6-1972

The Comparative Utility of Structured Lessons, Group and Individually Contingent Events, and Conditioned Reinforcers in Modifying Classroom Behaviors

James D. Long
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by James D. Long entitled "The Comparative Utility of Structured Lessons, Group and Individually Contingent Events, and Conditioned Reinforcers in Modifying Classroom Behaviors." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Educational Psychology.

Robert L. Williams, Major Professor

We have read this dissertation and recommend its acceptance:

William H. Conner, Robert G. Walker, Schuyle W. Huck

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

April 20, 1972

To the Graduate Council:

I am submitting herewith a dissertation written by James D. Long entitled "The Comparative Utility of Structured Lessons, Group and Individually Contingent Events, and Conditioned Reinforcers in Modifying Classroom Behaviors." I recommend that it be accepted in partial fulfillment for the requirements for the degree of Doctor of Education with a major in Educational Psychology and Guidance.

Robert L. Williams
Major Professor

We have read this dissertation
and recommend its acceptance:

William M. Cormier

Robert G. Walker

Vice Chancellor for Graduate
Studies and Research:

Hilton A. Smith

THE COMPARATIVE UTILITY OF STRUCTURED LESSONS, GROUP AND INDIVIDUALLY CONTINGENT EVENTS, AND CONDITIONED REINFORCERS IN MODIFYING CLASSROOM BEHAVIORS

A Dissertation

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

---

by

James D. Long

June 1972

ABSTRACT

A major purpose of the study was to assess the relative merits of group versus individually contingent consequences in modifying the classroom behavior of adolescents. Other major purposes were to determine whether student conduct would improve with the implementation of structured lessons and to ascertain whether improvements would occur with the awarding of points as a consequence for appropriate behavior without the use of backup reinforcers.

Eight students in an inner-city seventh grade classroom of 32 blacks served as the subjects. They were selected by the teacher as the most disruptive students who were in regular attendance. The eight subjects and the teacher were observed daily for 60 days in math and for 67 days in geography. Observation of students was conducted to determine the effectiveness of experimental conditions, while rating of teacher behavior was carried out to evaluate whether his behavior changed under the different treatments.

Treatments were applied successively in math and geography, and, except for the final phase in geography, a session in one class always corresponded to a session in the other class period. The phases were: math--baseline, geography--baseline; math--structured lessons, geography--baseline continued; math--group contingent free time, geography--structured lessons; math--structured lessons, geography--group contingent free time; math--individually contingent free time, geography--structured lessons; math--structured lessons, geography--individually contingent free time; math--points, geography--structured lessons; geography--points.

The structured lessons involved the daily specification of rules for classroom conduct and a mimeographed handout of the day's lesson being presented to each child as he entered the class. Subsequently, other consequences (e.g., group contingent free time) were simply added to or subtracted from the structured lessons. Under the individually contingent free time, any student could earn free time privileges (e.g., getting to talk with friends, study other lessons) contingent upon meeting a predetermined criterion of appropriate behavior. During the group procedure free time privileges were dependent upon the combined behavior of the class. The points phases consisted of students earning points for desired behaviors, but the points could no longer be used to purchase free time as had been the case under the individually contingent free time phase.

Line graphs were plotted to illustrate the percentages of appropriate behaviors of the subjects for each day of the study. Nonparametric statistics were also used to analyze changes in appropriate behavior as a function of experimental conditions. Tabular presentations and histograms were the primary methods employed in illustrating teacher behaviors.

Every treatment condition in math yielded statistically higher levels of appropriate student behavior than the baseline. Similarly, only the structured lessons in geography were not statistically different from baseline. The group and individually contingent consequences produced significantly higher rates of desired behaviors than the other treatments. The group procedure in math, but not in geography, was statistically

superior to the individually contingent free time. Overall, the class achieved the highest rates of appropriate behavior during the group contingent free time phases. Individually contingent free time ranked second in the production of positive effects. Points, structured lessons, and baseline yielded successively lower rates of desired responses.

Both the structured lessons and points phases resulted in increased percentages of appropriate classroom behaviors, but their power to modify student behaviors enough to establish a semblance of effective classroom control was not demonstrated. Although the group contingent consequences were found to be the most potent treatment, both group and individually contingent free time proved to be powerful techniques for a beginning teacher to use in improving and sustaining desired student behaviors. From the standpoint of teacher time, the group procedure appeared more efficient since consequences had to be dispensed only once for the entire class as opposed to awarding free time to 32 individual students. Finally, statistical analyses of results across math and geography revealed that treatment effects were highly specific to the setting in which they were applied.

TABLE OF CONTENTS

LIST OF TABLES

TABLE PAGE

LIST OF FIGURES

FIGURE PAGE

CHAPTER I

INTRODUCTION

An increasing accumulation of data indicates that classroom behaviors can be successfully managed through systematic control of important environmental consequences. There are, of course, many consequences that may be employed in managing a classroom and also different ways in which a given consequence may be applied. For example, some investigators have arranged teacher attention as a consequence for improving desirable behaviors (Becker, Madsen, Arnold, and Thomas, 1967; Cormier, 1970; Thomas, Becker, and Armstrong, 1968; Zimmerman and Zimmerman, 1962).

Similarly, token reinforcement programs were demonstrated to be effective consequences for increasing appropriate academic and social behaviors (Birnbrauer, Wolf, Kidder, and Tague, 1965; McKenzie, Clark, Wolf, Kothera, and Benson, 1968; O'Leary and Becker, 1968; Wolf, Giles, and Hall, 1968). However, many token programs have employed backup reinforcers such as candy, trinkets, and money, which were unnatural to the school setting. A more recent trend has been to employ tokens (e.g., points, check marks) which are exchangeable for special privileges, and free time activities that are readily available in any classroom (Osborne, 1969; Williams, Long, and Yoakley, 1972).

Self-determined consequences (Glynn, 1970; Lovitt and Curtis, 1969), peer attention (Solman and Wahler, 1970), and graphic feedback (Jens and Shores, 1969) are a few of the many other consequences shown to

be useful in modifying student behaviors. Several researchers have even demonstrated that a point system without backup reinforcers produced desired changes in pupil conduct (Jens and Shores, 1969; Jessee, 1971; Long, 1971; Sulzer, 1966; Sulzer, Hunt, Ashby, Koniarski, and Krams, 1971).

All of the preceding studies involved the administration of consequences on an individual basis. That is, whenever a single student met a predetermined criterion of appropriate behavior, he received the given consequences (e.g., teacher attention, free time activities). Under individual procedures each student stands or falls by his own performance. Some researchers, however, have arranged consequences contingent upon the combined behavior of a group of persons. Typically, with this arrangement, inappropriate behavior by any member of the group results in the loss of desired consequences for every member of the group.

A recent study (Hamblin, Hathaway, and Wodarski, 1971) compared the academic achievement of elementary students under three types of group contingencies with their achievement under individual contingencies. Under the group contingencies the students received reinforcement (tokens with edibles, toys, and sundries as backup consequences) based on the average, high, and low academic performance of group members. For example, a mean test score of 50% resulted in each child receiving five tokens. Under the high performance group contingencies, the students were reinforced on the basis of the top three scores of the group. Thus, if the top scores averaged 90% each group member received nine tokens. Finally, the low performance condition consisted of students receiving reinforcement based on the bottom test scores. The findings revealed that, on the

average, students performed best under the low and high performance group contingencies. The slower students, however, improved least under the high performance group contingencies and by far reached their highest levels of achievement with the low group contingencies. The more gifted students did about equally well with the low and high group conditions. Data indicated clearly that the low performance contingency accelerated learning for all students more than individual performance contingencies. A second study by the researchers suggested that spontaneous peer tutoring was largely responsible for the acceleration of learning of the slower students under the low performance contingencies.

Other studies of group contingent consequences, while dealing primarily with controlling behaviors that interfere with learning activities, can be classified as low performance group contingenices. That is, reinforcement is dependent upon appropriate behavior of all students. Consequently, all members of the group stand to gain by the improved behavior of the most deviant group members (i.e., students with the lowest levels of desired behaviors). Group consequences, however, have generally been arranged in classes where the behavior of more than just a few students was deemed highly disruptive. For example, Schmidt and Ulrich (1969) investigated the efficacy of group contingent events in suppressing excessive classroom noise. These researchers arranged for a regular fourth grade class to receive extra gym time and a class break contingent upon the entire group maintaining an unbroken 10-minute quiet period as measured by a decibel meter. Transgression of a predetermined sound limit resulted in a delay of desired consequences by the resetting of a

timer to the full 10-minute interval. The study demonstrated that a group control procedure was an effective and practical method of suppressing and maintaining low sound intensities.

Another study (Sulzbacker and Houser, 1968) demonstrated that a group control procedure substantially reduced the frequency of undesirable behavior ("naughty finger") in a primary level classroom of mentally retarded. With the introduction of group contingencies, the emission of the unwanted behavior by any student resulted in the loss to all students of one minute from an anticipated 10-minute recess period. The study was unique in that it illustrated the advantage of employing natural social consequences of peer reactions (which the researchers contended was maintaining the undesirable behavior) to decelerate inappropriate actions. Peers who had previously giggled or commented about the "naughty finger" discontinued such behavior under the group contingencies.

Other researchers have also documented the utility of group consequences. For example, in an experiment by Barrish, Saunders, and Wolf (1969) a good behavior game involving group competition between teams of students was used to reduce out-of-seat behavior and disruptive verbalizations. Special privileges (e.g., winner tags, lining up first for lunch, a free time period) were awarded to the team with the fewer number of penalties for inappropriate conduct. Both teams received the consequences if neither team exceeded five penalty points. Another experimenter, Keefauver (1970), used a special 10-minute game period as a group contingent event to substantially reduce the disruptive behavior of fourth grade students. The studies by Keefauver and Barrish et al. show explicitly that

group privileges available in almost any class can be successfully employed to control disruptive behaviors.

In yet another unique group contingency experiment, Packard (1970) utilized a timer and a light to control student conduct in four elementary classrooms. A timer ran so long as students were engaged in attending behavior (e.g., following teacher instructions, facing desk with eyes on book). The teacher stopped the timer whenever nonattending behaviors were observed. A light signaled transgressions. Special privileges were awarded dependent upon the group accumulating a set criteria of attending time. Data indicated that an elementary teacher can markedly increase paying-attention behavior of all her students by making special events contingent upon attending behavior of the group. Similar studies in junior high (Andrews, 1971) and elementary (Wilson, 1971) settings have further illustrated the effectiveness of group procedures. A major finding in the studies by Packard, Andrews, and Wilson was that group contingencies provide an efficient tactic for controlling the behaviors of an entire class without the use of contingent teacher approval. Thus, the procedure should prove especially useful where the teacher is disinclined to ignore inappropriate behaviors and praise appropriate responses or where adult social approval is not clearly reinforcing.

At least one researcher (Wilson, 1971) has assessed the value of group consequences in a team teaching situation. Wilson arranged for a team of four teachers with a class of 100 first graders to make a free time period contingent upon completion of assignments and an absence of disruptive behaviors by all students. Levels of desired social and academic behaviors increased significantly with the implementation of the

group contingencies, thus establishing a powerful means of managing the behaviors of a large group.

While numerous studies have been conducted to assess the relative merits of either group or individually contingent consequences, only two previous studies have investigated the efficiency of individual versus group consequences on the behavior of the same subjects. One of these studies (Hamblin, Hathaway, and Wodarski, 1971) consisted of experiments to evaluate the effects of group versus individually contingent reinforcement on the academic achievement of elementary students. Results suggested that group contingent consequences have some advantages (e.g., spontaneous peer tutoring of slow students) over individually contingent consequences in accelerating academic performance. The other study (Herman and Tramontana, 1971) compared the utility of group versus individual consequences in reducing disruptive behavior of matched groups of head start children. Only moderate behavioral changes were noted for both techniques until instructions were added to clarify the behaviors for which the children were receiving reinforcing consequences. Inappropriate behavior then dropped to near zero. Since there was a general absence of any inappropriate behavior under both the individual and group consequences with instructions, neither technique proved more potent than the other.

The purpose of the present study was to assess the effects of structured lessons, individually and group contingent consequences, and conditioned reinforcers on the behavior of a class of black students in an inner-city junior high school. The study was unique in several ways.

First, the structured lessons consisted of the teacher's providing a mimeographed handout of the day's assignment to each child as he entered the classroom. This procedure was introduced because high rates of disruptive student behaviors during the baseline conditions usually delayed the assignment of lesson activities from 10 to 15 minutes each class session. Additionally, to preclude the possibility that the students did not know what conduct was expected of them, rules were made explicit during the structured lessons. No other studies have examined whether expediting lesson assignments would produce behavioral changes. Certainly, if the structured lessons along (i.e., a handout of the day's assignment and rules of classroom conduct) could significantly improve classroom behaviors, the addition of other consequences would be superfluous.

Secondly, although two previous studies have provided evidence concerning the comparative effectiveness of group versus individually contingent consequences, no comparison of these techniques has been conducted at the junior high school level. Since most consequences are administered on either a group or individually contingent basis, the efficacy of the two approaches deserves further investigation at all grade levels. Simply stated, educators need to know which is the better program for the establishment of desired behaviors.

A third distinctive feature of the study was the evaluation of the effects of points with no backup reinforcers. Points in and of themselves probably have little value for altering behavior. However, most school children have had ample opportunity for points to have been paired

with grades, privileges, teacher approval, games, or other events that did have the capacity for modifying behaviors. Therefore, points should have become conditioned reinforcers (Skinner, 1953). In addition, points administered immediately following desired behaviors should serve as feedback to a child as to how well he is improving on specified behaviors. Thus, for many students knowledge of progress alone may be sufficient to increase and sustain desired behaviors. In the present investigation, points were paired with free time activities and then presented without backup consequences. The few studies that investigated points without backup consequences have indicated that points alone did yield at least temporary behavior changes. No previous studies, however, have evaluated whether the use of points alone in an inner-city school with highly disruptive students could produce even transitory changes.

Finally, the design of the present study included elements of both reversal and multiple baseline procedures. The design thus facilitated an evaluation as to whether behavior changes are specific to the environmental consequences or whether changes produced by a given consequence in one situation would generalize to another situation. Statistical analyses and single subject behavioral analysis were used for the results. A common criticism of previous classroom behavior management research has been the general failure to apply inferential statistics in the treatment of data (Birnbrauer, 1971).

The independent variable was the various treatment conditions (baseline, structured lessons, individually contingent free time, group contingent free time, points). The dependent variables were the frequency of designated student and teacher behaviors emitted per observation period.

CHAPTER II

METHOD

Subjects and Setting

The study was conducted in Lower East Tennessee, in an inner-city junior high school whose population was 99% black. Eight students (five males and three females) in a seventh grade classroom of 32 blacks served as subjects (Ss). All students in the classroom were several years behind in at least one subject area and had been grouped together because of low achievement. Additionally, the teacher categorized the class as being highly disruptive. Target Ss were selected by the teacher as being the most disruptive students who were in regular attendance.

The students were together with the same teacher from 9:45 a.m. until 12:30 p.m., Monday through Friday. The classes selected for observation were math (9:45-10:30) and geography (11:30-12:30). A lunch period separated the two classes.

Teacher

The teacher, a white, age 29, had received his B. S. in education the previous year and was in his first year of teaching. His class was selected because he was experiencing problems in managing classroom behaviors and wanted to participate in research on classroom control.

Observational Procedures

Two predata observations were employed to permit students to adjust to the presence of observers. Subsequently, two observers were present daily in each class (math and geography) for approximately 40 minutes. One observer recorded the behavior of the eight Ss and the other observer recorded the behavior of the teacher. Initially, two observers for each class were scheduled to observe on Monday, Wednesday, and Friday, and two on Tuesday and Thursday. During the final quarter of the study, two observers for each class were scheduled Monday through Friday.

In both math and geography, the same eight Ss were observed. A 10-second time interval assessment of behavior was employed with the observer recording one identifiable behavior at the beginning of every 10-second interval. The observer began with S1, recording one behavior every 10-seconds for two consecutive minutes. This process was followed until all eight Ss were observed and was then repeated, beginning anew with S1. Thus, each S was observed for four minutes in each class or a total of eight minutes daily. Observation of targets was systematically varied to ensure that no S was observed daily in the same sequence or at the same time. The Ss' behavior was recorded in the following categories, which was developed by Williams (1970):

A. Appropriate Behaviors

1. Tr--Task relevant: answering or asking questions (must be lesson oriented), writing when directed to do so, looking at book when directed to do so, hand raising to get teacher's attention, looking at teacher while he is lecturing, looking at another student who is

participating in lesson activity, and any other behavior that is consistent with the ongoing lesson.

2. S--Appropriate social interaction: includes talking, laughing, playing games, telling jokes, or just sitting at one's desk when students have not been instructed to engage in lesson activity and when these behaviors are not forbidden by the instructor. S behavior would usually occur during free time.

B. Inappropriate Behaviors

1. To--Time-off-task: just sitting at one's desk without appropriate materials or attempting to get appropriate materials, looking at non-lesson materials, gazing out the window or looking around the room when lesson activity has been assigned. The student, however, is not distracting another student by his inattention.

2. Disruptive behavior includes any behavior that disrupts the academic performance of another student.

M--Motor behaviors: getting out of seat, standing up, walking around, rocking in chair, moving chair, gesturing without talking, squirming in chair, exchanging looks with other student, tapping objects, or any disruptive movement.

N--Noise making: tapping feet, clapping hands, tearing papers, tapping pencil on desk, or any other nonverbal noise-producing behavior not directly involved in Tr or S.

V--Verbalization: crying, screaming, singing, whistling, laughing, coughing, or engaging in conversation (talking and listening) with other children when these behaviors are not consistent with Tr or S.

A--Aggressions: hitting, pushing, shoving, pinching, slapping, striking, playing with objects, grabbing objects from another child, or destroying objects.

C. ?--Questionable Behavior

Could not see student or see what student was doing.

Rating of teacher behavior was carried out to clarify the relationship between changes in teacher behavior and changes in student behaviors. Teacher behaviors in each class were logged daily for eight four-minute intervals. The behaviors of the teacher were recorded on the

basis of the frequency of specified behaviors directed toward target children. That is, the teacher was observed for four minutes consecutively for any interaction with S1, then for four minutes for any interaction with S2, and so on until being observed with each S. The same procedure was followed in both math and geography. Thus, the teacher was observed for a total of 64 minutes each day for the two classes combined. Teacher behaviors were recorded in the following categories, also developed by Williams (1970):

A. P--Verbal praise: "Fine job," "That's good," "Right," "Correct," "You're studying well," and similar remarks administered to a child for appropriate behavior.
B. S--Smile.
C. C--Contact: touching or patting the child when the intent is clearly positive.
D. H--Hovering: hovering over (but not touching) the child.
E. N--Negative attention: reprimands, criticism, threats, sarcasm, hard looks, shaking the head, striking the child.
F. ✓--All other social interaction: any other kind of social interaction between the teacher and student, initiated by either and considered neutral in tone. For example, looking at a student, nodding head, asking a question, giving a direction (e.g., "Go to the board," "Take question five") or listening to a child's comment or question.

Observer Training and Reliability Checks

Ten graduate and two advanced undergraduates served as observers. The observers were volunteers who received partial credit towards completing the requirements for courses in educational psychology.

Target student observers received training via a video tape of a simulated classroom situation. The trainer and observers viewed the

video tape while simultaneously logging one identifiable behavior at the beginning of 10-second intervals. The records of the trainer and observer were then compared interval by interval over 4-minute segments. An agreement occurred when the trainer and observer recorded the same behavior for the same interval. The percentage of agreement was determined by dividing the number of agreements by the total number of agreements plus disagreements. All observers for the study were required to achieve an agreement of 85% or better with the trainer on four 4-minute time segments.

Reliability of the target student observers was established at least twice for each observer. Ten-second intervals were recorded on a cartridge tape recorder equipped with a "Y" connector from which two ear plugs were connected. This permitted the experimenter (E) and the observers to make simultaneous but independent classroom observations. The classroom reliability checks were based on 32 minutes of observations. The results of these checks ranged from .88 to .97 (mean = .93). Table 15, Appendix A, contains the behavior rating agreement for E and target student observers for the training session and the classroom reliability checks.

The teacher observers received training similar to that of the target student observers. Subsequent to the training session, classroom reliability checks consisted of the E and observer making independent but simultaneous observations. Reliability was facilitated by the E and the observer using watches with sweep-second hands. Every four minutes, they synchronized their watches before independently observing the

teacher interacting with a new S. Table 16, Appendix A, provides the results of training and classroom reliability checks for the teacher observers.

Experimental Conditions

The overall procedure followed the standard intra-subject design where each subject acted as his own control (Sidman, 1960, pp. 317-340). Aspects of both reversal and multiple baseline were employed in the design. The reversal technique was employed to evaluate whether removal of an experimental condition would return behavior to its former state. Reversal to the baseline phase was not attempted, however, because of the undesirability of baseline conditions. Instead, there was reimplementation of the second experimental condition (structured lessons) following all but the final phase. The design involved a multiple baseline in that the same behaviors of eight separate individuals were concurrently measured in different situations (Hall et al., 1970). In using the multiple baseline across situation, experimental variables were applied successively to designated behaviors in the different situations. The combination of the techniques of reversal and multiple baseline was used to strengthen empirically the conclusions as to the reliability of the findings.

Data were recorded in math and geography during seven and eight experimental conditions or phases, respectively. Figure 1 gives a graphic delineation of the experimental conditions. These phases are described below.

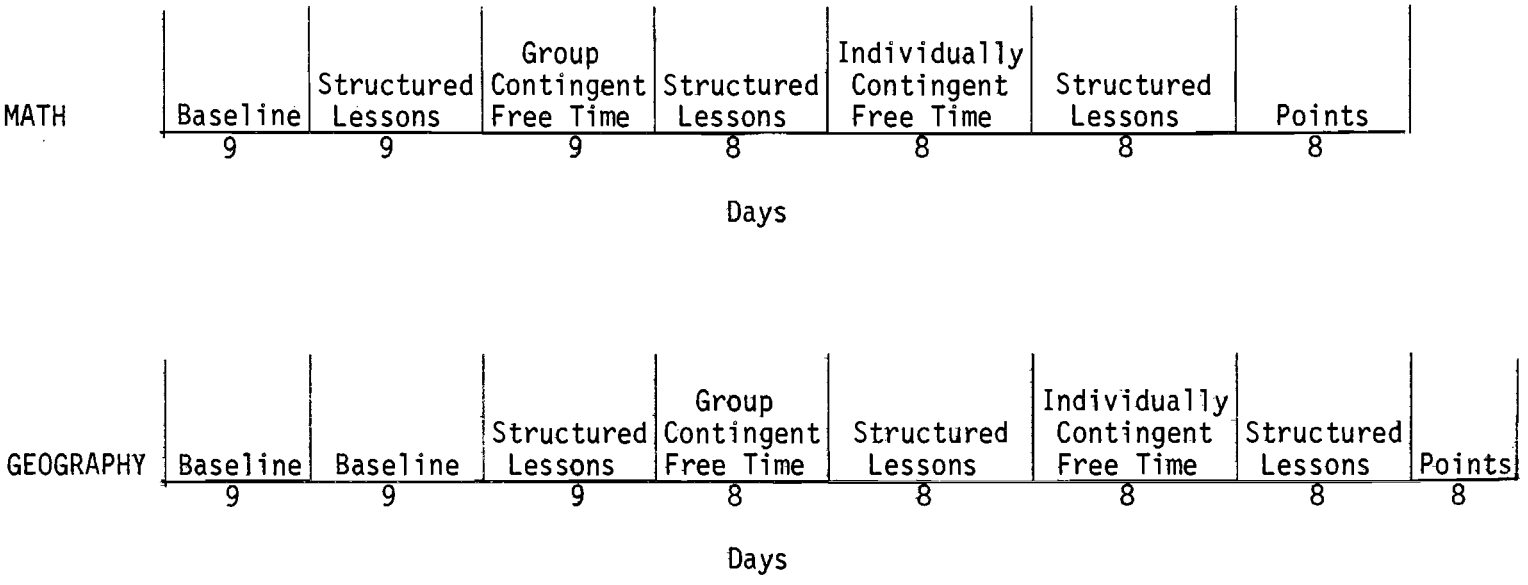

Figure 1. Delineation of experimental conditions in math and geography.

Phase I. Math, Baseline; Geography, Baseline

These corresponding baselines reflected the frequency of specified teacher and student behaviors under usual classroom conditions. The teacher was asked to conduct his classes according to his regular routine.

Phase II. Math, Structured Lessons; Geography, Baseline

During the second phase, structured lessons were introduced in math but not in geography. It became apparent in Phase I that the teacher was experiencing difficulty in getting lessons underway. Out-of-seat behaviors, late arrivers (a 5-minute break separated all classes), and disruptive behaviors usually delayed lesson assignments from 10 to 15 minutes. The lessons during math usually involved teacher lectures or the sending of students to the chalkboard to work problems. In all the structured lesson phases, the teacher was asked to stand at the classroom door and provide a mimeographed handout of the day's lesson to each child as he entered. The handouts were prepared to correct weaknesses evidenced in the preceding day's lessons and to teach basic course skills. Additionally, to preclude the possibility that students did not know what was expected of them, rules were made explicit during the structured lessons phases. The teacher was instructed to specify specific rules and to go over these rules sometime during the session every day. The rules were posted conspicuously in the front, side, and back of the classroom. These rules were:

A. Be in your seat and ready to start lesson by the time the second bell sounds.

B. Bring paper and pencil to class every day.

C. Work quietly, remain in your seat, and do not make unnecessary noise.

D. No chewing of gum.

Phase III. Math, Group Contingent Free Time; Geography, Structured Lessons

In the third phase, group consequences were added to the structured lessons in math whereas the structured lessons alone were implemented in the geography class. While group contingencies were in effect, a rotary-type file with 18 cards was mounted on the teachers desk and the students were informed:

> For the next few days we will be doing something different in class. You will be able to earn certain privileges by helping to make a better classroom. By obeying class rules [teacher discusses the rules which are specified above in Phase II] you can earn eighteen minutes of free time each day. However, the eighteen minutes of free time can only be earned if every student cooperates. Each time any student violates a rule, I will flip one of these cards, and the entire class will have one less minute of free time. For example, if a student is not in his seat when the second bell sounds, I will flip a card [demonstrate] and the entire class loses one minute of free time. Remember that every time someone breaks a rule, I will flip a card.
>
> We will stop the lesson activities near the end of regular class time so that you may use the minutes of free time showing on the last card that has not been flipped. During your free time period, you may engage in the following activities: talk with friends, play games, work on other assignments, read magazines and comics, play records, write on the chalk board, color, or spend your time in any activity which does not disturb others. [Games and toys requested and used by students during free time included: checkers, chinese checkers, yo-yos, pick-up sticks, play dough, cards, puzzles, coloring books, jacks, and bolo paddles. Other activities provided on certain days included: a cassette tape recorder for student use, a camera and films for students to make color slides, and showing of slides taken by students. A variety of magazines and comics was always available.]

Phase IV. Math, Structured Lessons; Geography, Group Contingent Free Time

During Phase IV, the group consequences were eliminated in math while being added to the previous condition in geography. The students were told in math that the former conditions were no longer in effect. Meanwhile, the geography class received instructions on group contingent free time.

Phase V. Math, Individually Contingent Free Time; Geography, Structured Lessons

In this phase, individually contingent consequences were added in math at the same time group contingent consequences were being withdrawn in geography. Individually contingent free time was implemented via a point system. Each pupil received a copy of the point system similar to that shown in Table 1. Points were assigned so that each pupil could accumulate 16 points daily. Students were instructed that they must complete their assignment and earn a minimum of 12 points before engaging in free time. The students maintained their own point sheet which was checked daily by the teacher before the student could participate in free time activities. During this phase, a kitchen timer was placed on the teacher's desk and set to go off every 6 minutes. Pupils who remained in their seats and worked quietly until the timer sounded were permitted to record 2 points on their sheets. Names of students not entitled to record points for a 6-minute period were placed on the chalk board.

Table 1

Point System

Earn Points		Days 1	2	3	4	5	6	7	8	9	10
1	Being Present										
1	Ready to Start Lesson										
2	Having Materials (Paper and Pencil)										
2											
2	Remaining in Seat and Working Quietly for _____ minutes.										
2											
2	Not Chewing Gum										
4	Completing Assignment										
	TOTAL										

Phase VI. Math, Structured Lessons; Geography, Individually Contingent Free Time

During the sixth phase, the math class was returned to the structured lessons condition. Correspondingly, individual consequences were implemented in geography.

Phase VII. Math, Points; Geography, Structured Lessons

In math, Phase VII consisted of reimplementation of the point system described above in Phase V (Math, Individually Contingent Free Time). However, under the new condition, the points earned had no exchange value. The seventh phase was undertaken to assess whether points had acquired the

status of conditioned reinforcers as a result of their previous association with free time activities. The teacher instructed the students to maintain their own point sheets as they had formerly done in math and geography. Students were also advised that points could not be used to earn free time and that the only purpose of the points was for the students' own information. In the meantime, the geography class returned to the structured lessons condition.

Phase VIII. Geography, Points

Lastly, the point stage was introduced in geography.

CHAPTER III

RESULTS

Data were analyzed by two methods. First, the rates of behavior under study were computed for individual Ss for each observational session, and averages were calculated for all the Ss combined. These rates of behavior were presented in discrete curves (line graphs) and/or in tabular form. Tabular data and the shape of the curves in the resulting figures indicated behavioral changes during the various phases of the experiment. Second, nonparametric statistics were used to determine the statistical significance of experimental conditions.

For the purpose of analysis, several behavioral categories were combined. For example, appropriate behavior included task relevant (Tr) and social behavior (S). In the statistical analyses and graphic presentations, these categories were grouped together. Also, the disruptive behaviors--motor (M), noise-making (N), verbalizations (V), and aggressions (A)--were combined for tabular presentation.

Group Data

Overview

The group achieved the highest rates of appropriate behavior during the group contingent free time phases. The individually contingent free time phases ranked second in producing positive effects. Points, structured lessons, and baseline yielded successively lower rates of desired behavior. The sequential effectiveness of the experimental

conditions was identical in math and geography. The reactions of the eight Ss to the study phases are shown in Tables 2 and 3 and in Figure 2.

Table 2

Comparison of the Mean Percentages of Appropriate Behavior (TR & S) for All Students

Treatment	Mean Percentages of Appropriate Behavior	
	Math	Geography
Group Contingent Free Time	80	74
Individually Contingent Free Time	77	70
Points	50	47
Combined Structured Lessons	40	32
Baseline	31	29

As can be seen from Figure 2, the average percentages of appropriate behavior during the baseline periods were extremely low. The group means of appropriate behavior in math and geography were 31 and 29%, respectively. The students talked incessantly and moved freely about the room. It was not uncommon for students to yell at one another or for a student to go to the windows and call out to someone on the playground. Students read comics and played with things at their desks. The teacher could scarcely be heard above disruptive noises and verbalizations. In Phase II, when the structured lessons condition was instituted in math, no noteworthy changes occurred. Appropriate behavior actually declined slightly.

Table 3

Group Mean Percentages for Each Phase

Behavior	Baseline	Struct. Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Math							
Task Relevant	30.46	28.65	58.74	48.06	55.40	40.45	49.32
Social	.41	.12	21.47	1.56	21.06	2.69	.86
Time-Off-Task	32.90	34.20	13.82	30.72	13.76	32.04	19.53
Disruptive	36.24	37.02	5.98	19.67	9.78	24.82	30.28
Geography							
Task Relevant	26.55	30.04	74.19	26.11	67.89	39.10	47.29
Social	2.44	1.28	.00	.00	2.29	.07	.00
Time-Off-Task	38.80	36.66	11.94	38.01	16.92	26.61	27.75
Disruptive	32.21	32.03	13.86	35.88	12.91	34.22	24.96

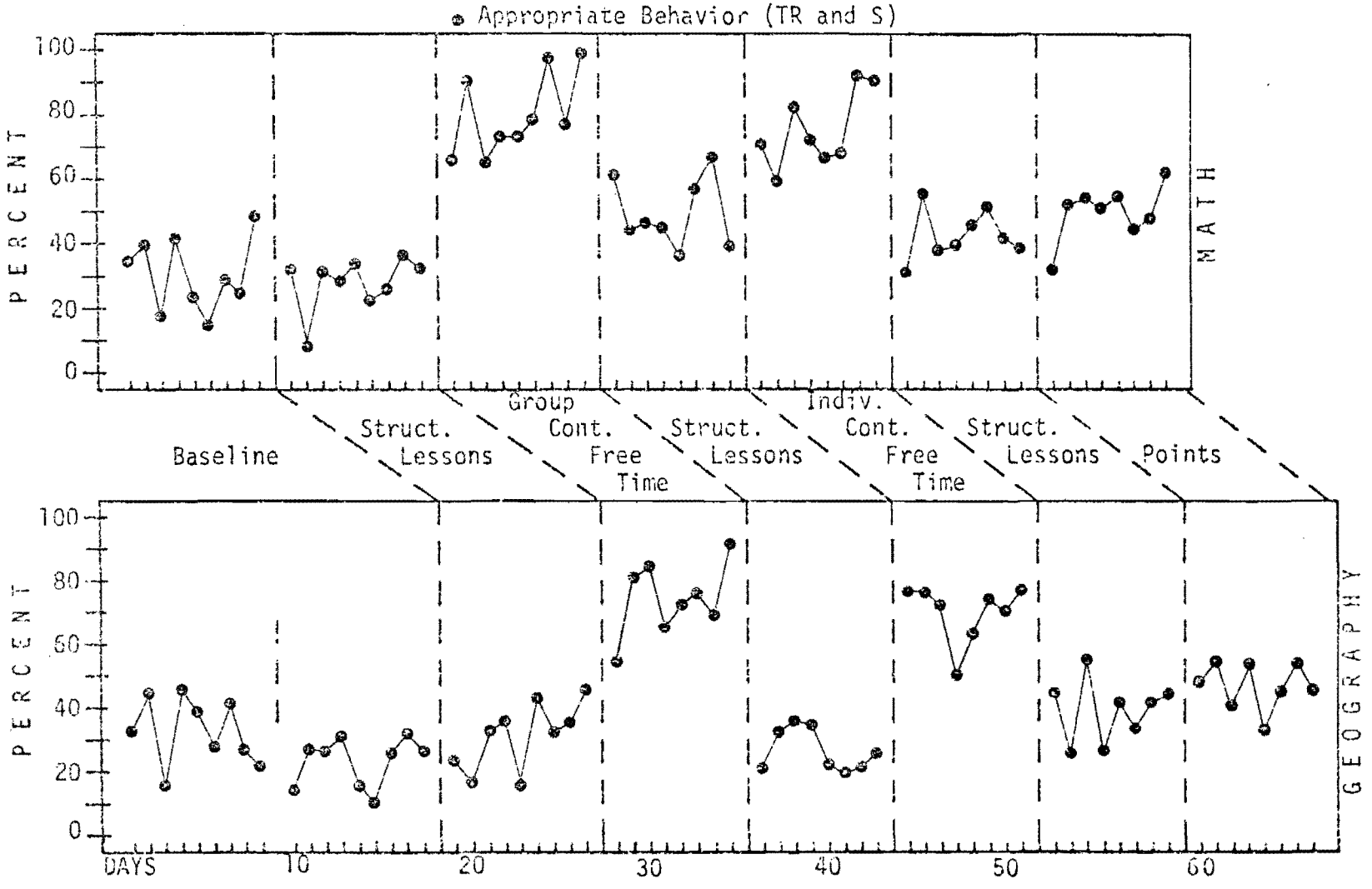

Figure 2. Group: Appropriate behavior as a function of experimental conditions.

Meanwhile, during the geography period, where baseline was still in effect, appropriate behavior also continued at low levels.

Only the introduction of group and individually contingent free time phases produced immediate and dramatic results. For example, in the third phase, when group contingencies were applied during math, there was a sharp rise in appropriate behavior. The daily mean of appropriate behavior during the math group contingent free time ranged from 65 to 98% (mean = 80%), while the daily rates of appropriate behavior during the corresponding structured lessons phase in geography ranged from 16 to 48% (mean = 31%).

During the fourth phase, group consequences were withdrawn in the math period. Consequently, rates of appropriate behavior declined to 50%. In the corresponding phase for geography, group contingent free time was introduced, and the students' appropriate responses climbed to a daily average of 74%.

In the next phase, individually contingent free time was instituted in math while the geography class returned to the structured lessons condition. A group average of 76% of appropriate behavior paralleled the implementation of individually contingent free time. The corresponding structured lessons in geography yielded an average of only 26% of appropriate behavior.

During the sixth treatment, individually contingent free time was withdrawn in math while simultaneously being initiated in geography. Group levels of appropriate behavior in geography increased rapidly to a daily mean of 70%. Conversely, the group sharply reduced appropriate responses in math to an average of 43%.

Progression to the final phase (points) in math increased the level of appropriate behavior approximately 7% above the preceding structured lessons condition. Concurrently, the geography class returned to the structured lessons following the removal of the individually contingent free time. During this phase the group reduced appropriate responding to 39%. When the geography class advanced to the final points phase, the group produced a daily mean of 47% of appropriate behavior. Although the group emitted far less appropriate behavior under the points phase than under the individual or group contingencies, the points conditions were more effective than structured lessons.

The graphic data indicate that the group and individually contingent free time had the most profound effects, since appropriate behavior remained markedly high only when they were in effect. High rates of desired behavior could not be maintained when these phases were withdrawn. Nor was desirable behavior high in concurrent phases which themselves lacked elements of group or individually contingent free time. Additionally, only the group and individually contingent free time significantly changed the relationship of the various classes of behavior. For example, inappropriate behavior over most phases was equally divided between time-off-task and disruptive behavior. However, during the group contingent free time in math, disruptive behavior was reduced to 6% and constituted approximately one-fourth of the total inappropriate behavior. Also, when individually contingent free time was implemented in math, disruptive behavior declined to 10%, amounting to less than half of the total inappropriate behavior. The same relationship held when individually contingent free time was introduced in geography.

Qualitatively, out-of-seat behavior, disruptive noises, and unwanted verbalizations were noticeably lower during the group and individual contingencies. Blurting-out behavior was minimal during these phases, whereas, during baseline it was indeed an infrequent event to observe hand raising to solicit teacher attention.

Summary of Group Data

The group achieved the highest levels of appropriate behavior during the group contingent free time phase. Individually contingent free time ranked second in the production of positive effects. Points, structured lessons, and baseline yielded successively lower rates of desired responses. Immediate and dramatic improvements in appropriate behavior occurred during the group and individually contingent free time phases. At the conclusion of the study, rates of desired behavior were approximately 20% higher in both math and geography than they were during baseline, although only conditioned reinforcers (points) were being used to sustain appropriate behavior.

Student Use of Free Time

As can be seen from Table 17, Appendix B, students earned an average of 12 and 10 minutes of free time in math and geography, respectively, each day the group contingencies were in effect. Under the individually contingent free time, the amount of earned free time varied from student to student. Table 18, Appendix C, presents the points earned and percentages of appropriate behavior during each day of individually

contingent free time. A S earned some free time each day that he accumulated at least 12 points.

The students utilized their free time to participate in a variety of activities. A favorite activity during group congingent free time was use of a cartridge tape recorder. During the group contingent free time, the students also played records, and made and viewed slides of the class. Additionally, the students played with jacks, yo-yos, cards, checkers, puzzles, colored, wrote on the chalkboard, read comics and sports magazines, and talked quietly with one another. During free time, the E observed the students and solicited their suggestions about desired free time activities. The E attempted to bring all requested materials so that the reinforcing value of free time remained high.

Single Student Data

Overview

This section describes the behavior of individual Ss under each experimental treatment. The figures in this section present the daily percentages of appropriate behavior obtained by the eight Ss. The tables show the mean percentages of task relevant, social, time-off-task, and disruptive behavior for the eight Ss as a function of study phases.

Although certain treatments were more effective than others in increasing desired behaviors of all Ss, even the most potent treatments produced differential effects. For example, data indicate that the application of either group or individually contingent free time reliably increased appropriate behavior for all students. These techniques,

however, were more effective for some than for others. Also, the group contingent free time proved to be more potent for a greater number of Ss than did the individual consequences. In math, seven of eight Ss achieved higher levels of desired behavior under the group contingencies as compared to the individually contingent free time. In geography five of the Ss performed better during the group rather than the individual contingent free time. Desired behavior also rose above base rates for the majority of Ss during the structured lessons and points phases, but the rates varied considerably from S to S.

Specific Results

Bill (age 13).[1] During the baseline, the teacher described Bill as a student with poor study habits who was always doing something other than his lessons. Bill was observed reading comics persistently during lesson activities. Of all the targets, Bill emitted the lowest percentages of desired behavior during the base periods. Because Bill's levels of appropriate behavior varied markedly from the group, his reactions to the treatments are discussed in detail. Also, more than any S, he exemplified the dramatic changes corresponding to the application of both the group contingent and individually contingent free time.

Figure 3 presents the percentages of appropriate behavior obtained with Bill. Table 4 provides a breakdown of his appropriate and inappropriate behavior for each phase. As can be seen from Figure 3, this S had only

---

[1]Names were fictionalized for ethical reasons. Sex identify was retained by the assignment of commonly recognized male and female names

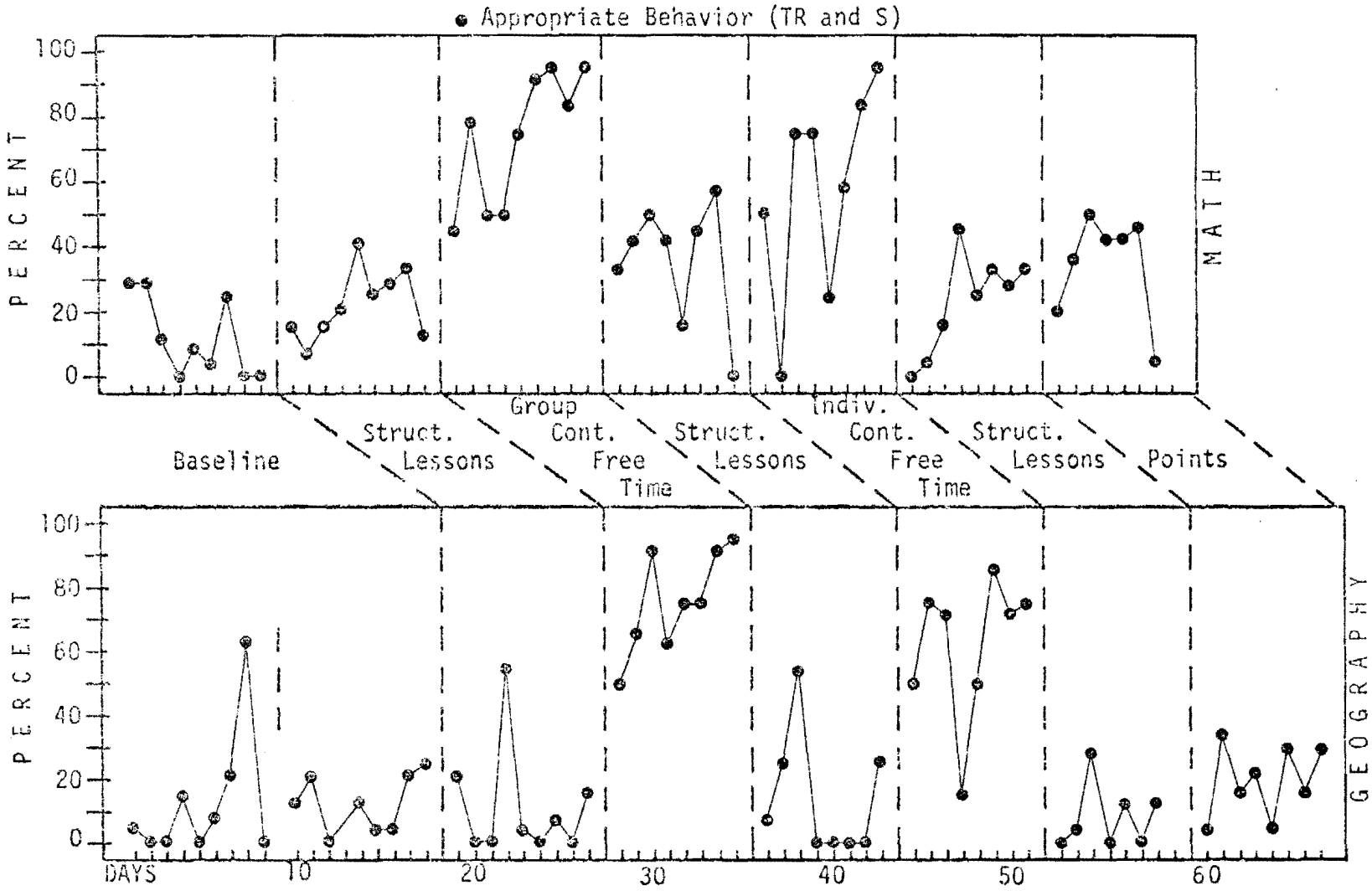

Figure 3. Bill: Appropriate behavior as a function of experimental conditions.

Table 4

Bill's Mean Percentages for Each Phase

Behavior	Baseline	Struct. Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Math							
Task Relevant	12.04	22.69	68.52	29.69	44.27	23.49	34.52
Social	.00	.00	5.56	6.25	13.54	.00	.00
Time-Off-Task	57.87	56.48	21.76	42.19	31.25	53.13	25.00
Disruptive	30.09	20.83	4.16	21.88	10.94	23.37	40.49
Geography							
Task Behavior	9.08	9.26	76.04	14.06	58.85	8.33	19.27
Social	3.47	2.31	.00	.00	3.13	.00	.00
Time-Off-Task	63.34	63.39	14.58	62.50	34.90	44.64	54.69
Disruptive	24.12	24.54	9.38	23.44	3.13	47.03	26.04

12% of appropriate behavior in the math baseline, and he behaved similarly in geography. Over the course of the study, there were 23 class sessions in which he produced no appropriate behavior. Table 4 reveals that time-off-task, rather than disruptive behavior, constituted the major portion of Bill's inappropriate behavior.

With the introduction of structured lessons in math, Bill doubled his appropriate responses, while registering little change in the simultaneous geography baseline. Still, appropriate behavior in math amounted to less than one-fourth of Bill's total behavior. The rise in appropriate behavior resulted in a corresponding decrease in disruptive behavior, but time-off-task continued unchanged.

When group contingent free time was introduced in math, Bill's daily percentage of appropriate behavior increased dramatically. For this period, appropriate behavior ranged from 46 to 96% with the average constituting almost three-fourths of Bill's actions. Time-off-task and disruptive behavior declined to 22 and 4%, respectively. Meanwhile, in geography, where group contingent free time was not applied, appropriate behavior remained extremely low (12%), whereas time-off-task and disruptive behavior comprised 88% of Bill's total output.

In the next treatment (structured lessons), group contingent free time was withdrawn in math and Bill sharply reduced his emission of appropriate behavior. Time-off-task and disruptive behavior climbed to 42 and 22%, respectively. Simultaneously, the geography class was introduced to group contingencies, and Bill produced a mean of 76% of appropriate behavior. Time-off-task decreased to 15% and disruptive behavior fell to 9%.

During the next phase, individually contingent free time was implemented in math while the geography class returned to the structured lessons. Bill's rates of appropriate behavior fluctuated drastically (zero to 96%) during individually contingent free time, yet he averaged 58% of appropriate behavior. In the corresponding geography class, Bill emitted only 14% of appropriate behavior and for half of the class sessions he did not emit a single task relevant response. Conversely, when the geography class entered the individually contingent free time phase, Bill again responded with a high daily average (63%) of desired behavior. During the parallel structured lessons phase in math, Bill decreased his emission of desired behavior.

The introduction of the points phase was ineffectual in producing appropriate behavior in math and was even less potent when introduced in geography. During the points phase, Bill behaved appropriately in math and geography at the rate of 35 and 19%, respectively.

In summary, data indicate that only the group contingent and individually contingent free time had marked effects, since Bill's behavior was changed maximally only with the application of these treatments. The group contingent free time produced the highest, most stable levels of desired behavior. Individually contingent free time ranked second in effectiveness. Bill emitted more appropriate behavior during points than he did under baseline, but inappropriate behavior remained excessive. For practical purposes, the results under structured lessons were hardly distinguishable from baseline.

Gary (age 13). The teacher described Gary as the most oppositional child in the class. During the base period Gary talked out of turn, whistled, sang, made "cute" remarks, ate candy at his desk, pulled at his clothes (sometimes taking his shirt off or putting gym shorts over his pants), made noises, and fussed to himself about the lesson. He was consistently in motion and would change seats perhaps five or six times per class period. When Gary was called down, he usually either ignored teacher requests or openly opposed the teacher.

Figure 4 depicts the percentages of appropriate behavior achieved with Gary for each day of the study. Table 5 gives the percentages for the subcategories of appropriate and inappropriate behavior for each phase. Although Gary's behavior was quite erratic within phases, his behavior across phases was similar to that of the group. In contrast to Bill's behavior, Gary's rates of inappropriate behavior were about equally divided between time-off-task and disruptive behavior. Across the study Gary averaged slightly higher levels of disruptive behavior than the group. For example, Gary's disruptive responses during the math baseline equaled 42% as compared with the group's 36% of disruptive behavior. His disruptive conduct reached a peak during the second structured lessons phase in geography. During that phase, disruptive behavior constituted 53% of his total responses, and he emitted an incredible low of only 6.95% of task relevant behavior for the eight day treatment. Conversely, graphic data indicate that Gary was capable of high task relevant productivity, since he had four days during math in which he produced 100% of wanted behavior.

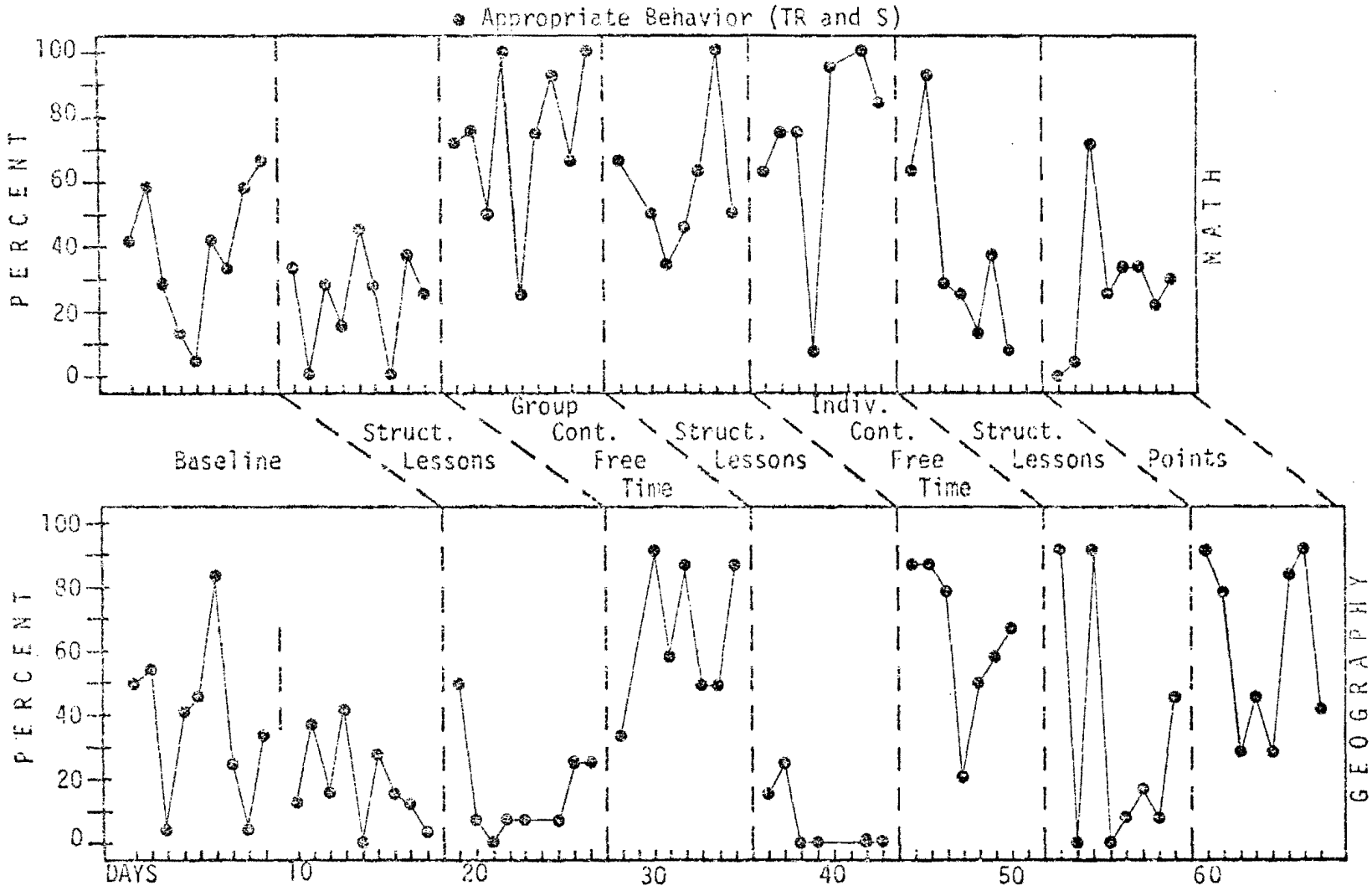

Figure 4. Gary: Appropriate behavior as a function of experimental conditions

Table 5

Gary's Mean Percentages for Each Phase

Behavior	Baseline	Struct. Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Math							
Task Relevant	38.42	24.07	44.91	58.33	57.14	28.57	27.08
Social	.00	.00	27.87	.00	14.29	9.52	.00
Time-Off-Task	19.44	28.71	21.76	17.86	10.71	26.79	25.52
Disruptive	42.12	47.22	5.45	23.81	17.86	35.12	47.40
Geography							
Task Relevant	25.70	22.92	65.48	6.95	63.69	32.81	61.46
Social	2.78	.00	.00	.00	.60	.00	.00
Time-Off-Task	33.10	42.71	22.62	39.58	19.05	18.75	15.10
Disruptive	38.42	34.37	11.90	53.47	16.67	48.43	23.43

Gary behaved most appropriately during group contingent free time. For example, he emitted a mean of 72% of appropriate behavior during the group contingencies in math. He also produced high levels of appropriate behavior whenever individually contingent free time was applied. As can be seen from Figure 4, however, the range was great both in math (8 to 100%) and geography (20 to 88%). Analogous to the group, Gary behaved better under the points treatments than under the baselines. But unlike the group, Gary produced less appropriate behavior during the overall structured lessons phases than he did during baselines.

In summary, Gary's behavior was altered dramatically under the group contingent free time phases. He also responded favorably to individually contingent free time, but his behavior varied more under this treatment than it did under group contingencies. Points, but not structured lessons, were more effective than base periods.

John (age 13). "Disruptive, inattentive, frequently opposed to doing assignments" was how the teacher described John. Ratings during the baselines showed John to be a highly disruptive student. He registered 45 and 28% of disruptive behavior in math and geography, respectively.

Figure 5 presents the daily percentages of appropriate behavior obtained with John. Table 6 consists of his percentages of task relevant, social, time-off-task, and disruptive behavior for each study phase. During baselines, John's behavior was similar to that of the group. He produced 29 and 33% of appropriate behavior in math and geography, respectively. The introduction of structured lessons in math failed to alter

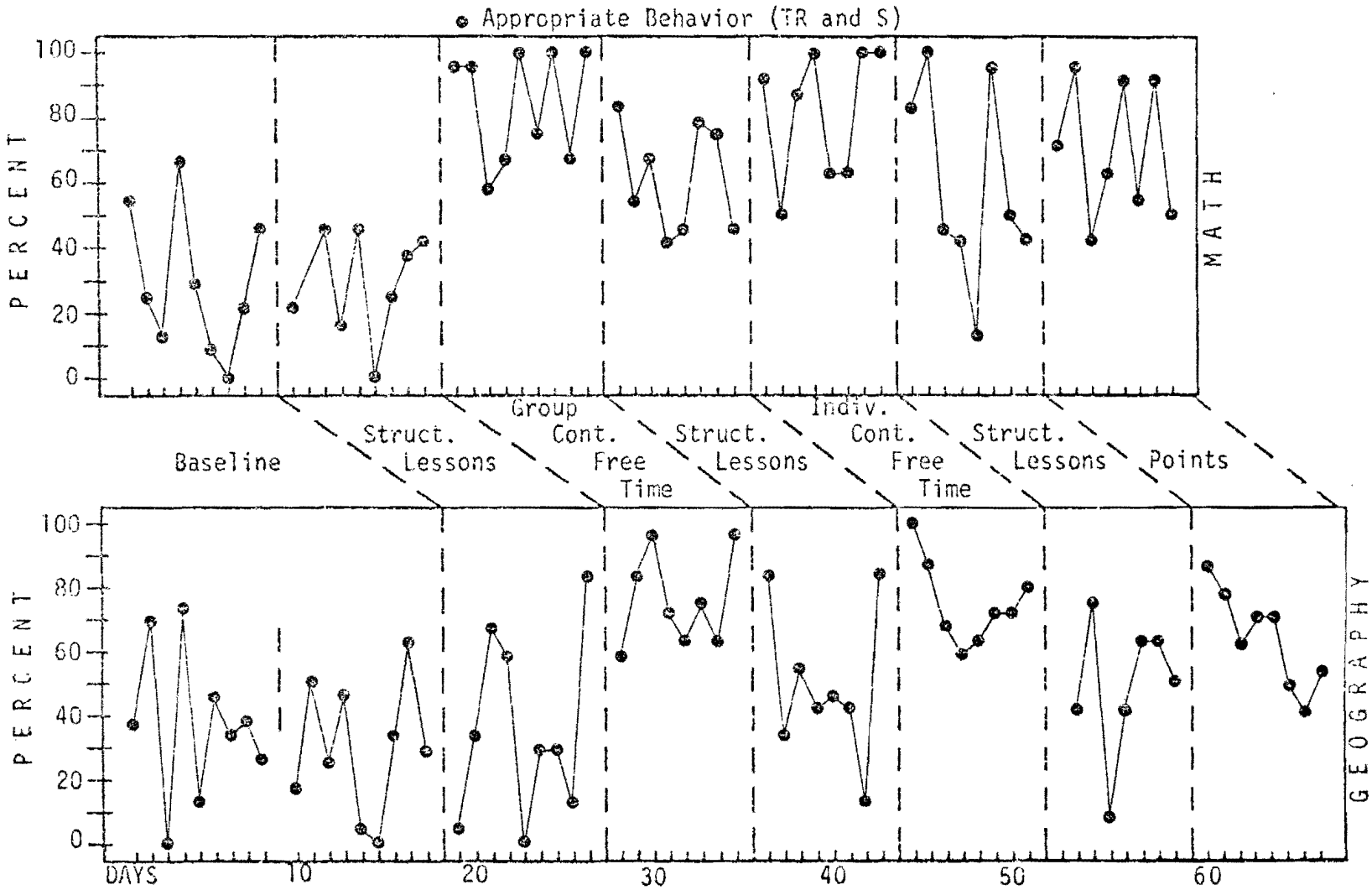

Figure 5. John: Appropriate behavior as a function of experimental conditions.

Table 6

John's Mean Percentages for Each Phase

Behavior	Baseline	Struct. Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Math							
Task Relevant	29.17	29.17	65.74	61.46	42.71	46.88	64.58
Social	.00	.00	18.52	.00	39.06	11.98	5.21
Time-Off-Task	25.93	29.17	6.02	19.27	12.50	23.96	14.06
Disruptive	44.90	41.66	9.72	19.27	5.73	17.18	16.14
Geography							
Task Relevant	29.96	35.19	75.51	49.48	67.19	48.81	64.58
Social	3.47	.00	.00	.00	7.29	.00	.00
Time-Off-Task	39.06	28.24	10.42	21.61	15.10	23.81	19.79
Disruptive	27.52	36.58	14.06	28.91	10.41	27.39	15.62

John's baseline performance. When group contingent free time was implemented, however, an exceptional change occurred--John averaged 84% of appropriate behavior. His appropriate behavior was 4% higher than the mean for all Ss combined. Disruptive behavior was concurrently reduced to less than 10% of his total recorded responses. Meanwhile, under structured lessons in the corresponding geography class, John's behavior remained unchanged.

In the next treatment (structured lessons), group contingent free time was withdrawn in math. John behaved less appropriately, but he averaged 61% of appropriate behavior during this experimental condition. There was also a noticeable change in the composition of his inappropriate behavior. Disruptive behavior had dropped to an average of 19% (half of his total inappropriate behavior) and never exceeded this level for the remainder of the study. Disruptive actions had previously made up the majority of John's inappropriate responses. Concurrently, under group contingent free time in geography, John emitted an average of 76% of appropriate behavior.

During the next phase, individually contingent free time was implemented in math as the geography class returned to the structured lessons. John's daily average of appropriate behavior once again was reduced to less than 6%. In the corresponding geography class, John emitted 49% of appropriate behavior. Conversely, when the geography class entered the individually contingent free time phase, John responded with an average of 74% of appropriate behavior. In the meantime, the individually contingent free time was removed in math. Consequently,

John behaved less appropriately in math, yet he still was emitting well over 50% of appropriate behavior.

During the succeeding points phases in math and geography, John responded more faborable than did the group. He obtained rates of 70 and 65% of appropriate behavior in math and geography, respectively.

In summary, John's conduct was similar to that of the group during the base periods and during the first introduction of structured lessons in both math and geography classes. His behavior was not appreciably modified until the implementation of group contingent free time. During the group contingencies, John exceeded the group level of appropriate behavior. And, from the point of introduction of group consequesces in both math and geography, the composition of John's behavior changed substantially. His rates of disruptive behavior were lowered and remained moderately low for the remainder of the study. He responded equally well to the group and individual consequences, although group contingent free time yielded slightly higher percentages of appropriate behavior. His production of desired behavior was higher under structured lessons than under baseline; and, under the points condition, he responded with levels of appropriate behavior far in excess of baseline.

Gail (age 13). During the baseline, the teacher characterized Gail as inattentive, constantly talking with peers. Baseline data indicated that 33 and 30% of Gail's actions were disruptive during the math and geography classes, respectively. The results obtained with John

were representative of the results obtained with Gail. Gail's reactions to experimental conditions are shown in Figure 6 and Table 7.

Gail began the experiment with higher base rates of desirable behavior than did John or the group. She produced 42 and 40% of appropriate behavior in the math and geography baselines, respectively. Gail also maintained greater levels of appropriate behavior than the group throughout the study. But, like John, her highest rates of appropriate behavior were attained in the group and individual contingent free time phases. During these phases Gail's desired responses rose to extremely high, stable positions. Under group contingent free time in math, for example, her appropriate responses ranged from 70 to 100% (mean = 87%). And, she averaged 86% of appropriate behavior with consistently high daily performances during the individually contingent free time in math. Concurrently, disruptive behavior was reduced to less than 4% of her total responses.

In summary, Gail's behavior was similar to John's. Her responses were most markedly changed during the group and individually contingent free time. From the moment of introduction of group contingencies in both math and geography, her rates of appropriate behavior remained relatively high, the only exception being low levels of appropriate behavior (35%) during the second implementation of structured lessons in geography. Nonetheless, her overall production of appropriate behavior under structured lessons was higher than her base rates. During the final implementation of structured lessons in math, for example, she emitted an average of 58% of appropriate behavior. Similar to John, she too reacted with high rates of appropriate behavior under the points treatments.

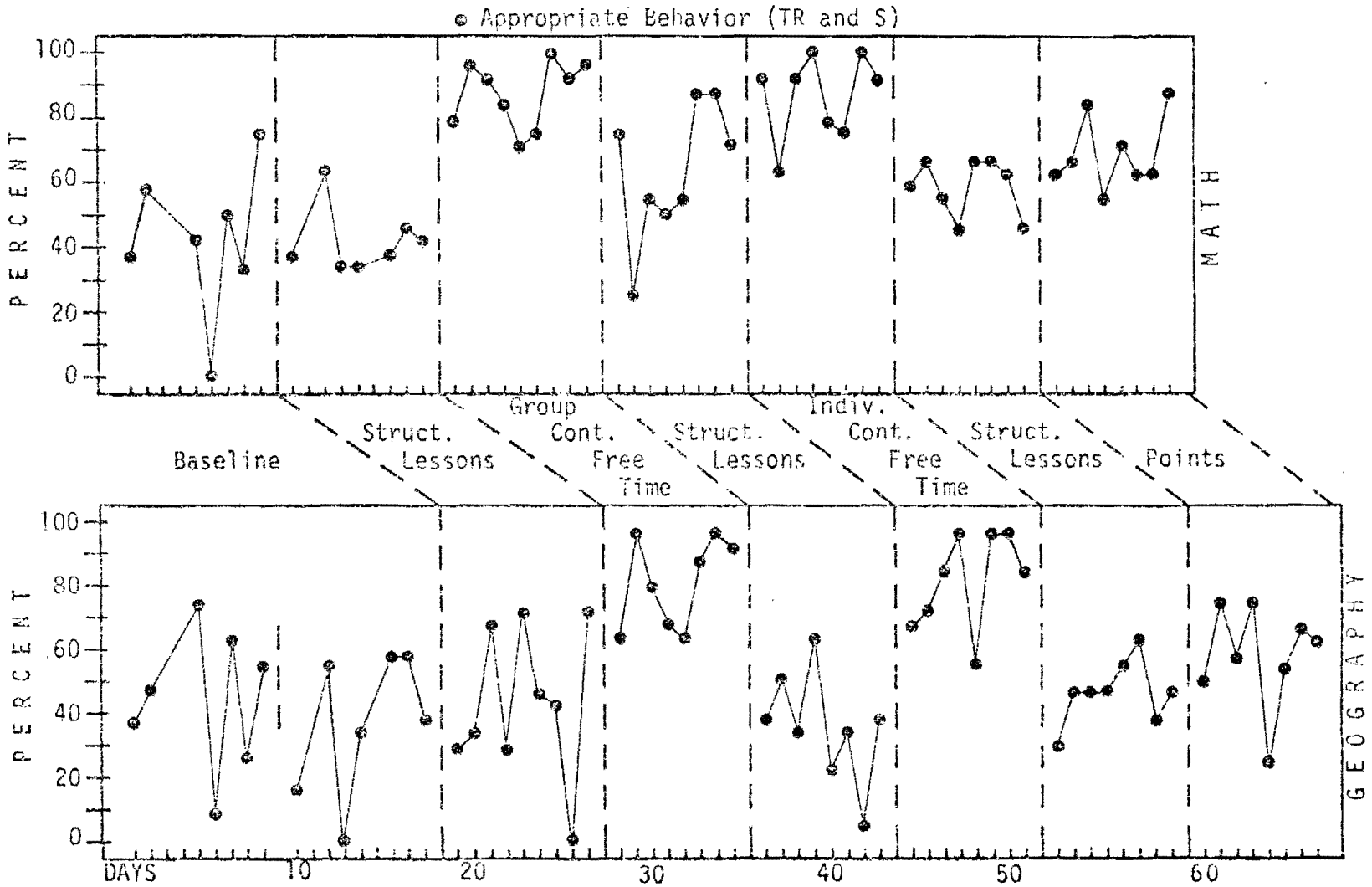

Figure 6. Gail: Appropriate behavior as a function of experimental conditions.

Table 7

Gail's Mean Percentages for Each Phase

Behavior	Baseline	Struct. Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Math							
Task Relevant	42.26	41.67	58.80	63.02	52.08	58.33	68.75
Social	.00	.00	28.24	.00	34.38	.00	.00
Time-Off-Task	24.41	30.95	7.87	20.31	9.90	19.79	5.21
Disruptive	33.33	27.38	5.09	16.67	3.65	21.87	26.04
Geography							
Task Relevant	39.65	43.06	80.21	34.90	80.21	45.31	58.33
Social	.90	.00	.00	.00	.52	.52	.00
Time-Off-Task	29.78	13.43	4.69	28.13	4.17	17.71	13.54
Disruptive	29.67	43.52	15.10	36.98	15.11	36.46	28.12

Phil (age 14). During baseline the teacher described Phil as an isolate who seldom attended to the lessons. Data revealed that time-off-task constituted the principal portion of Phil's inappropriate actions. During baseline, for example, he emitted 32 and 49% of time-off-task behavior in math and geography, respectively. Correspondingly, disruptive behavior comprised 29 and 21% of his responses in math and geography.

The results obtained with Phil were almost identical to those obtained with John and Gail. Phil's results are shown in Figure 7 and Table 8. In the case of each of these Ss, the highest totals of appropriate responding occurred during the group and individually contingent free time. However, under the group contingent free time in math, Phil achieved the greatest level of appropriate behavior of all Ss (mean = 91%). Phil maintained relatively high rates of appropriate behavior following the removal of group and individually contingent free time. Phil, of course, did reduce his output of appropriate responses following the withdrawal of group and individual contingent free time; yet, his levels of desired behavior did not drop to their previous positions. One exception was that appropriate behavior did decline below base rates during the second application of structured lessons in geography.

In summary, Phil performed most appropriately in math during the group consequences, but in geography he yielded his highest rates of appropriate behavior under individually contingent free time. Phil maintained relatively high rates of appropriate behavior following the

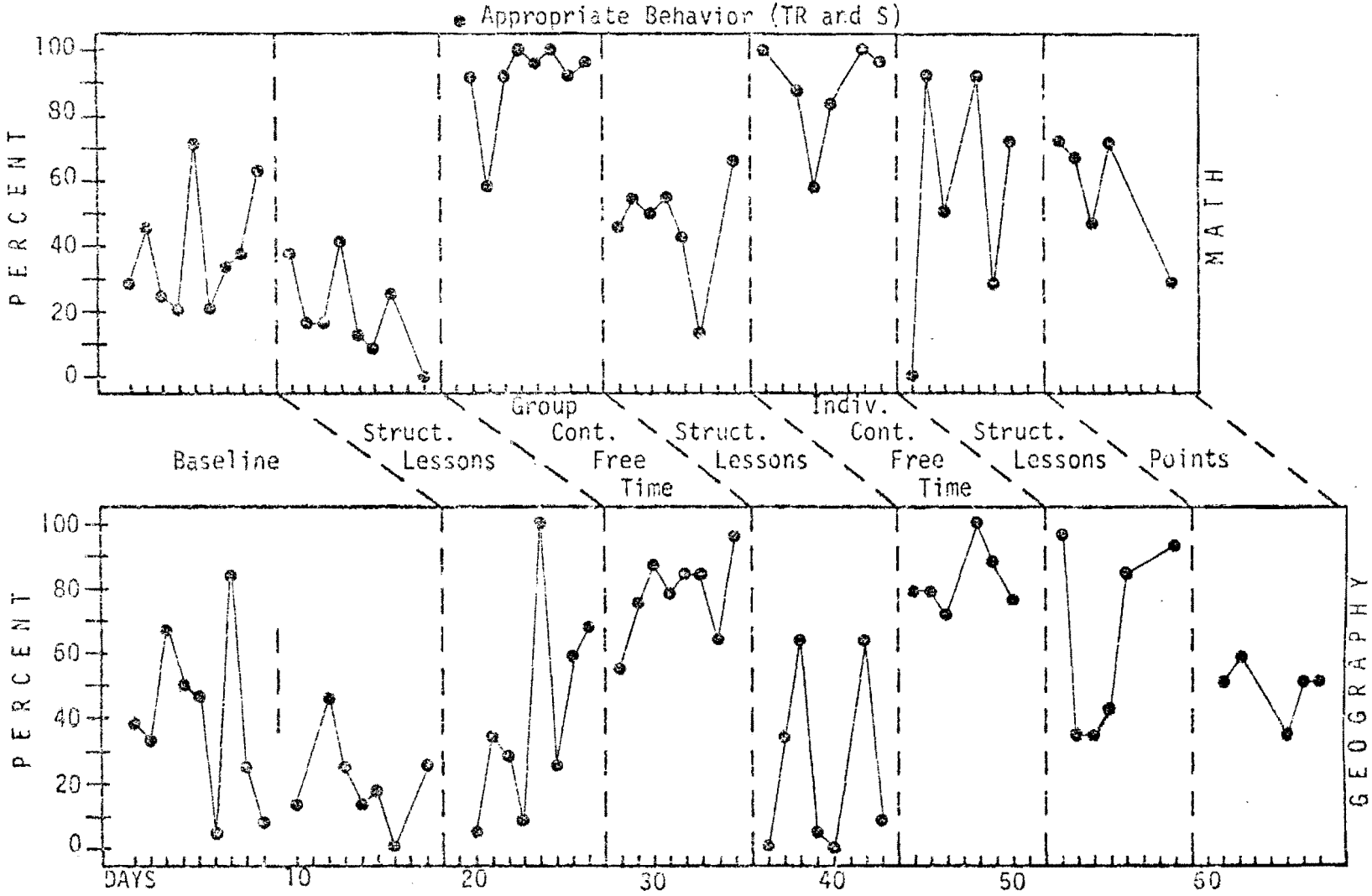

Figure 7. Phil: Appropriate behavior as a function of experimental conditions.

Table 8

Phil's Mean Percentages for Each Phase

Behavior	Baseline	Struct. Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Math							
Task Relevant	35.18	19.27	62.50	46.43	75.69	55.56	56.67
Social	3.24	.52	28.13	.00	11.81	.00	.00
Time-Off-Task	32.41	23.44	7.29	39.88	9.72	39.58	21.67
Disruptive	29.17	56.76	2.08	13.69	2.78	4.86	21.67
Geography							
Task Relevant	22.72	35.94	77.60	24.40	78.47	63.19	48.33
Social	6.78	4.69	.00	.00	3.47	.00	.00
Time-Off-Task	49.44	42.19	8.33	48.22	12.50	23.61	35.00
Disruptive	21.06	17.18	14.06	27.38	5.56	13.20	16.67

implementation of group consequences in both math and geography. Analogous to other students, Phil averaged higher rates of desired behavior under points and overall structured lessons than he did under baseline conditions.

Mary (age 13). The teacher described Mary as being talkative and oppositional. Mary's reactions to experimental conditions are reported in Figure 8 and Table 9.

Mary's responses to the treatments were similar to those of the group. She differed from the group in several respects, however. First, Mary was the only S who responded more favorably in math to individually rather than group contingent free time. She averaged 85% of appropriate behavior during group contingencies in math, while reaching a daily average of 86% under the individually contingent free time phase. In geography, however, the inverse was true, since she produced 84 and 71% of appropriate behavior for group and individual contingencies, respectively. Second, she responded more favorably than the group to the points phases.

In summary, Mary's responses were maximally affected during the group and individually contingent free time phases. She yielded moderately high rates of appropriate behavior as a result of the application of points. Minimal differences existed between her behavior under baseline and structured lessons.

Mark (age 13). Noisy, inattentive, and oppositional is how the teacher described Mark. Baseline data indicated Mark to be a highly

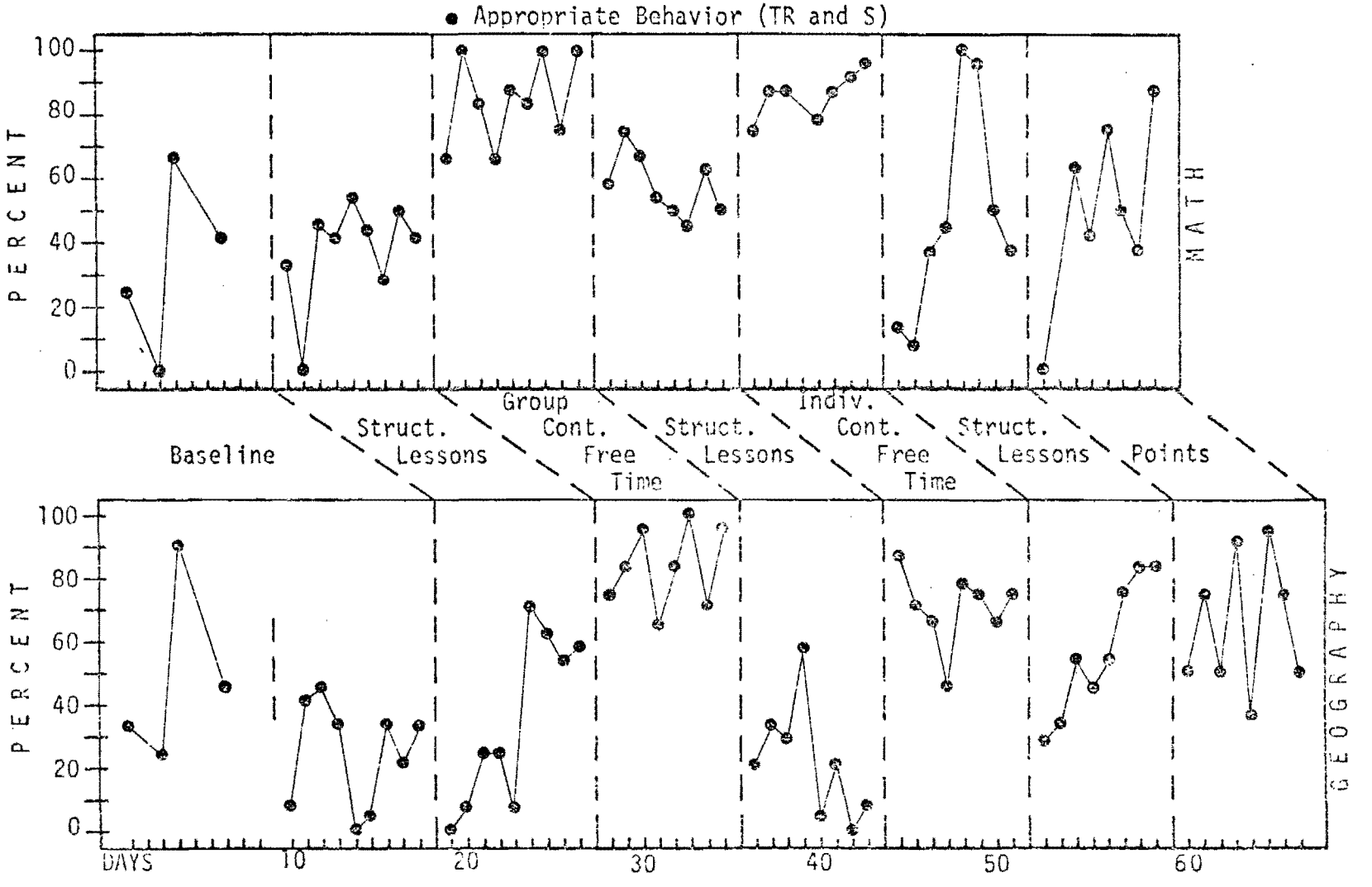

Figure 8. Mary: Appropriate behavior as a function of experimental conditions.

Table 9

Mary's Mean Percentages for Each Phase

Behavior	Baseline	Struct Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Math							
Task Relevant	33.33	37.73	68.52	57.81	73.21	48.44	48.18
Social	.00	.00	16.20	.00	13.10	.00	1.79
Time-Off-Task	40.63	25.23	6.49	28.65	8.93	29.69	17.26
Disruptive	26.04	37.03	8.80	13.54	4.77	21.85	32.15
Geography							
Task Relevant	36.13	34.72	83.85	21.87	70.83	47.92	65.63
Social	.47	.00	.00	.00	.00	.00	.00
Time-Off-Task	26.88	27.78	10.42	30.21	15.63	23.96	15.10
Disruptive	36.52	37.50	5.73	47.92	13.54	28.12	19.27

disruptive student. In math, for example, he emitted 50% of disruptive behavior during the base period.

Figure 9 and Table 10 present Mark's responses to experimental variables. Mark's behavior pattern differed from that of the group in one respect. For Mark, points were no more effective than the overall application of structured lessons.

In summary, data indicate that group and individually contingent free time had the most profound effects, since Mark's appropriate responses remained markedly high only when these techniques were applied. High levels of desired behavior could not be sustained when these phases were withdrawn. The structured lessons were slightly superior to baselines. In geography, for example, Mark's appropriate behavior rose approximately 6% with the progression from baseline to structured lessons. Only minimal differences existed between the effectiveness of points and overall structured lessons.

Jane (age 13). The teacher reported that talking to peers and out-of-seat behavior were representative of Jane's conduct. Baseline data showed that Jane spent only 31 and 25% of her time engaged in appropriate acts in math and geography, respectively.

The results obtained with Mark are representative of results obtained with Jane. Jane's behaviors are presented in Figure 10 and Table 11. Her major difference from Mark was her performance during the points phase in math. During that phase Jane emitted 61% of appropriate behavior as compared to Mark's 33%. Introduction of points in geography, however, yielded only 26% of appropriate behavior. Jane,

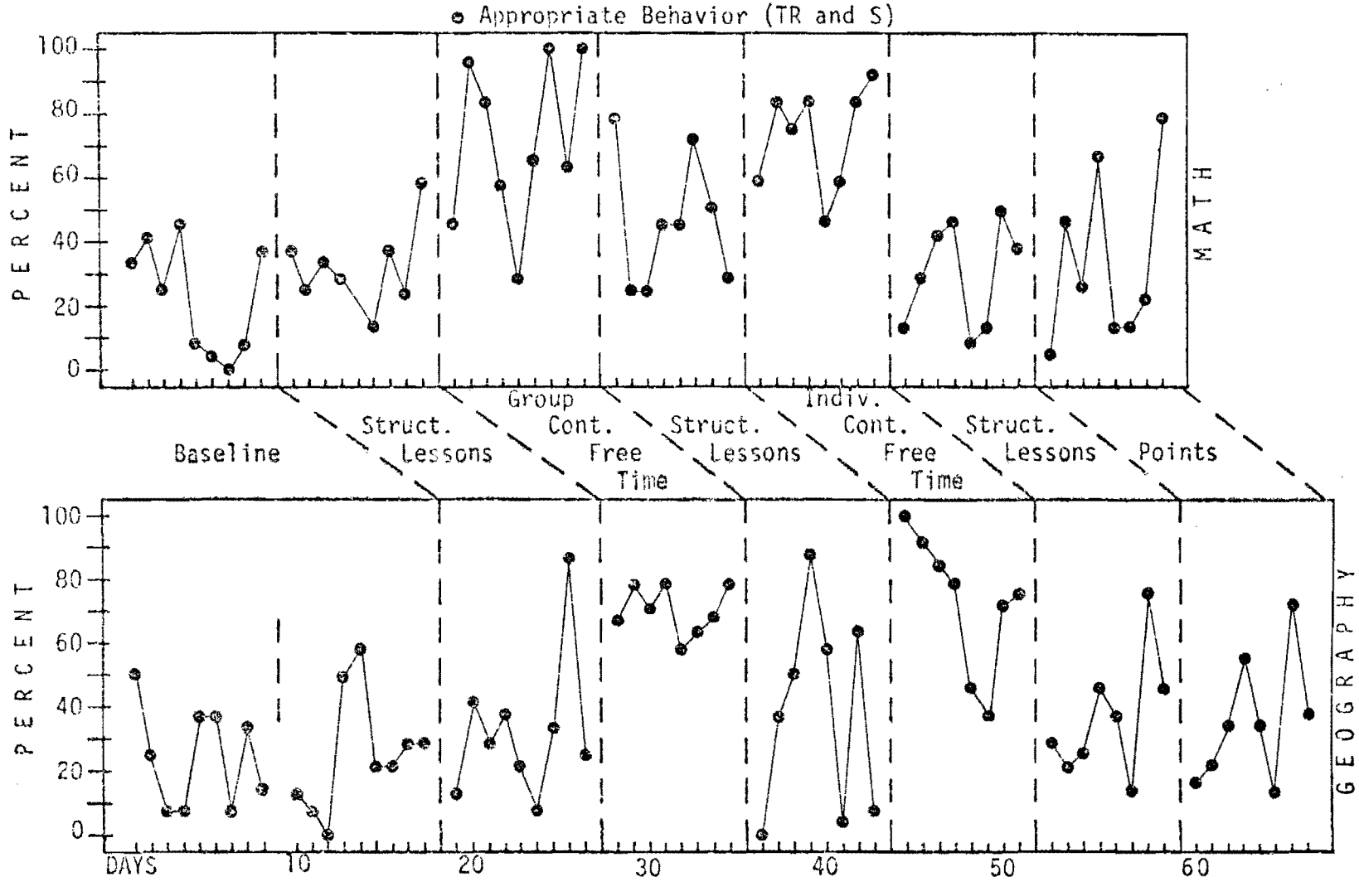

Figure 9. Mark: Appropriate behavior as a function of experimental conditions.

Table 10

Mark's Mean Percentages for Each Phase

Behavior	Baseline	Struct. Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Math							
Task Relevant	22.68	31.94	46.30	40.10	53.64	29.69	33.33
Social	.00	.00	25.00	6.25	18.75	.00	.00
Time-Off-Task	26.85	29.17	20.83	28.65	10.42	32.81	29.17
Disruptive	50.46	38.90	7.87	25.00	17.19	37.50	37.50
Geography							
Task Relevant	24.17	30.56	70.31	38.53	72.39	36.46	34.90
Social	.93	2.31	.00	.00	.52	.00	.00
Time-Off-Task	37.70	33.33	6.25	28.65	14.58	27.08	27.08
Disruptive	37.20	33.80	23.43	32.81	12.50	36.46	38.02

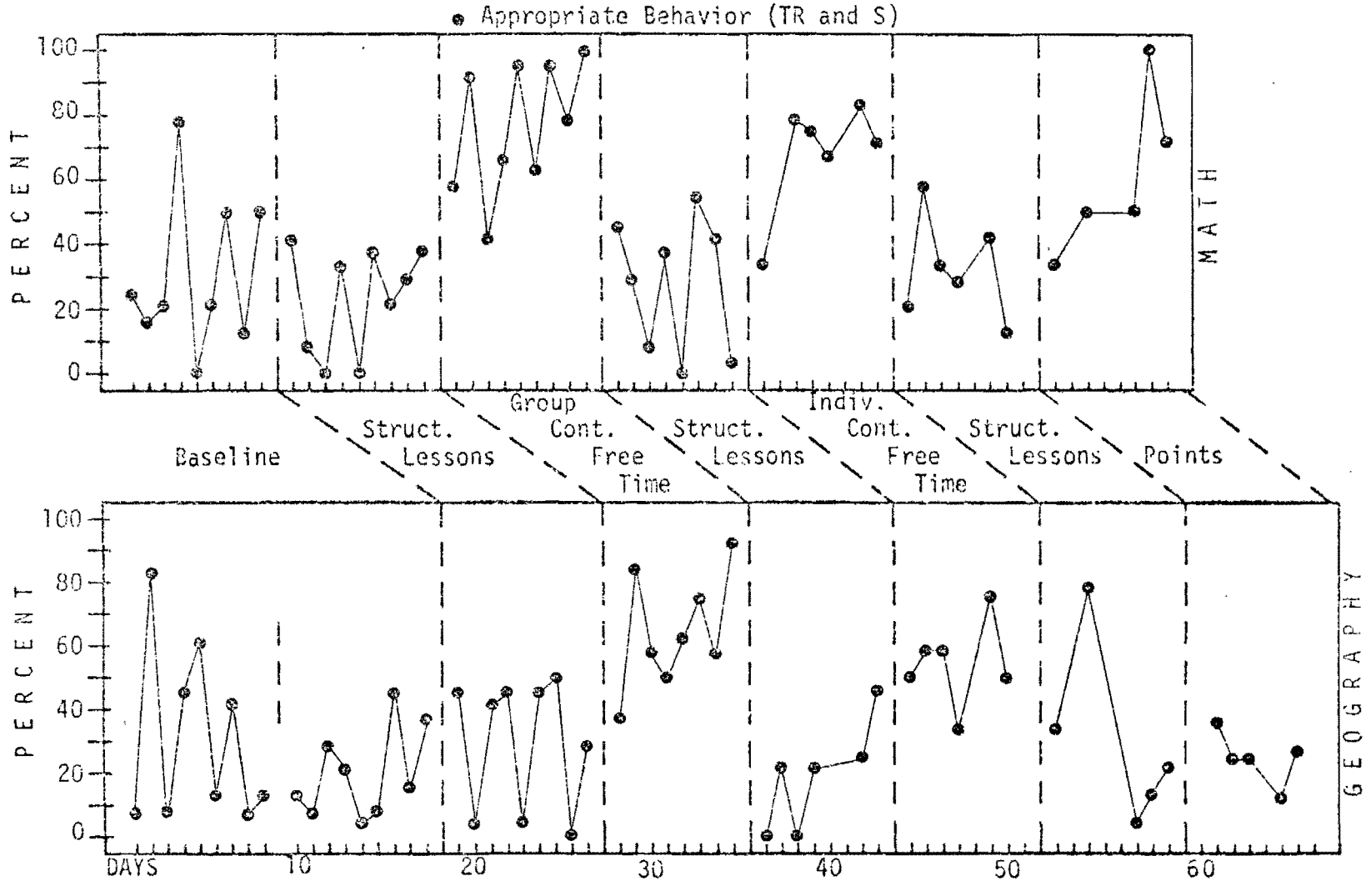

Figure 10. Jane: Appropriate behavior as a function of experimental conditions.

Table 11

Jane's Mean Percentages for Each Phase

Behavior	Baseline	Struct. Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Math							
Task Relevant	30.56	22.69	54.63	27.61	44.44	32.64	60.83
Social	.00	.46	22.22	.00	23.61	.00	.00
Time-Off-Task	35.65	50.46	18.52	48.96	16.67	30.56	18.33
Disruptive	33.81	29.39	4.63	23.43	15.28	36.80	20.83
Geography							
Task Relevant	25.08	28.70	64.54	18.75	51.39	30.00	25.83
Social	.70	.93	.00	.00	2.78	.00	.00
Time-Off-Task	31.09	41.67	18.23	45.14	19.44	33.33	41.67
Disruptive	43.14	28.72	17.25	36.11	26.39	36.66	32.50

like Mark, responded with her highest levels of appropriate behavior under the group and individual free time conditions. In summary, data clearly indicate that Jane's behavior was consistently different from baseline only during the application of the group and individual consequences.

Summary

Certain treatments were more effective than others in increasing desired behaviors of all Ss, yet even the most potent treatments produced differential effects. Nevertheless, examination of individual data in both the math and geography classes yielded a number of specific results. First, desirable behavior for all Ss was consistently low during the base periods. Second, group contingent free time dramatically increased and sustained high levels of appropriate behavior for all Ss. Third, during the individually contingent free time condition, appropriate behavior for all Ss also reached high levels; but, there were greater day-to-day fluctuations than occurred under the group contingencies. Fourth, for the structured lessons combined, desirable behavior rose moderately above baseline for all but one S. Structured lessons were less effective in geography than in math. Also, the structured lessons were more effective after repeated implementation, but extreme variability was observed for single Ss. Finally, the points phases were superior to the baselines for all Ss, but the potency of points varied between Ss and failed to produce day-to-day stability.

Statistical Analysis

For the purpose of analysis, the structured lessons phases were combined and treated as a single experimental condition. The Friedman Two-Way Analysis of Variance by Ranks (Siegel, 1956, pp. 166-172) was performed on the Ss' mean percentages of appropriate behavior across five treatments (baseline, combined structured lessons, group contingent free time, individual contingent free time, and points). The analysis in math yielded a significant effect ($X_r^2 = 27.6 > .001$, df = 4). Similar results ($X_r^2 = 30 > .001$, df = 4) were obtained in geography.

To determine the specific source(s) of significance obtained with the Friedman statistical procedure, the Wilcoxon Matched-Pairs Signed-Ranks Test (Siegel, 1956, pp. 75-82) was used to make two-by-two treatment comparisons. Additionally, the Wilcoxon test was applied to evaluate differences between corresponding phases in math and geography. The results of these comparisons are presented in Table 12.

In math every treatment was statistically superior to the baseline condition. Group and individually contingent free time were both superior ($p < .01$) to points and combined structured lessons phases. The group contingencies proved statistically superior ($p < .05$) to the individually contingent free time. A nonsignificant effect was obtained for the contrast between combined structured lessons and points. The effectiveness of treatments can be summarized as follows: group contingent free time > individually contingent free time > points = combined structured lessons > baseline.

Table 12

Results of the Wilcoxon-Matched-Pairs-Signed Ranks Test

Two-by-Two Treatment Comparisons	ΣT	Level of Confidence[a]	Statistically Superior Treatment
Math			
Baseline x Combined Struct. Lessons	2.5	.05	Combined Struct. Lessons
Baseline x Group Cont. Free Time	0	.01	Group Cont. Free Time
Baseline x Indiv. Cont. Free Time	0	.01	Indiv. Cont. Free Time
Baseline x Points	2	.05	Points
Combined Struct. Lessons x Group Cont. Free Time	0	.01	Group Cont. Free Time
Combined Struct. Lessons x Indiv. Cont. Free Time	0	.01	Indiv. Cont. Free Time
Combined Struct. Lessons x Points	6.5	NS[b]	Neither
Group Cont. Free Time x Indiv. Cont. Free Time	1.5	.05	Group Cont. Free Time
Group x Points	0	.01	Group Cont. Free Time
Indiv. Cont. Free Time x Points	0	.01	Indiv. Cont. Free Time

[a]All tests for significance were two-tailed tests.

[b]NS = Not Significant.

Table 12 (Continued)

Two-by-Two Treatment Comparisons	ΣT	Level of Confidence[a]	Statistically Superior Treatment
Geography			
Baseline x combined Struct. Lessons	6	NS[b]	Neither
Baseline x Group Cont. Free Time	0	.01	Group Cont. Free Time
Baseline x Indiv. Cont. Free Time	0	.01	Indiv. Cont. Free Time
Baseline x Points	0	.01	Points
Combined Struct. Lessons x Group Cont. Free Time	0	.01	Group Cont. Free Time
Combined Struct. Lessons x Indiv. Cont. Free Time	0	.01	Indiv. Cont. Free Time
Combined Struct. Lessons x Points	1	.05	Points
Group Cont. Free Time x Indiv. Cont. Free Time	10.5	NS[b]	Neither
Group Cont. Free Time x Points	0	.01	Group Cont. Free Time
Indiv. Cont. Free Time x Points	0	.01	Indiv. Cont. Free Time

[a]All tests for significance were two-tailed tests.
[b]NS = Not Significant.

Table 12 (Continued)

Two-by-Two Treatment Comparisons	ΣT	Level of Confidence[a]	Statistically Superior Treatment
Across Classes			
Baseline x Baseline	11.5	NS[b]	Neither.
Math Struct. Lessons x Geography Baseline	16.5	NS	Neither.
Math Group Cont. Free Time x Geography Struct. Lessons	0	.01	Math Group Cont. Free Time
Math Struct. Lessons x Geography Group Cont. Free Time	0	.01	Geography Group Cont. Free Time
Math Indiv. Cont. Free Time x Geography Struct. Lessons	0	.01	Math Indiv. Cont. Free Time
Math Struct. Lessons x Geography Indiv. Cont. Free Time	0	.01	Geography Indiv. Free Time
Math Points x Geography Struct. Lessons	8.5	NS	Neither.

[a]All tests for significance were two-tailed tests.

[b]NS = Not Significant.

The results in geography differed from those in math in several respects. First, no difference was found between baseline and combined structured lessons. Second, the points phase was statistically superior ($p < .05$) to the combined structured lessons. Third, a comparison of group and individually contingent free time yielded a nonsignificant effect. The effectiveness of the treatments in geography can be summarized as follows: group contingent free time = individually contingent free time > points > combined structured lessons = baseline.

Comparisons across classes showed that the base periods were not significantly different. Similarly, there was no difference for the comparison between the math structured lessons and the concurrent continuation of baseline in geography. However, the contrast between the group contingent free time in math and the corresponding structured lessons in geography yielded a significant difference ($p < .01$). There was also a significant difference ($p < .01$) between the group contingencies in geography and the corresponding structured lessons in math. In each of these comparisons, the group condition was the superior treatment. Likewise, individually contingent free time proved to be superior ($p < .01$) to the treatment in the corresponding class.

The statistical comparisons across classes indicated that the behavior of the Ss was quite situation-specific. That is, when the most potent treatments were applied, behaviors changed markedly only in the situation where the effective treatment was in effect. For example, each implementation of group contingent free time dramatically increased desired behaviors; yet, a significant difference existed between the group

condition and the corresponding situation where the group contingencies were not applied. Identical results were observed for the individually contingent free time. These results demonstrate clearly that any generalization of behavior across situations was not statistically significant.

In summary, the results demonstrate, with one exception, that every treatment was superior to the base periods. Only the combined structured lessons in geography failed to yield an improvement over baseline. The group and individually contingent free time phases proved to be the most potent treatments, since both techniques produced results superior to all other treatments. The group condition yielded the most favorable results in math, but there was no difference between the group and individually contingent phases in geography. Points alone were superior to structured lessons in geography, but not in math. Analysis between classes revealed that the baselines were similar. Finally, the comparisons across classes indicated that changes in one situation did not generalize to a corresponding situation.

Teacher Behavior

Rating of the teacher's behavior was carried out to determine if his behavior changed under the different experimental conditions. Teacher behaviors in the categories for verbal praise, smiles, contact, hovering, negative attention, and all other attention for each study phase are shown in Tables 13 and 14. For the purpose of analysis, the categories of verbal praise, smiles, contact, and hovering were treated as positive

Table 13

Frequency of Teacher Behavior Directed Toward Target Students During Each Phase--Math

Behavior	Baseline	Struct Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Verbal Praise	3	4	1	1	2	1	3
Smile	1	0	0	0	0	0	0
Contact	0	1	0	0	0	1	0
Hovering	4	10	10	5	12	9	7
Negative Attention	30	15	9	14	12	17	16
All Other Attention	31	27	24	23	14	17	15
TOTAL	69	57	44	43	40	45	41

Table 14

Frequency of Teacher Behavior Directed Toward Target Students During Each Phase--Geography

Behavior	Baseline	Struct. Lessons	Group Cont. Free Time	Struct. Lessons	Indiv. Cont. Free Time	Struct. Lessons	Points
Verbal Praise	7	1	2	1	3	2	2
Smile	3	1	1	0	0	0	0
Contact	0	0	0	0	0	0	2
Hovering	8	6	5	7	9	5	7
Negative Attention	40	13	8	15	12	11	14
All Other Attention	82	35	30	22	21	24	19
TOTAL	140	56	46	45	45	42	44

attention in Figures 11 and 12. Figure 11 depicts the percentages for experimental treatments. Figure 12 denotes the percentages of positive attention, negative, and all other attention directed toward target students for the entire study.

There were no extreme changes in teacher behaviors under the different treatment conditions. But, as can be seen from Figure 11, teacher behavior did not remain constant under the different treatments. However, to understand fully the changes that did occur in the teacher's behavior, it is important to consider the behavior of the targets at the time the teacher interacted with them. During the base periods, for example, the students were highly disruptive; and, the teacher seemed to catch every deviant act. He attempted to control the students through sharp reprimands and exhortations. Positive attention accounted for only 12 and 13% of his interactions with targets during the baselines in math and geography, respectively. Concurrently, negative attention in math and geography comprised 43 and 29%, respectively, of his attention.

With the first application of the structured lessons, the teacher reduced the frequency of interactions with the targets. For example, in math, total interactions dropped from a frequency of 69 during baseline to 57 under structured lessons. In geography the interactions fell from 140 during baseline to 56 under structured lessons, but the base period in geography lasted twice as long as the structured lessons phase. Possibly, under the structured lessons the teacher was focusing more of his attention on lesson activities than was the case

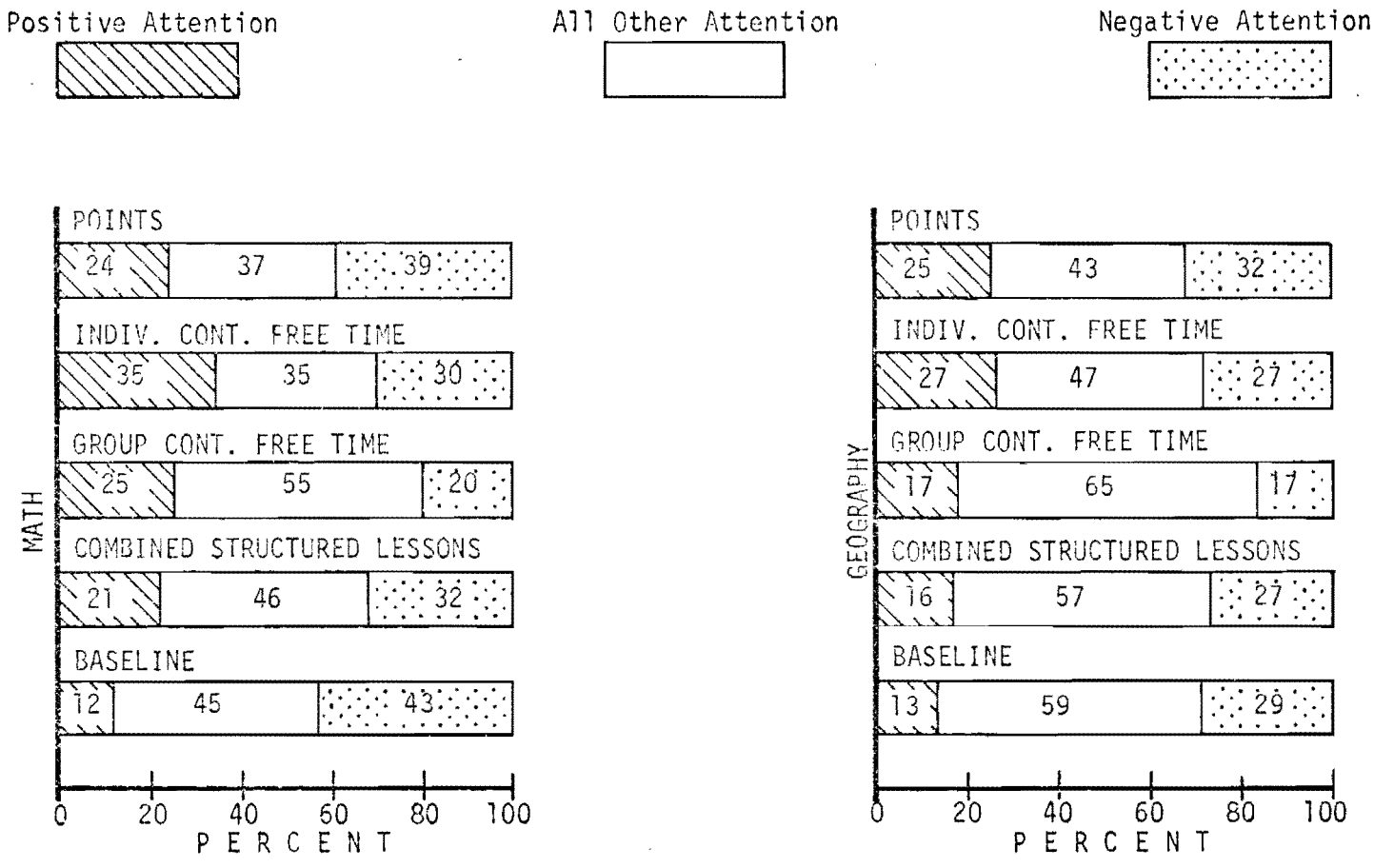

Figure 11. Collapsed Behavioral Categories Denoting the Percentages for the Types of Teacher Attention Directed Toward Target Students for all Experimental Treatments.

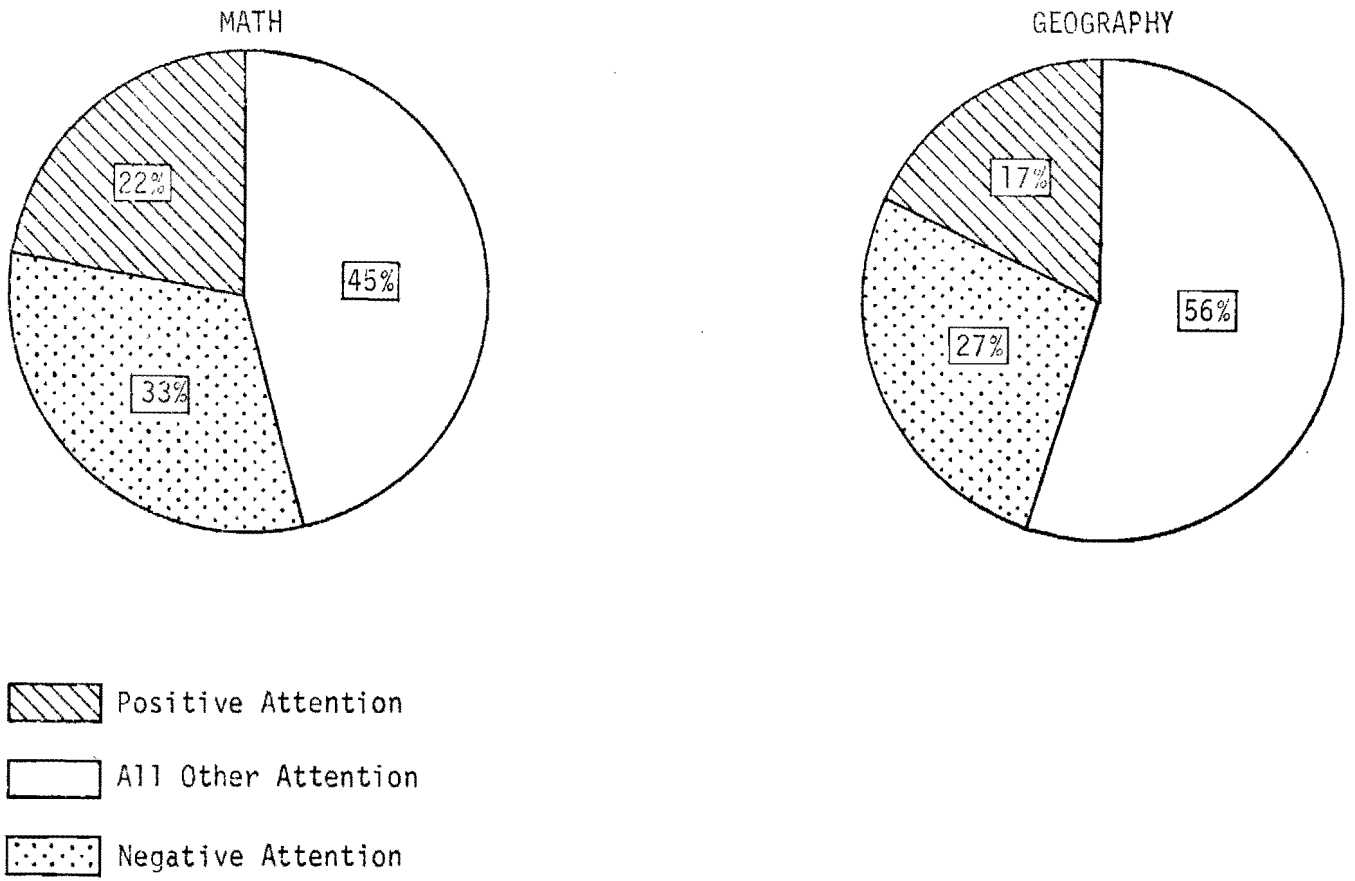

Figure 12. Collapsed Behavioral Categories Denoting the Percentages for the Types of Teacher Attention Directed Toward Target Students for the Entire Study.

during base periods. Overall, however, the teacher behaved more positively during the structured lessons than he did under the baselines.

When group contingent free time was implemented in math and geography, the teacher further reduced the frequency of interactions with the targets. In math, observers recorded a total of 44 interactions with the targets, while 46 interactions were recorded during the group contingencies in geography. For the remainder of the study, the frequency of the teacher's attention did not vary appreciably, but the nature of his attention did change. The teacher was the least negative, both in math and geography, under the group contingent free time. For example, in math he reduced negative attention to 20%, less than half the amount of negative attention administered during baseline. Concurrently, he doubled the baseline level of positive attention. But, appropriate student behavior had greatly increased with the introduction of group contingent free time, so the teacher had more appropriate student behavior that he could legitimately attend to. Similarly, during the individually contingent free time, the students produced high levels of appropriate behavior. In turn, the teacher reacted with his highest rates of positive attention (35 and 27% in math and geography, respectively). Nonetheless, negative attention amounted to 30 and 27% of his behavior in math and geography, respectively.

During the points phases, the teacher gave more negative than positive attention to the Ss. In math, for example, 24% of the teacher's attention was positive, while 39% of his interactions with the Ss were negative. Positive attention, however, was double the base rate and

even exceeded the level of positive attention given during the group condition in geography.

Negative attention was probably the most striking aspect of the teacher's behavior, since negative interactions were excessive through all study phases. At its lowest point, negative attention still constituted 17% of the teacher's responses. Data disclosed that over the course of the study, negative attention amounted to 33 and 27% of the teacher's behavior in math and geography, respectively.

In summary, no extreme changes in teacher behavior occurred under the different treatments, but teacher behavior did fluctuate. There appeared to be somewhat of a reciprocal relationship between student and teacher behaviors. Generally, when appropriate student behaviors were high, the teacher responded more positively. There were exceptions, however. For example, the teacher responded more positively in geography under the points phase than he did under the group condition, yet the students behaved most desirably under the group contingencies. Also, the teacher emitted his highest levels of positive attention under the individually contingent free time, but the students behaved more appropriately during the group contingencies than during the individually contingent free time. The E contends that the noted changes in teacher behavior were a function of changes in student behavior and not the reverse, since there was never any attempt to manipulate teacher behavior. Also, it is highly unlikely that the students' behavior was controlled by teacher attention, because of the infrequency of specific verbal praise directed towards the targets. A striking aspect of the study was the excessive amounts of negative teacher attention throughout the study.

CHAPTER IV

DISCUSSION, CONCLUSIONS, AND SUGGESTIONS FOR FURTHER STUDY

Discussion

The teacher in the present study experienced a situation similar to that of many beginning teachers. In his first teaching assignment, he was placed in a crowded classroom in an inner-city school where one would expect low academic achievement and indifference toward school. He faced the problem not only of planning suitable lessons for his students but also of finding ways to motivate students to attend to the lesson activities. In brief, the teacher was confronted with the problem of achieving classroom control. Hall et al. (1968) have pointed out that some teachers never discover ways of effectively managing their classes. Likewise, those who are successful often waste considerable time before learning techniques that improve student behaviors. The present study, however, presented several procedures that were clearly effective in helping a beginning teacher manage his class.

During the baselines the teacher was so busy reprimanding the students that only minimal attention was directed to class lessons. Structured lesson conditions were therefore introduced successively in math and geography to expedite lesson activities, but the structured lesson phases failed to produce desired results. The first implementation of structured lessons yielded an average of only 29 and 31% of appropriate student behavior in math and geography, respectively.

One might assume that the structured lessons were ineffectual because the curriculum materials were uninteresting, irrelevant, or because a beginning teacher could not properly organize lesson activities. Such assumptions weaken under close scrutiny, however. After the initial implementation of structured lessons, other consequences were simply added to or subtracted from the structured lessons. When group contingent free time was added to the structured lessons as a consequence for appropriate behavior, desired behavioral changes were affected immediately. Therefore, it seems likely that only the absence of appropriate consequences accounted for the relative ineffectiveness of the structured lessons.

A number of explanations may be offered as reasons for the dramatic changes which occurred with the implementation of group contingent free time. For example, Oxborne (1969) suggested three plausible explanations for the power of free time to modify behavior. First, a typical classroom situation may be so aversive to students that the presentation of free time constitutes an escape conditioning procedure. Such a rationale cannot be overlooked, since negative teacher attention was a striking aspect of the present study. By remaining in their seats and attending to lesson activities for a limited period of time, the pupils could obtain free time privileges and escape teacher reprimands and any other aversive conditions associated with the regular classroom routine.

Second, Osborne suggested that free time gives students an opportunity to engage in positively reinforcing activities. This explanation has considerable merit in the present study. As the children

entered the classroom, they made comments such as, "Remember, you promised that I could be in charge of the tape recorder during free time," and "I'm going to listen to records today during free time." The students also requested a variety of reading material for the free time periods. They asked the teacher, "Did you bring any football books today?" . . . "Do you have any new comics?" These and many similar comments imply that free time activities, in fact, had positive reinforcement value for the students.

Third, the Premack principle (Premack, 1959) was offered by Osborne as a reason for the effectiveness of free time. Simply stated, the Premack principle means that a preferred activity (e.g., reading magazines, talking with friends) may be used to strengthen less preferred activities (e.g., attending to math lessons). In the present study free time privileges were made contingent upon the emission of appropriate classroom behaviors, and thus can be used to explain the occurrence of behavioral changes.

Peer pressure is another variable that may have contributed to the improved behaviors under the group contingent consequences. Subjective evidence suggests that students did attempt to control the behavior of their peers. For example, the students were observed admonishing each other for inappropriate actions. The students gave hard stares and shook their fists at peers who caused the group to be penalized. They also signaled one another to be quiet and sit down. "Hurry-up and get in your seat" was a frequently heard comment that preceded the sounding of the tardy bell. "Why don't you shut-up" was occasionally directed at a

peer; however, this type of comment was infrequent since it, too, led to a group penalty. Under the group consequences pupils were also observed helping peers. It was not uncommon for a student to ask, "Can I help _____ with his work." This subjectively reported helping behavior is consistent with the findings of another study (Hamblin et al., 1971) which indicated that spontaneous peer tutoring occurred when the group received consequences based on the work of other students.

Finally, one might contend that the increase in appropriate behavior under both the group and individually contingent free time phases was a result of changes in teacher attention. There appeared to be somewhat of a reciprocal relationship between student and teacher behaviors. Generally, when appropriate student behaviors were high, the teacher responded less negatively. Since no attempt was made to manipulate teacher responses, it seems likely that variations in teacher behaviors were a function of student conduct. Also, the low rates of specific verbal praise directed toward targets makes it improbable that teacher approval was a controlling factor in the study.

A combination of factors was probably responsible for student behaviors under the group contingent consequences. Undoubtedly, the aversive qualities of the regular classroom activities, the reinforcement value of free time, and peer pressure all contributed to the favorable changes occurring with the application of group contingent consequences.

Although the group contingent free time conditions proved to be the more potent, individually contingent free time also yielded extremely

high levels of appropriate behavior for all Ss. Under the individually contingent free time, the daily mean of appropriate behavior amounted to 77 and 70% in math and geography, respectively. Levels of desired behavior for each S rose abruptly when individually contingent free time was added to the structured lessons. But in contrasting the results of the group and individually contingent consequences, data showed that the group technique produced greater day-to-day stability. The group procedure was also statistically different ($p < .05$) from the individual consequences in math, but the two procedures were not statistically different in geography. However, raw data revealed that seven of eight Ss in math and five of eight Ss in geography performed better under the group than under the individually contingent consequences. Peer influences may have accounted for the differential efficiency of the two techniques, since the principal difference between the group and individually contingent free time was the method by which students earned free time. The fact that the individually contingent free time yielded high rates of appropriate behaviors suggests that escape from aversive features of the classroom and/or the reinforcement value of free time were important variables in controlling student behaviors.

When points without backup consequences were applied successively in math and geography, minimal increases in desired behaviors were obtained over the preceding structured lessons phase. However, the points alone yielded an increase of 19 and 16% of appropriate student behavior over the baselines in math and geography, respectively. Considerable variability of behavior occurred under the points phases. These findings

are not entirely in agreement with earlier studies. Jessee (1971), for example, found that points without backup consequences were as effective as points without backup reinforcers in managing the behaviors of middle class junior high students. In Jessee's study, however, the rates of appropriate behavior during baseline comprised 60% of student actions, double the rate of desired student behaviors in the present study. Also, in Jessee's research, points alone raised appropriate student behaviors approximately 15% above baseline. Similar small but abrupt changes are reported in other studies (Jens and Shores, 1969; Long, 1971; Sulzer et al. 1971). Except for the daily variability of student behaviors, points alone in the present study yielded about the same percent of improvements as found in other experiments. This suggests that points without backup reinforcers possess only limited power to alter disruptive behaviors irrespective of the starting point. While an increase from 60 to 75% raises desired behavior to a level which would be considered acceptable by many teachers, an improvement of only 15% would no doubt be unacceptable if over half of all student responses continued to be inappropriate. Therefore, points alone would appear to have maximum utility where only small changes are needed to raise student behaviors to acceptable levels.

The findings in the present study do not entirely exclude the use of points without extrinsic backup reinforcement even in settings where substantial changes are needed. The results simply imply that other tactics must be employed to maintain desired behaviors when backup consequences are eventually withdrawn. Any number of possibilities exist.

For example, the students could be organized into teams and play "good behavior games" to determine which group could simply accumulate the greatest number of points. Another possibility would be to let the students' earning of points serve as a method for the delivery of contingent teacher approval. While these suggestions are not devoid of backup consequences, they may prove more acceptable to classroom teachers than the continuous use of extrinsic reinforcement. Certainly the technique of pairing teacher approval with a point system is advisable in settings where negative teacher attention constitutes a major portion of the teacher's interactions with the class. It may be that increasing the reinforcement value of teacher approval by pairing teacher approval first with points which are exchangeable for desired consequences is a key element affecting any point system. Where the teacher's approval is highly valued, students may be more inclined to work for points simply because the point system is being implemented by a highly regarded person. Conversely, students may be less inclined to work for points alone if the teacher is a person who is held in low esteem and is associated only with negative attention.

The experimental procedure in the present study, consisting of aspects of both reversal and multiple baseline designs, demonstrated vividly the power of the treatment conditions. The design also facilitated evaluation of the generality of behavior changes. For example, dramatic changes occurred with every successive application and withdrawal of either group or individually contingent free time. Although

the rates of desired behavior of several Ss declined less than others with the removal of free time consequences, reductions in appropriate behavior were noted for every S. Statistical analyses across classes showed that changes in environmental consequences in one situation did not generalize to a corresponding situation where the consequences were different. When group contingent free time was applied in math, but not in geography, rates of appropriate behavior rose rapidly in math while remaining virtually unchanged in geography. Similarly when the group consequences were withdrawn in math and concurrently introduced in geography, rates of desired behavior rose in geography and declined in math. This finding implies that a teacher should plan adequate consequences in all, not just a few, of his classes.

In summary, the group achieved the highest levels of appropriate behavior during the group contingent free time phases. Individually contingent free time ranked second in the production of positive effects. Aversive classroom conditions, the reinforcing value of free time privileges, and the Premack principle are offered as explanations for the behavioral changes accruing under the individual and group free time phases. Peer influences appeared to have added potency to the group contingent procedure. Points, structured lessons, and baselines yielded successively lower levels of desired student responses. The results suggest that structured lessons alone and points without backup consequences are not practical methods for managing the behaviors of students in an inner-city junior high school. Finally, the treatment effects were highly specific to the class in which they were applied. This finding

indicates that a teacher should plan consequences to control behaviors in all, rather than a few, of his classes.

Conclusions

The major conclusions to be drawn from the present study are:

1. Neither structured lessons alone (i.e., the expediting of teacher prepared lessons via a handout of daily assignments and the specification of rules of classroom conduct) nor the use of points without backup consequences are practical methods for substantially modifying disruptive classroom behaviors of inner-city students. Although both procedures resulted in improved classroom behaviors, their ability to establish classroom control was not demonstrated.

2. Although group contingent consequences was found to be the most potent treatment, both the individually contingent free time and group contingent free time proved to be efficient techniques for the beginning teacher to use in substantially increasing and sustaining desired student behaviors. Dramatic changes were effected with both individual and group consequences without extensive changes in classroom materials and without the manipulation of teacher approval.

3. From the standpoint of teacher time, the group procedure appeared to be slightly more efficient than the individually contingent consequences. Under the group contingent free time the teacher had merely to censor one student and the others behaved more appropriately. Additionally, the students seemed to accept much of the responsibility for classroom control. They encouraged as well as admonished one

another to behave more appropriately. Free time was dispensed only once each session for the entire class as contrasted with awarding free time on an individual basis under the individually contingent free time phases. In essence, though, both the group and individually contingent free time were easily implemented and required only minimal expenditure of teacher time.

4. The selection of either group or individually contingent consequences as a classroom behavior management technique may well be dependent upon a teacher's philosophical orientation. Some teachers may be opposed to penalizing or rewarding students on a group basis. If a teacher is convinced that the goals of education will best be served through independent accomplishments, he may decide to forego the use of group consequences. Conversely, others may regard group consequences as a method of achieving cooperation and a commitment to attain common goals as well as an efficient way of managing classroom behaviors. Since the present study demonstrated the utility of both individual and group consequences, it remains largely an open question as to which method a teacher should select.

5. Statistical comparisons of results of treatment conditions across two separate classes with the same Ss revealed that behavioral changes in each class were dependent upon the treatment condition in that class. That is, a treatment applied in math, but not in geography, had no significant effect on classroom behaviors in geography. While not surprising, this finding suggests that a classroom teacher should plan consequences to control behaviors in all, not just a few, of his classes.

Suggestions for Further Study

1. Since there is limited data concerning the comparative effectiveness of group versus individually contingent consequences, systematic comparisons of the two techniques should be undertaken at all grade levels with a variety of subjects (e.g., exceptional children, various cultural groups).

2. A study should be conducted to determine if differential results are obtained by varying the sequence in which group and individually contingent consequences are introduced. Matched groups could be used in such a study. One group could be introduced first to the individually contingent consequences followed by the group contingencies, while the sequence could be reversed with the other group.

3. Other studies should seek to develop techniques that can be used in conjunction with group and individually contingent consequences. For example, contingent teacher approval might be used in future studies where negative teacher attention comprises a high percentage of teacher behavior. Similarly, the addition of programmed materials or teaching machines might further enhance the quality of classroom management.

4. Studies should be conducted to assess the effectiveness of a combination of group and individual contingencies. For example, a team approach such as that used in the study by Barrish et al. could be compared with individual and group contingencies.

5. Other studies should be conducted which employ points and a variety of nontangible backup consequences. For example, what would be

the effect of simply displaying the students' daily accumulation of points for appropriate behavior.

BIBLIOGRAPHY

BIBLIOGRAPHY

Andrews, H. B. The effects of group contingent reinforcement on student behavior. Paper read at American Personnel and Guidance Association meeting, Atlantic City, March, 1971.

Barrish, H. H., M. Saunders and M. M. Wolf. Good behavior game: Effects of individual contingencies for group consequences on disruptive behavior in a classroom. Journal of Applied Behavior Analysis, 1969, 2, 119-124.

Becker, W. C., C. H. Madsen, Jr., C. R. Arnold, and D. R. Thomas. The contingent use of teacher attention and praise in reducing classroom behavior problems. The Journal of Special Education, 1967, 1, 287-307.

Birnbrauer, J. S. Contingency management research. Educational Technology, 1971, 4, 71-77.

Birnbrauer, J. S., M. M. Wolf, J. D. Kidder and C. E. Tague. Classroom behavior of retarded pupils with token reinforcement. Journal of Experimental Child Psychology, 1965, 2, 219-235.

Cormier, W. H. Effects of approving teaching behaviors on classroom behaviors of disadvantaged adolescents. Final Report, Project No. 9-D-017, The University of Tennessee, 1970.

Glynn, E. L. Classroom application of self-determined reinforcement, Journal of Applied Behavior Analysis, 1970, 3, 123-132.

Hall, R. V., C. Cristler, S. S. Cranston, and B. Tucker. Teachers and parents as researchers using multiple baseline designs. Journal of Applied Behavior Analysis, 1970, 3, 247-255.

Hamblin, R. I., C. Hathaway, and J. Wodarski. Group contingencies, peer tutoring and accelerating academic achievement. In E. Ramp and B. L. Hopkins (eds.), A New Direction for Education: Behavior Analysis 1971. Lawrence: The University of Kansas, 1971. Pp. 41-53.

Herman, S. H. and J. Tramontana. Instructions and group versus individual reinforcement in modifying disruptive group behavior. Journal of Applied Behavior Analysis, 1971, 4, 113-119.

Jens, K. G., and R. E. Shores. Educational materials: Behavior graphs as reinforcers for work behavior of mentally retarded adolescents. Education and Training of the Mentally Retarded, 1969, 4, 21-27.

Jessee, R. E. The effects of points and backup reinforcers on appropriate classroom behavior. Unpublished master's thesis, University of Tennessee, 1971.

Keefauver, L. W. Modification of deviant behavior in the classroom through group contingent reinforcement. Unpublished master's thesis, University of Tennessee, 1970.

Long, J. D. The comparative utility of three levels of token reinforcement in a class of behaviorally retarded students. Unpublished manuscript, University of Tennessee, 1971.

Lovitt, T. C., and K. A. Curtiss. Academic response rate as a function of teacher- and self-imposed contingencies. Journal of Applied Behavior Analysis, 1969, 2, 49-54.

McKenzie, H. S., M. Clark, M. M. Wolf, R. Kothera, and C. Benson. Behavior modification of children with learning disabilities using grades as tokens and allowances as backup reinforcers. Exceptional Children, 1968, 34, 745-752.

O'Leary, K. D., and W. C. Becker. Behavior modification of an adjustment class: A token reinforcement program. Exceptional Children, 1967, 33, 637-642.

Osborne, J. G. Free-time as a reinforcer in the management of classroom behavior. Journal of Applied Behavior Analysis, 1969, 2, 113-118.

Packard, R. G. The control of "classroom attention": A group contingency for complex behavior. Journal of Applied Behavior Analysis, 1970, 3, 13-28.

Premack, D. Toward empirical behavioral laws. I. Positive reinforcement. Psychological Review, 1959, 66, 219-233.

Schmidt, G. W., and R. E. Ulrich. Effects of group contingent events upon classroom noise. Journal of Applied Behavior Analysis, 1969, 2, 171-179.

Sidman, M. Tactics of Scientific Research. New York: Basic Books, 1960.

Siegel, S. Nonparametric Statistics for the Behavioral Sciences. New York: McGraw-Hill Book Company, 1956.

Skinner, B. F. Science and Human Behavior. New York: MacMillan and Company, 1953.

Solomon, R. L., and R. H. Wahler. Peers as behavior therapists. Paper read at American Personnel and Guidance Association meeting, March, 1970.

Sulzbacker, S. T., and J. C. Houser. A tactic to eliminate disruptive behaviors in the classroom: Group contingent consequences. American Journal of Mental Deficiency, 1968, 73, 88-90.

Sulzer, B., S. Hunt, E. Ashby, C. Koniarski, and M. Krams. Increasing rate and percentage correct in reading and spelling in a fifth grade public school class of slow readers by means of a token system. In E. Ramp and B. L. Hopkins (eds.), A New Direction for Education: Behavior Analysis 1971. Lawrence: The University of Kansas, 1971, Pp. 5-28.

Thomas, D. R., W. C. Becker and M. Armstrong. Production and elimination of disruptive classroom behavior by systematically varying teacher's behavior. Journal of Applied Behavior Analysis, 1968, 1, 35-45.

Williams, R. L. Student and teacher rating scales. Unpublished manuscript, University of Tennessee, 1970.

Williams, R. L., J. D. Long and R. W. Yoakley. The utility of behavior contracts and behavior proclamations with advantaged senior high school students. Journal of School Psychology (in press).

Wilson, A. W. Aversive properties of an auditory stimulus as a function of association with removal of group contingent reinforcement. Unpublished Doctoral dissertation, University of Tennessee, 1971.

Wilson, S. The use of group contingent free time in a first grade class. Unpublished manuscript, University of Tennessee, 1971.

Wolf, M. M., D. K. Giles and R. V. Hall. Experiments with token reinforcement in a remedial classroom. Behavior Research and Therapy, 1968, 6, 51-64.

Zimmerman, E. H., and J. Zimmerman. The alteration of behavior in a special classroom situation. Journal of Experimental Analysis of Behavior, 1962, 5, 59-60.

APPENDICES

APPENDIX A

Table 15

Behavior Rating Agreement for Experimenter and Target Student Observers

Observer	Training Session	First Classroom Reliability Check	Second Classroom Reliability Check	Third Classroom Reliability Check
Trained for First Three-Fourths of Study:				
1[a]	.91	.88	.94	.97
2[b]	.88	.94	---	---
3[c]	.93	.96	---	---
4	.96	.90	.94	---
5	.86	.95	.90	---
Trained for Last One-Fourth of Study:				
6	.88	.93	---	---

[a]Observed for the duration of the study.

[b]Dropped out of university before completing observation schedule.

[c]Trained to complete schedule of Observer 2.

Table 16

Behavior Rating Agreement for Experimenter and Teacher Observers

Observer	Training Session	First Classroom Reliability Check	Second Classroom Reliability Check
Trained for First Three-Fourths of Study:			
1	.86	.87	---
2	.88	.92	.92
3	.86	.83	.88
4	.94	.90	---
Trained for Last One-Fourth of Study:			
5	.92	.87	---
6	.96	.92	---

APPENDIX B

Table 17

Minutes of Earned Free Time During Group Contingent Free Time

Day	Minutes of Earned Free Time	
	Math	Geography
1	10	0
2	15	14
3	9	14
4	10	4
5	13	13
6	12	11
7	16	10
8	8	16
9	16	--
Mean	12	10

APPENDIX C

Table 18

Points Earned and Percentages of Appropriate Behaviors (TR & S) During Individual Contingent Free Time Phase

Student	Days (Points/Percentage Appropriate Behaviors)							
	1	2	3	4	5	6	7	8
Math								
Bill	12/50	6/0	14/75	14/75	12/25	16/58	16/83	16/95
Gail	16/92	14/63	15/92	16/100	16/79	16/75	16/100	16/92
John	16/92	13/50	14/88	16/100	12/63	14/63	16/100	16/100
Jane	10/33	a	15/79	16/75	12/67	a	16/83	15/71
Gary	15/63	16/75	16/75	10/8	16/96	a	16/100	16/83
Mark	10/58	16/83	16/75	16/83	8/46	12/58	16/83	16/83
Mary	16/75	16/88	16/88	a	15/79	16/88	16/92	16/96
Phil	16/100	a	16/88	14/58	16/83	a	16/100	16/96
Mean	14/71	14/60	15/82	15/71	13/67	15/68	16/93	16/91
Geography								
Bill	12/50	12/75	14/71	8/17	10/50	16/88	16/71	15/75
Gail	12/67	16/71	16/83	16/96	10/54	16/96	16/96	16/83
John	16/100	16/88	12/67	14/58	14/63	16/71	16/71	16/79
Jane	8/50	8/58	14/58	10/33	a	15/75	12/50	a
Gary	16/88	16/88	16/79	6/21	6/50	16/58	16/67	a
Mark	16/100	16/92	16/83	16/79	10/46	10/38	16/71	16/75
Mary	15/88	15/71	16/67	10/46	16/79	16/75	14/67	16/75
Phil	16/79	16/79	16/71	a	16/100	16/88	14/75	a
Mean	14/78	14/77	15/72	11/50	12/63	15/73	15/71	16/78

a = Absent.

Table 19

Points Earned and Percentages of Appropriate Behaviors (TR and S) During Points Phase

Student	Days (Points/Percentage Appropriate Behavior) 1	2	3	4	5	6	7	8
Math								
Bill	6/21	6/38	16/50	10/42	12/42	10/46	6/4	a
Gail	16/63	16/67	16/83	14/54	13/71	14/63	16/63	16/88
John	14/71	16/96	10/42	12/63	16/92	16/54	16/92	10/50
Jane	6/33	a	12/50	a	a	12/50	16/100	16/71
Gary	6/0	6/4	16/71	8/25	8/33	8/33	6/21	6/29
Mark	8/4	10/46	8/25	10/67	8/13	8/13	8/21	16/79
Mary	6/0	a	12/63	8/42	12/50	12/50	10/38	16/88
Phil	16/71	16/67	15/46	15/71	a	a	a	14/29
Mean	10/33	12/53	13/54	11/52	11/44	11/44	11/48	13/62
Geography								
Bill	6/4	12/33	12/17	12/21	6/4	10/29	14/17	12/29
Gail	14/50	16/75	14/58	15/75	10/25	14/54	16/67	14/63
John	16/87	15/79	14/63	13/71	16/71	15/50	12/42	16/54
Jane	a	6/38	12/25	8/25	a	8/13	12/29	a
Gary	16/92	16/79	14/29	10/46	12/29	16/83	16/92	12/42
Mark	8/17	8/21	8/33	12/54	12/33	8/13	16/71	8/38
Mary	15/50	15/75	16/50	16/92	10/38	16/96	16/75	13/50
Phil	a	12/50	14/58	a	a	12/33	12/50	14/50
Mean	13/50	12/56	13/42	12/55	11/33	12/46	14/55	13/46

a = Absent.

VITA

James D. Long was born in Marion, North Carolina, on January 25, 1942. He was graduated from Marion High School in 1960. The following September he entered Western Carolina University, and in August, 1963, he received a Bachelor of Science degree in Business Administration. In August, 1967, he received a Master's degree in Guidance and Counseling from Appalachian State University.

He was employed for two years as a classroom teacher and for two years as a guidance counselor in the North Carolina public schools. He entered the doctoral program at The University of Tennessee in the summer of 1969. During the school year 1970-71 he held a University of Tennessee Non-Service Fellowship. The following year he was a graduate assistant in the Bureau of Educational Research and Service. He received the degree of Doctor of Education with a major in Educational Psychology and Guidance in June, 1972.

He is married to the former Elizabeth Whitener of Marion, North Carolina.