of peer tutoring on increasing social interactions as a collateral behavior. While this study defined social approvals and disapprovals as vocalizations, it would be interesting to study the effects on social interactions including the number of sequelics and conversational units (Greer, 2002).

Observers also noted an increase in social approvals in other areas, i.e. in small group instructional sessions. All observers noted an increase in encouragement and reinforcement provided by peers when it was another student's turn to respond. Future studies should focus on the generalization of social approvals and reinforcement to other academic settings as a result of the introduction of peer tutoring.

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