*TRAINING ELEMENTARY AGED PEER-BEHAVIOR
MANAGERS TO CONTROL SMALL GROUP PROGRAMMED
MATHEMATICS¹*

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The effects of a training procedure and two maintenance contingencies on consequence-dispensing behavior were investigated. Four peer behavior managers were trained to supervise small groups of subjects (four to six per group) working in programmed math materials and were compared with a teacher skilled in the use of social and point reinforcement and response cost. Manager training was differentially effective in accelerating manager's rates of appropriate social and point dispensing. Having manager reinforcement contingent upon manager consequence-dispensing resulted in moderately higher rates of appropriate social and point dispensing for three of four subjects than did having manager reinforcement contingent upon group study behavior. Two managers exposed to the group performance contingency before the manager performance contingency increased inappropriate social and point-dispensing behaviors to pretraining baseline levels. Subsequent change to the manager performance contingency was effective in reducing the inappropriate dispensing behavior of only one of the two managers.

Researchers concerned with the problem of maintaining treatment effects produced in natural settings have suggested the training of social agents within the natural setting to initiate and carry out behavioral intervention (Hartmann, 1970; Patterson and Brodsky, 1966; Patterson, Cobb, and Ray, 1973). Social agents (*e.g.*, parents, teachers, and peers) who are "naturally" in control of reinforcers and punishers, remain in the life setting after treatment is completed and can foster maintenance of gains due to their natural and continuing proximity to the target subject. Tharp and

Wetzel (1969) formalized a triadic intervention model whereby the experimenter trained a "mediator", (*e.g.*, parent, teacher, or peer) to implement a behavioral program designed to modify the deviant behavior of the target or referral subject. With such an intervention model, it was possible for the experimenter to forego interaction with the change target since treatment was implemented and monitored completely by the trained mediator.

Early use of the "triadic intervention model" was demonstrated by Ayllon and Michael (1959) and by Williams (1965). In the Williams study, parents were trained to ignore tantrum behavior of their child at bedtime. This procedure rapidly extinguished that behavior. Ayllon and Michael (1959) trained the nursing staff of a mental hospital in the use of extinction, record keeping, and in administering social reinforcers. These procedures were effective in modifying numerous patient behavior problems; *i.e.*, magazine hoarding, self-feeding, and psychotic talk.

More recent utilization of the triadic model has involved the training of teachers to effect behavioral change efficiently in their classrooms.

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Teachers have been trained to eliminate isolate play behaviors (Allen, Hart, Buell, Harris, and Wolf, 1964), increase attending and academic behaviors (Birnbrauer and Lawler, 1964; Broden, Bruce, Mitchell, Carter, and Hall, 1970), decrease disruptive classroom behavior (Hall, Panyon, Rabon, and Broden, 1968; Madson, Becker, and Thomas, 1968; Thomas, Becker, and Armstrong, 1968), and increase instruction-following behavior (Schutte and Hopkins, 1970).

Parents have similarly been trained to implement procedures to change their children's behavior. Allen and Harris (1966) reported the modification of excessive scratching behavior by training the mother to operate a token and social reinforcement system in the home. Mira (1970) described a similar parent training program in which the common procedure involved consultation with the parent without ever seeing the child. Researchers have also successfully trained parents in groups (Lindsley, 1970) and in the home (Zeilberger, Sampen, and Sloane, 1968) to implement and maintain treatment procedures.

Peer training strategies have focused primarily upon two procedures. The first procedure has used the target subjects' peer group, usually under the control of a group reinforcement contingency, to supply antecedents and consequences directed at modification of the target subjects' deviant behavior. Patterson and Brodsky (1966), Patterson and Reid (1970), Wahler (1967), and Walker and Hops (1973) have used this procedure to increase social interactions of subjects with limited social skills. Evans and Oswalt (1968) used a peer group reinforcement contingency to increase academic performance in low achieving subjects. The second peer control technique involves training a single peer to modify the behavior of other individuals through the differential application of consequences. Lovitt, Lovitt, Eaton, and Kirkwood (1973) modified the rate of "nasty comments" made by a subject by training a preferred peer to ignore and move away from the mis-

behaving subject contingent upon such behavior. Surratt, Ulrich, and Hawkins (1969) trained a peer to operate an apparatus that differentially reinforced "working" behavior of four subjects. Phillips (1968) and Phillips, Phillips, Wolf, and Fixsen (1973) reported training a "peer manager" to dispense and remove points contingent upon appropriate cleanup behaviors of individual subjects in a home for predelinquent boys. Bailey, Timbers, Phillips, and Wolf (1971) used both group and individual methods of peer control to modify articulation problems of predelinquents.

To date, few studies have been reported in which peers have been used effectively to control academic responding; only one (Surratt *et al.*, 1969) trained the peer manager systematically to apply consequences to academic responding. The present study investigated the effects of a training procedure and two maintenance contingencies on peer managers' ability to apply social and token reinforcement and response cost contingencies differentially to fellow subjects working in programmed mathematics materials.

METHOD

Subjects and Setting

Twenty four subjects (21 male, three female) enrolled in a classroom for "behavior problem" and "unmanageable" children at the Garfield School in Salt Lake City, Utah, served. Subjects' ages ranged from 9 to 12 yr. IQ scores on several instruments ranged from 68 to 103. The subjects had been in a token economy classroom for approximately four months before the present investigation began (Greenwood, *unpublished*). The token system was designed to take advantage of Premack's Differential Probability Hypothesis (1959), which states that high-probability responses (*e.g.*, play) will function to reinforce low-probability responses (*e.g.*, academic responses) if made available contingently. The token system involved the use of two classrooms; one served as the "academic room" and the other as the "reinforcement" or

high-probability response room. The academic room contained desks, tables, and academic materials. The other classroom contained games, toys, arts and crafts materials, and personal toys brought by the subjects. Subjects earned points dispensed by the teacher contingent upon improvement in individually prescribed social and academic behaviors in the academic room. Twice daily the subjects had an opportunity to trade in the points for time (15 to 30 min) in the reinforcement room. There, subjects were managed during each reinforcement period by a teacher's aide. A subject could enter the reinforcement area at the appropriate time by paying an entry fee and selecting an activity from a list of items with which the subject could play during the time period.

During math, the subjects were divided into four groups according to performance on the Sullivan Programmed Mathematics Placement Test. Each group was homogeneous with respect to placement in the same skill level of the program; *e.g.*, Groups I, II, and III (level I—Basic Addition), Group IV (level II—Advanced Addition). Groups ranged in size from four to six subjects per group.

Selection of peer behavior managers. The manager selection procedure utilized by Phillips *et al.* (1973) was used with slight modification. In the Phillips *et al.* study, election of behavior managers by secret ballot was the most preferred method by peers of selecting managers. In the present study, it was presumed that subjects with (1) high rates of school attendance (few absences from school) and (2) high rates of correct responding in the programmed mathematics materials would make maximal contributions as peer managers. Based upon these criteria, two subjects from each of the four

academic groups were selected as candidates for the manager position. Elections, using secret ballot, were then held in each group. In reporting the election outcome, the teacher used the same criteria (school attendance and correct rate) to cast the deciding ballot when ballots were evenly split, as was the case for Groups I and II. This was done without knowledge of the group members or manager candidates. Groups III and IV elected their managers with votes of 5 to 1 and 6 to 0, respectively.

Sessions. As shown in Table 1, during the daily 75-min math period, all subjects rotated through three 15-min math sessions in different areas of the academic room and one 15-min session in the reinforcement room. For example, in one 15-min session, one group had math story problems at the table in the back of the room, the next 15 min were spent in the reinforcement room, the next with math worksheets at the round table, and the final session in a peer manager-conducted workbook session. This rotational scheduling of sessions ensured that only one manager-conducted session operated at a time. The experimental manipulations and observation of manager behavior occurred only during the 15-min in-seat Sullivan Programmed Math Workbook session for each of the four math groups.

Observation Procedures

Definitions of managing behavior. The definitions of managing behaviors are contained in Table 2. The definitions varied along two critical dimensions: (1) type of dispensing behavior; *i.e.*, social (praise), point, and response cost, and (2) appropriateness of the manager behavior determined by the student behavior upon which it was contingent.

Table 1
Scheduling of Academic and Reinforcement Sessions

<i>Time</i>	<i>Group I</i>	<i>Group II</i>	<i>Group III</i>	<i>Group IV</i>
8:45-9:00	SR+ Room	Manager	Story Prob.	Work Sheet
9:05-9:20	Story Prob.	Work Sheet	SR+ Room	Manager
9:25-9:40	Manager	SR+ Room	Work Sheet	Story Prob.
9:45-10:00	Work Sheet	Story Prob.	Manager	SR+ Room

Table 2
Definitions of Manager Behavior

	<i>Appropriate Dispensing</i>	<i>Inappropriate Dispensing</i>
Social	<ol style="list-style-type: none"> 1. <i>Verbal Statement</i>: "Good"—working, going, job, etc. 2. <i>Verbal Statement</i>: "Thank you for—" 3. <i>Verbal Statement</i>: "Yes, you may go, do that, ask Mr. G., etc." 4. <i>Verbal Contracting</i>: "If you do—those problems, work, etc., I will give points"—contingent upon (1) having slider in the right place, (2) pulling down to the line, (3) working, (4) raising hand, (5) working quietly, (6) in seat, etc. 	<ol style="list-style-type: none"> 1. Appropriate social dispensing statements contingent upon: (1) not working, (2) not attending, (3) slider in wrong position, (4) looking under slider, (5) talking aloud, (6) disrupting, (7) out-of-seat, (8) hitting, poking, etc. 2. Talking to Ss contingent upon responses other than hand raising. This does not include (1) instructions dispensed by the manager at the beginning of the session or (2) contracting statements made by the manager.
Point	<ol style="list-style-type: none"> 1. <i>Verbal Statement</i>: "Dave gets a point for: (1) having slider in the right place, (2) pulling down to the line, (3) working, (4) raising hand, (5) working quietly, (6) in seat, etc." 2. The manager is observed marking a data sheet contingent upon behavior 1-6, in item #1 above. 	<ol style="list-style-type: none"> 1. <i>Verbal Statement</i>: "Dave, you get a point" and S is (1) not working, (2) not attending, (3) looking under slider, (4) talking aloud, (5) disrupting, (6) out-of-seat, (7) hitting, poking, etc. 2. The manager is observed marking a data sheet contingent upon behaviors 1-7 listed in this cell. 3. The manager is observed marking a data sheet without a verbal statement describing the behavior reinforced.
Response Cost	<ol style="list-style-type: none"> 1. <i>Verbal Statement</i>: "Dave, minus a point for (1) not working, (2) not attending, (3) slider in the wrong place, (4) looking under the slider, (5) talking aloud, (6) disrupting, (7) out-of-seat, (8) hitting, poking, etc." 2. The manager is observed marking a data sheet contingent upon the 8 behaviors mentioned in number 1 in this cell. 	<ol style="list-style-type: none"> 1. <i>Verbal Statement</i>: "Dave, minus a point for: (1) having a slider in the right place, (2) pulling down to the line, (3) working, (4) raising hand, (5) working quietly, (6) in seat." 2. The manager is observed marking a data sheet contingent upon behaviors 1-6 in this cell. 3. The manager is observed marking point sheet without verbal statement describing the behavior being punished.

Data collection. Two observers were trained to record "dispensing behaviors" by observing a trained teacher conducting 15-min workbook sessions before baseline collection. An audio interval timer (Worthy, 1968) was used to signal 20-sec time intervals. The apparatus was equipped with two earphones so that the observers could receive simultaneous signals indicating onset of each interval during reliability checks. A data sheet designed to record appropriate and inappropriate social, point, and response-cost behaviors dispensed by managers or the teacher was used by observers, who marked all "dispensing" events observed during each 20-sec time interval. Forty five 20-sec intervals were used for 15 min total observation time.

Reliability Procedures

Interobserver reliability was obtained by having both observers record the same manager

throughout alternating sessions of the experiment. Observers checked reliability on 25% of the manager-conducted sessions over the entire investigation. The data sheets were compared, interval by interval, after the session. Intervals containing different frequencies were scored as "disagreements", whereas intervals containing the same frequencies were scored as "agreements". The interval agreement reliability method was used to calculate reliability measures ($100 \frac{\text{number of intervals agree}}{\text{number of intervals agree} + \text{number of intervals disagree}}$). Observers were trained until a criterion level of 85% agreement was reached.

One per cent agreement score was computed for each behavior during each condition, across all managers. Per cent agreement scores ranged from 82 to 100%, with a mean of 95%. In addition, the reliability of observations for each manager was separately examined behavior by

behavior. The total frequency scores of each observer for each behavior for each manager were ranked, and Spearman Rho correlation coefficients were computed to assess interobserver reliability. Rho coefficients ranged from 0.92 to 1.00, with no extreme differences noted across managers.

Design

A single-subject complex reversal design was used to evaluate the effects of training and maintenance procedures upon measures of social and token reinforcement and response cost dispensed by peer behavior managers to small groups of subjects working in programmed mathematics. The experiment was replicated four times using four different groups and four different managers. However, the order of exposure to the manipulations was not identical in all four cases.

Procedures

All four managers were exposed to two baseline conditions in which they each managed an academic group without formal training (B), alternating in ABAB fashion with two conditions in which the teacher served as manager (A). The four managers were then exposed to a manager training condition. After training, two managers (I and II) were randomly selected to receive a manager performance maintenance contingency (manager received points contingent on his performance), return to baseline, then a group performance maintenance contingency (manager received points contingent upon the group's behavior). Managers III and IV were exposed to the same conditions in a counterbalanced manner. Managers III and IV received the group performance contingency, followed by return to manager baseline, then the manager performance contingency. Manager IV was exposed to an additional training condition immediately following the manager performance condition.

Teacher baseline 1. Baseline 1 employed the teacher as the manager for each of the four study session groups. The teacher dispensed so-

cial, point, and response-cost consequences contingent upon the behavior of individual students. This condition served (1) to test the reliability of dependent variable measures, and (2) to produce "model data" for training peer managers.

Manager baseline 1. A 30-min meeting was held with the four peer managers the day before the start of the manager baseline condition. The four managers were given instructions by the teacher on how to (1) stand in front of the academic group in order to see the students working on their math materials, (2) mark the hand-held point sheet, mounted on a clipboard, to record point gain and point loss, and (3) verbally dispense praise, point gain, and/or point loss; e.g., "Good work, Dave! You get a point for working." Each manager was given an opportunity to practise each of the dispensing behaviors contingent upon the student behaviors contained in Table 2 (appropriate and inappropriate dispensing) while the other managers role-played students.

During each 15-min manager-conducted session, managers were free to manage their group as they pleased. Peer managers received feedback from the experimenter intermittently for standing in the correct position and for marking the point sheet correctly. No consequences were scheduled for peer dispensing behavior during this condition.

Teacher baseline 2. The teacher again dispensed social, point, and response-cost consequences to the four study groups.

Manager baseline 2. The peer managers resumed dispensing consequences for study behavior. The teacher continued intermittently to give feedback contingent upon correct standing position and correct marking of the point sheet.

Manager training. The teacher sat or stood near a small table in close proximity to each manager and his group in order to monitor manager and group behavior during the four manager-conducted sessions. The teacher dispensed (1) descriptive praise and (2) point gain for the manager contingent upon appro-

priate manager dispensing (see Table 2). Praise and points were arranged by the teacher on an approximate FR 1 schedule (*i.e.*, each appropriately dispensed consequence was praised and accredited a point by the teacher.) The points earned during the session were exchangeable by the manager during the group's scheduled time in the reinforcement room. Inappropriate manager dispensing was handled by the teacher simply modelling the correct dispensing behavior given the particular subject behavior that occasioned incorrect manager responses. Other inappropriate manager behaviors (*e.g.*, hitting, being late, threatening, *etc.*), resulted in loss of (1) the manager job for the day and (2) the points that had been earned by the manager during the session. Only one manager missed a scheduled manager session for reasons other than being absent from school.

An attempt was made during training to develop rates of manager behavior similar to those demonstrated by the teacher in teacher baselines 1 and 2.

Manager performance contingency. As in the training condition, the manager earned points contingent upon his dispensing behavior. However, during the manager performance contingency, the teacher arranged points and praise on a VI 2.65-min maintenance schedule by using an inexpensive kitchen timer to signal the end of each variable interval. The VI 2.65-min schedule was composed of intervals ranging in length from 30 sec to 5 min. The intervals were drawn at random and compiled on a roster used by the teacher each day. The sequence of intervals recycled every five to six sessions. It was possible for the manager to earn points four or five times during one 15-min period if appropriate dispensing behavior occurred no later than 10 sec after the bell sounded the end of an interval (10-sec limited hold). The teacher timed the 10-sec hold by watching the sweep second hand on the classroom wall clock, and then reset the kitchen timer for the next interval. Praise and points were dispensed to the manager for appropriate dispensing only dur-

ing the 10-sec limited-hold period. Inappropriate dispensing was ignored by the teacher. Perfect performance could earn a maximum of 120 points, which was based upon the highest number of points earned by a manager during the training condition. The 120-point total was prorated over the number of possible variable intervals for that particular session. For example, three of four possible intervals would pay the manager $(120/4)(3) = 90$ points.

Group performance contingency. In this maintenance condition, the manager earned points if all, or all but one, of the individuals in his group were involved in study behavior during the VI 2.65-min 10-sec limited-hold period. As the bell sounded the end of an interval, the teacher would observe the group and decide to dispense points to the manager if all or all but one of the students were in-seat, writing, correcting, raising hand, looking at materials, *etc.*, during the entire 10-sec hold period. Again, a manager could earn a maximum of 120 points given perfect group performance prorated over the number of variable intervals marked + during the period.

Manager baseline 3. This was the same as the prior manager baseline conditions, and preceded the final maintenance condition for all four peer managers.

Manager training 2. Manager III was exposed to the training conditions a second time in order to demonstrate experimental control of dispensing behavior.

RESULTS

The data for appropriate social and point dispensing are presented in Figures 1 and 2. Figure 1 contains the data generated by managers I and II, while data produced by managers III and IV are contained in Figure 2. Mean frequencies of appropriate dispensing are summarized for each manager over experimental conditions in Table 3.

Inspection of both teacher and manager baseline conditions (Figures 1 and 2) indicate that all four managers were consistently lower than

Fig. 1. Frequency of appropriate consequences dispensed by Managers 1 and 2 over experimental conditions.

the trained teacher in rates of social dispensing. Managers I and II appeared quite similar in mean rate but slightly more variable when compared to the teacher in the use of points to control student behaviors (Table 3). Manager III demonstrated variable rates of appropriate point dispensing, and Manager IV demonstrated very low rates of appropriate point dispensing when compared to teacher baseline performance.

Managers III and IV, in contrast to managers I and II and the teacher, generated consistently higher levels of inappropriate social (7.2 per session *versus* 1.9 per session, respectively) and point (41.1 per session *versus* 6.0 per session, respectively) dispensing behaviors during both manager baseline conditions. Both measures of response cost (appropriate and inappropriate) remained relatively low, ranging from 0 to 16

Fig. 2. Frequency of appropriate consequences dispensed by Managers 3 and 4 over experimental conditions.

per session, with a combined mean of 1.8 over the entire investigation with one exception. During manager baseline 2, manager I (Table 3) generated a relatively high rate of appropriate response cost (28.6 per session), which was dramatically and immediately reduced when manager training was introduced.

Manager training produced dramatic increases in the frequency of appropriate social dispensing for three managers and had little or no effect on manager IV. Point dispensing rates

during training remained relatively unaffected for managers I and II. Managers III and IV demonstrated increased appropriate dispensing with contrasting reductions in rates of inappropriate dispensing (3.8 per session social and 8.4 per session point). In general, the manager training condition produced selected changes in all four managers, bringing their dispensing behaviors in line with rates demonstrated by the classroom teacher during teacher baselines. However, training was effective in producing

Table 3
Mean Appropriate Dispensing Behavior of Four Peer Managers Over Experimental Conditions

	Manager	Teacher		Manager		Teacher		Manager		VI 2.65-		Manager		VI 2.65-		Manager Training 2
		Base 1	Base 1	Base 1	Base 2	Base 2	Base 2	Base 2	Base 2	min	Schedule	Base 3	Base 3	min	Schedule	
Social	1	73.2	6.5	102.8	0.3	74.0 M	33.5	64.2	62.3 G	—	—	—	—	—	—	—
	2	64.3	0.6	99.8	0.3	41.9 M	46.8	27.0	29.1 G	—	—	—	—	—	—	—
	3	71.3	57.3	95.5	48.7	145.3 G	125.4	82.2	159.0 M	—	—	—	—	—	—	—
	4	66.1	0.0	67.2	1.4	22.0 G	51.8	9.5	12.6 M	—	—	—	—	—	—	24.0
Point	1	63.3	50.8	65.0	62.1	78.6 M	58.5	67.4	65.8 G	—	—	—	—	—	—	—
	2	46.9	63.1	47.0	38.4	39.5 M	38.5	26.6	28.6 G	—	—	—	—	—	—	—
	3	57.0	30.7	53.7	30.1	59.9 G	64.5	49.2	78.6 M	—	—	—	—	—	—	—
	4	68.1	0.0	67.2	1.4	5.7 G	51.8	1.5	16.0 M	—	—	—	—	—	—	35.2
Cost	1	7.5	12.6	9.5	28.6	2.1 M	5.5	10.0	1.6 G	—	—	—	—	—	—	—
	2	3.1	5.0	3.6	1.0	0.1 M	2.0	0.6	0.4 G	—	—	—	—	—	—	—
	3	4.9	1.4	4.5	0.9	0.6 G	2.8	0.4	0.2 M	—	—	—	—	—	—	—
	4	5.3	11.7	1.0	0.4	1.1 G	1.6	0.8	1.6 M	—	—	—	—	—	—	0.2

M = Manager Performance Contingency
G = Group Performance Contingency

APPROPRIATE DISPENSING

overall rates of appropriate dispensing in only manager III, which closely approximated or exceeded the magnitude of those demonstrated by the teacher.

Managers I and II. Managers I and II received the manager performance maintenance contingency directly after training. Manager I showed generally higher rates of social and point dispensing than those generated during training. Manager II demonstrated virtually no change in social and point dispensing, maintaining rates produced during training. The switch to manager baseline 3 produced slightly reduced levels of social and point dispensing for the two managers (Table 3). Exposure to the group performance contingency was effective in maintaining social and point dispensing after the baseline condition, but at rates lower than those produced during the manager performance contingency (see Table 3).

Managers III and IV. Managers III and IV were exposed to the group performance maintenance contingency immediately following training. Rates of social and point dispensing showed declining trends, particularly with manager IV, dropping to near-zero levels by the end of the condition. Both managers showed increased inappropriate social (11.1 per session) and point (28.6 per session) dispensing during the condition. The change to baseline 3 conditions resulted in immediate drops in appropriate dispensing for manager III and no change in already near-zero rates for manager IV. Inappropriate dispensing continued unchanged during the baseline phase for both managers. Subsequent change to the manager performance contingency produced rates of appropriate dispensing for manager III higher than the previous baseline 3 condition and group performance contingency condition. Manager IV showed initial improvement then decreased to near-zero rates of appropriate dispensing in the last three days of the condition. Inappropriate dispensing for manager IV dropped dramatically from the previous condition (31.8 to 1.7 points per session, 13.0 to 3.1 socials per session). Manager III

dispensed fewer inappropriate points (18.7 per session) and twice as many socials (25.6 per session) during this condition than during baseline 3.

In summary, the manager performance contingency either increased rates of appropriate social and point dispensing (managers I and II) when compared to rates generated under previous conditions, or maintained increases produced during the training condition (manager I). In contrast, the group performance contingency either maintained lower baseline 3 rates of social and point dispensing (managers I and II) or produced decelerating rates of such behavior (managers III and IV) compared to the previous training conditions. Both managers III and IV showed increases in rates of inappropriate social and point dispensing with the onset of the group performance contingency. Later use of the manager performance contingency with managers III and IV reduced inappropriate dispensing of manager IV only.

An attempt was made in the remaining five days of the intervention to retrain manager IV. The training 2 condition produced only a small effect.

DISCUSSION

Each peer manager demonstrated manager behaviors (*i.e.*, social, point, and cost) differing both in rate and topography from the teacher during baseline, providing the teacher with a formidable problem in attempting to teach more effective consequating behaviors. Specific dispensing behaviors that required modification included: (1) the use of point consequences only, (2) the incorrect dispensing of appropriate point reinforcers (not providing verbal feedback to the subject or the group of subjects that they had earned a point and/or for what behavior the point was awarded), (3) social reinforcement of behaviors other than those pertaining to study behavior, (4) nonuse of social reinforcers (peer praise) for study behavior, and (5) high-rate use of punishment (response cost) for inappropriate study behaviors.

The manager training condition was effective in making the dispensing behaviors of all four managers more congruent with that demonstrated by a trained teacher.

The design of the present study, which involved counterbalancing the maintenance contingency conditions across managers and controlling the magnitude (120 points) and frequency (VI 2.65-min) of reinforcement, made possible the assessment of the maintenance effectiveness of contingencies on manager dispensing behavior after training. The manager performance contingency, where the manager earned points based on his dispensing behaviors, rather than the group's study behaviors, appeared to be the most effective maintenance procedure for three of the four managers.

Manager IV was least responsive to contingency manipulations after the training condition. The initial return of baseline dispensing rates for manager IV occurred with onset of the group performance contingency and continued with little change throughout the remainder of the investigation. The initial drop could be accounted for by the noncontingent nature of reinforcement on manager behavior during the group performance condition. However, later manipulations, including retraining suggested problems with ineffective back-up reinforcers, too large a delay in reinforcement, and perhaps the need for a manager response-cost contingency for incorrect or low-rate dispensing.

Subsequent research should look at the effects of a multiple or combined manager-group performance contingency system, in order for a balanced system producing optimal dispensing required for control and optimal study performance to be achieved. Additional consideration should be given to the effects of group *versus* individual delivery of reinforcement to subjects under manager control. In the present investigation, both the teacher and manager dispensed consequences contingent upon individual subjects' behavior as, for example, in Phillips *et al.*, 1973. However, the use of a peer-managed contingency system where the manager provides

consequences to the entire group rather than to individuals (Packard, 1970) seems worthy of investigation.

The present study demonstrated procedures that make the use of peers as behavior managers practical and possible in the classroom token economy. Particularly significant was the use of peers to manage academic responding during daily mathematics sessions, leaving the teacher intermittently free to assist students correcting tests or in need of individual help.

Manager control of programmed math groups was extended over a relatively long period of the school year (January through April) without loss of classroom control or academic responding (Greenwood, *unpublished*). Most dramatic, however, was the achievement of a peer control program with reportedly 'unmanageable', "uncontrollable" students who had been moved out of their regular school program.

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