EFFECTS OF COLLATERAL PEER SUPPORTIVE BEHAVIORS WITHIN THE CLASSWIDE PEER TUTORING PROGRAM

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A classwide peer tutoring procedure was implemented in an urban elementary school classroom to improve students' spelling performance. Three students combined untrained or collateral tutoring behaviors with the core behaviors initially taught. To explore the function of these natural and spontaneous behaviors, a multielement single-subject experiment with replications was conducted. Results indicated that the additional tutoring behaviors increased (a) the academic response frequencies of 3 tutees and (b) the weekly spelling achievement of 1 target tutee. The remaining class members were successfully taught and continued to use these behaviors over the final 3 weeks of the school year. These findings are discussed with regard to academic instruction, natural communities of peer reinforcement, and the social validation of intervention procedures.

DESCRIPTORS: peer tutoring, group contingencies, peer supportive behaviors

Peer tutoring, group-oriented contingencies, and their combinations have become increasingly popular approaches to classwide instruction in American education over the past decade and a half (e.g., Greenwood, Carta, & Hall, 1988; Johnson, Maruyama, Johnson, Nelson, & Skon, 1981; Maheady

& Harper, 1987; Slavin, 1977; Slavin, Stevens, & Madden, 1988). There are several reasons for this surge in popularity. First, these procedures have become increasingly easy to implement, and they permit the efficient application of the teacher's and peer tutor's skills in the process of individualizing instruction and managing students' classroom behavior (e.g., Greenwood, Carta, & Kamps, 1990; Greenwood, Delquadri, & Hall, 1989; Grieger, Kauffman, & Grieger, 1976; Kazdin & Geesey, 1977). Second, these procedures are more effective than some conventional teacher-mediated instructional methods (e.g., Greenwood et al., 1990; Greenwood, Dinwiddie et al., 1984; Jenkins, Mayhall, Peschka, & Jenkins, 1974). Third, compared to teacher-mediated forms of instruction, these procedures increase the opportunities for appropriate social interactions among peers. Consequently, these procedures are increasingly used to accommodate the instructional and social needs of students with heterogeneous academic skill levels and disabilities in a single classroom (e.g., Lloyd, Crowley, Kohler, & Strain, 1988).

One hypothesis accounting for the superior effectiveness of peer tutoring and group-oriented contingency procedures may be the higher rates of

active academic responding generated (e.g., reading, writing, asking academic questions, etc.), compared to conventional teacher-mediated instructional methods (e.g., Greenwood, in press; Greenwood, Dinwiddie et al., 1984). For example, researchers have reported students to be only marginally engaged during conventional teacher-mediated instruction. Hall, Delquadri, Greenwood, and Thurston (1982) reported that inner-city students spent only 25% of their day engaged in active academic responding. Similarly, Greenwood, Delquadri, and Hall (1984) reported that first graders spent less than 5 s per day practicing arithmetic facts.

In order to increase students' academic responding and achievement, Delquadri, Greenwood, Stretton, and Hall (1983) developed a classwide peer tutoring procedure (CWPT) combined with an interdependent group contingency in which class teams competed for a winning point score. Additionally, CWPT incorporated (a) social and point reinforcement for correct responding and correcting errors, (b) distributed practice over new content introduced each week, (c) immediate error correction, and (d) public posting. CWPT enables an entire class of students to practice writing words and receive immediate error correction. Delquadri et al. (1983) reported that CWPT increased the spelling scores of 6 low-achieving third graders to levels equal to those of the high-performing students in the class. In a series of subsequent studies (see reviews by Delquadri, Greenwood, Whorton, Carta, & Hall, 1986; Greenwood, Maheady, & Carta, in press), CWPT was found to increase students' engagement with academic tasks and to promote their achievement gains in a number of different subject areas (i.e., reading, vocabulary, spelling, math, and language).

A second hypothesis for the superior effectiveness of peer tutoring and group contingency procedures is the specific peer-teaching interaction (e.g., Greer & Polirstok, 1982; Polirstok & Greer, 1986). Pursuing both hypotheses, Kohler and Greenwood (1986a) examined the interactions of 120 first graders participating in spelling CWPT. They found that whereas some tutees wrote more than 75 words per 10-min session, others practiced fewer words

and often failed to cover the entire 10-word list more than once per session. The weekly posttest scores of these latter students were generally lower than those of tutees who practiced more spelling words throughout the week.

A second finding was that some tutors exhibited behaviors with respect to their tutee that were never taught as components of the tutoring game. For example, some tutors prompted other members of their team (e.g., tutees) to respond more quickly and provided approval and assistance for rapid, correct responding. Presumably, tutors did this in order to increase the number of points earned by their tutee and their team.

Greenwood and Hops (1981) reported that group-oriented contingencies often generate untrained behaviors, such as prompts or encouragement (Alexander, Corbitt, & Smigel, 1976), approval (Frankosky & Sulzer-Azaroff, 1978), and peer teaching (Axelrod & Paluska, 1975; McCarty, Griffin, Apolloni, & Shores, 1977), that appear to support academic learning. Collateral behaviors have been defined as "behaviors that are topographically dissimilar to the behaviors treated. They have not been classified as generalization traditionally, yet they may be changed as a result of treatment for a separate target behavior" (Greer & Polirstok, 1982, p. 124).

A few studies have analyzed the impact of collateral peer behaviors produced within group contingencies. For example, Van Houten and Van Houten (1977) reported that within a group contingency procedure, several children provided untrained evaluative comments for the reading of their peers. By directly teaching additional children to provide and withhold their evaluative statements in an alternating fashion, the authors found that the statements covaried with higher reading rates.

The Van Houten and Van Houten (1977) findings have important implications for the efficacy of group contingencies. Because peer behaviors such as those noted by Van Houten and Van Houten may potentially assume control of students' behaviors across settings, forms, and over time (Baer & Wolf, 1970; Kohler & Greenwood, 1986b), their role in behavior change produced by group-oriented contingencies is important. Research is

needed to analyze the functional effects of collateral peer behaviors within group contingency procedures. Therefore, the current investigation had three purposes.

First, within an operational CWPT program, we determined whether students in the tutor role delivered untrained forms of approval, prompting, or assistance for the academic responding of their tutees. Second, given the existence of collateral peer responses, we analyzed the function of these behaviors on academic responding and examined the relationship between increased academic responding and achievement for low-achieving tutees. Third, we assessed the generality and acceptability of the tutor's collateral behaviors when directly taught to all class members.

METHOD

Subjects and Setting

A class of students in the Kansas City, Kansas, School District participated in this study. All 23 students enrolled in a split grade-level classroom in an urban elementary school participated. This class contained 18 third graders and 5 fourth graders. According to school officials, the split grade-level arrangement was employed to achieve a more homogeneous set of students for instructional purposes.

Seven third graders in this class participated as subjects. Mike, Deb, Mary, and Jerry served as target tutees because they wrote fewer spelling words during daily CWPT tutoring sessions than did their classmates. Furthermore, Jerry consistently obtained the lowest scores in his class on weekly spelling tests. Three additional students, Karen, Kim, and Susan, served as target tutors because they exhibited collateral tutoring behaviors (i.e., prompting, approving, and helping) without explicit training. These 7 students ranged in age from 7 years 5 months to 8 years 4 months at the beginning of the school year.

All experimental procedures and observations occurred in the regular classroom during a 30-min spelling period. The 23 students, their teacher, and a program consultant (either the first author or a research assistant) also were present in the classroom at this time. The teacher had 8 years of teaching experience prior to this investigation. She participated because of a desire to learn an effective procedure for teaching spelling.

General Procedure

The standard CWPT procedure for spelling (Delquadri et al., 1983) took place during a 30-min period 4 days per week. This period was divided into two 10-min tutoring sessions and one 10-min point recording period. Students enacted both roles during tutoring sessions. For the first 10 min, 1 student acted as tutor and his or her partner was the tutee; the students then exchanged roles during a second 10-min period.

A list of 20 words comprised the tutoring content for each week. Words were chosen by the teacher from *The World of Spelling* (Thomas, Thomas, & Lutkus, 1978). All students were tutored on the same spelling list, which included seven words from the third-grade level, 10 words from the fourth-grade level, and three words from the fifth- or sixth-grade levels. Classwide spelling tests were given each Friday to assess students' mastery of the words covered that week (posttests) as well as the words included on the following week's list (pretests).

Measures

Measures were made through direct observation and weekly spelling tests. During the two 10-min tutoring sessions (total of 20 min), a program consultant arranged tape recorders on the desks of 2 to 7 tutoring dyads and recorded their tutoring interactions. Tutoring tapes were scored outside of the classroom by an observer using a system that measured core tutoring behaviors and collateral (supportive) behaviors.

Core tutoring behaviors. These behaviors were initially taught to all students as part of the standard tutoring game. The core behaviors and their sequence were as follows:

1. Tutor's oral presentation of each spelling word.
2. Tutee's oral spelling of the word (while the letters were being written on the paper).

3. Tutor's social feedback (and *one* correction if necessary) regarding the quality of each response. (a) Positive feedback consisted of "You are correct." (b) Corrective feedback consisted of "That word is wrong. The correct spelling for that word is 'M O I S T.'"

4. Tutor's statement indicating an award of 2 points for correctly spelled words.

5. Tutor's instruction to repeat words spelled incorrectly on the initial attempt three more times (repetition procedure).

6. Tutee's oral repetition of words spelled incorrectly three times (while word was being written).

7. Tutor's statement indicating an award of 1 point for words repeated correctly three times.

8. Tutor's statement indicating an award of 0 points if any one of the three repetitions was incorrect.

Core tutor–tutee behaviors were repeated for each spelling word (i.e., a word trial) throughout the 10-min sessions. To distribute practice and continue earning points for one's team, students did not stop after completing the list once but continued to practice the words (starting at the top of the list) until the 10-min session had terminated (e.g., Greenwood, Dinwiddie et al., 1984; Greenwood et al., 1987, 1989).

Collateral (supportive) tutor statements. These responses were derived from an earlier pilot study using CWPT (Kohler & Greenwood, 1986a) and were never taught to the students as part of the original CWPT. The observers scored each occurrence of these behaviors throughout every word trial in the session.

1. Go-faster prompts: These were scored whenever the tutor told the tutee to make academic responses (i.e., write spelling words or make corrections) at a more rapid pace. Examples included "go faster," "hurry up," or "come on."

2. Praise: This was scored if the tutor made a positive statement pertaining to the rate or quality of the tutee's responding. Examples included "good job" or "great" immediately after a correctly spelled word.

3. Help: Help was scored when the tutor cor-

rectly spelled a word for the tutee *more than once* during the error correction or repetition procedures. As indicated earlier, tutors were taught to provide only one instance of correction for each misspelled word.

Teacher statements to members of the monitored dyad also were scored. However, because results indicated that the teacher rarely interacted with the students after the first several weeks, these data are not reported.

The interactions of the 4 tutees and their 3 tutors were audiorecorded daily during all but the initial baseline phase. Two to three nontarget dyads (randomly selected pairs) also were recorded during each week to provide a normative peer estimate of performance (excluding the final condition when six dyads per day were monitored).

Weekly spelling tests. Weekly pre- and posttests were conducted on the list of 20 words that served as the content to be tutored each week (e.g., Delquadri et al., 1983). The tests were administered by the classroom teacher on each Friday. Posttests covered material tutored that week; pretests covered new material to be covered in the upcoming week.

Reliability

Reliability was assessed by having two observers simultaneously but independently score the same tutoring tapes. Reliability was conducted on 20% of the sessions and was distributed across the 3 target tutors, 4 target tutees, their 16 classmates, and all experimental phases. Occurrence and nonoccurrence reliabilities were calculated by dividing the total number of agreements of occurrence (or nonoccurrence) by the total number of agreements plus disagreements of occurrence (or nonoccurrence) and multiplying by 100. An agreement was scored when both observers recorded a core statement within the same word trial. Each trial could include from zero to seven core statements, depending upon students' compliance with the correct procedures and the quality of the tutee's written spelling word. Occurrence reliability for core interactions ranged from 64% to 100% and averaged 97% across the 3 tutors. Nonoccurrence agreement for core inter-

actions ranged from 0% to 100% and averaged 98%.

Using similar procedures, occurrence reliability was also calculated on supportive tutor statements. Mean agreement scores ranged from 66% to 100% and averaged 90%, 98%, and 92% for go-faster, praise, and help statements, respectively.

Reliability estimates were also obtained on three other measures. Observers counted the number of words that tutees wrote (from their worksheet) during each session (10-min period in which these students served as tutee). An agreement was scored when both observers counted a particular word. The average scores ranged from 98% to 99% for all 4 tutees. Reliability was also taken on the quality of the tutees' written responses. An agreement was scored when both observers counted a word as correct or incorrect. Mean scores equaled 100% for 3 tutees and 99% for a 4th. Finally, reliability was calculated on the pre- and posttest scores of Jerry, whose weekly academic gains were analyzed. (Because of the amount of observation data collected on tutor–tutee interactions, it was not possible to conduct a more extensive analysis of students' academic gains.) Agreements were scored when both observers recorded a word as correct or incorrect. Reliability ranged from 95% to 100% and averaged 98% across Jerry's pre- and posttests.

Experimental Design and Procedures

Two experimental designs were employed. Mike, Deb, and Mary participated in a multielement design (ABCD), whereas Jerry received a reversal design (ABAB). The experimental procedures were baseline or standard CWPT (A), modified peer tutoring (B), modified procedure training for entire class (C), and procedure of choice (D).

Baseline or standard CWPT procedure (A). This procedure was originally developed by Delquadri et al. (1983) and was described earlier. The teacher was trained by the first author during two 30-min sessions (Carta, Greenwood, Dinwiddie, Kohler, & Delquadri, 1984). Students were trained to use the standard procedure in two 15-min sessions with instruction, role play, and rehearsal.

Following training, CWPT was implemented 4 days per week. All student dyads were assigned to one of two class teams, which competed to earn the greater number of daily and weekly points. Every day, the teacher added each student's points and announced a winning team. No further consequences were provided to any members of the class.

Students were paired with a different partner each week. The program consultants audiorecorded the interactions of two or three dyads per day but never gave students feedback about the rate or quality of their tutoring behaviors. The 3 target tutors were recorded approximately once per week, and other class members were monitored on at least two occasions.

Modified tutoring procedure (B). Karen, Kim, and Susan were taught to use supportive tutoring behaviors in four 15-min sessions consisting of instructions, role play, and rehearsal. Training for the 3 target tutors occurred in the school library. Because only Susan had used praise previously, Karen and Kim were taught to deliver four to six approvals per session for rapid and correct tutee responding.

Because all 3 girls had, without specific training, used go-faster and help statements during the baseline phase, training for these responses focused on appropriate rates and contingent use. For example, go-faster statements were used only when the tutee responded slowly, and were not delivered more than twice per word trial. Help entailed stopping the tutee as soon as any letter of a word was incorrect and saying all letters with the tutee during repetition. In addition to these guidelines, the girls were instructed to use their best judgment regarding supportive behaviors and were permitted to adjust their repertoires if a conflict arose with the tutee.

Multielement phase (A vs. B). Karen, Kim, and Susan were paired on an alternating basis with 1 target tutee each week of this phase. The interactions of each girl and her tutee were recorded every day.

Because 1 target tutee, Mary, had not enrolled in the class until spring semester, she participated in the multielement phase for only 2 weeks. To

Table 1
Comparison of Standard and Modified Tutoring Procedures

Tutor presentation procedures	
Standard CWPT procedure	Modified procedure
Tutor waits for the tutee to write the complete word or request its correct spelling.	Tutor provides go-faster prompts if the spelling word is not completed in approximtely 5 s.
Tutor provides positive feedback and 2 points for correctly spelled words.	Tutor provides 2 points and intermittent praise for rapid and correctly spelled words.
Tutor provides corrective feedback and correction (once only) for misspelled words AFTER the tutee has written the entire word or requested its correct spelling.	Tutor provides corrective feedback and correction AS SOON AS one letter of a word is incorrect.
Tutor instructs tutee to repeat word independently three times and provides 1 point if all three repetitions are correct or no points if one or more repetitions are incorrect.	Tutor instructs tutee to repeat word three times and ensures that errors do not occur during repetition by saying the letters of the correctly spelled word WITH the tutee three times. The tutor also gives 1 point and intermittent praise for rapid and correct tutee responses.

ensure an equal number of target tutors and tutees during Mary's 2 weeks of participation, the teacher paired Mike or Deb with a classmate who had not exhibited or learned the modified tutoring repertoire. Tape recorded and permanent product data (e.g., daily number of spelling words) were not obtained from Mike or Deb during these 2 weeks.

Immediately before each session, a program consultant privately instructed Karen, Kim, and Susan to use either the standard or modified procedure. Table 1 illustrates the distinctive differences in the two procedures. Each day, the girls received feedback regarding their accuracy of implementation during the previous session. The girls also met with the first author on Friday for a special activity (e.g., game, snack, etc.).

The alternation pattern between the two tutoring conditions occurred on different schedules for the target tutees (i.e., daily vs. weekly). The pattern presented to Mike, Deb, and Mary alternated on a daily or every-other-day basis to examine effects on their frequency of responding (i.e., number of spelling words written). Conversely, Jerry's pattern alternated on a weekly basis in order to analyze the impact of the procedures on his number of words learned.

Modified procedure training for entire class (C). All students in the class (excluding the 3 target tutors) were taught to use the modified procedure

in one 15-min session. Training entailed adult instruction and role play as well as student rehearsal. After training, all students were instructed to use go-faster prompts, praise, and help during their tutoring sessions for 1 week. The teacher and program consultant circulated throughout the classroom to provide feedback and praise for accurate implementation.

Procedure of choice (D). In this condition, students were allowed to use the procedure of their choice. All 23 students were told that their tutoring interactions would be recorded but that they should feel free to use the procedure of their choice.

RESULTS

Collateral Supportive Tutor Behaviors

Figures 1 through 3 depict the daily number of go-faster, praise, and help behaviors used by the 3 target tutors across all experimental conditions. Karen, Kim, and Susan used an average of 7.7 go-faster prompts and 4.1 help statements during the standard CWPT procedure (baseline condition). Only Susan used praise during her initial phase (4.0).

Each tutor used increased numbers of supportive behaviors when trained to do so during the multielement phase. For example, Kim, Karen, and
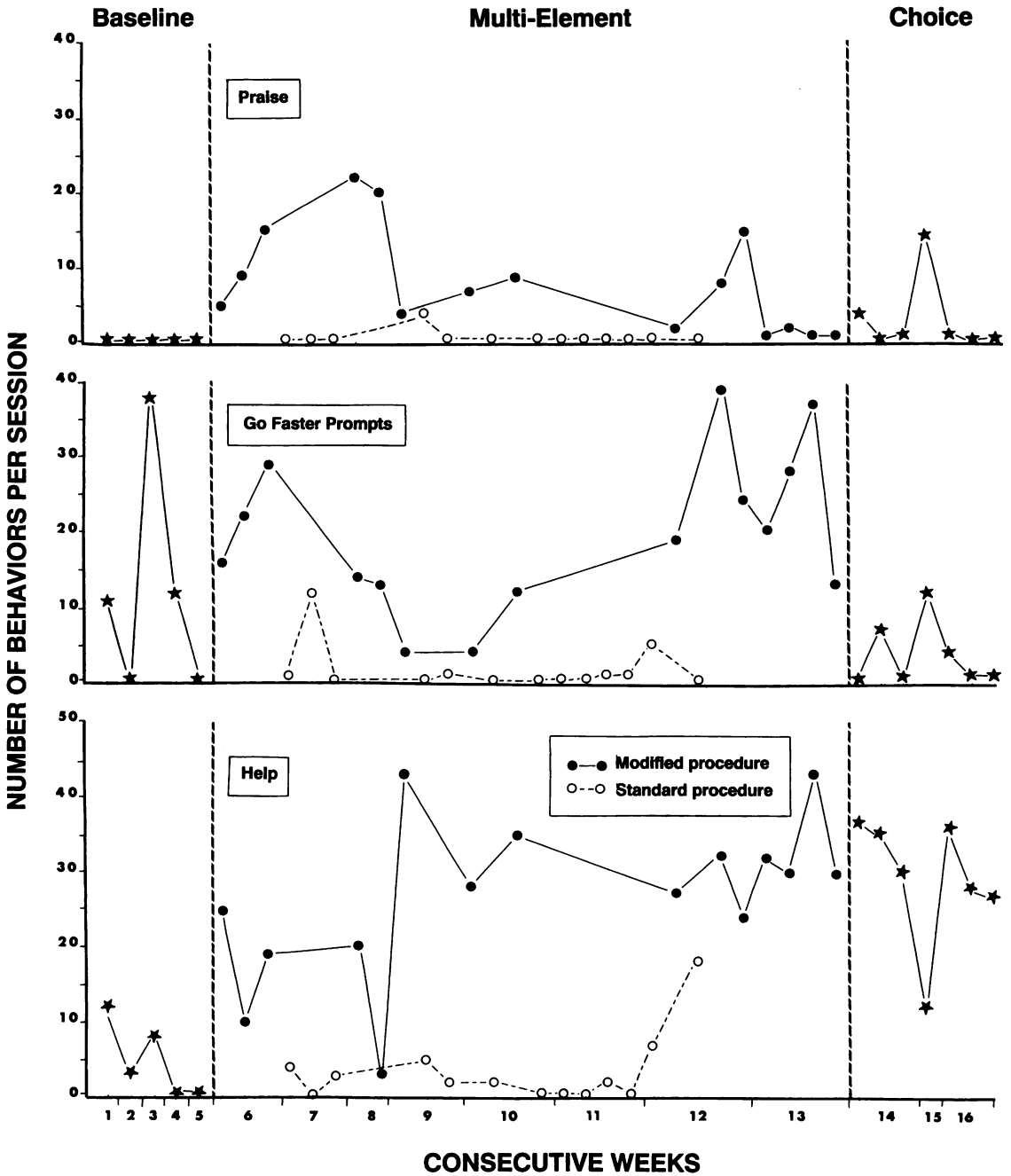
Figure 1. Kim's daily number of each supportive behavior across all experimental conditions.

Susan each used more go-faster prompts during the modified tutoring procedure than during the standard tutoring sessions (M = 19.6, 13.3, and 16.5 vs. M = 1.4, 1.2, and 0.5, respectively). Likewise, the girls each exhibited increased use of praise (M = 8.5, 6.8, and 5.2 vs. M = 0.4, 0.0, and 0.0, respectively) and help (M = 26.3, 21.5, and 14.0 vs. M = 3.2, 1.1, and 2.8, respectively).

The 3 girls continued to use supportive behaviors during the final choice condition but with some individual variation. Help and praise occurred regularly (except for Kim's praise), whereas go-faster
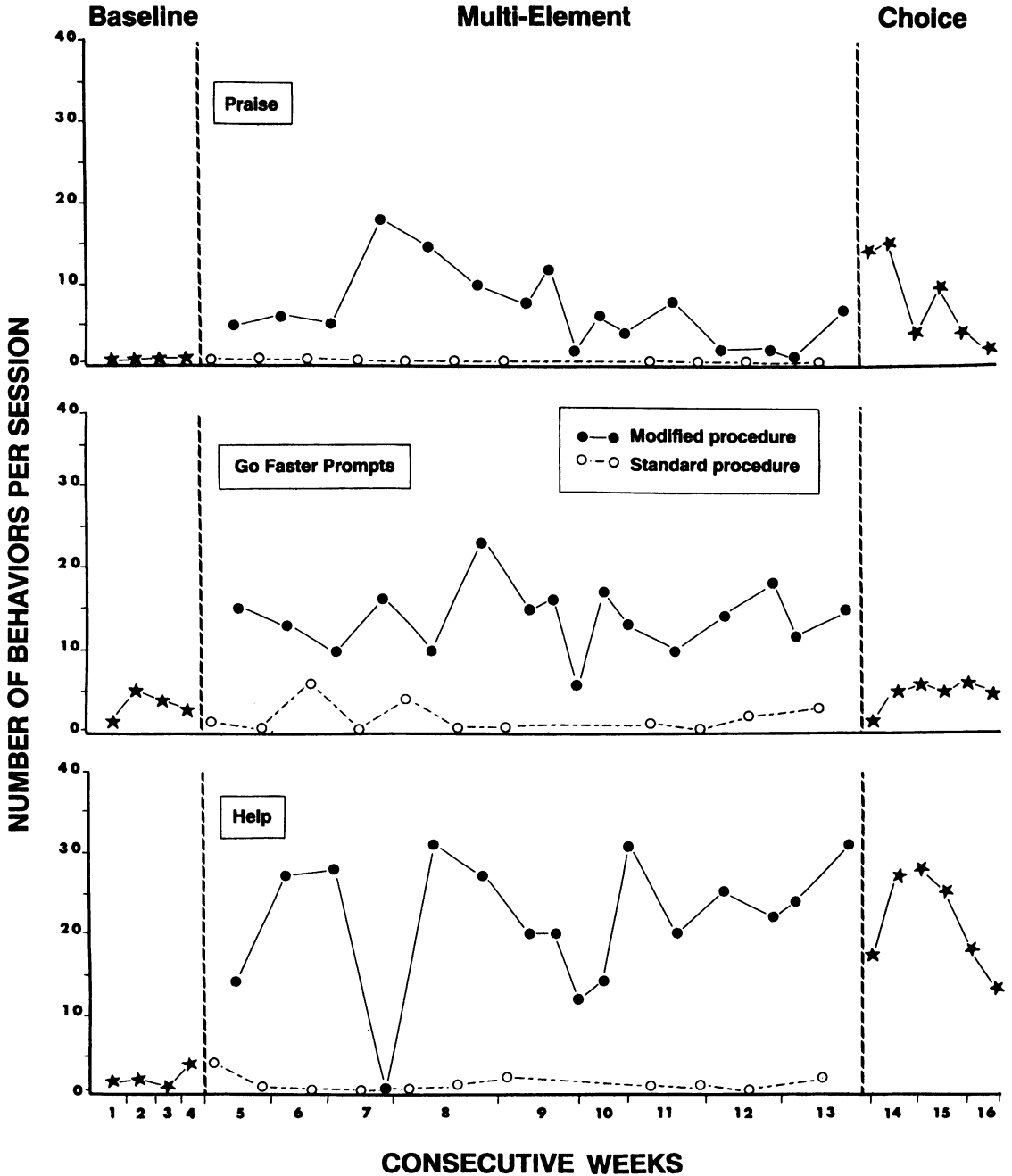
Figure 2.   Karen's daily number of each supportive behavior across all experimental conditions.

prompts decreased to low levels for Kim and Susan (See Figures 1 through 3).

Target Tutees' Academic Responding

Academic responding results for the 4 target tutees are shown in Figures 4 through 7. Data are presented in terms of each student's frequency of written words per session. A given frequency of words translated to a different number of word trials completed (or words from the list), depending upon the quality of each initial response. For example, if a tutee wrote each word correctly on a
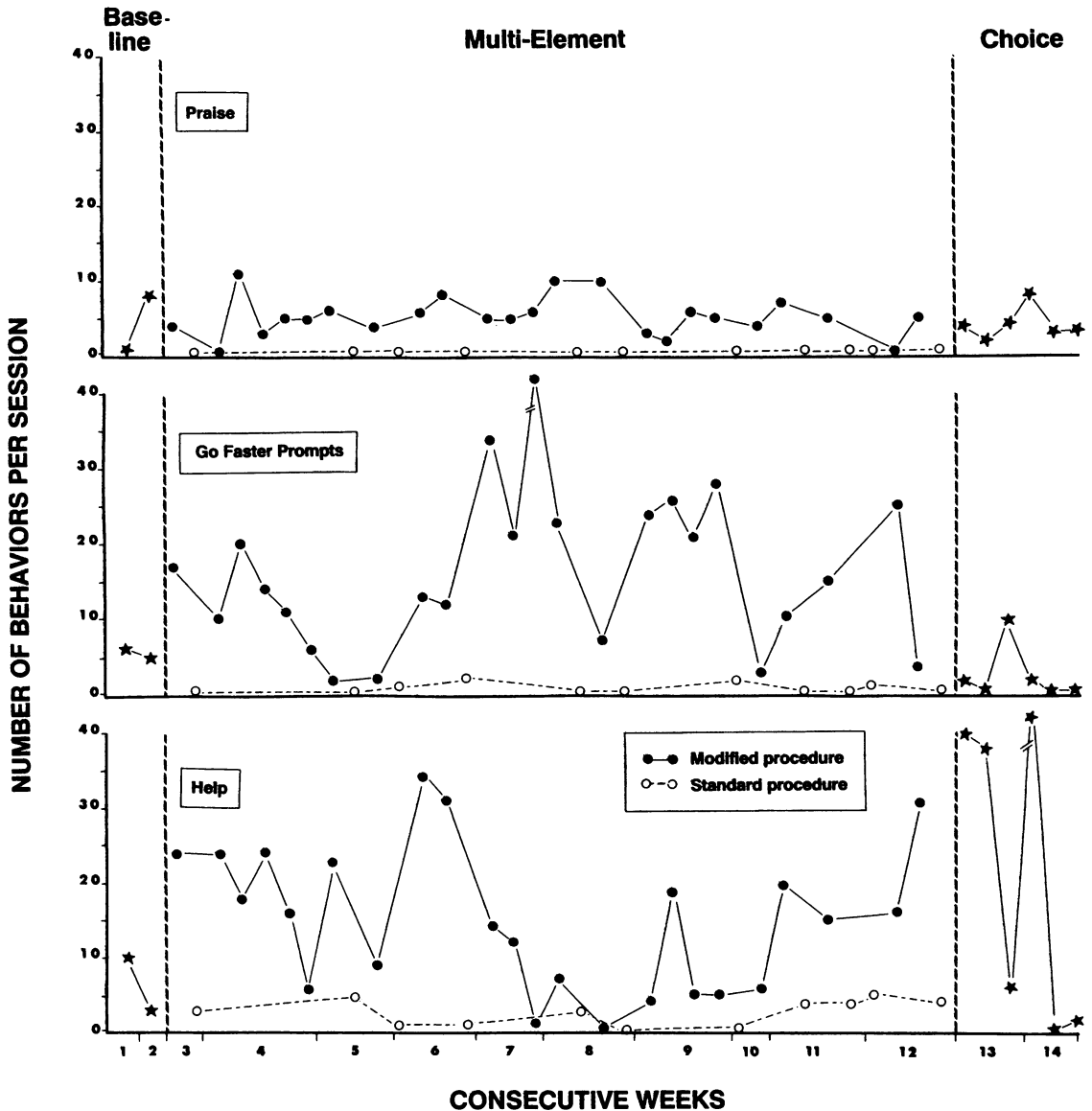
Figure 3. Susan's daily number of each supportive behavior across all experimental conditions.

first attempt, then a frequency of 60 words meant that he or she had completed 60 trials or covered the 20-word list exactly three times. Conversely, 60 words could also be written in 15 trials if a tutee spelled each word incorrectly on its initial attempt, because trials with correction consisted of four written words each (the initial incorrect spelling plus the three correct repetitions; e.g., 4 × 15 = 60).

Figure 4 shows Mike's frequency of written words per session across all conditions. Mike wrote an average of 62 words during baseline and showed an accelerating trend over the days of each week, approximating 50 on Monday and then increasing on all subsequent days.

The tutors' alternating repertoires had differential effects on Mike's written words. Standard tutoring produced an average of 64 words, a number similar to Mike's baseline levels. The modified tutoring method that included collateral behaviors yielded an average of 80 written words, a 20% increase (16 words per session) from standard days.
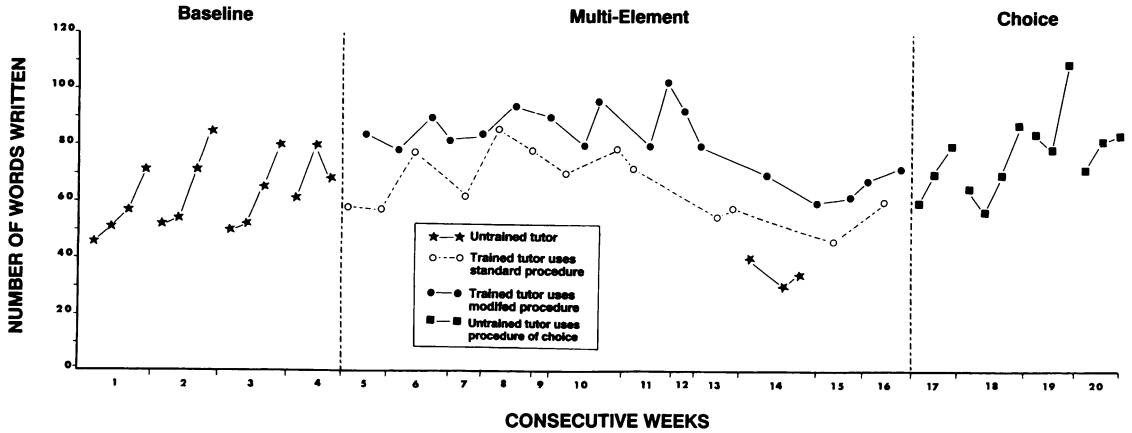
Figure 4.   Mike's daily number of written spelling words across all experimental conditions.

Unlike baseline, Mike's word frequency varied directly with the tutor's repertoire and not with days of the week.

During Week 14, Mike was paired with a non-target classmate who had previously exhibited very few supportive behaviors. Mike wrote 41, 30, and 35 words respectively on Monday, Wednesday, and Thursday of that week. Conversely, Mike wrote 70 words when he was paired with Susan on Tuesday.

During the choice phase, Mike wrote an average of 74 words per session when he was paired with tutors who had been trained on, but did not necessarily use, the modified tutoring repertoire. This number was slightly lower than that generated by the modified tutoring procedure and once again demonstrated an accelerating trend across successive week days.

Figure 5 shows Deb's daily frequency of written words across all experimental phases. Like Mike, her responses initially indicated an accelerating trend throughout the successive days of each week. Deb averaged 65 written words throughout the 9-week baseline condition.

The tutors' alternating procedures had differential effects on Deb's word frequency. The standard method yielded an average of 66 words, whereas Deb wrote a mean of 79 words with the modified procedure, which represents a 17% increase (13 words a session) from her standard phase. Like Mike, however, Deb's words decreased on Weeks 14 through 17. Finally, Deb wrote an average of 72 words during the choice phase.

Figure 6 illustrates Mary's daily word frequency. During baseline she averaged 41 words. Mary wrote
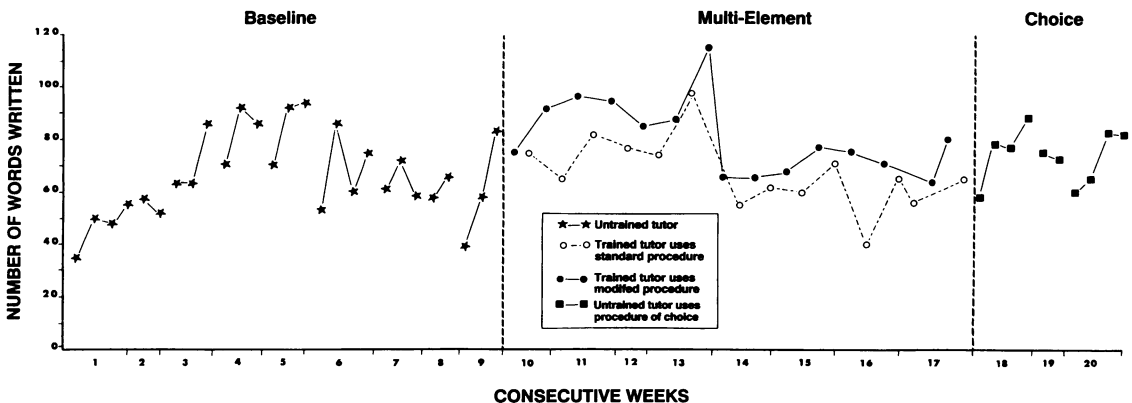

Figure 5.   Deb's daily number of written spelling words across all experimental conditions.
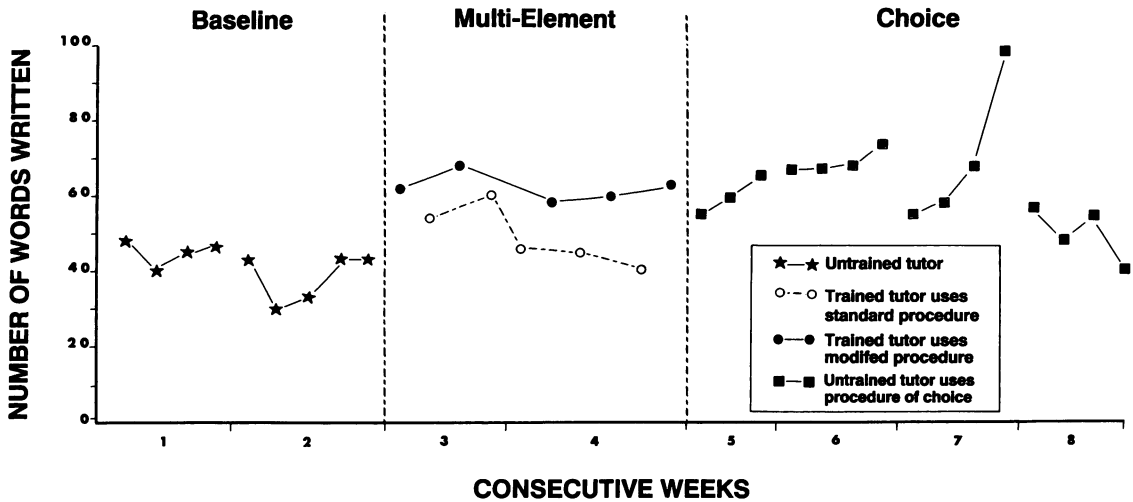
Figure 6.   Mary's daily number of written spelling words across all experimental conditions.

47 words on standard days, which represented a 13% increase above baseline. The modified procedure yielded a mean of 61 words, a 33% and 23% gain from the baseline and standard phases, respectively. Finally, Mary averaged 60 words during the choice phase, which was similar to the rate generated by the modified method.

Weekly Spelling Achievement

Weekly spelling test data indicated that Mike, Deb, and Mary learned a high percentage of words over the course of the study (pretest $M = 26\%$ vs. posttest $M = 80\%$). For Jerry, however, it was possible to correlate daily changes in word frequency (See Figure 7, upper panel), with error frequency (middle panel), and with actual weekly academic gains (*spelling words learned* in the lower panel) for each week. Jerry wrote an average of 33 words, misspelled 7 words on his initial attempt to write them, and learned an average of 6.5 words throughout the 3-week baseline. In Week 4, the first author served as Jerry's tutor and delivered supportive behaviors, which increased his words written (56 per session), errors made (12 per session), and words learned (11). Jerry resumed baseline for Weeks 5 and 6; his word total, error frequency, and words learned all decreased.

Subsequently, the standard and modified tutoring procedures had differential effects on all three measures. First, the standard versus modified procedures yielded frequencies of 50 and 64 words, respectively, for Jerry, replicating the effects for prior target subjects. Second, the modified procedure generated more errors that occasioned increased practice on unknown words. Third, the modified procedure enabled Jerry to learn nearly twice the number of words (i.e., 11 words per week vs. 6) compared to the standard procedure.

Nontarget Student Effects

Figure 8 illustrates the average number of supportive behaviors used by the 16 nontarget tutors (excluding the 7 target subjects) across all weeks and conditions. During Weeks 1 through 12, these students had been trained to use the standard procedure only and they used few go-faster prompts and praise. Help increased to higher levels during the final 4 weeks of baseline (Weeks 9 through 12).

Training in the use of supportive behaviors produced immediate increases in their use. Praise increased from a baseline mean frequencies of 0.2 to 6.8. Similar values for go-faster prompts were 1.2 to 5.8, and for help they were 2.5 to 17.3.

All three supportive behaviors were maintained at high levels during the choice phase. Go-faster, praise, and help occurred at mean frequencies of 7.0, 4.2, and 13.1, respectively. Analysis indicated
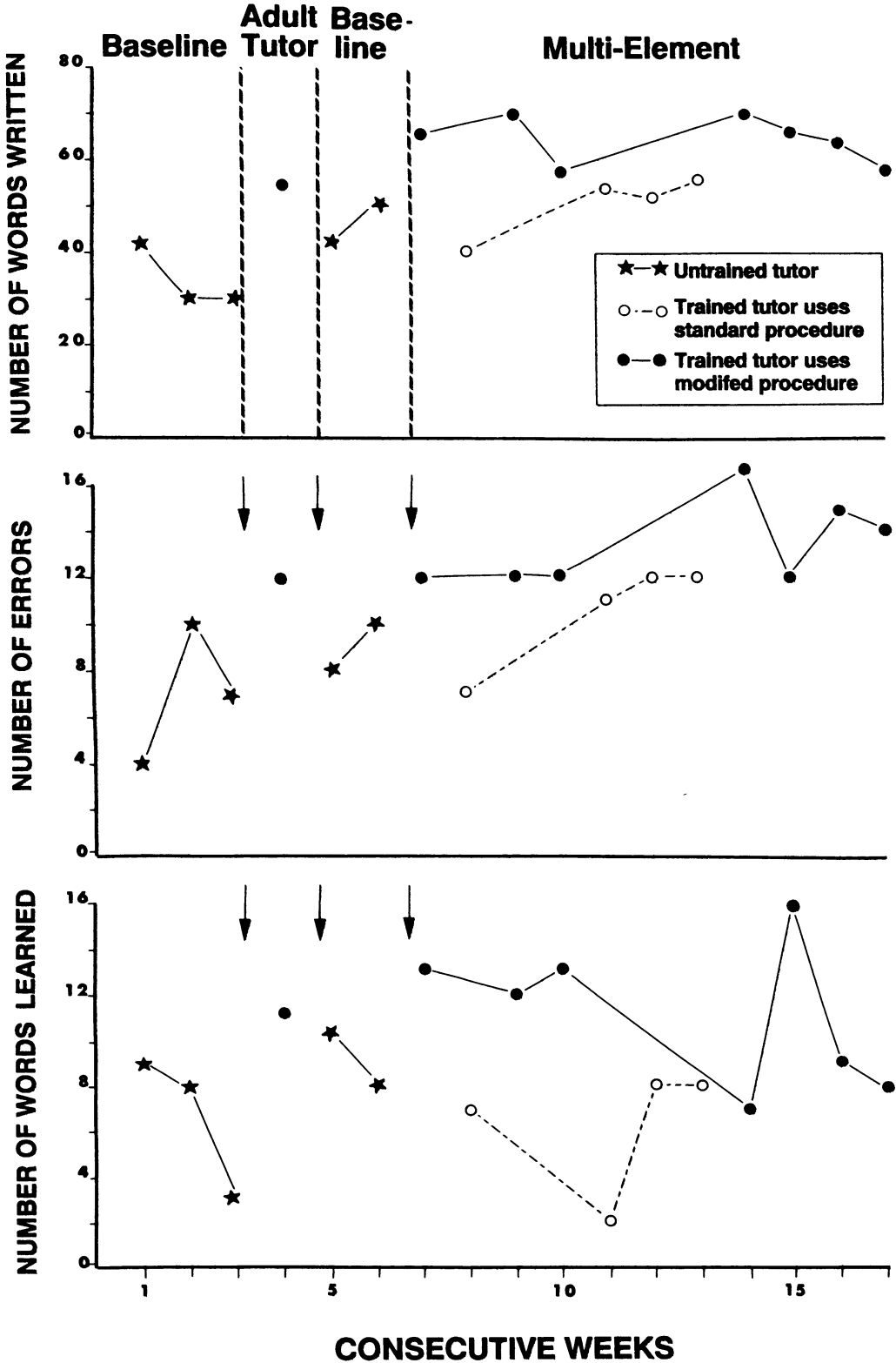
Figure 7.   Jerry's mean number of words written, errors made, and words learned per week.

that 11 of the 16 students used all three behaviors during their assessments.

DISCUSSION

In relation to the assessment and function of collateral tutoring behaviors within CWPT, the results can be summarized as follows: (a) 3 third-grade girls added collateral tutoring behaviors (go-faster prompts, praise, and help) that appeared to support the performance of their tutees after learning a standard tutoring procedure that did not directly teach these behaviors; (b) when analyzed within a multielement design, these supportive responses generated higher writing rates that were replicated across 4 low-achieving tutees; (c) for the lowest achieving tutee, these changes covaried directly with increases in weekly achievement; and (d) it was possible to teach these supportive behaviors to the remainder of the class, whose members continued to use them with individual variation over a final 3-week period.

It should be noted that there was initial variability among the 3 tutors in the use of collateral behaviors (go-faster prompts and help vs. praise). For example, only Susan used praise during the standard tutoring phase. Because the authors felt that the exclusive use of go-faster prompts and help might make the tutors sound abrasive, Kim and Karen were taught to use praise, which for them was not a collateral behavior. Thus, the modified procedure based on collateral behaviors was constructed partially by the experimenters.

As in prior studies of tutoring (e.g., Greer & Polirstok, 1982; Polirstok & Greer, 1986), the impact of tutors' behaviors on tutee performance was substantial. The 4 target tutees practiced writing an average of 13 more words per session with the modified procedure; this corresponded to a range of 3 to 13 more words from the spelling list, depending upon the quality of their initial attempts. Additionally, this increased practice covaried with increased weekly test scores for Jerry, the lowest achieving student, which indicated the practical importance of the supportive behaviors.
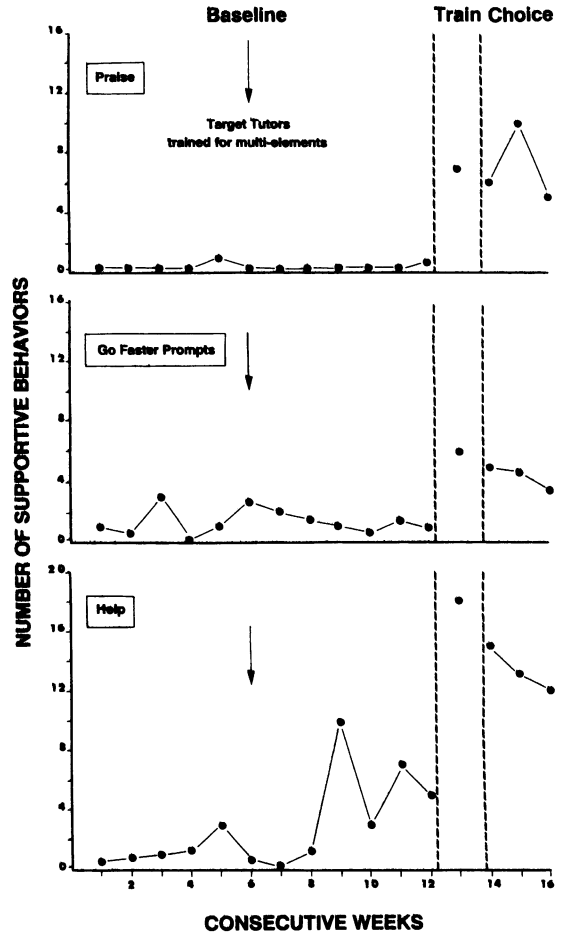
Jerry learned fewer words with the modified pro-

Figure 8. The mean number per week of go-faster, praise, and help statements used by 16 nontarget tutors.

cedure during Weeks 14, 16, and 17. The teacher selected the words throughout the study and increased the difficulty of the material during these weeks to challenge her average and higher achievers. Because Jerry's pretest scores were at 0% correct for Weeks 14, 16, and 17, his lower achievement gains for these weeks may have been a function of the increased difficulty level. Jerry also made more errors during the sessions in these weeks (see Figure 7), suggesting that the words were more difficult.

The nontarget students learned to use the modified procedure with apparent ease and continued to use this method for the final 3 weeks. However, these students had 5 months of exposure to the standard method before supportive tutoring responses were taught. Students who lack this ex-

posure to standard CWPT procedures may require more than 1 week to learn the supportive repertoire. Also, adult feedback and reinforcement may be necessary to maintain tutors' supportive responses for periods longer than 3 weeks.

Although it was not the intent of this study to isolate the impact of a single supportive response, the help behavior appeared to be the most effective. First, the immediate (vs. delayed) error correction aspect of the help behavior probably contributed to the higher levels of tutee responding. Second, the modified procedure required tutors to spell the words with their tutee three times during correction, thus reducing the overall likelihood of errors during repetition.

One purpose of this study was to determine whether a tutoring procedure with a group contingency would generate collateral supportive behaviors from students. Interestingly, collateral behaviors were identified for only 3 tutors, which was not nearly as widespread as one might expect, given the existing literature (e.g., Greenwood & Hops, 1981). These findings raise interesting questions about the efficacy of group contingencies for generating peer support throughout an entire peer group. Perhaps a formal back-up consequence for the winning team in CWPT, rather than simply declaring a winning team, would generate higher levels of supportive behavior. Alternately, the rather narrow sequence of core tutoring behaviors, and their high rate of occurrence as required by the standard CWPT procedure, may have constrained the opportunities for students to display a broader range of collateral behaviors. Future research should address these issues.

The multielement design is generally used to compare two or more interventions, and the more effective procedure is then implemented in a final phase (e.g., Hersen & Barlow, 1976). However, if the more effective method is not preferred by consumers, then it will not be adopted over time. The choice condition in this study provided a direct indication of acceptability by determining which method consumers actually used in a choice situation. This methodological feature is seen as an improvement over the standard practice in the be-

havior analysis literature of assessing consumers' satisfaction via verbal report. Future studies might use this same method to assess satisfaction. Consumer implementation might also be examined over longer time periods. A 1-year period would provide a much better indication of consumer satisfaction than the 3-week phase used in this study.

In summary, this study demonstrated several important findings. First, a tutoring procedure with an interdependent group contingency generated peer teaching behaviors that increased the academic responses of 4 students. This finding adds to our understanding of natural reinforcement communities by showing how and when children influence their peers (e.g., Baer & Wolf, 1970; Kohler & Greenwood, 1986b). Second, the supportive behaviors that occurred spontaneously when 3 tutors engaged in CWPT were easily learned and preferred by other students in the class. Third, the flexibility of CWPT, a desirable characteristic of behavioral interventions (Fawcett, Mathews, & Fletcher, 1980), permitted improvement in the overall intervention package. Research that continues to examine the effectiveness of consumer adaptations of intervention procedures may culminate in the development of interventions that persist in natural settings for longer time periods.

A number of questions remain to be addressed. Are the collateral behaviors generated within group contingencies limited to one situation, or will peers provide supportive behavior across diverse responses, settings, or over time? What role does back-up reinforcement play in the frequency and distribution of supportive behaviors across group members? Also, how can consumer adaptation information lead to interventions that are more effective and acceptable? Studies that address these questions may lead to the development of procedures that are more beneficial for their consumers.

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