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PYRAMID TRAINING OF ELEMENTARY SCHOOL TEACHERS TO USE A CLASSROOM MANAGEMENT "SKILL PACKAGE"[1]

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Three regular elementary teachers were trained in the use of a classroom management "skill package". Subsequently, each of these three teachers (tier 1 of training) trained three more teachers to use the same skill package (tier 2 of training). Direct behavioral measures of student disruptiveness were taken in the three tier-1 classrooms and four tier-2 classrooms, and permanent product measures of student productivity in arithmetic were taken in the three tier-1 classrooms. Results indicated that student disruptiveness decreased at least as much in the tier-2 classrooms as in the tier-1 classrooms. Data also indicated that serving as trainers benefited two of the tier-1 teachers who profited least from the original training by producing further reductions in disruptiveness in their respective classrooms. Productivity data suggested that use of the "skill package" increased classroom academic output, especially for those students below the median in productivity during baseline. The investigators' time investment in training a tier-2 teacher was one-fourth that of training a tier-1 teacher.

DESCRIPTORS: academic behavior, classroom discipline, classroom management, disruptive behavior, skill training, skill package, role playing, teacher training, elementary school teachers

The present study explored the pyramid model of training as a means of increasing the cost-efficiency of training elementary school teachers in the use of a classroom management "skill package". The study builds on previous work by the Classroom Management Training Project (CMTP) at the University of Rochester School of Medicine and Dentistry, which has had as its objective the development of social-skills oriented classroom management procedures and performance oriented teacher training procedures (Jones and Eimers, 1975; Jones and Miller, 1974). Previous research has demonstrated the utility of training teachers to use a comprehensive package of classroom management skills using role-playing as a training medium to provide skill practice and immediate corrective feedback. The present study extended previous work by developing and testing procedures for pyramid training of relatively large numbers of teachers. Using the pyramid training model, (Fremouw and Harmatz, 1975; Whalen and Henker, 1971), teachers who were trained by the investigators (tier-1 teachers) then served as trainers for a second group of teachers (tier-2 teachers) after having been given an additional brief course in "coaching" skills.

Pyramid training of classroom teachers in the present study attempted to multiply the efforts of an outside consultant or "expert" while building an in-house "expertise hierarchy", which included master teachers in the behavioral domain.

[1]This research was conducted in the Rochester City School District, Rochester, New York. The authors are indebted to the principals of the participating schools, Norman Martin and William Price, for their generous support. The authors also wish to thank those teachers who participated in the program and the teacher's aides who collected the behavioral data. Reprints may be obtained from Fredric H. Jones, Department of Psychiatry, University of Rochester School of Medicine and Dentistry, Strong Memorial Hospital, 300 Crittendon Boulevard, Rochester, New York 14642.

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This pyramid model of teacher training, therefore, had two primary objectives: (a) to reduce the cost per teacher trained to a level that is "cost realistic" within the normal budgetary constraints of school districts, and (b) to build an institutional structure to ensure quality control and maintenance of change, as the role of the outside consultant diminishes.

An additional issue related to pyramid training was the possible contribution of the "helper principle" to the performance of teachers serving as coaches. Since any pyramid training program has built into it the possible contribution of the "helper effect" for those teachers who serve as coaches for other teachers, the present study examined the effects of pyramid training on the performance of the tier-1 and the tier-2 teachers. The "helper effect", first noted by Riessman (1965), provides empirical support for the familiar adage that "one of the best ways to learn something is by teaching it". In a study by Fremouw and Harmatz (1975), the use of speech-anxious subjects as coaches or helpers in the subsequent training of additional speech-anxious subjects in a sample of college students appeared to facilitate change in the helpers. Controlled studies of both peer-teaching and cross-age teaching at the elementary and junior-high school levels (Cloward, 1967; Harris and Sherman, 1973) have demonstrated significant improvements in reading and mathematics for both the tutors and tutees in these programs. At the college level, in studies examining the proctoring component of the Personalized System of Instruction (PSI), Fremouw, Millard, and Donahoe (1976) and Nelson and Scott (1972) have shown that undergraduates who taught introductory psychology learned the material better than their students or a control group of psychology majors. Although potentially powerful in its implications, the "helper effect" has received relatively little attention in the behavioral literature until recently (Flowers and Guerra, 1974; Fremouw and Harmatz, 1975; Rakos and Schroeder, Note 1).

Finally, in addition to assessing the feasibility of pyramid teacher training and the potential contribution of the helper principle, the present study was designed to provide information on two secondary issues concerning the CMTP skill package. First, the present study systematically separated room re-arrangement plus skill modelling from skill practice via role-playing, two aspects of the skill package confounded in previous CMTP research. The present study, therefore, provides information on the relative contribution of these skill-package components to reducing classroom disruptiveness. Second, the present study was conducted in predominantly black ghetto elementary schools, whereas previous CMTP research had been carried out in the suburbs. The present study therefore provides information on the "robustness" of the CMTP skill package in such supposedly difficult settings.

METHOD

Subjects and Setting

Subjects consisted of the teachers and students of seven regular elementary school classrooms located within two "inner-city" schools of the city school district of Rochester, New York. These schools were designated arbitrarily as School "A" and "B". Both schools were situated in urban renewal areas and were surrounded largely by decaying and abandoned houses, low-income housing projects, vacant lots, and settlement houses. In School A, the four classrooms observed ranged from second through fifth grade. In School B, one first-grade and two second-grade classrooms were observed. All teachers were solicited by their respective school principals to participate in exchange for in-service training credit. The principals selected teachers whom they felt would benefit most from the training and who also displayed some interest in being trained. Participating teachers had an average of 6.3 yr of teaching experience, with a range of 1 to 15 yr. Two teachers were black females, three were white females, and two were white males. The students were predominantly black and lower to lower-middle

class. The median number of students per class across all seven classrooms was 21, with a range of 16 to 27. Classrooms utilized a traditional, rather than an open, format for "core" subjects with students usually either studying at their seats, being "drilled" by the teacher in small groups, or participating in group exercises led by the teacher.

Design

The experiment used a pyramid model of teacher training. According to this design, the investigators trained an initial group of three teachers (tier 1 of training), and each of these three teachers subsequently trained three additional teachers (tier 2 of training). Consequently, 12 teachers were trained in all, three from tier 1 and nine from tier 2. Two of the tier-1 teachers came from School "A" and one from School "B". Behavioral data were taken for all tier-1 teachers and for two tier-2 teachers from each school. For purposes of notation, teachers are referred to first by school ("A" or "B"), then by their tier ("1" or "2"), and finally by subnumeral "1" or "2" to arbitrarily distinguish teachers within the same school and tier. Thus, a teacher from School "A" who participated in tier 1 of training would be designated as teacher $A1_1$ or $A1_2$. A schematic for this pyramid training design is presented in Figure 1.

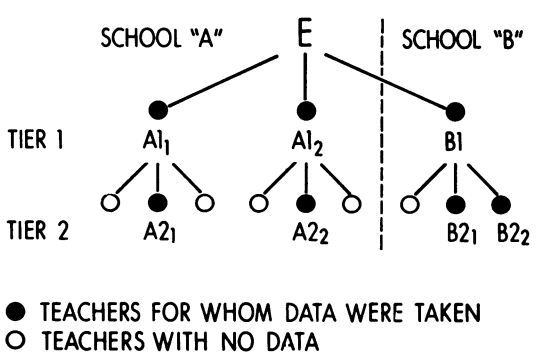

Fig. 1. Schematic of teacher training pyramid in which tier-1 teachers were trained by the experimenters (E), and tier-2 teachers were trained by tier-1 teachers.

Behavioral Assessment and Reliability

Disruptive student behavior was scored in all seven classrooms during a half-hour seat work period in which students independently worked on arithmetic problems. Behaviors chosen to be scored were (1) talking to neighbors and (2) out of seat, since they represented the majority of disruptive events in these classrooms and occurred at high rates. Student behaviors rather than teacher behaviors were scored in this study due to their ease and economy of scoring. Previous research (Jones and Miller, 1974) showed student disruptiveness to correlate above 0.90 with critical classes of ineffective teacher behavior that were systematically altered by training.

To maximize reliability of scoring, "talking to neighbors" and "out of seat" were scored sequentially rather than simultaneously. Indigenous teacher's aides took data in each classroom during a 17-min segment of seat work beginning approximately 3 min after the teacher had finished giving instructions to the class. "Out of seat" was scored during minutes 1, 5, 9, 13, and 17, and "talking to neighbors" was scored during the 3-min time segments separated by the scoring of "out of seat" (*i.e.*, minutes 2 to 4, 10 to 12, and 14 to 16).

The definitions of "talking to neighbors" and "out of seat" were the same as those used in previous CMTP research (Jones and Eimers, 1975). "Talking to neighbors" was scored when a student conversed with a nearby student, yelled across the room, or made an audible remark to no one in particular "Out of seat" was scored whenever a child was not sitting at desk, unless conferring with the teacher or an aide.

A modified event recording system identical to that used in previous CMTP research (Jones and Eimers, 1975) was again employed for tallying "talking to neighbors", since it proved to be both simple and maximally sensitive to the changing classroom environment. Each observer divided the room roughly in half and scored behavior occurring only in a given half of the room during any 3-min time segment, with the

observed half being alternated in each of the four successive 3-min time segments. The observer made six scans per minute, scanning half of the classroom in a standard fashion for 5 sec beginning each 10 sec. During each scan, the scorer tallied the number of students "talking to neighbors". Using this system, the theoretical maximum for a given day's tally would be three per minute per child.

"Out of seat" was tallied three times per minute during five nonconsecutive minutes. During each minute, the observer scanned the whole classroom in a clockwise fashion for 5 sec, rested for 15 sec, and then repeated this procedure two more times to complete the minute of "out-of-seat" observation. Using this system, the theoretical maximum for a given day's tally would also be three per minute per child.

Seven indigenous teacher's aides, who served as primary observers, were trained to a criterion of 90% correct on both dependent variables. Each observer was trained in the classroom with immediate feedback for their scoring from the investigators in three 1-hr training sessions. Observers were systematically rotated among participating classrooms insofar as the scheduling of the aide's duties would permit, and 30% of all data points were double scored to minimize observer drift and maximize observer conscientiousness. Participating aides were given no information concerning the nature and purpose of the research. Reliability for both dependent variables was checked at least once weekly in each room, and reliability assessment was evenly distributed across scorers. Reliability scoring was performed by an independent scorer standing at least 1.5 m from the primary observer and reading from a separate stopwatch following initial collaboration.

The reliability index used was the per cent agreement between the primary observer's and the independent observer's frequency totals for each dependent variable for a given class on a given day (dividing the smaller total by the larger total). For "talking to neighbors", the mean reliability across all seven classrooms was 91%, with a median of 89% and a range of 67 to 100%. For "out of seat" the mean reliability was 92% with a median of 92% and a range of 50 to 100%.

Productivity Assessment

Student productivity was assessed for the students in the three tier-1 classrooms on the basis of permanent products. Permanent product output was collected for the arithmetic period, during the same period when behavioral data were collected. Since curriculum materials were different for each of the three classes, units of productivity are idiosyncratic to each class.

In classes $A1_1$ and $A1_2$, the number of arithmetic *units* completed by each student per week was the measure of academic productivity. An arithmetic unit was composed of 10 to 12 workbook pages on a given topic; units were arranged in ascending complexity so that they became more difficult as the year progressed. Unit tests were scored by the teachers, and a student could not progress to the next unit until the previous unit test had been completed to a criterion of 80% correct. In Class $B1_2$, students completed individualized work sheets and did not have a unitized curriculum comparable to Classes $A1_1$ and $A1_2$. Therefore, the teacher recorded the number of arithmetic problems that each child completed correctly per day.

The baseline period for productivity assessment was the same as for the behavioral assessment (Weeks 1 to 6 beginning in November). This period followed the time in which students reviewed the previous year's work and included only units containing new material. Postbaseline assessment of student productivity was divided into one seven-week and one nine-week period (Weeks 7 to 14 and Weeks 15 to 23). The time during initial teacher training was used out of necessity because Classroom $A1_1$ completed their unitized materials in the fourteenth week of the study, precluding any further assessment in that room. Consequently, the time periods for the productivity assessment do not exactly correspond to the time periods of the behavioral data.

Assessment of student productivity in the previously described manner introduced several conservative biases into the data. First, the curriculum materials became more difficult as the students progressed through their workbooks or worksheets, so that completion of a unit or problem became increasingly difficult as the school year progressed. Second, the rate of absenteeism increased during the winter months that coincided with the postbaseline periods. Because individual attendance records were inaccurate, the daily rate of productivity was computed on the basis of the total number of school days possible regardless of the number of days any child actually attended. And third, a conservative bias was deliberately introduced into the computation of units completed. During the baseline period, units partially completed were rounded off to the nearest one-quarter unit, whereas, during postbaseline assessment periods, partially completed units were rounded downward to the nearest one-half unit. The productivity data, therefore, provide a rough but conservative index of the effect of teacher training on student productivity.

Procedures

Since tier-2 teachers could not be trained until tier-1 training was completed, teacher training for tier-1 and -2 teachers was staggered in time typical of a multiple-baseline format, with tier-1 and tier-2 teachers serving as multiple subjects. However, baseline assessment began later for tier-2 teachers than for tier-1 teachers for logistical reasons, and this difference in time of onset of baseline assessment is at variance with traditional multiple-baseline designs. Also, tier-2 training was staggered in time betweeen Schools "A" and "B", also for logistical reasons, and this sequencing of training provided additional demonstration of the effects of training.

In school "A", baseline data were taken for six weeks before tier-1 training. Baseline was terminated by teacher training, which occurred once per week for six weeks (six training sessions). Following tier-1 training, followup data were taken for five weeks (Weeks 11 to 16) before the beginning of tier-2 training. During this first follow-up period, tier-1 teachers in school "A" were trained in "coaching skills" for three sessions toward the end of the followup period to enable them to conduct role-playing and give corrective feedback appropriately during tier-2 training. Tier-2 baseline began in the eleventh week of the program in school "A", and tier-2 training began in the sixteenth week.

The sequence of training in school "A" was essentially the same for tier 2 as for tier 1, with one exception. To assess the effect of room arrangement and the modelling of skills unconfounded by skill practice, Session 1 of training for tier 2 was conducted in the fourteenth week of the study, and during this session, rooms were re-arranged and all of the various skills of limit setting were explained and modelled. The trainees, however, did not have the opportunity to practise these skills until Session 2 in Week 16. This did not represent a loss of skill practice for the tier-2 teachers because Session 1 typically contains didactic material with modelling and only brief role-playing. This brief role-playing was made up in Session 2, which was lengthened. The separation in time between Sessions 1 and 2 to 6 for tier 2 served simply to supply a brief followup period for the orientation session to see if it constituted a major part of the intervention in its own right, apart from skill practice. Skill practice for tier 2 (Sessions 2 to 6) lasted for 4.5 weeks (five sessions) and terminated in Week 20. The second followup period in school "A" for both tier 1 and tier 2 began in Week 20 and lasted for 4.5 weeks.

The sequence of events was the same for training in school "B" as in school "A" except that the first followup period in school "B" between the training of tier-1 and tier-2 teachers was longer than in school "A". In school "B", this followup period between tier-1 and tier-2 training was 12 weeks as opposed to five weeks in school "A".

This sequence of events is unavoidably complicated due to the complex nature of the pyra-

mid training design. The time frame of the study relative to the various experimental conditions is clarified in the figures, since the abscissa is plotted in terms of successive days and weeks, rather than in terms of successive data points.

Experimental Conditions

Baseline. Baseline data were collected for tier 1 starting in November; tier-2 data taking began in January in school "A" and in March in school "B". Scorers were present in all of the classrooms for approximately two weeks before the taking of formal data, in order to train data takers and to enable teachers and students to adapt to the data takers. Teachers were instructed to ignore the data takers and to conduct their classrooms in their accustomed fashion.

Tier-1 teacher training. Intervention consisted of training teachers in the effective use of the CMTP classroom management "skill package" through the medium of role-playing (Jones and Eimers, 1975). The vehicle for role-playing was a mock classroom lesson in which participants alternated playing the roles of "teacher", "good student", and "bad student". In this role-playing situation, one person played "teacher" and attempted to conduct a lesson, one person played "good student" to serve as a "straight man", and the remaining participants played the part of "bad student". "Bad students" were instructed to engage in misbehavior typical of school children such as talking to neighbors, passing notes, getting out of seat, "hassling" each other, making "wise" or "smart" remarks or throwing objects. During role-playing, the trainer explained component skills of the "skill package" and how they followed each other in sequence, modelled the skills, and directed the feedback process to the "teacher". Skill training focused on integrating a broad range of specific skills within the context of both group discussion and seat-work lesson formats. Training may be conceptualized as having two major parts. The first focused on "limit-setting" within the context of a group discussion (Sessions 1 to 3), and the second focused on the prompting and differential reinforcement of on-task behavior within the context of a seat-work lesson (Sessions 4 to 6).

Training in limit-setting began with a brief discussion by participants of the kinds of problem behaviors typically found in their elementary classrooms and an explanation by the trainer of basic skills employed in effectively dispensing disapproval during a discussion. These skills included (a) a clear statement of format and behavioral rules before beginning, (b) early identification of potentially disruptive behavior, (c) quickness of responding but in an unhurried manner following the onset of disruption, so that the disruption was interrupted if possible, (d) a repertoire of brief, low intensity, nonperjorative verbalizations and gestures signifying that the student was out of order such as "just a second", "wait", "that's enough", or simply the child's name, (e) physical proximity to and orientation toward the offending student, and (f) assertiveness of gesture, facial expression, and tone of voice when signifying disapproval. Since physical proximity had been found to be important in both reinforcement and limit-setting, desks in the teachers' rooms were arranged in a "horseshoe" configuration near to and facing the main blackboard; following this re-arrangement, one of the fundamental skills practised was continually moving around the inside perimeter of the horseshoe so that the teacher could dispense both approval and disapproval at close range. An additional element of limit-setting was the use of timeout, which included the selection of a timeout area in each teacher's classroom, practice in sending students to timeout, and a conference with the principal to arrange adequate backup in cases of extreme provocation by students.

For training in skills of differential reinforcement, the focus shifted from a group discussion format to seat work and from "limit-setting" to reinforcement of "on-task" behavior. Arithmetic seat work was typically chosen as the vehicle for training by the teachers, since they reported having trouble during this period. Problems took the form of frequent disruptions while teachers attempted to give individual help

to students and a lack of motivation on the part of many students. However, the teaching of other subjects was also practised as the need arose. Initial training focused on increasing the rate of positive attention by teachers to students' on-task behavior while simultaneously employing the limit-setting skills as the teacher moved within the horseshoe. Next, skills of shaping "on-task" behavior were practised. These skills enabled the teacher to respond to children who were "stuck" and to build problem-solving skills in these students without relinquishing movement within the horseshoe, which was vital to limit-setting and approval of on-task behavior. Teachers typically reported that they spent most of their time in class giving prolonged (3 to 6 min) individual attention to relatively few students who were "stuck", often the same students every day. This, they reported, seemed incompatible with moving around the room to set limits or to give positive attention to students who were on-task. Teachers were instructed to structure the class period during transition so that students were required to stay in their seats and try to do problems, even when they encountered difficulty. The teachers were then coached to spend only 2 to 10 sec helping students who were "stuck" at any given time. Teachers were taught to reduce problems to a series of more simple component tasks, to prompt each successive component step effectively, to praise each completed step as the teacher came past the student's desk the next time, and to reinforce completion of the problem with additional time and attention. Due to the teachers' continual movement within the horseshoe, they could typically return to the "stuck" student every 1.5 to 3 min. In addition, methods of giving prolonged attention to an individual child when necessary without relinquishing limit-setting for the rest of the class were practised.

Followup #1 and "coaching training". Following tier-1 teacher training, the tier-1 teachers were instructed to lead their classes, using whatever skills they found helpful until the beginning of tier-2 training. In the weeks preceding their respective tier-2 training periods, each tier-1 teacher received three 1.5-hr training sessions, which focused on "coaching" skills, *i.e.,* specific skills used in conducting role-playing with trainees. This training had several aspects. The first and most important aspect was the process of giving corrective feedback. Prospective coaches were trained to give feedback in such a way that it was supportive, rather than aversive, so that coaches functioned as leaders of a group problem-solving effort, rather than as experts or answer givers or "know-it-alls". Steps in feedback were first to point out and praise any approximation of effective performance, then to ask the "teacher" to critique his or her performance, then to have the "students" describe the effect of the teachers' behavior on them, and then to elicit suggestions for effective teaching behavior from the group. Only at this point would the coach make additional suggestions, model a technique if necessary, and give stage directions to the "teacher" as to how to play the previous sequence or scene the next time it was re-enacted. At this time, any requests for a change in the "teacher's" behavior during the ensuing re-enactment were phrased as requests for an increase in behavior. Finally, it was the coach's task to structure a faithful re-enactment of the preceding interaction sequence to provide the teacher with an "instant replay" for practice. A second aspect of "coaching" skills training was the review of rationales for certain aspects of the "skill package", so that the coaches would have a "rap" to go along with training. A third aspect of training focused on constructive ways of dealing with anxiety about role-playing by participants. This included the coach taking the first turn, being patient and supportive, and limiting question asking in deference to actual practice. Finally, the fourth aspect of training was practice in fielding negative comments about training (*i.e.,* "Behavior Mod is mechanical and dehumanizing!" or "This just sounds like common sense".) so that the "coaches" could respond to such issues gracefully without feeling at a loss if so confronted.

Tier-2 teacher training. The skills taught to the tier-2 teachers were identical to those taught to the tier-1 teachers. Tier-1 teachers or "coaches" and the tier-2 teachers were given curriculum materials in the form of a 21-page (double spaced) booklet that contained an overall rationale as well as goals, procedures, training methods, and performance criteria for each of the six training sessions. In addition, before each training session, one of the investigators held a 30-min "prep" session with each coach to review the curriculum materials, to role-play fine points of the lesson, and to deal with any problems that the coach might be having with his or her group. At the request of the coaches, the investigators were not present at the actual training sessions.

RESULTS

Disruptive Student Behavior

Figures 2 and 3 show the decrease in "talking to neighbors" for all classrooms in which data

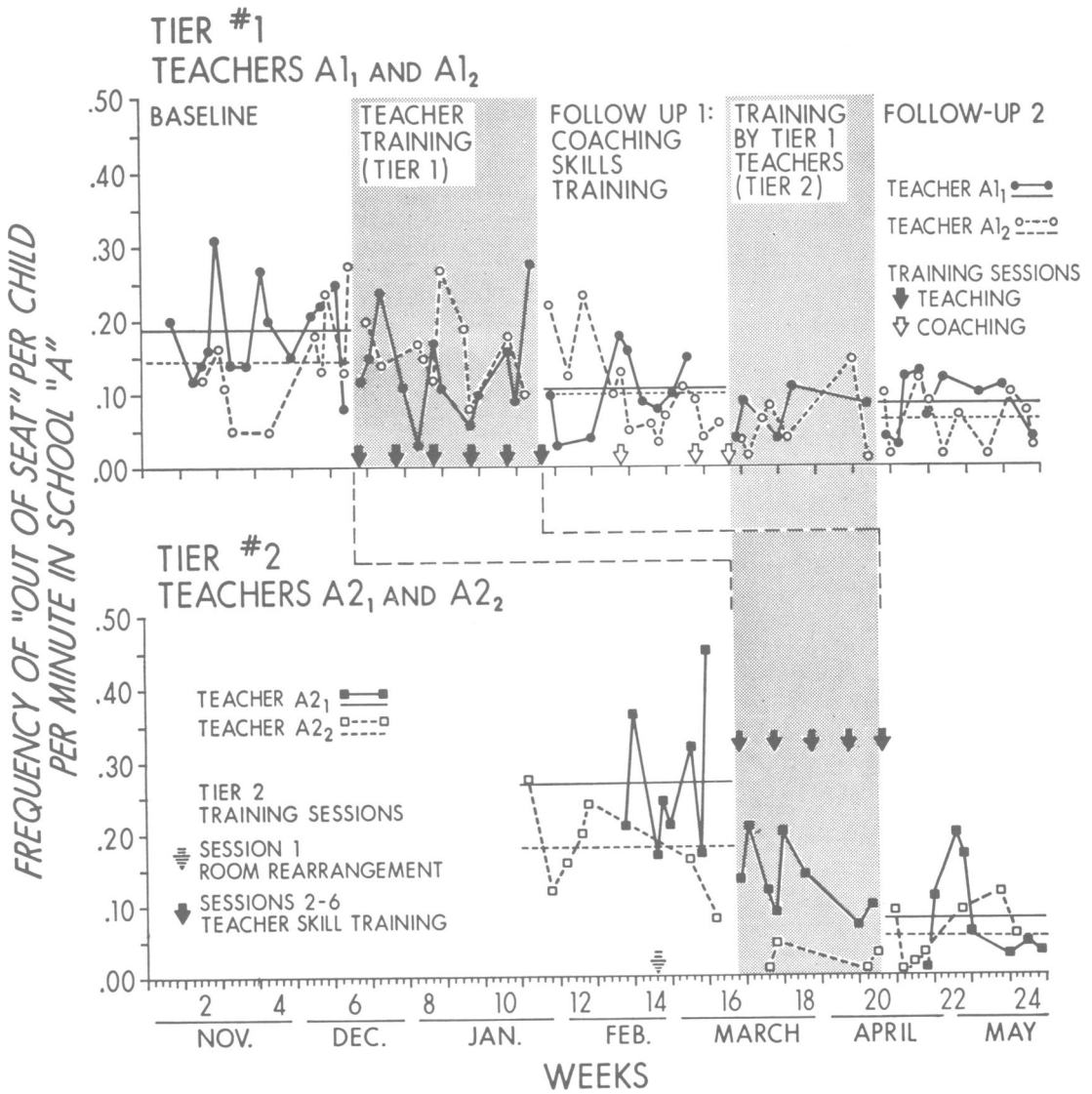

Fig. 2. Frequency of "talking to neighbors" per child per minute for tier-1 and tier-2 teachers in school "A" across treatments.

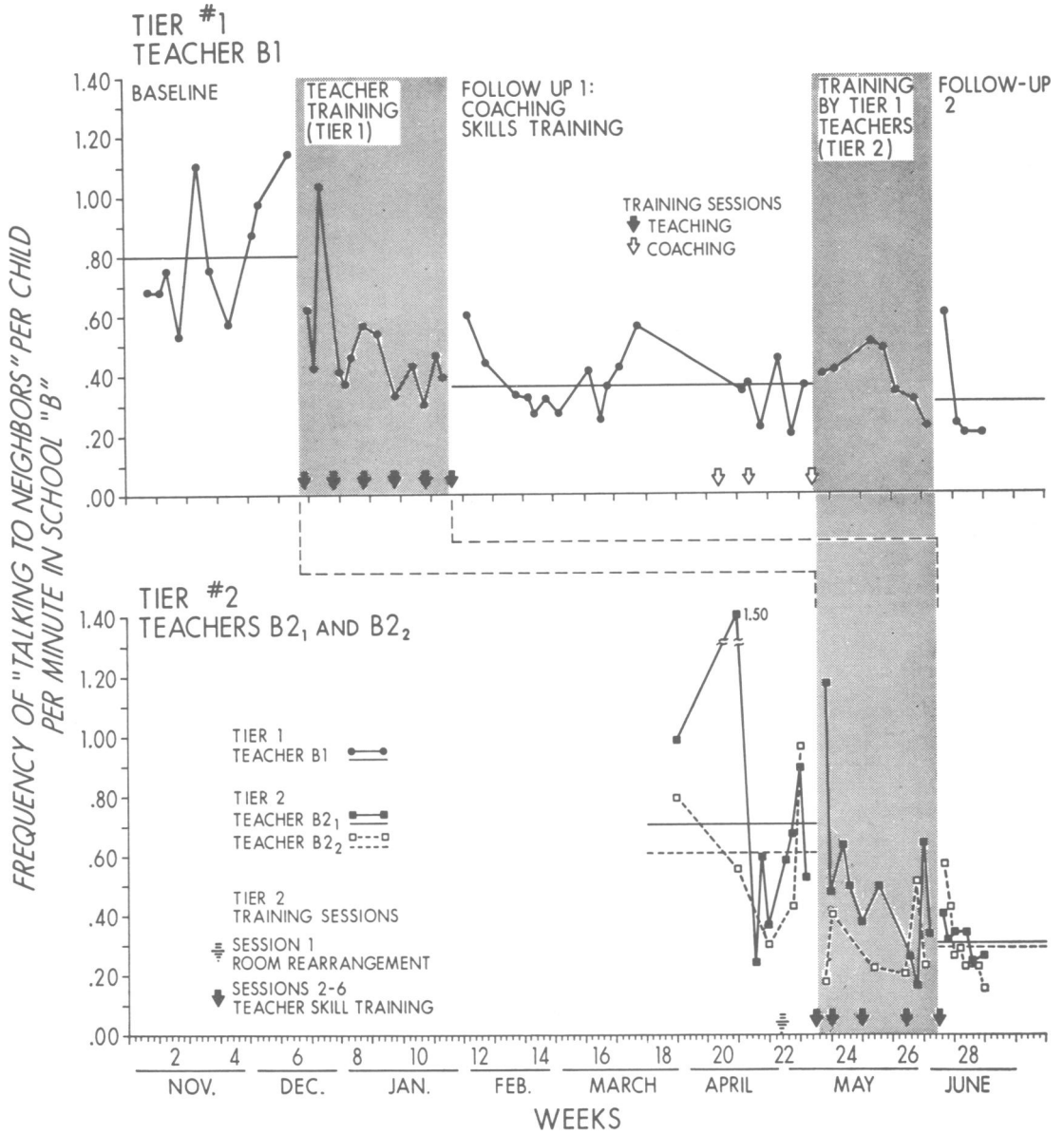

Fig. 3. Frequency of "talking to neighbors" per child per minute for tier-1 and tier-2 teachers in school "B" across treatments.

were collected. The ordinate represents the frequency of "talking to neighbors" per minute per child and the abscissa represents successive days and weeks of the program. For the three tier-1 classrooms, the mean levels of disruption are shown for the baseline, posttraining, and postcoaching periods. "Talking to neighbors" decreased for the students of teacher $A1_1$ from a baseline average of 0.55 per minute to a postcoaching average of 0.31 per minute (56% of baseline). The posttraining average of 0.52 per minute (95% of baseline) shows that the frequency of "talking to neighbors" changed only slightly after the initial training period, with most of the change occurring following the coaching period. "Talking to neighbors" for the students of teacher $A1_2$ decreased in a more stepwise fashion beginning with a baseline aver-

age of 0.55 per minute, a posttraining average of 0.37 per minute (67% of baseline) and postcoaching average of 0.23 per minute (42% of baseline). A third pattern of change occurred in the class of teacher B1, where "talking to neighbors" decreased mostly during the training period. The frequency of "talking to neighbors" for the students of teacher B1 decreased from a baseline average of 0.80 per minute to a posttraining average of 0.36 per minute (45% of baseline) and a postcoaching average of 0.31 per minute (39% of baseline).

"Talking to neighbors" decreased in the four tier-2 classrooms at least as much as in the tier-1 classrooms. In school A, "talking to neighbors" decreased for the students of teacher $A2_1$ from a baseline average of 0.42 per minute to a posttraining average of 0.17 per minute (40% of baseline), and students of teacher $A2_2$ decreased from 0.52 per minute to 0.15 per minute (29% of baseline). In school B, rates for students of teacher $B2_1$ decreased from 0.70 per minute to 0.31 per minute (44% of baseline), and students of teacher $B2_2$ decreased from 0.61 per minute to 0.31 per minute (51% of baseline).

Figures 4 and 5 show the decrease in "out of seat" for all seven classrooms, with the ordinate representing the frequency of "out of seat" per minute per child and the abscissa representing days and weeks of the program. "Out of seat" decreased in classrooms $A1_1$ and B1 most during the training period and only slightly thereafter. In classroom $A1_2$, "out of seat" decreased in a more stepwise fashion across conditions. The frequency of "out of seat" decreased in classroom $A1_1$ from a baseline average of 0.19 per minute per child to a posttraining average of 0.10 (53% of baseline) and a postcoaching average of 0.09 (47% of baseline). Rates in classroom B1 decreased from 0.30 during baseline to 0.06 following training (20% of baseline) and 0.04 following coaching (13% of baseline). Classroom $A1_2$, in contrast, decreased from 0.14 per minute per child during baseline to only 0.10 following training (71% of baseline) and then to 0.07 following coaching (50% of baseline).

"Out of seat" decreased in all four tier-2 classrooms as well. The frequency of "out of seat" decreased in classroom $A2_1$ from a baseline average of 0.27 per minute per child to a posttraining average of 0.08 (30% of baseline), and classroom $A2_2$ decreased from 0.18 per minute per child during baseline to 0.06 following training (33% of baseline). For classroom $B2_1$, "out of seat" decreased from 0.47 during baseline to 0.14 (30% of baseline), and classroom $B2_2$ decreased from 0.26 to 0.08 (31% of baseline).

Student productivity. For each tier-1 classroom, student productivity in arithmetic was assessed for a baseline period (Weeks 1 to 6), a first postbaseline assessment period (Weeks 7 to 14) and second postbaseline assessment period (Weeks 15 to 23). These data are summarized in Table 1.

The data were first analyzed to determine the per cent of students who increased their rate of productivity above baseline during each of the two postbaseline assessment periods. During the first postbaseline assessment period, 67% of class $A1_1$, 8% of class $A1_2$, and 62% of class B1 accelerated the rate of arithmetic units completed to criterion. During the second postbaseline assessment period, productivity increased further so that 56% of class $A1_2$ and 80% of class B1 were completing more work than during baseline (class $A1_1$ had changed curriculum materials by this time).

Data were further analyzed to see whether there was any differential increase in productivity between the "slow" and "fast" students of each class. Students in each class were rank-ordered in terms of baseline productivity, and the classes were divided into upper and lower halves. These results consistently showed that more students in the lower half of the classes improved than in the upper half. In class $A1_1$, during the first postbaseline assessment period (before their change in curriculum materials), 56% of the upper half and 78% of the lower half of the class showed accelerated productivity. In class $A1_2$, although negligible acceleration in productivity occurred during the first postbase-

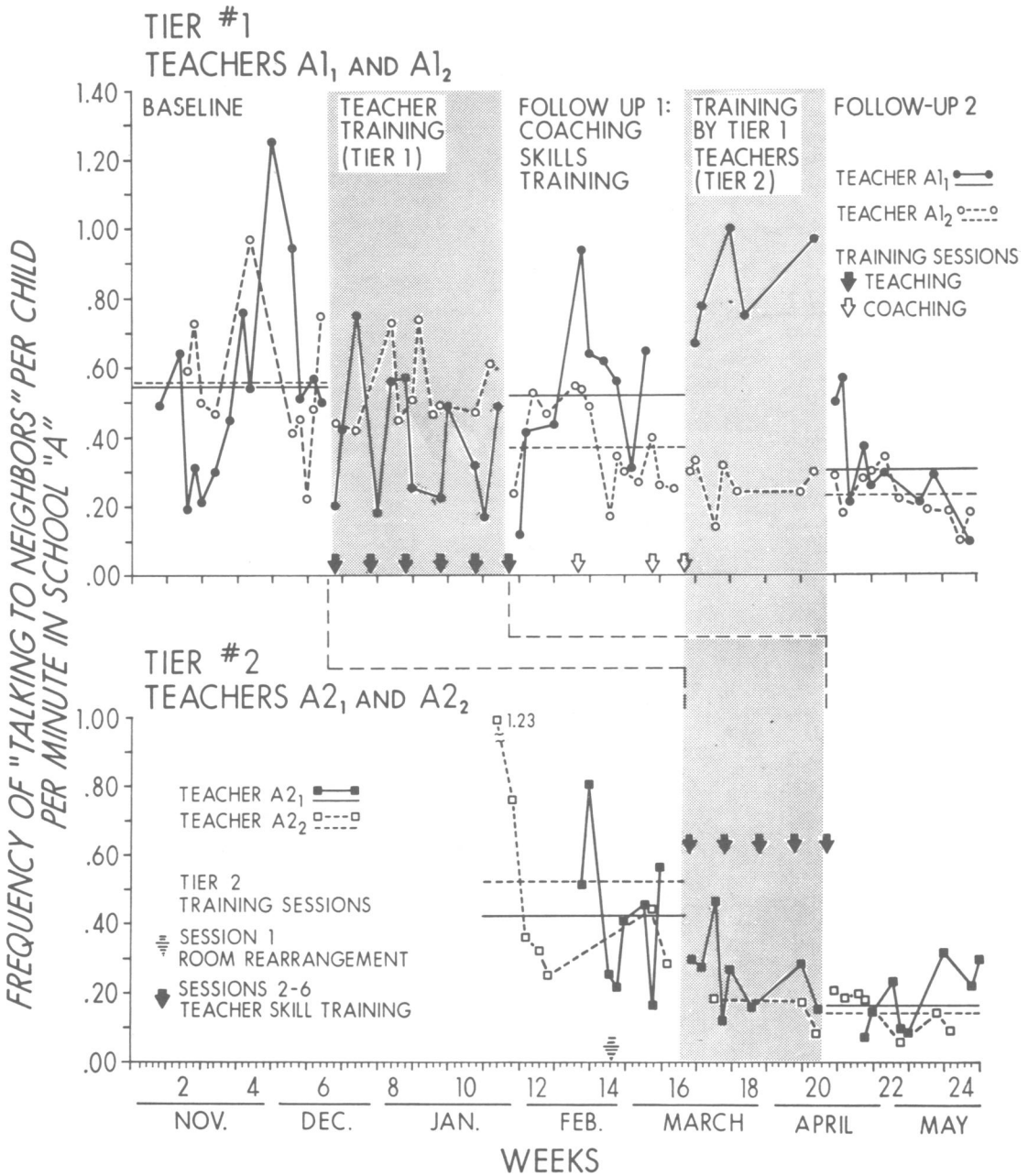

Fig. 4. Frequency of "out of seat" per child per minute for tier-1 and tier-2 teachers in school "A" across treatments.

line assessment period, 9% of the upper half and 100% of the lower half showed acceleration during the second postbaseline assessment period. In class B1, 50% of the upper half and 73% of the lower half showed acceleration in productivity during the first postbaseline assessment period. These figures increased to 60% of the upper half and 100% of the lower half during the second postbaseline assessment period.

As a means of assessing the interrelationship between student productivity and classroom disruptiveness, productivity and behavioral data

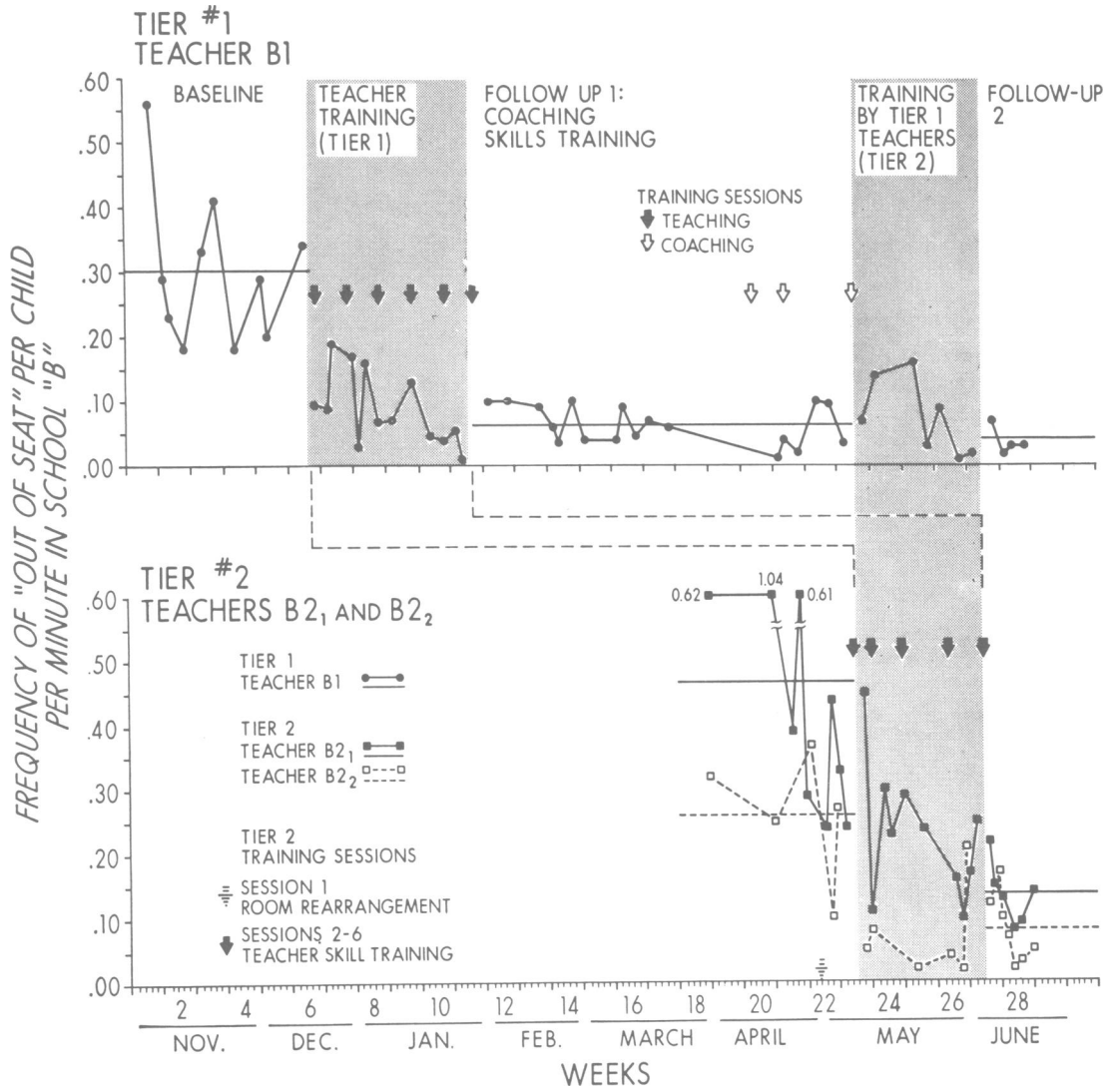

Fig. 5. Frequency of "out of seat" per child per minute for tier-1 and tier-2 teachers in school "B" across treatments.

were compared for the tier-1 classrooms during the baseline and the first and second postbaseline assessment time periods. The productivity measure was the mean output per child per time period in each class (units completed per child in classes $A1_1$ and $A1_2$ and problems correct per day per child in class B1), and the measure of student disruptiveness was the mean number of disruptions per child per time period summing "talking to neighbors" and "out of seat". All classes demonstrated a negative relationship between student productivity and classroom disruptiveness. For class $A1_1$, productivity increased by 20% from baseline to the first postintervention assessment period, while disruptiveness decreased by 23%. (No further productivity data were available for teacher $A1_1$.) For class $A1_2$, most of the improvement in behavioral data occurred during the second postbaseline assessment period. During this time, productivity increased by 25% and disruptiveness decreased by 46%. For teacher B1, the most dramatic shift in the behavioral data came between baseline and the first postbaseline assessment period:

Table 1

Per cent of students increasing productivity from baseline (Weeks 1 to 6) to the first postbaseline assessment period (Weeks 7 to 14) and to the second postbaseline assessment period (Weeks 15 to 21).

Class		N	Weeks 7-14	Weeks 15-23
$A1_1$	>Md	9	56	No Data
	<Md	9	78	
	Total	18	67	
$A1_2$	>Md	11	0	9
	<Md	12	16	100
	Total	23	8	56
B_1	>Md	10	50	60
	<Md	11	73	100
	Total	21	62	80

productivity increased by 17% and disruptiveness decreased by 52%.

Secondary findings. In addition to studying the process of pyramid training *per se,* the present study also replicated the effectiveness of the basic CMTP skill-training package and extended previous research apart from pyramiding. Extensions of previous work included (a) the systematic separation of room re-arrangement and modelling of skills from actual skill practice in tier 2, and (b) the use of CMTP procedures in supposedly "difficult" ghetto schools.

In tier-2 classrooms, room re-arrangement and modelling of limit-setting skills preceded the first training session by 2.5 weeks in school A and 1.5 weeks in school B. This intervention is indicated by the hash-marked arrows on the abscissas of Figures 2 to 5. No sizeable or systematic effect of this intervention is observable.

Inspection of Figures 2 to 5 also shows CMTP skill training to be generally effective in the 12 ghetto classrooms that participated in this study, with the possible exception of the class of teacher $A1_1$, which did not show significant improvement until after tier-2 training. This level of effectiveness of the CMTP skill package is consistent with previous research in suburban schools.

DISCUSSION

The present study demonstrated that, with the aid of adequate curriculum materials and coaching, regular elementary school teachers trained in the use of the CMTP "skill package" could train colleagues to a high level of proficiency in the use of a complex set of classroom management social skills. The separation of room rearrangement and skill modelling in tier 2 underscored the central importance of skill practice, relative to structural or modelling components in CMTP classroom management training. The success of the pyramid training program was all the more impressive because training took place in ghetto classrooms and because followup data for tier 2 were taken in the last two weeks of the school year, when students and staff were eager for vacation to begin.

Data from the present study also provided information concerning the possible contribution of the "helper effect" on the performance of teachers who later served as coaches. The effect of the initial training and the subsequent experience of coaching produced widely varying patterns of change in the students' behavioral data. Class $A1_1$ did not show its major improvement until after coaching, whereas class $A1_2$ showed a stepwise improvement across treatments and class B_1 showed its major improvement after initial training. Perhaps the most parsimonious conclusion to draw from these findings is that serving as a coach tended to benefit most those who profitted least from the initial training. This benefit derived from coaching might be attributed either to the experience of coaching itself, or to the concentrated review and additional skill practice that occurred in the prep sessions conducted by the investigators before each coaching session. An additional source of help for the coaches, which probably affected the data, was the availability of the investigators during prep sessions to give support and to troubleshoot interpersonal difficulties that arose during tier-2 training. These "personnel management" functions of the investigators were particularly

important for teacher A1, who became extremely discouraged during tier-2 training due to the disruptiveness and unwillingness to role-play of one of his tier-2 trainees. This experience underscores the risk factor inherent in peer training and the critical role of the consultant in preventing the training process from "going sour".

A basic implication of the above findings is that the cost of teacher training can be significantly reduced through the use of pyramid training, while at the same time improving the skills of the tier-1 teachers and establishing them as master teachers in the behavioral domain. The reduction in cost per teacher trained in terms of hours of outside consultant time purchased by the district was reduced from tier-1 to tier-2 training by a factor of 4:1.

Increases in student productivity were also noteworthy. These findings are similar to earlier findings obtained in a middle-class suburban elementary school setting (Jones and Eimers, 1975), which showed the slower students to be the greatest beneficiaries of their teacher's training. In addition, in the present study, the time periods of greatest increase in productivity roughly corresponded to the time periods of greatest behavioral improvement for each class. While the many conservative biases present in the data mitigate against these results being spurious improvements in productivity, the lack of control data renders these findings suggestive only. Unfortunately, finding control classrooms matched for both grade level and curriculum materials was not feasible.

While the success of the pyramid training model in the present study has important cost implications for training teachers in complex classroom management skills, it has equally important implications for maintaining effects after training. Pyramid training, in addition to producing skillful teachers, produces an "in-house" expertise hierarchy comprised, at the very least, of trained teachers and their coaches. This expertise hierarchy provides the structural bases for periodic feedback and refresher training within a continuing education framework. In CMTP teacher-training programs underway in a nearby regional special-education facility, this commitment to quality control has been extended to include training of educational and psychology resource personnel to carry out all executive and personnel management functions, which were performed by the investigators in the present study. These include coaches' training, training data takers and reliability assessment, coordinating formal data taking by teacher's aides, conducting periodic informal observations of teachers' performance in the classroom, counselling when interpersonal difficulties arise during training, and conducting periodic feedback and refresher training for participating teachers.

In the present study, the emphasis in measurement was primarily on counterproductive student behavior and secondarily on productive student behavior. Teacher behavior was monitored by the investigators only informally during weekly classroom observations, and these observations served to focus subsequent feedback and skill practice. The time has perhaps come to re-order these measurement priorities and the investment of resources that they imply toward a primary emphasis on the measurement of student productivity and the development of simple measures of teacher behaviors to aid quality control in the field. These emphases are reflected in CMTP research now in progress. The authors also wish to stress that the "skill package" is an evolving and growing set of procedures that must be adapted to fit specific settings and educational objectives. It is not incompatible with any other incentive system and may be best employed as part of a more comprehensive incentive structure in some settings.

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