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Effects of reduced disruptive behavior upon academic performance in the classroom

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EFFECTS OF REDUCED DISRUPTIVE BEHAVIOR
UPON ACADEMIC PERFORMANCE IN THE CLASSROOM

A Masters Thesis

Presented to
the Faculty of the Graduate School
University of the Pacific

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by

Patricia Erwin Busher

August 1976

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ABSTRACT

The purpose of this study was to investigate the relationship between disruptive behavior and academic performance. Using an ABA design the experimenter trained a teacher of a disruptive class to use precision teaching technique to reduce the incidence of out-of-seat and talking-out behaviors. The experiment was conducted during the history period. The effects of the experiment upon academic performance in history were measured by equivalent weekly history tests. Students participated in goal setting and selection of reinforcement. Students reached their behavioral goals during 4 of the 5 weeks of treatment. Percentage of occurrence of target behaviors was reduced by 4:1 for talking-out, and 17:1 for out-of-seat, as recorded by outside observers. The mean percentage of correct responses on weekly history tests increased by 36% under treatment conditions. During the reversal phase a slight increase in target behaviors occurred. Single subject analysis showed that all students improved in performance during the treatment phases. A return to baseline conditions brought an incomplete reversal; 19 decreased slightly in academic performance, 12 continued to improve. Results suggest that the children who will

benefit most from such interventions are those who, in a disruptive class, have a low or moderate level of academic performance.

Effects of Reduced Disruptive Behavior
Upon Academic Performance In The Classroom

Patricia Erwin Busher

University of the Pacific

The purpose of this study was to investigate the relationship between disruptive behavior and academic performance. The major goal of education is academic achievement. If improved behavior brings about improved academic performance then the importance of behavior control is clearly indicated. As a function of practicality and teacher time needed for implementation, the most desirable behavior control procedures would be those which were applicable to entire classes.

The efficacy of group behavior control procedures and group contingent consequences has been demonstrated in a number of applied settings. Long and Williams (1973) studied the effects of group versus individually contingent free time in modifying student behaviors, and found that group reinforcement procedures appeared to be slightly more effective than individual reinforcement.

Dixon (Note 1) applied precision teaching techniques (See Appendix A, Precision Teaching) using a group contingent procedure to control talkouts. During the television watching time of 11 institutionalized emotionally disturbed boys, the turning off the T.V. set for 1 min. was made contingent upon any member of the groups' talking out of turn. Rate-of-talking-out data showed that this contingency decelerated talking-out much more effectively than did a similar contingency which penalized each boy for only his own violations of the no talking-out rule. ✓

Perine (1971) used precision teaching in a group contingent situation to decrease talk-out behavior in a regular third grade classroom. In two weeks the class had reached their goal of three talk-outs. A reversal condition was not used in this study, but the teacher reported that the talk-outs remained low and that the students had developed an awareness and control of talk-outs.

Schmidt and Ulrich (1969) found that noise level could be reduced in an entire class by the use of group consequences. In their study, reinforcement consisted of a 2 min. addition to the class gym period and a 2 min. break after maintenance of an unbroken 10 min. quiet period as monitored on a decibel meter. Transgressions of the sound limit resulted in a delay of reinforcement by the resetting of the timer to the full 10 min. interval. These procedures were highly effective in suppression and control of sound intensities.

The effects of teacher praise and disapproval on two target behaviors, inappropriate talking and turning around, were investigated by McAllister, Stachowiak, Baer, and Conderman (1969). The contingencies were applied to all students in an experimental class utilizing a multiple baseline experimental design. The contingencies were aimed first at decreasing inappropriate talking behavior and then at decreasing inappropriate turning behavior. The results demonstrated that the combination of disapproval for the target behaviors and praise for appropriate, incompatible behaviors substantially reduced the incidence of the target behaviors in the class. In a control class taught by the same teacher, observations revealed that inappropriate talking and turning around continued to occur at a high level.

McLaughlin and Malaby (1972) employed a procedure that enabled a teacher to bring inappropriate verbalizations under control in a classroom of approximately 25 fifth and sixth grade students. They found that contingent point loss for inappropriate verbalizations resulted in a low but steady rate of such verbalizations, whereas, point gain contingent upon quiet behavior produced a greater decrease in appropriate verbalizations. A return to the contingent point loss condition brought about an increased rate of inappropriate verbalizations. These inappropriate verbalizations decreased when quiet behavior was reinforced again.

Several studies bear upon the relationship between disruptive behavior and academic performance. Harris and Sherman (1973) found that although disruptive behavior was markedly reduced by the "good behavior game," the reductions were correlated with only slightly improved accuracy of academic performance in the classroom where performance was measured. The study was designed in such a way that there were alternations from treatment (behavior control) in a first math period to no-treatment in a second math period and visa versa with a daily comparison of performance rates from each math period involving equivalent math problems. It may be that the frequent alternations of treatment versus no treatment did not afford an appropriate amount of time for the behavior control to affect academic performance.

Hall, Panyan, Rabon, and Broden (1968) found that punishment of disruptive behavior brought about increased study behavior and a decrease in classroom noise. When the classroom teacher used punishment procedures, placing a chalk mark on the chalk board if any subject got out of his seat without permission or disturbed the class and deducting 10 seconds from a 5 min. break period or no break period if marks exceeded 24, study behavior increased from 65% to 76%. A marked decrease in classroom noise was observed. After the first two days of reversal, when punishment of noisy behavior was discontinued, the rate of study behavior dropped sharply. During

a final reinforcement phase the study behavior rose immediately to 81% and was maintained at that level to the end of the study. Study behavior included writing the assignment, looking in the book, and answering teacher's questions.

Allyon and Roberts (1974) found that reinforcement of academic performance resulted in reduced disruptive behavior. They used an alternative approach whereby discipline problems were attacked by reinforcing relative academic skills. The teacher conducted 15 min. performance sessions in her reading class during which written academic performance and disruptive behavior were recorded. When systematic token reinforcement was applied to reading performance only, the rate of disruptive behavior fell drastically, and reading performance increased. When the reinforcement procedure was withdrawn, disruptive behavior again rose, and reading performance declined. The reinstatement of reinforcement doubled reading performance and eliminated disruption. It may be that these results are peculiar to individuals with well developed academic repertoires, as the study was conducted in an affluent, upper-middle class public school with students at, or above, grade level in achievement. Furthermore, the authors do not report the level of disruptive behavior or academic performance when the students were not involved in intensive work periods.

Ferritor, Bucholdt, Hamblin and Smith (1972) found that behavioral contingencies improved attending and decreased disruptions but did not improve academic performance, while performance contingencies improved performance but resulted in increased disruptive behavior. Combined contingencies improved both academic performance and behavior.

It may be that the pre-existing level of disruptive behavior in a class is an important variable in determining whether behavior control alone will result in improved academic performance. Where classroom control is lacking or poor, improved behavior control may well result in improved academic performance. Where classroom control is adequate, efforts to improve disruptive behavior may result in no improvement in academic performance unless performance contingencies are introduced.

The present study was designed to ascertain whether a reduction of disruptive behavior would result in increased academic performance in a classroom with a high incidence of disruptive behavior and a low level of behavior control.

Method

Subjects

An entire elementary fifth grade self-contained class (32 students) from the Lincoln Unified School District participated in the study. One subject transferred to

another school district during the treatment phase of the study, but data recorded for this student is retained for inspection. The criterion for selection of the class was the identification of a high level of disruptive behavior in the classroom by the principal's request for assistance, based on an evaluative needs assessment, with teacher agreement. To verify the reported high incidence of disruptive behavior in the classroom, a school psychologist and the experimenter made three independent observations in the classroom over a two-week period.

Design

An ABA experimental design was used to evaluate the effectiveness of the behavioral intervention, precision teaching. (See Appendix A.) The baseline data for both academic performance and for disruptive behavior was collected until the two target behaviors, out-of-seat and talking-out, stabilized. This resulted in a four-week baseline condition. The treatment procedures were then implemented until sufficient treatment effect was reflected by the data, a period of five weeks. A return to baseline conditions was then initiated and ran for three weeks, until the end of the school year.

Pretraining Procedure

The entire class received five days of 15 min. training sessions in precision teaching charting techniques. The pretraining sessions were conducted during the last

four days of the baseline period, but took place in a morning session, whereas, baseline collection occurred in the afternoon. The fifth pretraining session, which was the only session that dealt directly with the target behaviors, and the subsequent introduction of the study and the treatment phase occurred after baseline collection had terminated. Baseline measures were taken on Mondays through Thursdays only; the fifth pretraining session was conducted on Friday. Conducting pretraining sessions on concurrent days of base period did not appear to alter behavior during the base period of this study. The experimenter conducted all pretraining sessions to eliminate the necessity of prior training of the teacher. The teacher participated, along with the students, in the pretraining sessions to learn about precision teaching charting techniques.

Prior to the first pretraining session the students received the following instructions from the experimenter:

"Hello. How are you today? My name is _____ and I'd like it very much if you could help me with a project I'm working on. Your help would really mean a lot to me. The reason I'm working on this project is to try to find out whether your charting or keeping track of things that you do in class each day will help you to do even better in school.

You will need to learn a special technique called precision teaching; it's easy to learn and lots of fun too. All of you look like such good workers. I will pay you for helping me by letting you select a candy bar from this grab bag each day after we've finished our lesson."

The pretraining procedures have been used frequently in the past for classroom control, academic intervention and teacher training in the Stockton Unified School District by the experimenter and have been found to be effective. The instructions and procedures for the pretraining sessions are described below:

Pretraining session 1. "This will be your first training session in precision teaching. Now I want you to listen very carefully to what I tell you and be sure to ask me questions if there is something you don't understand.

Look at the big chart on the wall. (Experimenter used an overhead projector and chart transparency.) You have a smaller one just like it in front of you. The up-and-down lines are day lines. (Experimenter demonstrated by pointing to day lines.) What are the up-and-down lines called? Good. The day lines are labeled to help you recognize them. The heavy black up-and-down lines are Sunday lines. Point to a Sunday line on your chart. If you have pointed to any one of these lines, your answer is correct. (Experimenter demonstrated by pointing to the Sunday lines.) Where do you think the Monday line might be. Very good. How are the Monday lines labeled. Good with an M. (Experimenter expanded this approach to include other days of the week.)

There are five weeks shown on the chart. Let's count them together. (Experimenter demonstrated by pointing to the week intervals on the chart.) Good. Is there someone in class who thinks that they can come up and count the weeks as we just did? (Experimenter selected a student.) Good.

Now it's time to learn about the other lines on the chart. The lines that go across the sheet are called number lines. (Experimenter demonstrated by pointing to the number lines.) What are the lines that go across the sheet called? Good. Make a dot on the 1 line like this. (Experimenter demonstrated.) Anywhere on the 1 line is fine so long as you put your dot right on the line and not beside it. Very good. Can you point to the 7 line? If you have pointed to this line your answer is correct.

(Experimenter demonstrated by pointing to the 7 line.) Make a dot on the 7 line. Any where on the 7 line is fine. Did you remember to put your dot right on the 7 line like this and not beside it? (Experimenter demonstrated.) Very good. (Experimenter expanded this approach to include other number lines.)

The number lines tell you how many times you do something. For example, the 1 line means you did something one time; the 3 line means you did something three times. Can you tell me what the 10 line means? Good. Can you tell me what the 30 line means? Very good. (Experimenter expanded this approach to include other number lines.)

You have worked very well today. I really appreciate your help. You may select a candy bar from this grab bag just like I promised you."

Prior to the commencement of pretraining sessions 2 through 5, the subjects received the following greeting and instruction:

"Hello, I'm glad to see you again. You did so well yesterday, I hope you do as well again today. Remember to listen very carefully to what I tell you and be sure to ask me questions if there is something you don't understand."

At the completion of pretraining sessions 2 through 5, the subjects were assured that they performed well, thanked for their cooperation and given a candy bar as follows:

"You have worked very well today. I really appreciate your help. You may select a candy bar from this grab bag just like I promised you."

Pretraining session 2. (Experimenter reviewed day lines and number lines using the approach described in the first pretraining session.) "You certainly have done a greater job on learning your day lines and number lines.

Can you make a dot where the 1 line and a Sunday line cross like this? (Experimenter demonstrated.) Any Sunday line is fine. Very good.

(If subjects experienced difficulty in identifying points of line intersection, Experimenter instructed them to place a tag board card across the specified number line with their left hand and to use their right index finger to locate the specified day line. Experimenter instructed them to place their right index finger at the top of the day line and move it slowly downward along the day line until it touched the edge of the tag board card.) Make a dot where the 1 line and the first Monday line cross. Very good. Can you show me where the 5 line and the second Tuesday line cross? Good. Make a dot where the 10 line and the first Wednesday line cross. Very good. Now here's a tricky one. Let me see if I can stump you. If I ask you to put a dot at 15 on the first Thursday line, where would you put it? Very good. How about 21 on the first Friday line? Good." (Experimenter provided assistance to those subjects who experienced difficulty in estimating points of intersection. Experimenter expanded this approach to include other points of intersection.)

Pretraining session 3. (Experimenter reviewed locating and plotting points of intersection using the approach described in the second pretraining session.) "Very good. I'm pleased to see that you have remembered what you learned yesterday.

Let's try something new. Lay your pencils down and set your charts out of your way for a minute. (Experimenter passed out sheets of paper to subjects.) When I give you the signal, I want you to make all the happy faces you can on this paper until I tell you to stop. To draw a happy face correctly you make two eyes and a mouth inside a circle like this. (Experimenter demonstrated by drawing a happy face on the chalk board. Experimenter gave a 1 min. timing using a stop watch.) Very good. Now count the number of happy faces you have drawn. At the top of your paper mark the number you did. Now make a dot on your chart where your score and the second Monday line cross. Very good. Who can mark the chart on the overhead projector to show how many happy faces they made? (Experimenter selected a student.) Very good. O.K., put your charts aside again. When I give the signal, see if you can draw more happy faces than you did the last time until I say stop. Good. Now count the happy faces and make a dot on your chart where your score and the second Tuesday line cross. Good. Now connect your two dots with a straight line like this. (Experimenter demonstrated.) Very

good. If your line goes from lower left to upper right it means that you were successful in drawing more happy faces than the time before. If your line runs from upper left to lower right it means that you drew fewer happy faces than the time before. (Experimenter demonstrated by pointing to lines shown on the overhead projector.) What was your aim? Did you want to draw more happy faces or fewer happy faces than the time before? Good. The aim was to draw more happy faces. In precision teaching we show our aim by placing an asterisk at the intersection of the lines representing the desired rate and target date. For example, if I wanted to be able to draw 100 happy faces by the third Wednesday on our chart, I would place an asterisk here. (Experimenter demonstrated.) Who can show us where we should place our asterisk if we wanted to be able to jump rope 70 times in 1 min. by the fourth Thursday on our chart? (Experimenter selected a student.) Very good." (Experimenter expanded this procedure to include other behaviors.)

Pretraining session 4. "Yesterday you counted and charted happy face drawing behaviors. Today I would like you to count and chart some other kinds of behaviors. I have brought wrist counters to help you count. Wrist counters may be used when you are not able to write down what you have counted. There aren't enough wrist counters for all of you to use at one time. However, I will make sure that each one of you gets a turn at using a wrist counter before our lesson is over. (Experimenter redistributed the wrist counters after each timing and charting had been completed.) There are three windows on the face of your wrist counter. The top two windows tell you how many times you did something from 0 to 99. The bottom window tells you how many hundreds of times something happened. Every time you want to count something, you must press the stem down like this. (Experimenter demonstrated.) Now you try it. Very good.

Let's see if you can count the number of times I pick up my pencil. In order to count my picking-up-pencil behavior, you must wait until the whole movement cycle has been completed before depressing the stem of your wrist counter. For example, my fingers must touch the pencil, I must remove it from the table and put it down again. (Experimenter demonstrated picking up pencil behavior.) When I give you the signal, I want those of you who have wrist counters to use them to count the number of

times I pick up my pencil until I tell you to stop; the rest of you should count also so you can check to see whether they have counted correctly. Remember, you can only count my picking-up-pencil behavior after the whole movement cycle has been completed. (Experimenter gave a 1 min. timing using a stop watch.) Good. Now place a dot where your count and the first Monday line cross. Very good. Who can chart it on the overhead projector? (Experimenter selected a student.) Good." (Experimenter expanded this approach to provide subjects with experiences in observing, counting and recording movement cycles.)

Pretraining session 5. (Experimenter observing, counting and recording movement cycles by using the approach described in the fourth pretraining session. The target behaviors, out-of-seat and talking-out, were used as examples.)

At the end of the fifth pretraining session, the subjects received the following instructions:

"Now that you have learned precision teaching you are ready to start helping me with my project. (Experimenter displayed a large wall chart which showed the baseline data.) _____ (teacher's name) has been counting the number of times students in this class talk out or leave their seat without permission during the history period over the last four weeks. On this chart, talk-outs are charted in red and out-of-seats are shown in black. Did you know that on the first Monday your talk-out count was 180 and your out-of-seat count was 32, on the first Tuesday your talk-out count was 91 and your out-of-seat count was 25 ... and on the fourth Thursday your talk-out count was 168 and your out-of-seat count was 29? Your teacher and I feel that these behaviors keep you from doing better in school.

Do you feel that it would be a worthwhile precision teaching project to work on reducing the number of talk-out and out-of-seat-without-permission behaviors in your classroom? Good. Starting Monday, the whole class will work on reducing the number of talk-out and out-of-seat-without-permission behaviors during the history period. _____ (teacher's name) will wear wrist counters and keep the count for you. You will be responsible for charting. Each day a different member of the class will be asked to record the count on the precision teaching wall chart.

Who thinks they can suggest a reasonable aim for the class to set? Good. Does anyone else have another suggestion? (Experimenter continued to elicit responses until all class members who had suggestions to present had been recognized. Experimenter wrote the suggestions on the chalk board.) Good. If there are no other suggestions, then let's vote as a class. The aim receiving the most number of votes will be the one that the class will set and record on the wall chart." (The class set an aim of 30 for talk-outs and an aim of 10 for out-of-seats for the first week of the treatment phase. Two students were selected to record the aims on the wall chart by placing a red asterisk for talk-outs and a black asterisk for out-of-seats on the wall chart.)

_____ (teacher's name) will announce the count throughout the charting period each day. To help you to reach your aim, that is, bringing your count down by trying to stop talking out and leaving your seat without permission, _____ (teacher's name) will not pay attention to you when you are talking or when you are out of your seat without permission. _____ (teacher's name) will only pay attention to you when you are doing what you are supposed to be doing, that is, sitting in your seat without talking and raising your hand for permission to leave your seat or to talk.

If you are successful in reaching your aim then every member of the class will earn a privilege agreed upon by the class. What are some things you would like to earn? If you raise your hand and wait to be recognized, I will be able to list all your suggestions on the chalk board. When there are no more suggestions, the class will vote. The item which receives the highest number of votes will win. Of course, all suggestions must be subject to the discretion of your teacher as there are some things that would not be possible, such as earning a million dollars. However, such things as earning free time, selecting an art project, going on a picnic and taking a field trip may be items you might wish to include on your list. Once the item is selected it will be recorded on the precision teaching chart as an arrangement. (A class vote was taken and it was agreed that each member of the class would receive a candy bar on Thursday if their talk-outs and out-of-seats did not exceed the aims set for the week.)

Are there any questions about what you will be doing on Monday? Your teacher will help you if you need any assistance in charting your count."

Baseline and Reversal

In order to establish whether improved behavior and academic performance could be attributed to the experimental variable it was necessary to determine the levels of behavior disruption and of academic performance during the baseline period, the experimental period, and the reversal period. The frequency of two deviant classroom behaviors, out-of-seat behavior and talking-out behavior was recorded by the classroom teacher and by outside observers. These observations constituted the baseline measure of deviant behavior.

Out-of-seat behavior was defined as leaving the seat and/or seated position during a lesson without permission. Permission was defined throughout the study as raising one's hand, being recognized by the teacher, and receiving consent from the teacher to engage in a behavior.

Talking-out behavior was defined as talking or other vocal noise without permission. It included, for example, talking while raising one's hand, talking to classmates, talking to the teacher, calling the teacher's name, blurting out answers, or making noises with one's mouth such as animal-like sounds, howls, cat calls, etc.

While the definitions of disruptive behavior were constructed by the experimenter, they were formulated with the help of the classroom teacher on the basis of what she considered to be the disruptive classroom behaviors.

Normal classroom conditions were maintained during the baseline and reversal phases. There was no charting or intervention during the baseline and reversal phases. The baseline and reversal phase took place during the history

period, held weekly on Monday through Thursday from 1:00 to 1:30 p.m., as the teacher had indicated that her students were most disruptive at this time. Observations made by the school psychologist and the experimenter prior to the baseline phase had revealed that the incidence of disruptive behavior was greater in the afternoon session than during the morning session, although the incidence of disruptive behavior in the morning was high.

History lesson plans for each week were structured as follows:

Monday, independent reading of the assigned chapter for the week;

Tuesday, written seat work, three "To Help You Understand" activities from text;

Wednesday, class discussion, review of main points from the chapter;

Thursday, chapter test, open book.

This schedule was maintained by the teacher throughout the study. Although chapter content necessarily varied from week to week, the daily schedule of activities was constant.

During all phases of the experiment measures of the students' history performance were taken as well as of their behavior. Two objective measures of academic performance were used, the average number of "To Help You Understand" activities completed each week by each student, and the percentage correct score on each week's chapter

history tests attained by each student.

Prior to baseline collection 12 equivalent chapter history tests were constructed by a psychologist in the Stockton Unified School District, who was unaware of the nature of the experiment. The chapter tests were identical in format, consisting of five fill-in questions containing 10 blanks and five true-false questions. In the true-false questions the students were required to indicate whether the statement was true or false and also to correct the false statements. (See Appendix D.)

The tests were scored by the experimenter on a percentage correct basis, as that was the scoring technique previously used by the teacher. Scoring criteria involved 5 points for each correct fill in and 10 points for each true and false item.

The "To Help You Understand" activities were contained in the chapters from the text, (The Story of Our Nation¹). These activities were selected by the experimenter. Three activities related to the chapter were assigned each week. (See Appendix E.) These activities fell into three categories; list, discuss, and chart. On two occasions, when the activities contained in the chapter did not fit the criteria for selection, equivalent activities were constructed by the experimenter. At the end of the period the teacher recorded the number of activities which had been successfully completed by each

student. The average number of activities completed by the entire class was computed by the experimenter for each week of the study.

Recording Procedure

Procedures were selected which were easily usable by the teacher for a variety of behaviors. The behavior recording of the teacher was supplemented with behavioral recording by outside observers, who used a more refined recording procedure.

Prior to the baseline period, recording procedures were explained to the teacher, and she practiced these procedures in another class. During this practice session the teacher and the experimenter, using a pocket timer and wrist counter, counted and recorded the number of target behaviors emitted by the subjects over six 5 min. intervals. To assess agreement between teacher and experimenter observations, each 5 min. interval was treated as an independent observation. Reliability was calculated by dividing the smaller number by the larger number and multiplying by 100. Interobserver agreement ranged from 85 to 90%.

The teacher was instructed to count and record the incidence of out-of-seat and talking-out behavior emitted by the subjects during each 30 min. history period. She was also instructed to continue her normal teaching procedures.

In order to analyze interobserver agreement the

experimenter served as a second observer once during each experimental condition. Reliability was calculated by dividing the larger number into the smaller number and multiplying by 100. Interobserver agreement was 81% for out-of-seat behavior and 77% for talking-out behavior.

To assure objective recording of data, an outside observer recorded out-of-seat and talking-out behavior on an occurrence-nonoccurrence basis over ninety 20 sec. intervals on an interval recording sheet (See Appendix C). When a target behavior occurred within a 20 sec. interval the observer checked the square for that interval. The observer was familiar with interval recording procedures, but was given one training session in another class to become familiar with the recording apparatus. A portable, battery operated cassette recorder with a jack which permitted both observers to listen simultaneously was used to signal interval change. On Wednesdays a second observer served as a reliability checker in the classroom. The observers sat at the side of the classroom and avoided eye contact and interactions with students both preceding and during recording.

Interobserver agreement for this recording was 96% for out-of-seat behavior and 85% for talking-out behavior. Reliability was calculated by scoring each interval as agree or disagree and dividing the total number of agreements by the number of agreements plus the number of disagreements (Bijou, Peterson, and Ault, 1968).

Treatment

At the end of the baseline period, the experimenter met with the teacher to explain treatment conditions. The teacher was told that the precision teaching During (intervention) Phase was to be implemented and continued until a noticeable treatment effect was reflected by the data. For the first five days of the treatment period, the teacher was asked to restate and define the target behaviors (out-of-seat and talking-out without permission) for the students and the procedures for obtaining permission prior to each charting session. Throughout the treatment condition the teacher reminded the subjects that their aim was to bring their count down and that earning a reward selected each week by the class was contingent upon their success in changing their behavior.

The teacher was instructed to systematically ignore (break eye contact and turn body away from subject for 30 sec.) out-of-seat and talking-out behaviors, whenever possible, and to reinforce sitting-in-seat-without-talking and raising-hand behaviors by attending to subjects (verbal praise or smile). The teacher announced the count by stating, "The count is _____," throughout the treatment period whenever a target behavior was emitted. The teacher selected two different students each day to chart the count for the class for out-of-seat and talking-out behavior on the precision teaching wall chart.

Just prior to the History period on Mondays the

teacher helped the students to set their aim for the week and decide on the precision teaching arrangement using similar procedures as described at the end of the fifth pretraining session. Aims set by the students during the five weeks of the treatment condition were as follows:

Week 1, out-of-seat 10 or below, talking-out
30 or below;

Week 2, out-of-seat 5 or below, talking-out
20 or below;

Week 3, out-of-seat 4 or below, talking-out
15 or below;

Week 4, out-of-seat 1 or below, talking-out
10 or below;

Week 5, out-of-seat 1 or below, talking-out
10 or below.

The arrangements made by the students during the five weeks of the treatment condition were as follows:

Week 1, each class member would receive a candy bar on Thursday contingent upon the class reaching its aim for the week;

Week 2, each class member would receive a candy bar on Thursday contingent upon the class reaching its aim for the week;

Week 3, each class member would receive a candy bar on Thursday contingent upon the class reaching its aim for the week;

Week 4, earning 10 minutes extra recess time on Thursday contingent upon the class reaching its aim each day of the week.

Week 5, earning 10 minutes extra recess time on Thursday contingent upon the class reaching its aim each day of the week.

Students reached their aim of Weeks 1, 2, 3, and 5.

Except for the treatment procedures described, normal classroom routines were maintained during the treatment period.

The experimenter met with the teacher each week to examine the data and to discuss the effectiveness of the interventions in use. It was explained that further interventions might be needed:

1. When the target behavior showed no difference from baseline conditions as reflected by the precision teaching wall chart.
2. When the intervention reduced the level of the target behavior but did not last long as reflected by precision teaching wall chart.
3. When level of the target behavior plateaued off at a higher level than desired by the teacher and experimenter as reflected by the teacher and experimenter as reflected by the precision teaching wall chart.

Periodic observations by the experimenter and the outside observers confirmed that the teacher

was carrying out treatment conditions as specified. At the end of the first week of treatment the experimenter advised the teacher to increase the frequency of verbal reinforcement. This was successful, and a higher rate of reinforcement was maintained throughout the succeeding weeks of treatment.

Results

Group Analysis

Figure 1 represents the percentage of intervals in which disruptive behaviors occurred across all conditions as recorded by outside observers on an occurrence/non-occurrence basis during ninety 20 sec. intervals. The percentage of occurrence of talking-out behaviors decreased from 85 in the baseline phase to 20 in the treatment phase, a decrease greater than 4 to 1 in magnitude. The percentage of occurrence of talk-outs increased to 27 during the reversal phase, a relatively slight increase.

The percentage of occurrence of out-of-seat behaviors decreased from 62 in the baseline phase to 3.5 in the treatment phase, a decrease greater than 17 to 1 in magnitude. The percentage of occurrence of out-of-seat behaviors increased to 5.5 during the reversal phase.

Figure 2 represents the frequency of disruptive behavior for all subjects across all conditions as recorded by the teacher. The mean daily frequency of talking-out

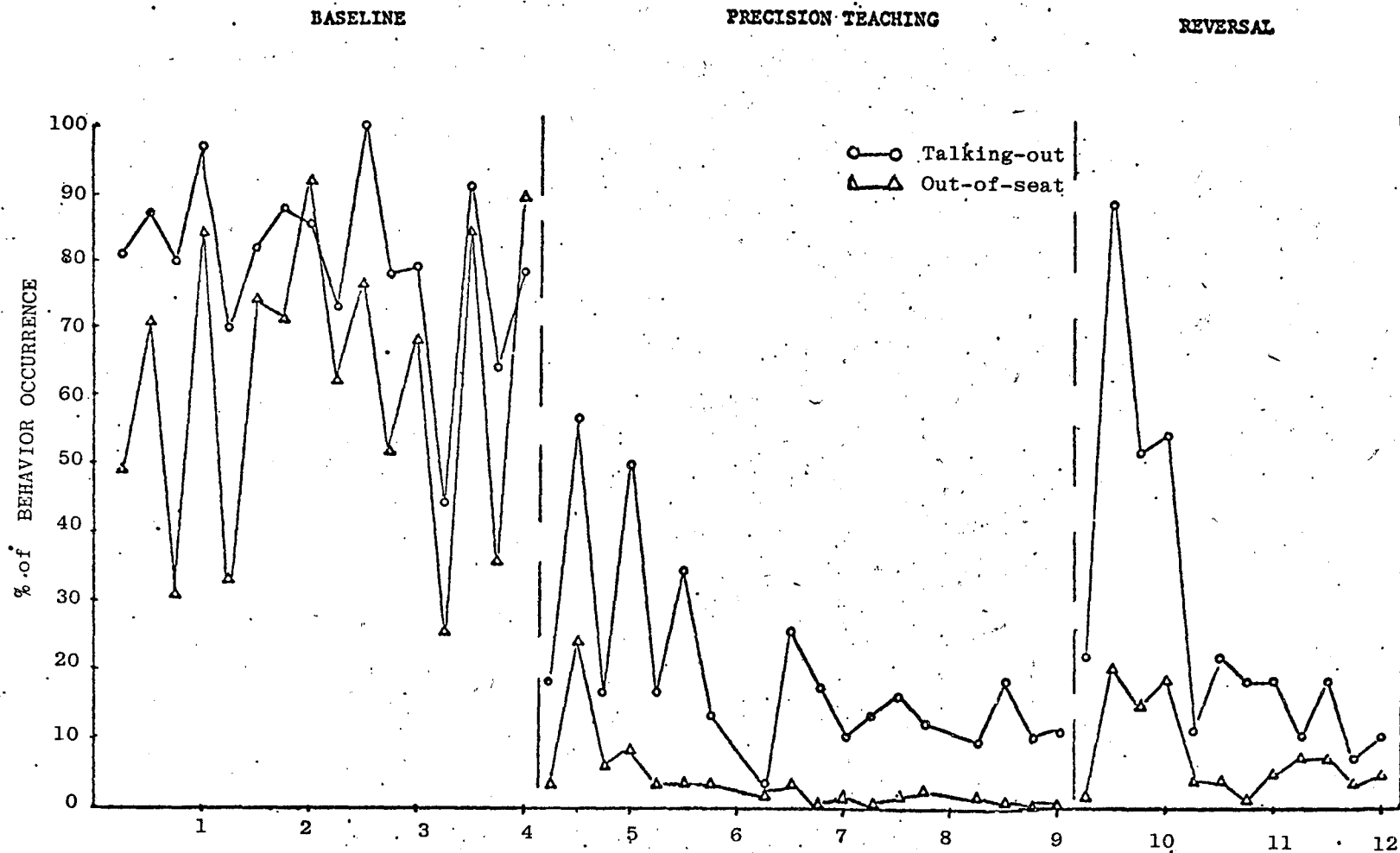


Figure 1. Percentage of occurrence of out-of-seat and talking-out behavior during daily ninety twenty second intervals as recorded by outside observers.

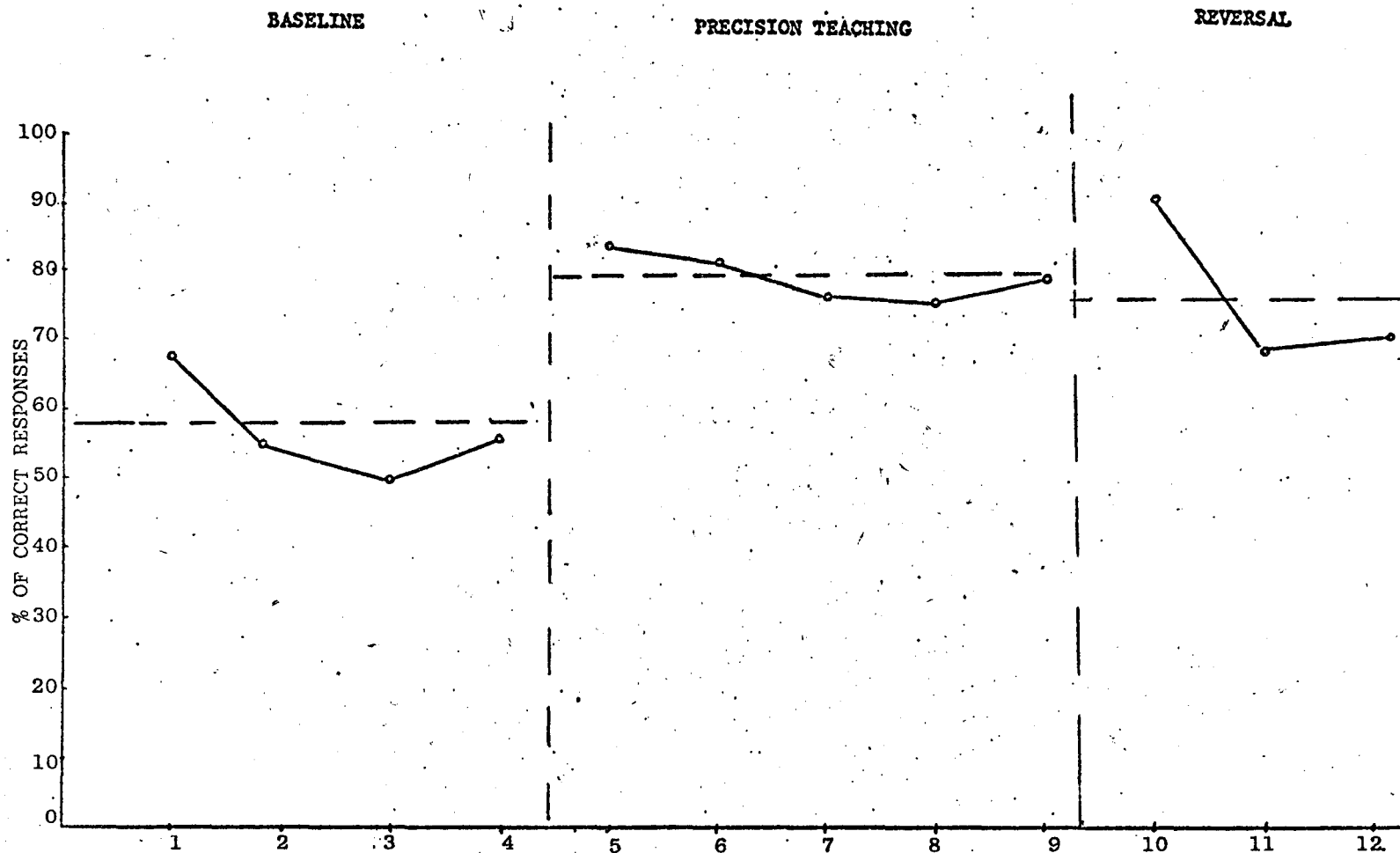


Figure 3. Class mean percentage of correct responses on weekly United States history tests.

behaviors decreased from 102 in the baseline phase to 9 in the treatment phase, a decrease greater than 10 to 1 in magnitude. The mean daily frequency of talk-outs increased to 26 during the reversal phase, a relatively slight increase. The mean daily frequency of out-of-seat behaviors decreased from 23 in the baseline phase to 1.5 in the treatment phase, a decrease of 15 to 1 in magnitude. The mean daily frequency of out-of-seat behaviors increased by 2 during the reversal phase.

Figure 3 represents the class mean percentage of correct responses on weekly United States history tests. The mean percentage correct increased from 58 during baseline to 79 during treatment. This difference represents an improvement of 36% under treatment conditions. During the reversal phase the mean percentage correct decreased by 3 points.

Figure 4 represents the class mean number of "To Help You Understand" activities completed each week across all conditions as recorded by the teacher. The mean number of activities completed was 2.4 during the baseline phase, 2.2 during the treatment phase, and 2.8 during the reversal phase. Treatment conditions did not produce a concurrent increase in the number of activities completed, although the increase in the reversal phase suggests that a higher level of productivity may have been established during that phase.

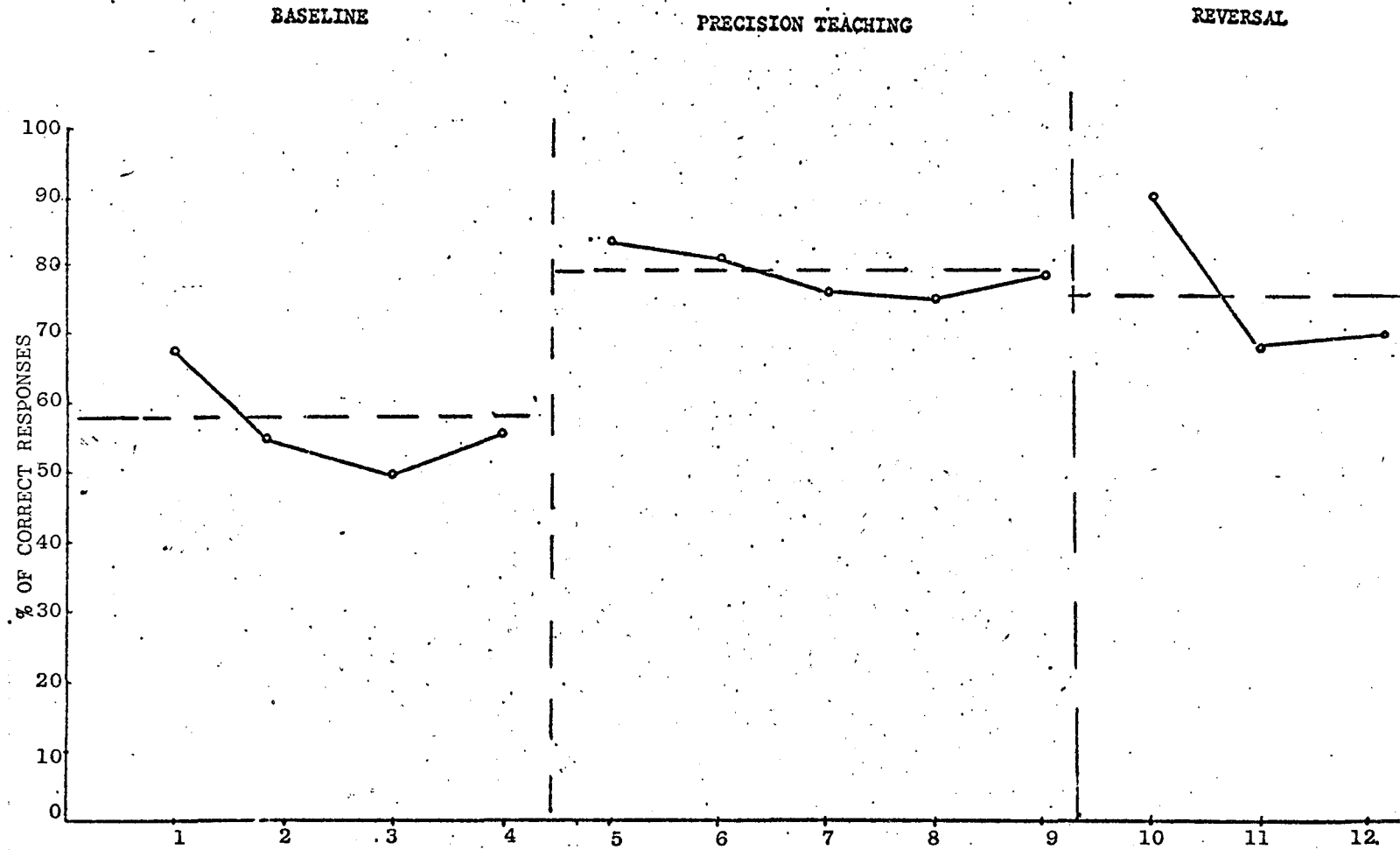


Figure 3. Class mean percentage of correct responses on weekly United States history tests.

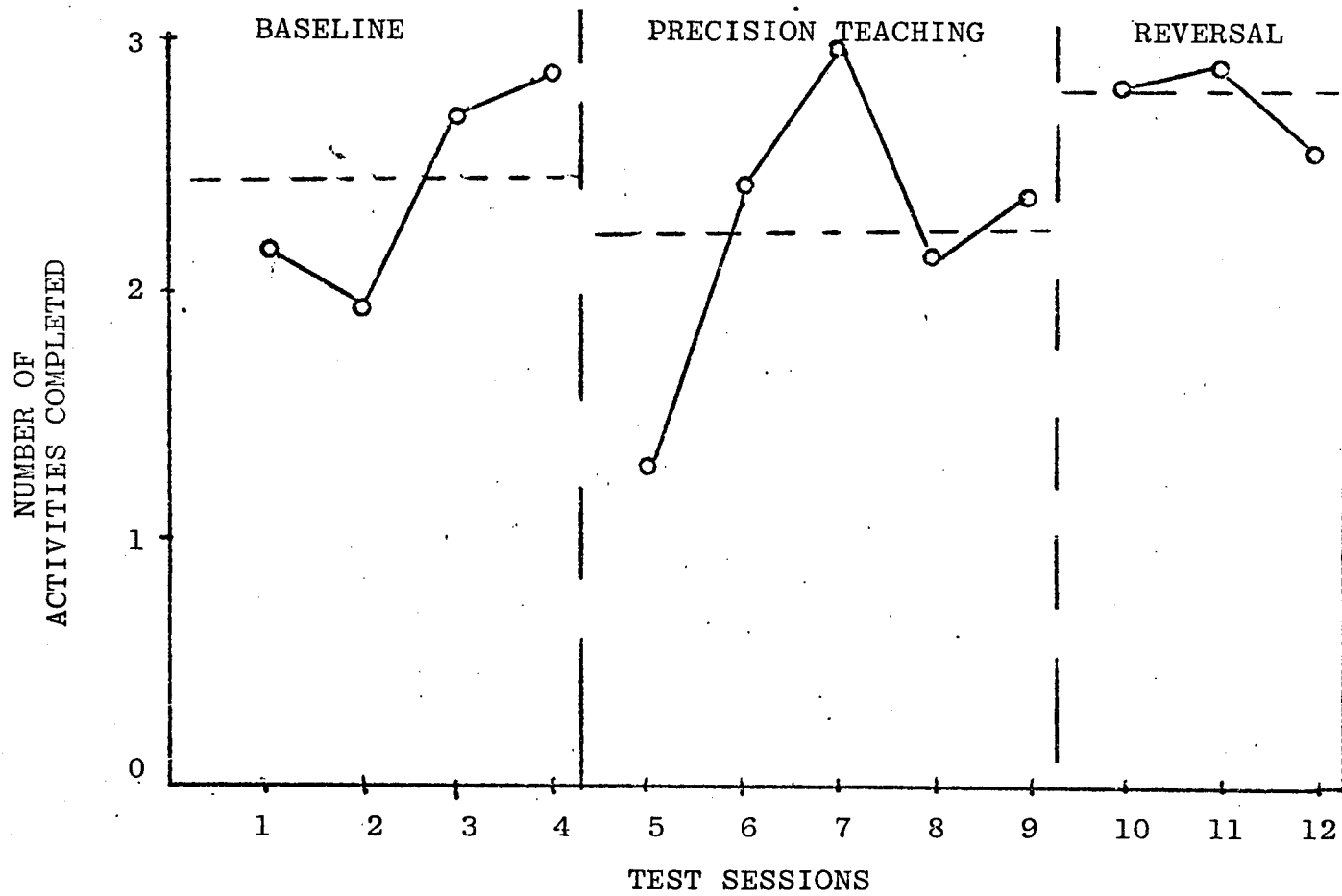


Figure 4. Mean of number of "To Help You Understand" activities completed.

Single-Subject Analysis

A single-subject analysis of the data showing the percentage of correct responses on weekly United States history tests was performed in order to assess the degree to which individual subjects behaved in a manner suggested by the group data. The single subject graphs were ordered by a psychologist who was unaware of the nature of the experiment so that subjects showing high treatment effects appear first (subjects 1 - 13), those showing moderate treatment effects appear next (subjects 14-26), followed by subjects showing little or no treatment effects (subjects 27 - 32). (Because Subject 32 moved prior to completion of the treatment phase only the data for the baseline phase and first week of the treatment phase was collected.)

The criteria for sorting into high, moderate and low treatment effects groups included: a large increase in the mean percentage of correct responses from the baseline phase to the treatment phase, a sudden increase in the percentage of correct test responses from the last week of the baseline phase to the first week of the treatment phase, and the amount of change in test performance across all conditions.

Visual inspection of the single subject charts (Figures 5, 6, and 7) reveals that for each subject the mean percentage of correct responses on weekly United States history tests was greater during the treatment

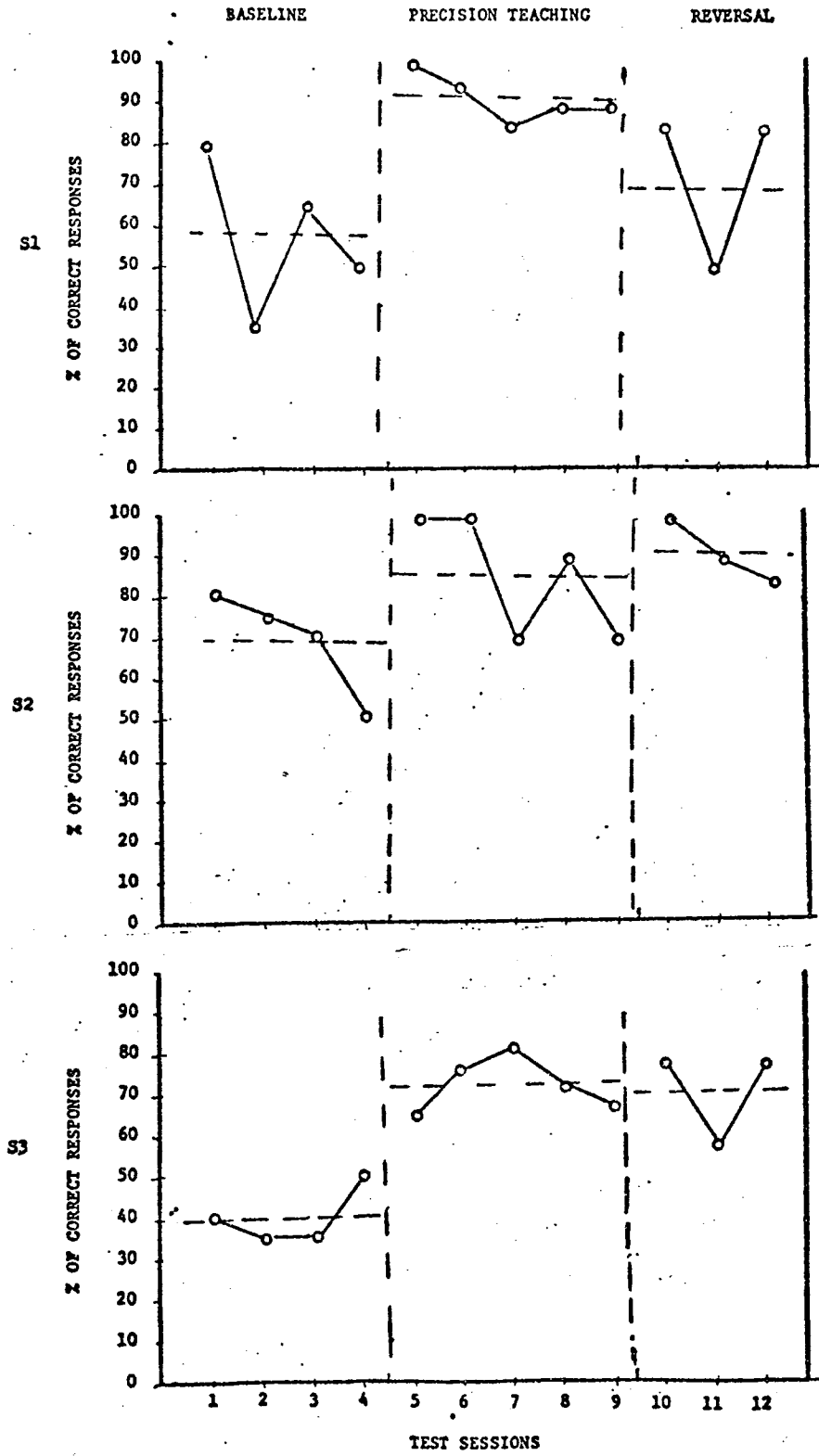


Fig. 5a. Percentage of correct responses on weekly United States history tests.

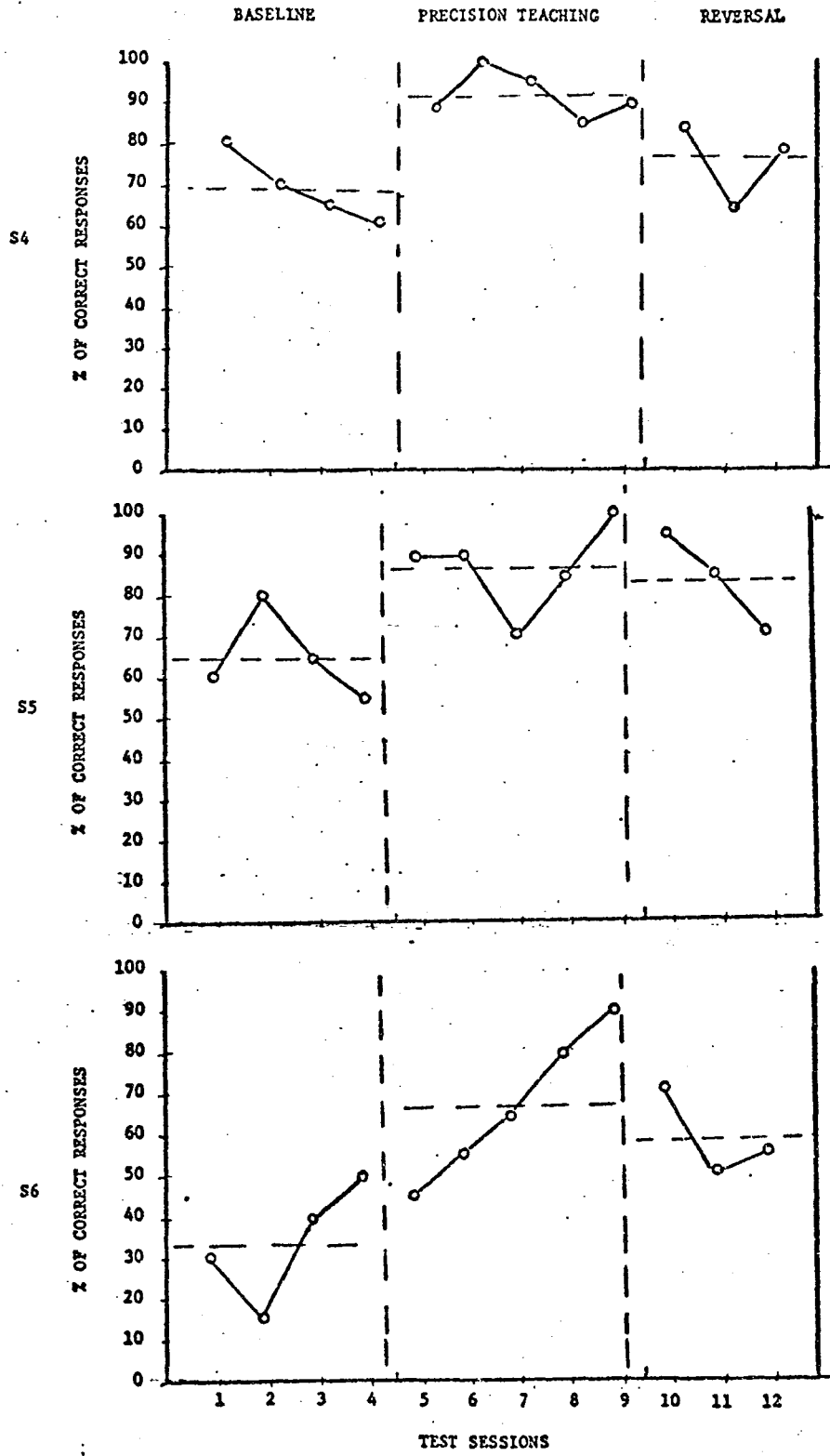


Fig. 5b. Percentage of correct responses on weekly United States history tests.

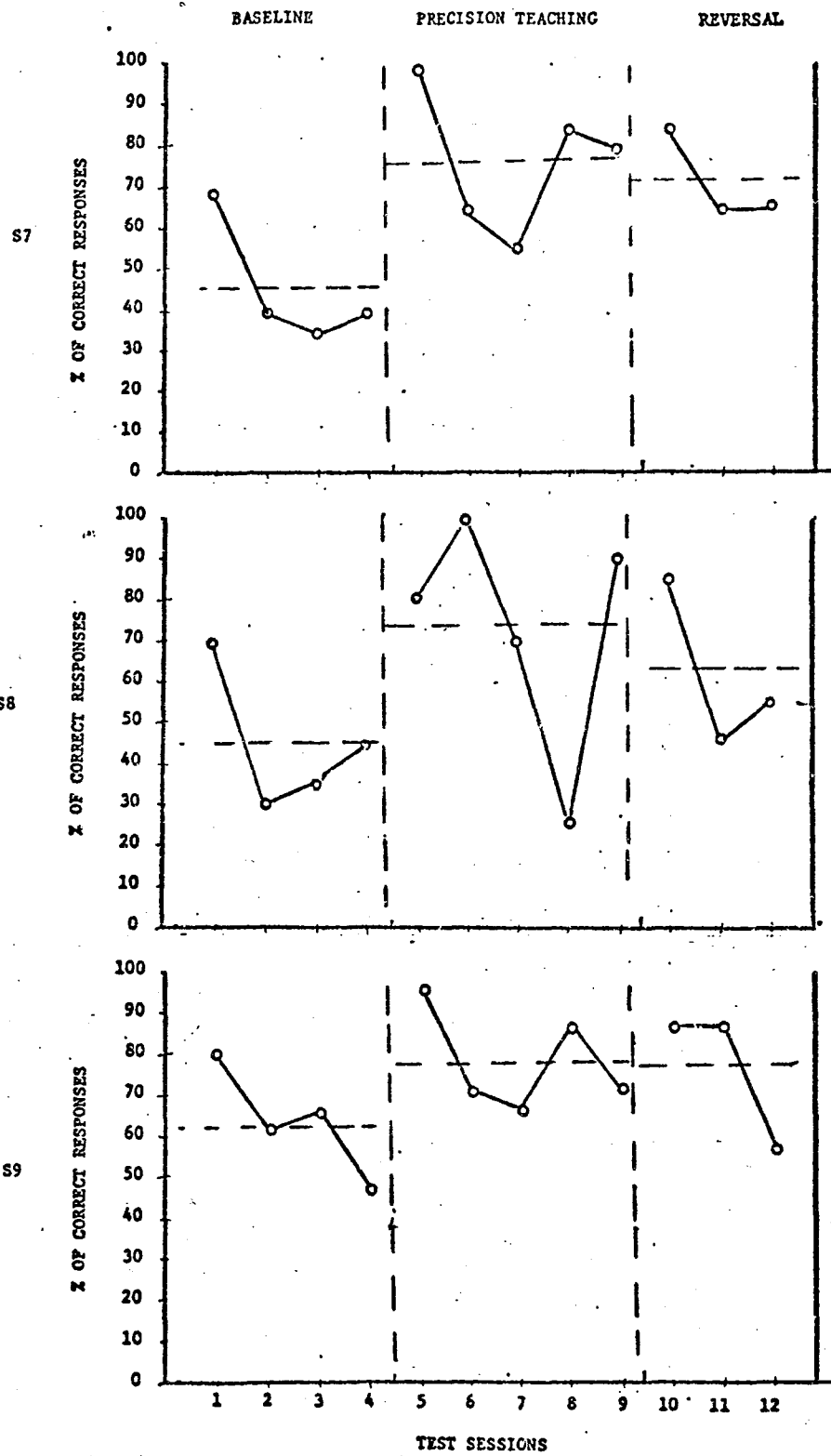


Fig. 5c. Percentage of correct responses on weekly United States history tests.

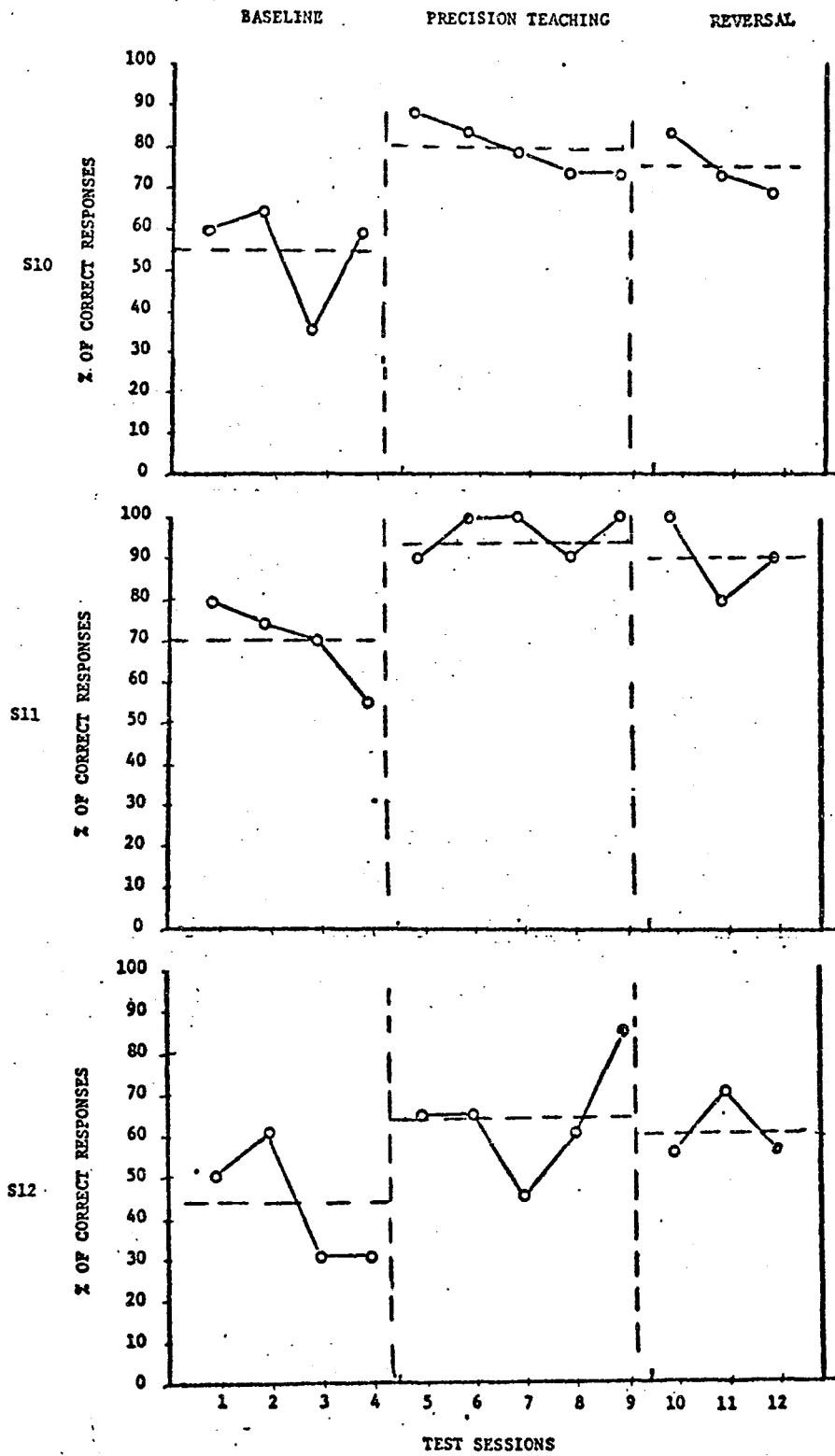


Fig. 5d. Percentage of correct responses on weekly United States history tests.

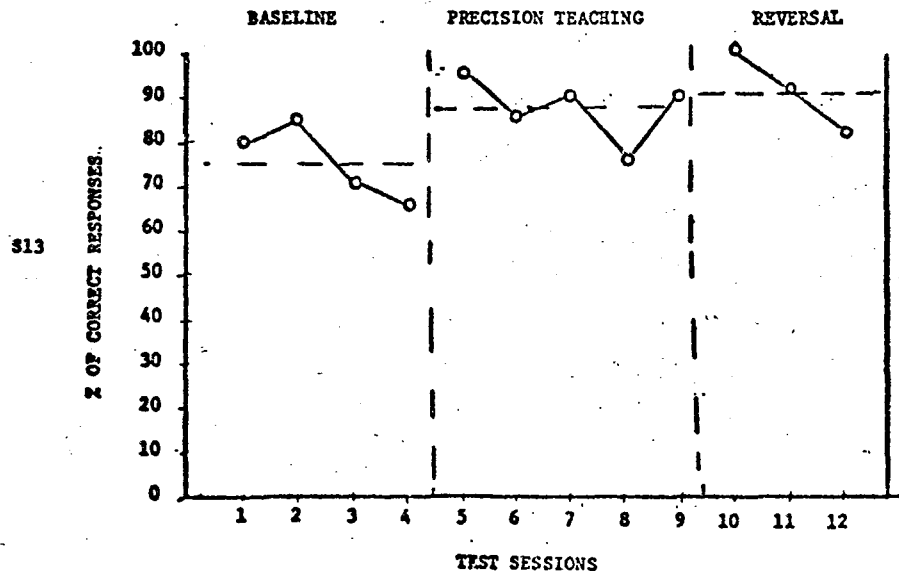


Fig. 5e. Percentage of correct responses on weekly United States history tests.

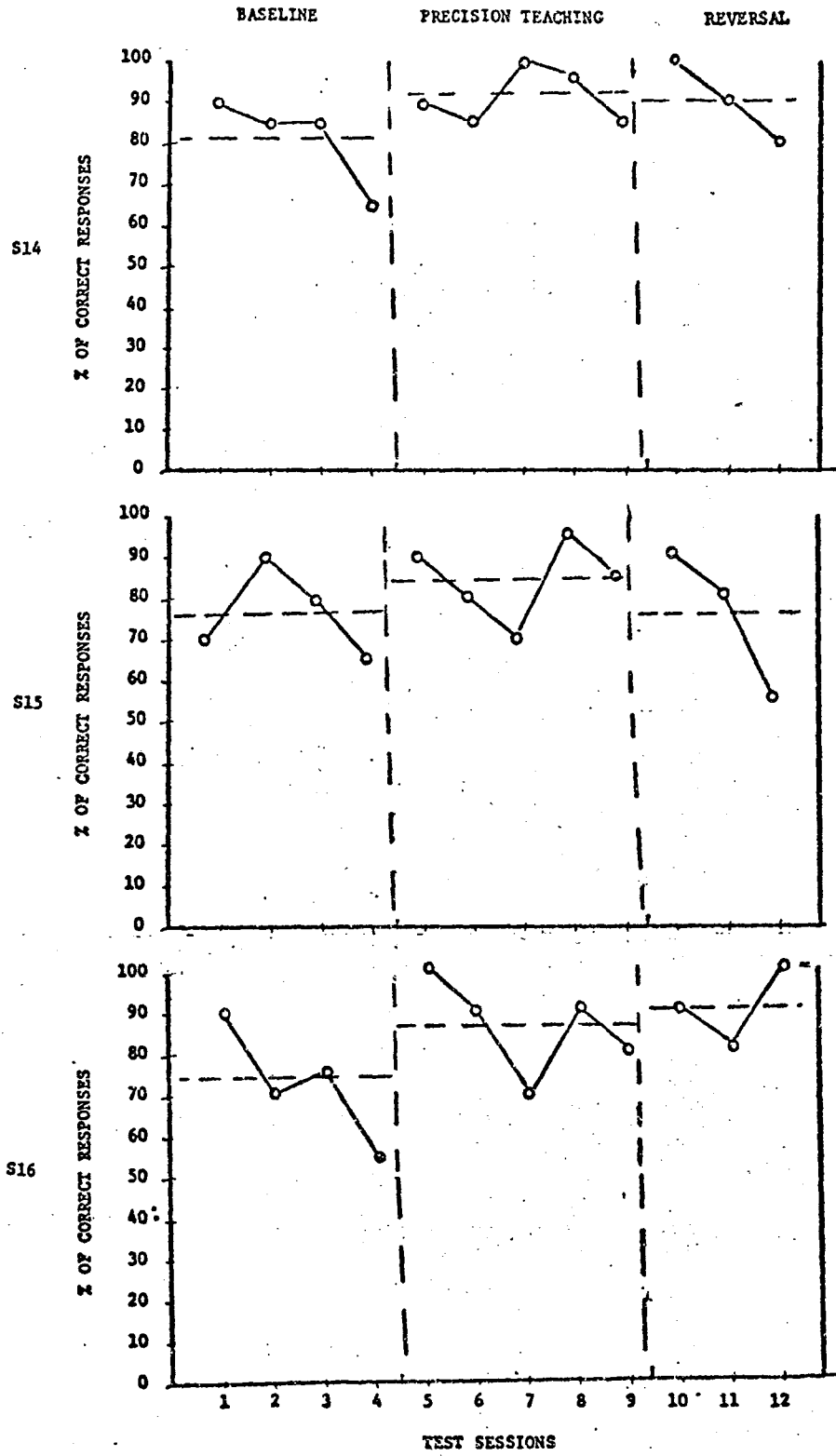


Fig. 6a. Percentage of correct responses on weekly United States history tests.

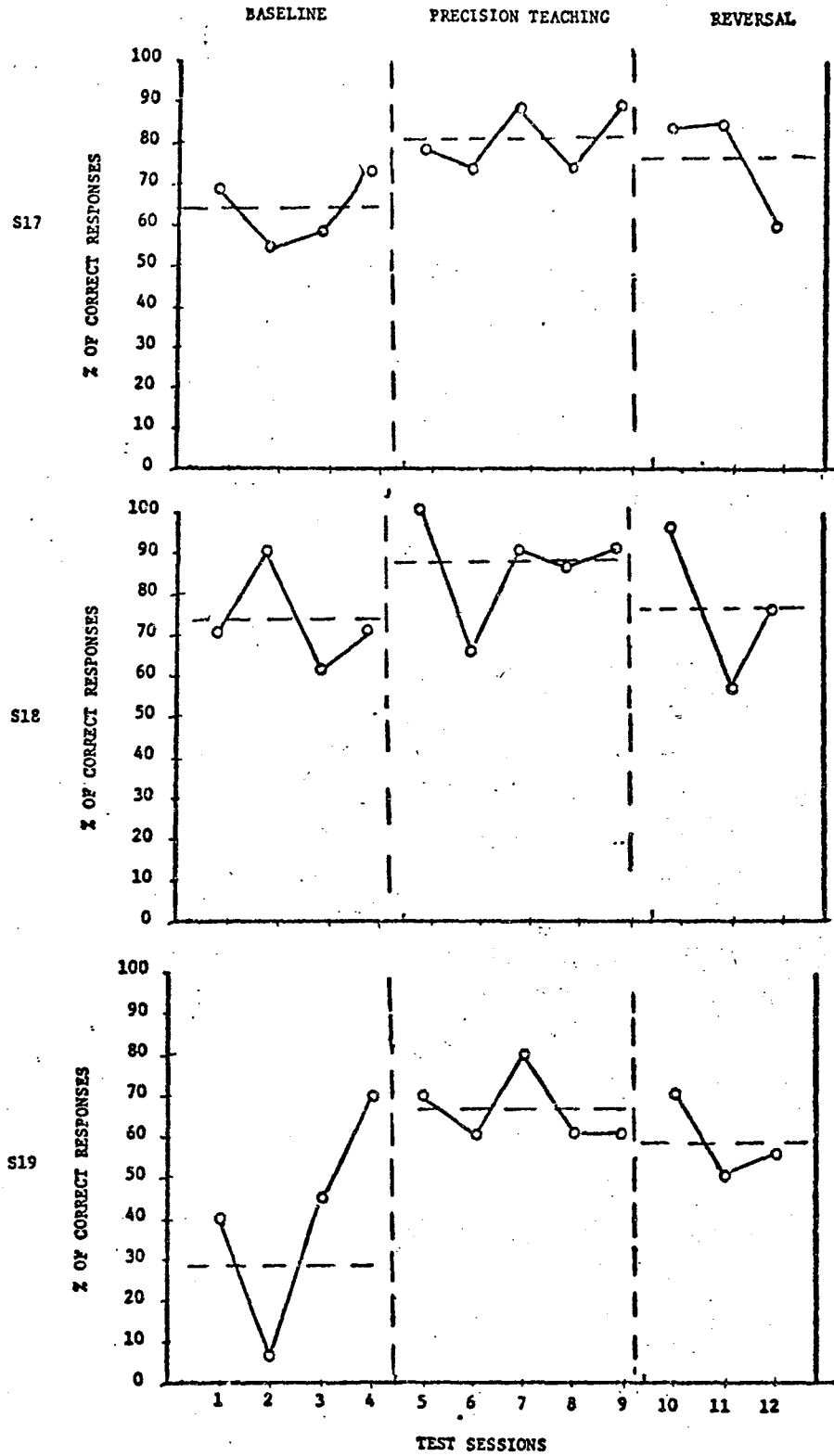


Fig. 6b. Percentage of correct responses on weekly United States history tests.

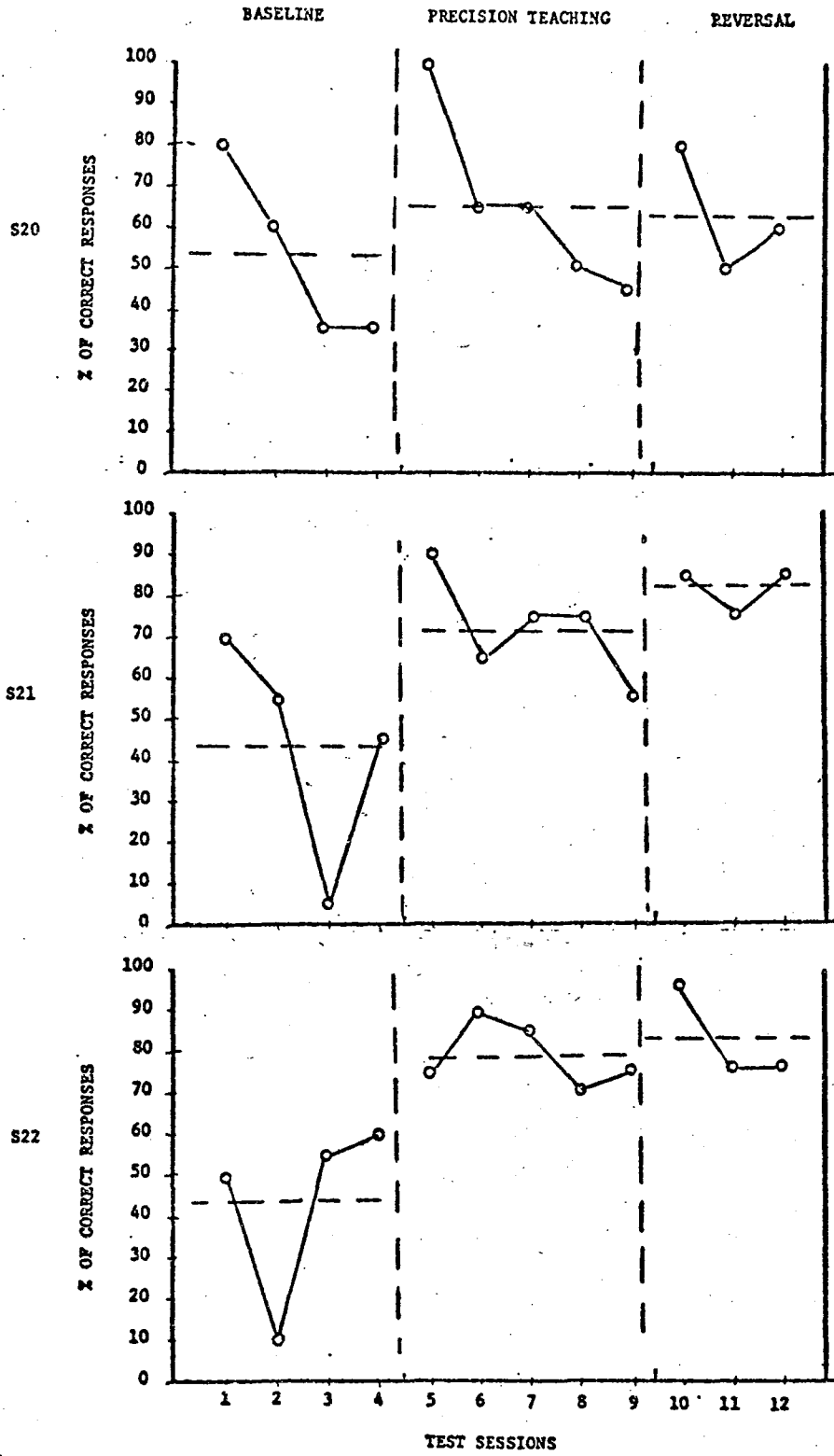


Fig. 6c. Percentage of correct responses on weekly United States history tests.

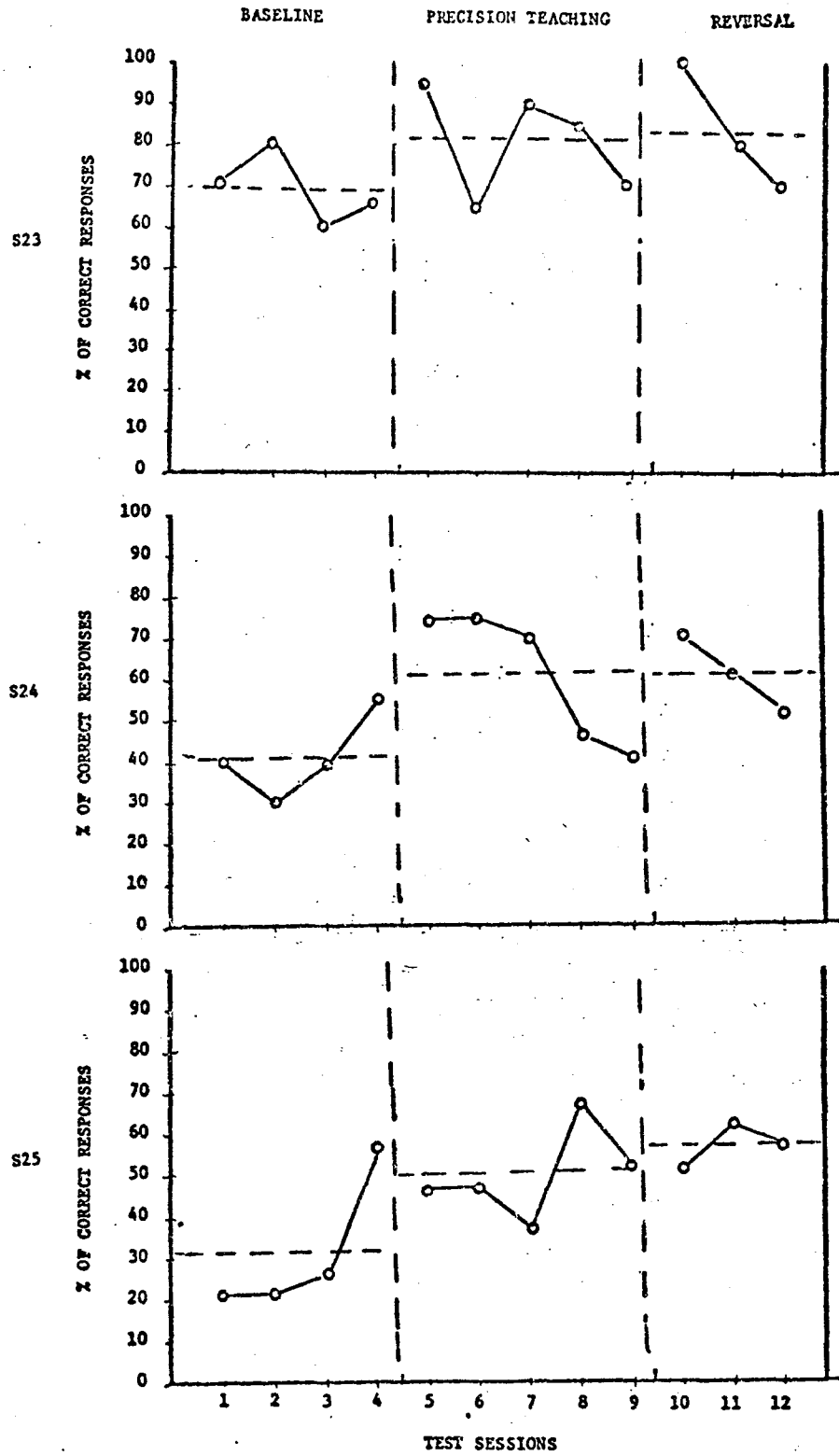


Fig. 6d Percentage of correct responses on weekly United States history tests.

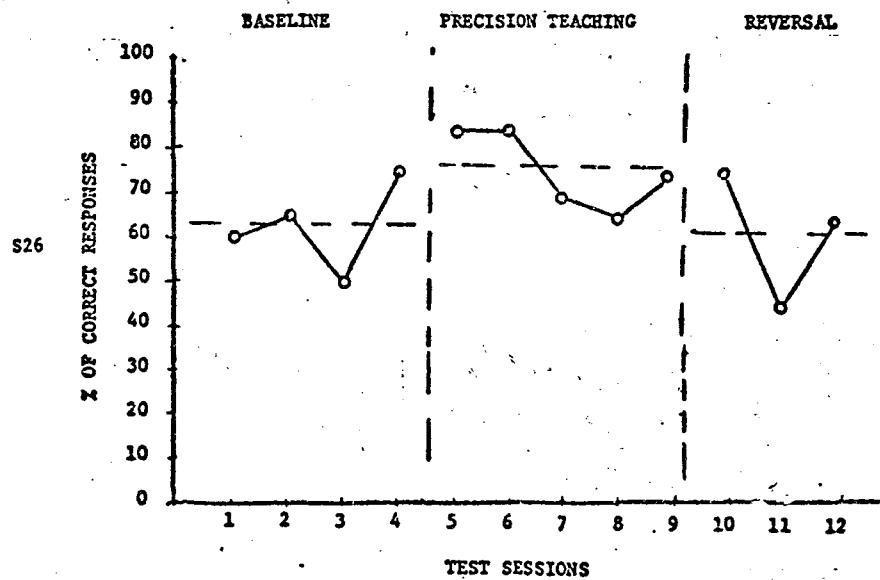


Fig. 6e. Percentage of correct responses on weekly United States history tests.

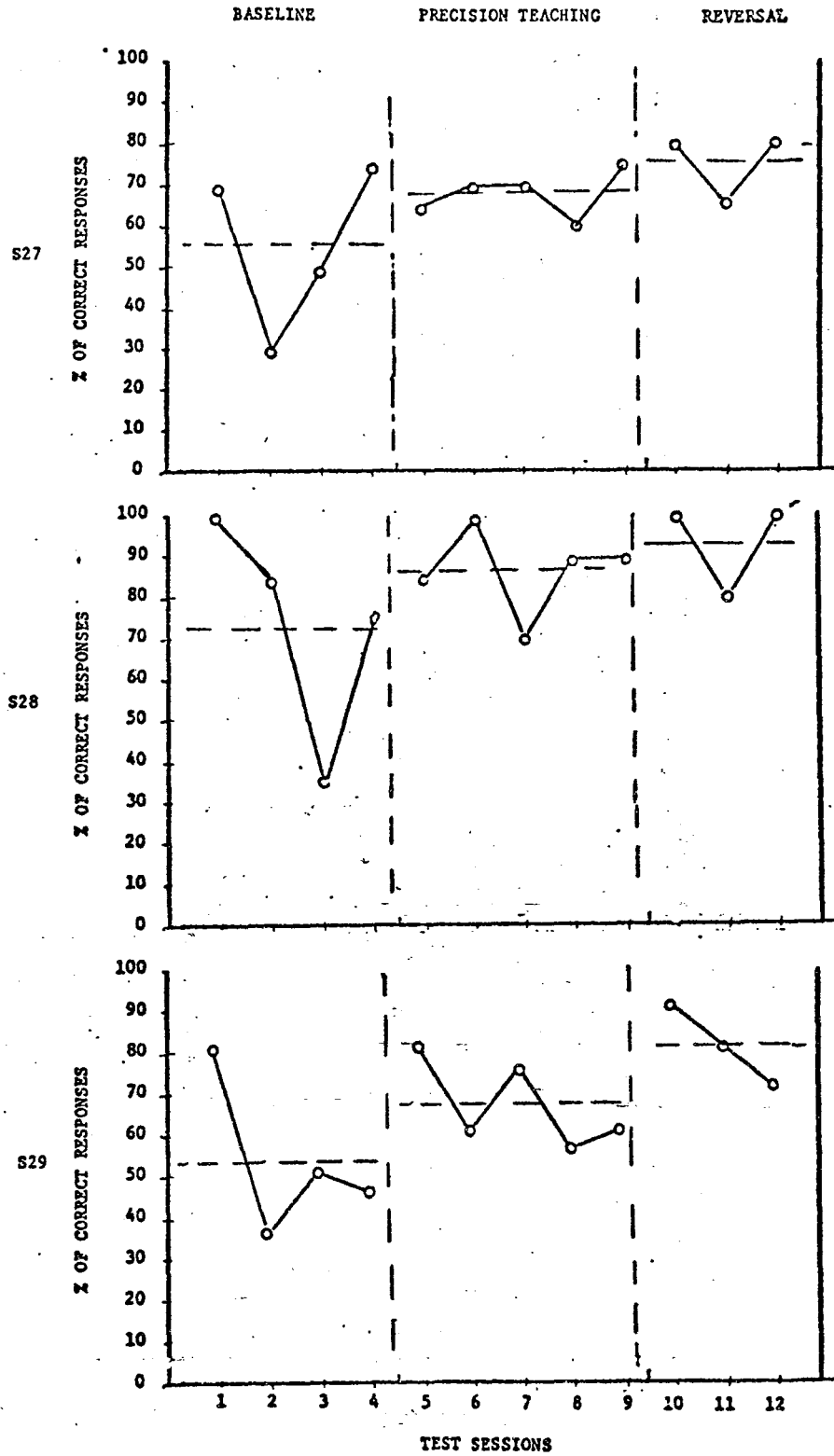


Fig. 7a. Percentage of correct responses on weekly United States history tests.

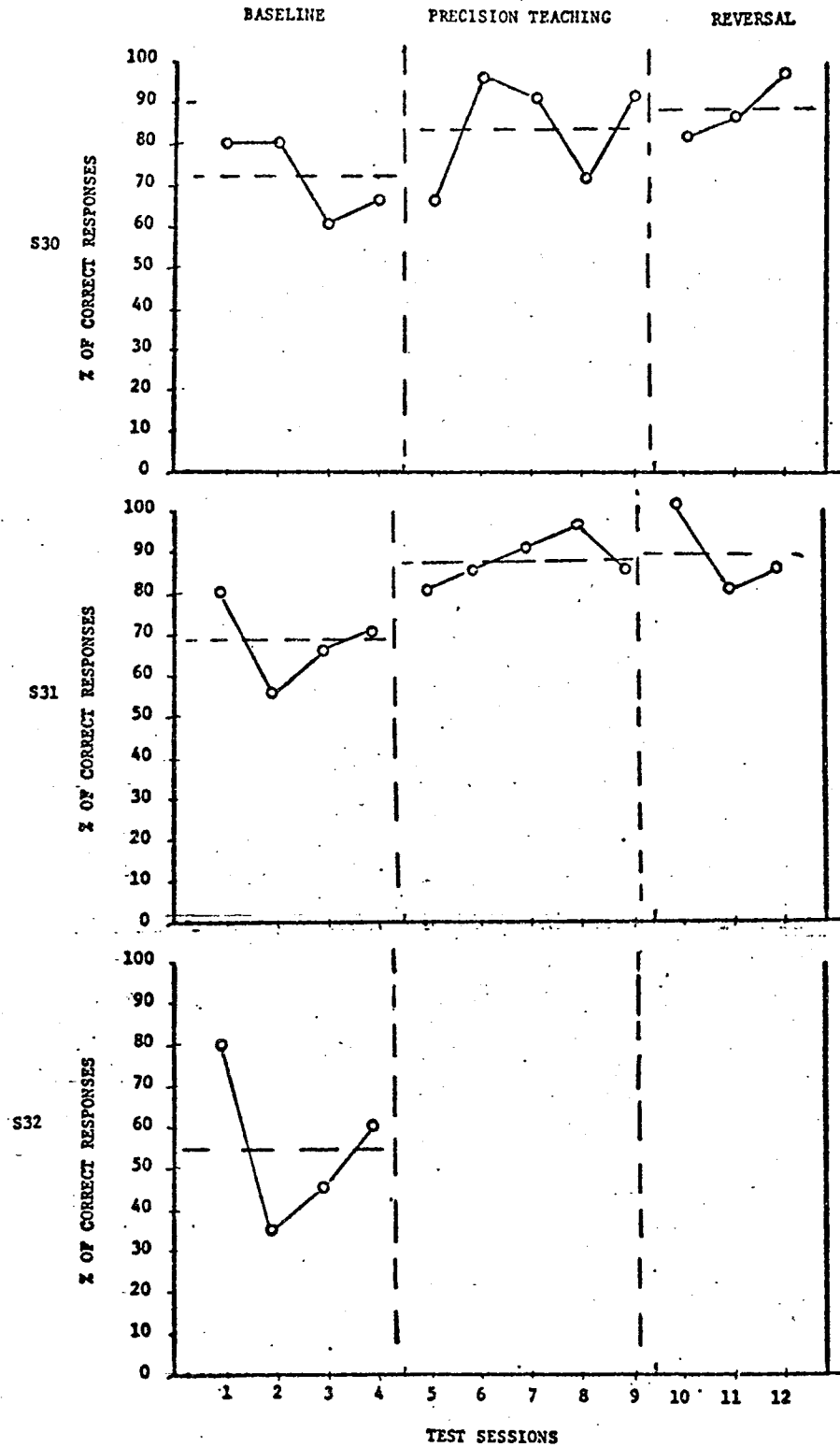


Fig. 7b. Percentage of correct responses on weekly United States history tests.

phase than in the initial baseline phase. After a return to baseline conditions nineteen subjects (Subjects 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 17, 18, 19, 20, 24, and 26) showed a decrease in their mean percentage of correct responses, but twelve subjects (Subjects 2, 13, 16, 21, 22, 23, 25, 27, 28, 29, 30, and 31) showed an increase in their mean percentage of correct responses compared to their performance in the treatment phase.

Subjects showing moderate to low treatment effects were more likely to continue to increase their academic performance after a return to baseline conditions (Subjects 16, 21, 22, 23, 25, 27, 28, 29, and 30). Ten of the subjects showing high treatment effects tended to decrease their academic performance after a return to baseline conditions (Subjects 1, 3, 4, 5, 6, 7, 8, 10, 11, and 12).

Group Interaction Analysis

Analysis of the group means for high, moderate, and low treatment effects for each condition gives some evidence of interaction effects between the level of initial academic performance, magnitude of treatment effects, and tendency toward reversal after a return to baseline conditions. (See Figure 8.)

The group with the greatest treatment effect was also the group with the lowest mean percentage of correct test responses during baseline (56%). This group showed an increase of 25 percentage points to a mean of 81% under

MEAN % OF CORRECT RESPONSES

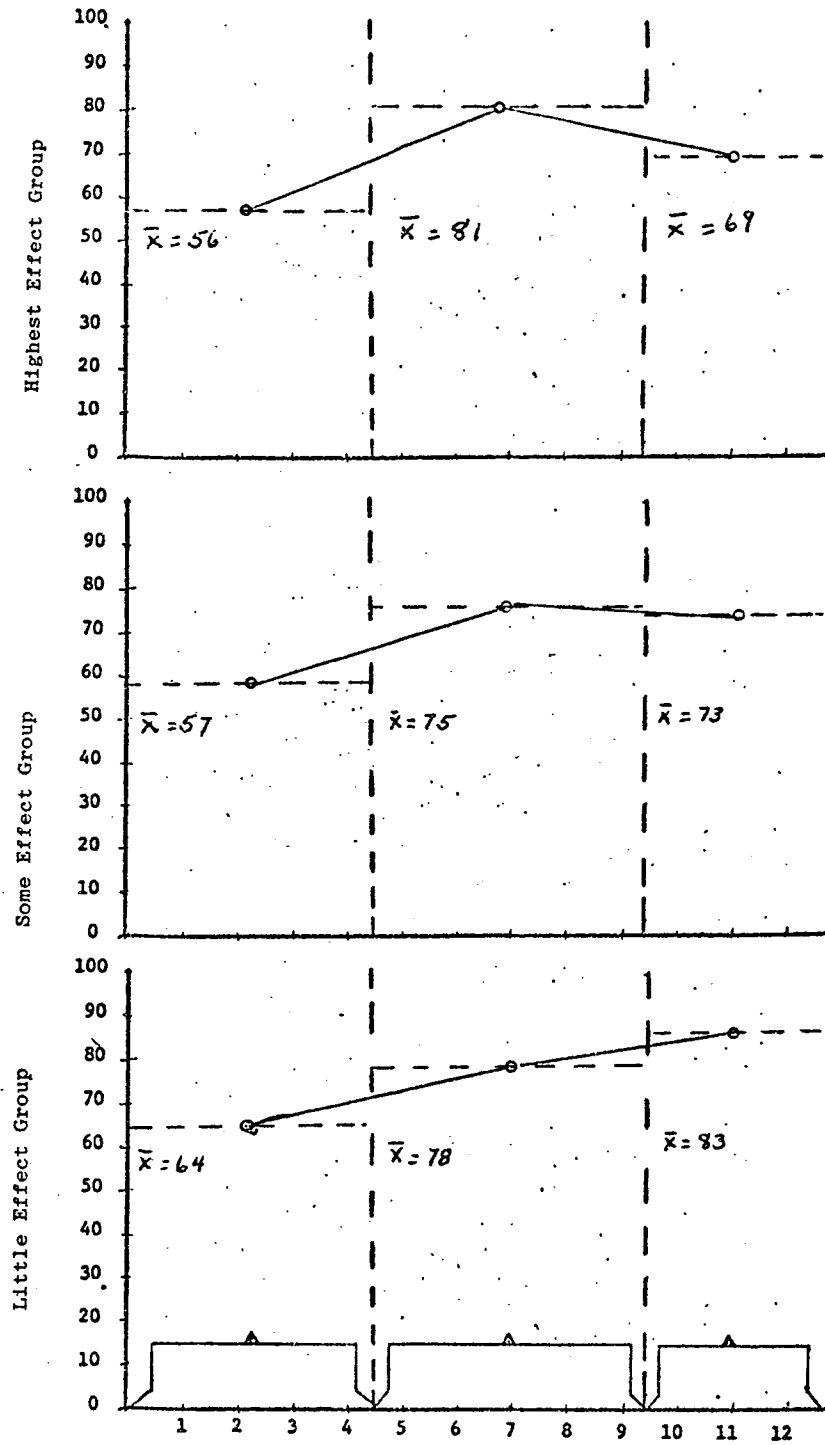


Fig. 8. Mean percentage of correct responses on weekly United States history test by Highest, Some, and Little effect group.

treatment conditions, only to decrease markedly to a mean of 69% after a return to baseline conditions.

The baseline mean percentage of correct responses for the group showing a moderate treatment effect did not appear to differ significantly (57%) from that for the group showing the greatest treatment effect (56%). This group showing moderate treatment effects had the lowest mean percentage of correct test responses under treatment conditions (75%), but tended to maintain most of their improvement when baseline conditions were reimposed (73%).

The group of subjects demonstrating the least treatment effect were those with the highest mean percentage of correct test responses during baseline (64%). The level of their mean correct responses under treatment conditions was intermediate (78%) between the means for the high treatment effects group (81%) and the moderate treatment effects group (75%). This low treatment effects group, which began the study with the highest level of academic performance, and made the least gain under treatment conditions (14 percentage points), continued to improve in performance, to a mean of 83%, the highest of the three groups when baseline conditions were reimposed.

Because the class mean number of "To Help You Understand" activities completed each week across all conditions did not improve during the treatment phase a single-subject analysis of this data was not made. Table 1

Table 1

The Number of "To Help You Understand"
Activities Completed by Subjects Each Week

Week	Baseline				Treatment					Baseline		
	1	2	3	4	5	6	7	8	9	10	11	12
Subject												
1	3	3	3	3	1	3	a	a	2	3	3	3
2	2	2 $\frac{1}{2}$	3	3	2	2	3	3	2 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
3	2	2	3	2 $\frac{1}{2}$	0	3	3	1 $\frac{1}{2}$	3	3	3	2
4	3	3	3	3	2	3	3	3	a	2 $\frac{1}{2}$	3	3
5	2	2	3	3	1	3	3	3	1 $\frac{1}{2}$	3	3	a
6	3	3	3	3	2	3	3	2 $\frac{1}{2}$	3	3	3	2 $\frac{1}{2}$
7	3	2 $\frac{1}{2}$	3	3	1	3	3	3	2 $\frac{1}{2}$	3	3	3
8	2	2	a	3	1	2	3	3	2 $\frac{1}{2}$	3	3	1
9	3	3	3	3	1	3	3	3	3	3	3	3
10	3	2	3	2 $\frac{1}{2}$	0	3	3	3	1	3	3	2
11	3	2	3	3	1	3	3	2	2	3	3	3
12	3	3	3	3	3	3	3	a	3	3	3	1
13	3	2 $\frac{1}{2}$	3	3	2	2	3	3	3	3	3	3
14	a	2 $\frac{1}{2}$	3	2 $\frac{1}{2}$	1	3	3	2	3	3	3	3
15	3	3	3	3	1	3	3	3	3	3	3	3
16	3	a	3	2 $\frac{1}{2}$	0	3	a	2 $\frac{1}{2}$	3	3	3	1
17	3	2	3	2 $\frac{1}{2}$	1	2	3	2 $\frac{1}{2}$	2	3	a	a
18	2	2	a	2 $\frac{1}{2}$	0	2	3	1	2	3	3	3
19	3	1	1	3	3	1	3	2	2 $\frac{1}{2}$	3	3	2
20	0	a	3	2 $\frac{1}{2}$	2	1	3	3	2	3	3	2 $\frac{1}{2}$
21	1	0	3	3	2	1	a	0	2	3	3	2 $\frac{1}{2}$
22	1	2	3	2 $\frac{1}{2}$	0	2	3	1	3	3	3	3

Table 1. Continued

Week	Baseline				Treatment					Baseline		
	1	2	3	4	5	6	7	8	9	10	11	12
Subject												
23	a	2	3	2½	0	3	3	1	3	3	3	3
24	2	0	2	a	0	1	a	0	1	0	3	2½
25	0	0	3	3	1	1	3	0	2	2	3	3
26	0	2	3	3	3	2	3	3	3	3	3	2½
27	2	a	3	2½	3	3	3	3	2	3	3	3
28	3	1	3	2½	1	3	3	3	a	3	3	2
29	0	0	1	2½	0	2	2	1	2	3	3	3
30	3	2	1	3	1	3	3	3	2½	3	3	3
31	2	2	3	3	1	2	3	2	2½	3	3	3
32 ^b	a	3	2	3	3							
Means	2.17	1.97	2.73	2.81	1.25	2.39	2.96	2.14	2.40	2.82	2.98	2.55

Note. Subjects were assigned three "To Help You Understand" activities to be completed each Tuesday.

^aStudent absent

^bStudent moved after week five

represents the number of "To Help You Understand Activities" completed by the class each week. Examination of the possibility of a relationship between the magnitude of treatment effects and the mean number of "To Help You Understand" activities completed indicates that the group with the greatest treatment effect completed the highest mean number of activities (2.55), followed by the group with the lowest treatment effect (2.39) and then the group with the moderate treatment effect (2.24).

Discussion

The results of this study demonstrate that in a classroom with a high incidence of disruptive behavior a reduction of disruptive behavior resulted in increased academic performance. In this study the use of precision teaching techniques to reduce the level of talk-outs and out-of-seat behaviors was effective, as measured both by teacher observation and by the observation of independent observers, but a return to baseline conditions did not result in a complete reversal of performance. The reduction in disruptive behaviors during the treatment phase was accompanied by an improvement of 36% in the academic performance of the class as measured by the class mean percentage of correct responses on weekly United States history tests.

On the second measure of academic performance,

the mean number of "To Help You Understand" activities completed each week, the mean number of activities completed during the treatment phase did not increase as expected, but decreased slightly, and increased to its highest level after baseline conditions had been reinstated. Some possible explanations for the inconsistency between these two measures of academic performance are: practice effect; student scores were only free to vary from 0 to 3, which resulted in too few intervals for refined measurement; the level of difficulty of activities might have varied from week to week; students were allowed to complete these activities at home and thus their ability to complete them in class was not affected as much by the level of disruptive behavior in the class. The increase in the mean number of activities completed during the several phase suggests that a greater length of time may have been required for the effects of behavioral intervention to be manifested on this type of task.

Statistical data alone are inadequate to describe the differences in the classroom milieu between the baseline phase and the treatment phase. During the baseline phase only a small number of students would participate in or attend to history instruction. Many students occupied themselves with other activities of their own selection, conversed with friends, and moved about the room, engaging in a variety of non-productive activities. Their attitude toward history was noticeably negative. The teacher

frequently interrupted her lesson to admonish students for their inappropriate behavior.

During the treatment phase student attention and participation in class discussion increased markedly. The teacher now felt able to ignore minor inappropriate behaviors which were few, and to reinforce appropriate behaviors. Some students began to look forward to the history period, which they had previously disliked. The teacher was able to offer history instruction without continual interruptions to deal with behavior. As she learned to emphasize positive reinforcement with the class a cyclical relationship developed in which the teacher's reinforcement of appropriate behavior increased the incidence of such behavior, which was, in turn, reinforcing to the teacher.

Following the treatment phase, baseline conditions were resumed by the teacher, lower level reinforcers were withdrawn, and the incidence of verbal reinforcement for appropriate behavior was decreased. Informal observation suggests that the teacher did not resume her earlier level of negative comments to children. By this time the class had already shown a tendency to move from a preference for lower-level reinforcers to higher-level reinforcers. Report cards showing improvement in history performance had been received at home, setting the stage for parents to participate in the continued reinforcement of appropriate behavior. Thus it is not surprising that

the frequency of disruptive behaviors increased only slightly during the reversal condition, and that the level of academic performance, as measured by weekly history tests, also remained high. Although three children showed a noticeable increase in disruptive behaviors during the reversal condition, the majority of the children showed no increase in the frequency of disruptive behavior.

The improved academic performance shown in this study is the result of the application of an experimental package which includes charting, goal-setting, positive reinforcement, and contingent teacher attention. Because these components of the experimental package were not isolated, one can draw no conclusions as to their relative effectiveness of their effectiveness in isolation.

The results of this study suggest that the children who will benefit most from such precision teaching interventions are children who, in a disruptive class, have a low or moderate level of academic performance. Children who have a comparatively high level of initial academic performance, even in a disruptive class, do not show as much improvement in academic performance, but tend to continue to improve in performance even when baseline conditions are reimposed. Not only did these children with a high level of academic performance

have less room to improve academically, as measured by the weekly history tests, but their performance appears to have been maintained independent of lower-level reinforcers.

The population to which the results of this study might apply is limited by the following factors: the study was completed during the daily history period, and these results would not necessarily be found in all subject matter areas; the study was completed in a class with a high level of disruptive behavior. It seems probable that a well-controlled class with a low level of disruptive behavior would not show significant academic improvement as a consequence of the imposition of precision teaching techniques to further reduce the frequency of disruptive behaviors which are already at a low level. Replications of this study in other subject matter areas, or with several classes which are precisely described in terms of their baseline level of disruptive behavior, would serve to establish the limits of the applicability of the inferences which have emerged here.

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Footnote

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APPENDIX A:

Precision Teaching

Appendix A: Precision Teaching

Precision Teaching is a behavior modification approach first presented by Ogden R. Lindsley (1964). An underlying premise of Precision Teaching is the assumption that all behavior is learned and, therefore, can be controlled, conditioned, or shaped by the administration of positive and negative consequences and by the implementation of interventions, the process of altering the environment in an effort to improve some aspect of behavior. The language and methodology emphasizes the precise identification of the behavior and environment in observable, unambiguous terms and the continuous recording of behavioral change.

Precision Teaching Components

There are three basic components to Precision Teaching. The first component is the requirement of precise "pinpointing" or defining of those behaviors which one may wish to change. "Pinpoint behaviors" are defined as "movements" or "movement cycles." An adequate pinpoint must have three basic characteristics: a) It must be an overt physical movement which is directly observable. b) It must have a definable beginning and end. For example, a "thumb sucking" movement would require that the thumb

first be out of the mouth, then in the mouth, then out of the mouth in order to be a complete movement. c) It must be cyclical (i.e., terminate in a state of affairs such that the behavior has some likelihood of being repeated). School expulsion for example, is a behavior that is unlikely to be emitted more than once by the same individual and thus does not meet the third criterion for an adequate pinpoint. However, adequate pinpoints may involve cyclical behaviors which may lead up to school expulsion such as acts of physical aggression, use of obscenities, damaging school property, or threatening teachers. Once the movement cycle has been identified, the objective is defined, then, in terms of acquiring, accelerating, decelerating, stabilizing, fluctuating, or maintaining the pinpoint.

The second component of the Precision Teaching method is the IS-DOES equation which includes all those environmental variables which are thought to have an effect on the behavior of an individual. Essentially there are five basic parts to the learning environment which are involved in the shaping or building of behavior. The IS formula is shown below:

PROGRAM/PROGRAM EVENT/MOVEMENT CYCLE/ARRANGEMENT/
ARRANGED EVENT

The "Program" element includes all things involved in the overall environmental setting. In a school setting, for example, a statement of "Program" includes such things as

time of day, classroom seating arrangements, location, subject taught, and teacher. A "Program Event" refers to factors which might cue an individual as to when an "Arranged Event" may be obtained and which might affect the emission of a movement cycle. Instructions, curriculum materials, demonstrations, and sounding of the recess bell are examples of "Program Events." The behavior which is being measured is referred to as the "Movement Cycle." The "Arrangement" stands for the numerical ratio between the movement and the "Arranged Event." For example, one might give one piece of candy for each time the individual raises his hand, in which case the arrangement would be 1:1, or a statement of praise for each five words spelled correctly, in which case the arrangement would be 1:5. Finally "Arranged Events" are those environmental events which occur just following the emission of the movement cycle, which may be the result of the movement cycle, and which may have an effect on the future occurrence of the movement. Examples of "Arranged Events" include smiles, statements of verbal praise, grades, teacher attention, children laughing, and withdrawal of privileges. "Arranged Events" have a higher probability of affecting rates of responding if they are dependent on the emission of the movement cycle. Furthermore, the closer in time the arranged event is paired with the movement cycle, the higher the probability of affecting rates of responding.

The components of the IS equation are thought of as having "potential" effect to change behavior rather than demonstrated function. Once the components of the IS equation have demonstrated a behavioral function, we then have the DOES part of the equation. The DOES equation is shown:

DISPOSITION/STIMULUS/RESPONSE/CONTINGENCY/CONSEQUENCE

The DOES part of the equation is identical in structure except that it is composed of those events which have been identified as having an effect upon the pinpointed behavior. The purpose for a change in terminology is to aid in the differentiation between alterations which were attempted and alterations which worked.

The IS-DOES equation represents a precise behavioral definition which takes the emphasis off the reinforcement component (arranged event or consequence) in behavior modification and places it on the total learning process (all five components).

The third component is a system of recording and charting data in such a way that one has a continuing record of behavioral changes expressed in the form of rate of occurrence. Rate is obtained by counting the frequency of occurrence of a specific behavior and dividing that frequency by the number of minutes during which the behavior is being recorded. Most data in Precision Teaching is graphed

on a "Movements per Minute" basis. For example, if in a two hour day (120 min.) the movement occurred 16 times, then the rate of that movement cycle is:

$$\frac{16}{120} = .13 \text{ movements per minute}$$

A six-cycle logarithmic chart allows recording of frequencies ranging from one behavior every thousand minutes to one thousand behaviors every minute. The use of a logarithmic chart system affords a proportional representation of the data. For some elementary children the use of a linear chart on which the raw count is recorded, has been equally effective and simpler to use.

The common language system standardizes the recording process. Related charting conventions further clarify the process. Some representative terms and respective charting conventions are described in Table 2.

Table 2

Precision Teaching Terms and Charting Conventions

TERM	DEFINITION	CHARTING CONVENTION
Rated Day	A day in which the movement was emitted and recorded.	Use a dot for acceleration target and an x for deceleration target. Plot points on daily chart and connect successive points with straight lines (with the exception noted below under No Change Day and Phase Change).
No Change Day	A day in which the movement had no opportunity to be emitted in the program setting.	Do not plot a point on the chart. Do not draw a line across a No Change Day.
Ignored Day	A day in which the movement may have been emitted and could have been recorded, but for some reason was not recorded.	Do not plot a point on the chart, but do draw a line from the last Rated Day to the Next Rated Day.
Phase Change	A point at which the program is altered.	Draw a vertical line on the daily chart between the last day of the old program and the first day of the new program. Label each phase on the right side of the line.

Table 2. Continued.

TERM	DEFINITION	CHARTING CONVENTION
Record Floor	The lowest measurable performance rate (other than zero) determined by the length of the time sample. Record Floor is obtained by dividing 1 by the number of minutes in the length of the time sample.	Draw a horizontal dashed line on the daily chart at Record Floor. If the Record Floor is always the same, then extend the line across the chart; if it changes then plot it daily.
Zero Rate	No movement cycle emitted within the time sample.	Plot point directly below Record Floor
Aim	The rate desired by a target date.	Place an asterisk at the intersection of the line representing desired rate and target date.

Precision Teaching Phases

The term "phase" denotes the stage or period and associated program alternations. There are three procedural phases involved in the Precision Teaching method, Before, During, and After phases. The Before Phase involves pinpointing the behavior and its environment, planning the interventions program, and collecting a baseline for the pinpointed behavior in the form of rate. The During Phase refers to the intervention program, making appropriate alterations to change the pinpointed behavior; alterations may be made in any of the equation elements (Program, Program Event, Arrangement, and Arranged Event). The After Phase designates the termination of the interventions program and restoration of the original conditions present in the Before Phase.

Precision Teaching Research

Precision teaching procedures have been demonstrated to be effective in both academic and non-academic settings for the modification of a wide variety of behaviors. In some instances the goal has been to decrease self-comforting, self-destructive, or withdrawal behaviors. At other times a decrease in attention-seeking or aggressive behaviors or of repetitive motor behaviors has been sought. Precision teaching has also been effective in increasing the frequency of desirable behaviors.

Self-comforting behavior

Galloway (1971) found that incessant rocking behavior in a seven-year-old phenylketonuric child could be successfully decreased by the father's use of a stern voice after each rocking behavior. A return to baseline conditions brought about increased rocking behavior which necessitated the reinstatement of treatment conditions.

Self-destructive behavior

Lindsley (Note 2) found that public recording by parents was sufficient to decelerate arm-biting behavior of both an eleven-year-old emotionally disturbed boy and his seven-year-old brain-damaged sister. A return to baseline conditions was not reported in this study.

Koenig (Note 3) found that self-recording procedures, by a nine-year-old educationally handicapped boy, brought about a decrease in hair-twisting behavior. Lindsley (Note 4) found that a precision teaching intervention decelerated fingernail chewing behavior in a housewife to a zero rate, which was maintained for over 60 days, with only four set backs, even after the consequences (ten minutes of wearing gloves for each chew) were removed.

Withdrawal behavior

Precision teaching procedures have been successfully applied in the reduction of withdrawal behavior. Johnson (1971) used self-recording and precision teaching to decrease the frequency of yawning behavior of an educationally

handicapped student, first in his special education classroom, and then in his regular classroom. Masking tape was used on his wrist for him to tally his yawns in both classes. The treatment procedures included the administration of poker chips which could be cashed in for inexpensive trinkets, and reading the teacher a story he had written.

Haughton (1971) developed a precision teaching plan in which a student who habitually left gym class without permission was required to do a ten minute subtraction practice sheet during recess, if he left gym. When the teacher was only counting the student's leaving without permission, he did so daily. After two weeks of practice sheets during recess, he never left again.

Attention-seeking behavior

The effects of precision teaching on the level of attention-seeking behavior have been examined by Bradfield (1970). He found that the rate at which a 13-year-old boy tugged and pulled at his teacher during the school day was reduced from a median rate of four times every one hundred minutes to a median rate of once every 100 min. when the teacher implemented a treatment condition in which she turned her back on the boy each time the behavior occurred.

In this same study Bradfield found that a boy's talk-out rate was reduced from one talk-out per minute, over a 20 min. period, to a zero rate, within six weeks.

Each time the boy talked-out the teacher called on another student with his hand raised. The boy received daily, visible feedback from the precision teaching chart regarding the effects of this change on his behavior.

Perine (1971) applied precision teaching procedures to a group contingent situation to decelerate talk-out behavior in a regular third grade class and found that in two weeks the class had reached their goal of three talk-outs. A reversal period was not used in this study, but the teacher reported that the talk-outs remained low, and that the students had developed an awareness and control of talk-outs. Dixon (Note 1) also used a group contingency technique to control talk-out behavior. During the television watching time of eleven institutionalized emotionally disturbed boys, the T.V. set was turned off for one minute when any member of the group talked out of turn. Rate-of-talking-out data showed that this contingency had a much stronger decelerating effect on talking-out than did a similar contingency which penalized each boy for only his own violations of the no talking-out rule.

Aggressive behavior

Holzschuh (Note 5) used time-out procedures to decelerate the frequency of hitting-mother behavior, emitted by a disturbed schizophrenic child, to a zero rate. The behavior remained low after a return to baseline conditions.

Duncan (1971) used precision teaching and self-

recording procedures to decelerate angry outbursts, emitted by a 12-year-old girl, and found that by the end of the project angry outbursts were less variable from day to day, although angry outbursts did not change much in overall frequency. The procedures involved the administration of self-hits immediately following the occurrence of angry outbursts.

Hirsch (1971) reported that a 10-year-old educationally handicapped student decreased his teacher's yelling behavior. The student counted and recorded his teacher's yelling behavior. Each time he counted he told the teacher "you're yelling." A reversal condition was not included in this study.

Repetitive motor behavior

Koenig (Note 3) used a telecoaching procedure to decelerate high rate foot movements and severe arm jerking movements in a ten-year-old educationally handicapped boy. The rate of undesirable jerking movements remained low after the treatment condition was discontinued.

Haughton (1971) used precision teaching intervention to control epileptic seizure behavior in a seven-year-old boy who was on medication. The boy's "starts" ceased immediately when the treatment, a swat on the rump, was initiated.

Increasing desirable behavior

Lindsley (1966) instructed a group of fathers in the use of precision teaching techniques for behavior management. The fathers were successful in increasing the frequency of putting things away, going to bed on time, getting up on time, dressing self, undressing, making bed, emptying wastebaskets, helping with dinner, setting and clearing table, washing dishes, eating faster, wiping nose and mouth, bathing self, and coming on call.

APPENDIX B:

SAMPLE CHART

APPENDIX C:

SAMPLE RECORDING SHEETS

Appendix C: Sample Recording Sheets Teacher/Observer _____

1. Sample Interval Data Sheet (teacher) Date _____

TARGET BEHAVIORS - Exhibiting out-of-seat behavior and talking-out behavior.

Behavioral Definition:

Out-of-seat behavior is defined as leaving the seat and/or seated position during the history period (1:00 - 1:30 M,T,W,Th) without permission.

Talking-out behavior is defined as talking or other vocal noise without permission during the history period (1:00 - 1:30 M,T,W,Th).

Permission is defined as raising one's hand, being recognized by the teacher, and receiving consent from the teacher to engage in a behavior.

INSTRUCTIONS

During the history period record the number of out-of-seat and talk-out behaviors emitted by the class within a fifteen minute interval using wrist counters.

Prior to beginning the count, set the pocket timer for fifteen minutes. You will be cued by the sounding of the pocket timer when the fifteen minute interval is over.

Reset the pocket timer for the second fifteen minute interval. Record your count on the interval data sheet provided below.

INTERVAL DATA SHEET

	M	T	W	Th
1				
O.S.				
2				

	M	T	W	Th
1				
T.O.				
2				

Appendix C: Sample Recording Sheets

2. Sample Interval Data Sheet (outside observers)
INTERVAL DATA SHEET

Date _____

	1	2	3	4	5	6
O.S.						
T.O.						

	7	8	9	10	11	12
O.S.						
T.O.						

	13	14	15	16	17	18
O.S.						
T.O.						

	19	20	21	22	23	24
O.S.						
T.O.						

	25	26	27	28	29	30
O.S.						
T.O.						

Date _____

INTERVAL DATA SHEET

	31	32	33	34	35	36
O.S.						
T.O.						

	37	38	39	40	41	42
O.S.						
T.O.						

	43	44	45	46	47	48
O.S.						
T.O.						

	49	50	51	52	53	54
O.S.						
T.O.						

	55	56	57	58	59	60
O.S.						
T.O.						

Date _____

INTERVAL DATA SHEET

	61	62	63	64	65	66
O.S.						
T.O.						

	67	68	69	70	71	72
O.S.						
T.O.						

	73	74	75	76	77	78
O.S.						
T.O.						

	79	80	81	82	83	84
O.S.						
T.O.						

	85	86	87	88	89	90
O.S.						
T.O.						

APPENDIX D:

SAMPLE CHAPTER TESTS

Appendix D: Sample Chapter Tests

1. Test for Chapter 13

Name _____

Date _____

TEST FOR CHAPTER 13

1. After _____ adopted the Declaration of Independence in the year _____, the American colonies called themselves _____.

2. All states except _____ attended a meeting in Philadelphia, called _____, to make a second and better plan of government.

3. The _____ was the first ten amendments to the constitution.

4. _____ was the first Secretary of the Treasury.

5. Washington served _____ terms or _____ years as President.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

_____ 6. In 1787, fifty-five men met in Philadelphia and wrote a Constitution for a stronger national government.

_____ 7. Thomas Jefferson, Alexander Hamilton and John Adams all served with George Washington in the government during his presidency.

_____ 8. James Madison is known as the "Father of the Country."

_____ 9. The Constitutional Convention decided that the new Congress, which would make the laws for the government, would be divided into three parts, the House of Representatives, the Executive, and the Senate.

_____ 10. The United States, under Washington, did not help France in its war with England.

Appendix D: Sample Chapter Tests

2. Test for Chapter 14

Name _____

Date _____

TEST FOR CHAPTER 14

1. _____ was so important to the _____ that it fought the _____ of _____ to protect its trade and to remain a free nation.
2. _____ was called "The Father of the Erie Canal."
3. _____ warned Europe not to interfere in North and South America.
4. _____, _____, and _____ developed as new means of travel in America.
5. The new ways of travel helped to make the nation strong by _____ and _____.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. Francis Scott Key was a famous American General during the War of 1812.
- _____ 7. The English fleet on Lake Champlain was defeated by the Americans under the command of Andrew Jackson.
- _____ 8. One of the big factors that helped travel in the early 1800's was the locomotive invented by Robert Fulton.
- _____ 9. To help move goods and people a system of canals were built.
- _____ 10. The Monroe Doctrine was the title given a message sent by President Monroe to the United States Congress to raise taxes to run the government.

Appendix D: Sample Chapter Tests

3. Test for Chapter 15

Name _____

Date _____

TEST FOR CHAPTER 15

1. The _____ and the _____ were two ways of entering Tennessee and Kentucky.
2. _____ and _____ explored much of Kentucky.
3. Pioneers used the rivers, traveling by _____, to settle the area north of the Ohio River, which was called the _____.
4. Two parts of frontier settlement that offered protection to the settlers were _____ and _____.
5. By 1850 _____ million people lived between the Appalachian Mountains and the Mississippi River.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. People who lived on the frontier were called pioneers.
- _____ 7. Boonesborough was the first settlement in Tennessee.
- _____ 8. Americans moved to Kentucky and Tennessee before the War for Independence began.
- _____ 9. The Northwest Ordinance gave the pioneers north of the Mississippi River a government until states were formed.
- _____ 10. New England merchants wanted people to move west.

Appendix D: Sample Chapter Tests

4. Test for Chapter 16

Name _____

Date _____

TEST FOR CHAPTER 16

1. Settlers in Kentucky, Tennessee, and Ohio were almost cut off from the original states by the _____.
2. Pioneer trade using the _____ to the Gulf of Mexico was threatened by _____ and _____.
3. The _____ was used to carry material to Spanish territory for the purpose of _____.
4. Presidents _____ and _____ dealt with the problems that the United States had with Spain.
5. Sacajewea, who helped Lewis and Clark, was the wife of a _____ guide and the sister of a _____ chief.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. President Washington bought Louisiana from Spain.
- _____ 7. The Lewis and Clark reports and maps told the American people about a vast country and gave the United States a right to claim the Oregon country.
- _____ 8. Zebulon Pike found the Red River.
- _____ 9. Lewis and Clark explored the Northwest Territory.
- _____ 10. Florida was purchased from Spain in 1819.

Appendix D: Sample Chapter Tests

5. Test for Chapter 17

Name _____

Date _____

TEST FOR CHAPTER 17

1. The mountain men were _____ who traveled throughout the mountain area of the west.
2. Three reasons the United States had for claiming the Oregon country were
 - a) Robert Gray discovered the _____,
 - b) _____ built a settlement there, and
 - c) _____ and _____ explored the Oregon country.
3. _____ were important to the Oregon country because they led the first home builders there.
4. Mrs. _____ and Mrs. _____ were the first white women to cross the continent of North America by _____.
5. The Oregon Territory was divided so that the northern part belonged to _____ and the southern part to _____.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. Men who lived in the mountains and trapped for furs were called guides.
- _____ 7. Jason Lee and Marcus Whitman were famous fur trappers.
- _____ 8. Most families traveled in covered wagons drawn by mules.
- _____ 9. England and the United States both claimed the Oregon country.
- _____ 10. The missionaries who went to Oregon brought the first permanent settlers with them.

Appendix D: Sample Chapter Tests

6. Test for Chapter 18

Name _____

Date _____

TEST FOR CHAPTER 18

1. Stephen Austin led thousands of _____ to _____.
2. The _____ was an easy travel route for settlers.
3. The Texans showed great courage but were defeated by _____ at the _____.
4. President _____ tried to buy _____ from _____.
5. _____ was a famous _____ here who fought at the Alamo.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. Texas belonged to England before it became a state of the United States.
- _____ 7. Texas broke away from Santa Anna's government and became the Republic of Texas.
- _____ 8. The Americans won the Battle of the Alamo.
- _____ 9. The United States admitted Texas as a state in 1945.
- _____ 10. In a war with Mexico, Texas won its independence, but Mexico refused to recognize that independence.

Appendix D: Sample Chapter Tests

7. Test for Chapter 19

Name _____

Date _____

TEST FOR CHAPTER 19

1. The people who went to _____ in 1949 in search of gold were called _____.
2. General _____ and General _____ were sent by President _____ to the west and southwest to fight Mexico.
3. The most popular route to California was the _____.
4. _____ was the leader of a group called Mormons who traveled to _____.
5. In 1850 _____ became the _____ state to be admitted to the Union.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. California became part of the United States because of a peace treaty that ended a war with Spain.
- _____ 7. The Gadsden Purchase gave the United States a strip of land near Canada.
- _____ 8. Silver was accidentally discovered on Sutter's ranch in Nevada.
- _____ 9. The Mormons helped to settle Utah.
- _____ 10. By 1848 the boundaries of the United States reached from the Atlantic to the Pacific.

Appendix D: Sample Chapter Tests

8. Test for Chapter 20

Name _____

Date _____

TEST FOR CHAPTER 20

1. The two main things the North and South disagreed about were _____
_____ and _____.
2. The Missouri Compromise allowed slavery in the state of _____
_____ and outlawed slavery in the state of _____.
3. Abraham Lincoln's election increased the likelihood of _____.
4. Three great Americans who argued about slavery in the early 1800's were
_____, _____ and _____.
5. As a result of the Civil War the Union was _____
and slavery was _____.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. Eli Whitney invented a beverage made of cotton.
- _____ 7. Tariffs were a cause of disagreement between the North and the South.
- _____ 8. Abolitionists helped slaveowners get their runaway slaves returned.
- _____ 9. Two great military leaders of the Civil War were Robert E. Lee and Ulysses S. Grant.
- _____ 10. Abraham Lincoln was the first president of the Confederacy.

Appendix D: Sample Chapter Tests

9. Test for Chapter 21

Name _____

Date _____

TEST FOR CHAPTER 21

1. The territory included in the last West was the _____, _____, and _____.
2. The geography of the last West was so different from that familiar to settlers that it _____.
3. One of the changes that made settlement possible was _____.
4. The region was settled by _____, _____, and _____.
5. Two of the inventions that helped settle the region were _____ and _____.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. The first settlers of the last West were farmers.
- _____ 7. The Plains Indians were the only Indians which had their treaties honored by the U.S. government.
- _____ 8. For the most part, Buffalo were killed for their meat.
- _____ 9. Between the 1870's and the 1880's, the cattlemen were the most important settlers on the Great Plains.
- _____ 10. The development of the railroad helped to make it possible for the farmer to settle the last West.

Appendix D: Sample Chapter Tests

10. Test for Chapter 22

Name _____

Date _____

TEST FOR CHAPTER 22

1. After the Civil War the United States changed from a nation of _____
_____ to a nation of _____.
2. The two companies who built the railroad from Nebraska to California were the _____ and the _____.
3. Three men who were important in the areas of steel, oil and the automobile were _____, _____, and _____.
4. In the field of communications _____ invented a code for the telegraph and _____ perfected the telephone.
5. Samuel Slater came from England with the knowledge of building _____
_____ for factories.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. The South had many streams and rivers that furnished water power for early factories.
- _____ 7. The discovery of new uses for the nation's natural resources was important to manufacturing.
- _____ 8. England was glad to share her early knowledge of machines with the United States.
- _____ 9. The first words heard on the telephone were: "Mr. Ford, please come here. I want you."
- _____ 10. Railroads were important in carrying raw materials to factories and manufactured goods to market.

Appendix D: Sample Chapter Tests

11. Test for Chapter 23

Name _____

Date _____

TEST FOR CHAPTER 23

1. Cities grew faster in the North because _____ increased faster in the North than in the South.
2. Until about 1880 most people who immigrated to the United States came from the countries of northern Europe like _____ and _____.
3. Two things caused by the growth of cities were _____ and _____.
4. Tall buildings in the cities were called _____.
5. Three ways in which city and farm life differed were _____, _____, and _____.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. Cities of the West and South did not grow as fast as those of the East because they had more farmland.
- _____ 7. Immigrants from European countries settled close to fellow countrymen in cities because of familiarity of language and customs.
- _____ 8. Many immigrant children worked with their parents in factories.
- _____ 9. Creative use of atomic power by the 1890's helped provide cities with power to run street cars, trains, subways, and light the city streets.
- _____ 10. Tenements provided an inexpensive place with many luxuries for families of moderate income to live.

Appendix D: Sample Chapter Tests

12. Test for Chapter 24

Name _____

Date _____

TEST FOR CHAPTER 24

1. The Treaty of 1842 opened trade with _____.
2. President _____ thought the United States should join other nations in the _____.
3. During the _____ War the travels of the ship the _____ proved a need for a shorter route between the _____ and _____ oceans.
4. _____ persuaded _____ trade with the United States.
5. On July 4, 1946 the _____ became an independent nation.

True and False

Directions: Place the letter T for the word "true" in front of those sentences that are true. Place the letter F for the word "false" in front of those sentences that are false. If the statement is false, correct it.

- _____ 6. The United Nations helped build the Panama Canal.
- _____ 7. During World War II the Philippines Island came under the control of the United States for the first time.
- _____ 8. The Maine was a ship blown up by "persons unknown."
- _____ 9. Cuba won freedom from Spain.
- _____ 10. Dr. Walter Reed found the cure for Polio.

APPENDIX E:

"TO HELP YOU UNDERSTAND" ACTIVITIES

Appendix E: "To Help You Understand" Activities

Table 3

"To Help You Understand" Activities

Week	Chapter	Page	Activities
1	13	183	<p>1. Make a two-column chart called "A New Nation." Head one column "For" and the other "Against." List arguments for and against the making of a new nation.</p> <p>2. List the things James Madison did in the Constitutional Convention to earn the title "Father of the Constitution."</p> <p>3. Discuss what the government leaders meant when they had to answer the question: "How strong is strong enough?"</p>
2	14	194	<p>1. List the main points you might have if you were making a class outline for the topic "The Erie Canal."</p> <p>2. Discuss how news reached people during the War of 1812, and why the Battle of New Orleans was fought after the war had ended.</p> <p>3. Study the picture of the tollgate on page 188. Make a two-column chart called "Tollgates." Head one column "Tollgates of Yesterday" and the other "Tollgates of Today." Compare this kind of tollgate with those used on highways today listing likenesses and differences under the headings.</p>
3	15	211	<p>1. Use a dictionary to find the meaning of the words "pioneer" and "frontier." Discuss the meanings of these terms as they were used in 1790 and as they are used today. A chart and listing format may be used.</p> <p>2. Study the picture on page 198 of pioneers clearing the land. Write an explanation of why the pioneers used the method shown in the picture and what people think of the method today.</p>

3. List the adjectives that could describe a pioneer or pioneer family that settled west of the Appalachian Mountains.
- 4 16 123
1. On a map of the United States, trace the route of a shipment of tobacco from Kentucky to New York by way of the Mississippi River. Discuss how tobacco might be shipped today.
 2. Study the picture of New Orleans on page 214 and then list the cargo the ship in the picture might be carrying and name the places to which it might go.
 3. List important supplies that you think Lewis and Clark took on their journey.
- 5 17 233
1. With a map of the United States on your desk, locate these places: Independence, Missouri; Astoria; the Columbia River; the Willamette River; Boise, Idaho; and give information about each one using a chart or list format.
 2. Discuss a typical day spent by travelers on the Oregon Trail.
 3. Study the diagram of the covered wagon on pages 23-231. Discuss which listed items you would need if you were moving to Oregon today. Add to the list other things you think you would take.
- 6 18 243
1. Draw and discuss three pictures to show how people traveled to Texas. The description on page 236 will give you suggestions.
 2. Give the reasons why the people of Texas and Mexico had trouble in 1835. Discuss how the government of the United States might handle these troubles if they arose today.
 3. Prepare a list of the arguments for and against making Texas a state.
- 7 19 256
1. On a map of the United States locate all the places that played a part in the war over Texas. List something important about each one.
 2. Compare the picture on page 244 showing the capture of Mexico City in 1847 with the picture on page 68 of the arrival in Mexico City of Cortes's

"Life on the Farm" and "Family Life in the City."
List as many differences in ways of living as you can.

2. Discuss why many immigrants came to this country after the Civil War.

3. List the contributions immigrants have made to the nation.

12 24 329

1. List the products that the United States wanted to exchange with China after a trade treaty was made between the two nations in 1842.

2. Make a chart naming the products that come from Hawaii, Alaska, and Puerto Rico today. You may illustrate the chart.

3. Discuss Walter Reed and his work to find the cause of yellow fever.

Spanish army. This may be done in chart form.

3. Write and discuss the newspaper headlines that you think might have appeared in a New York City newspaper in 1849 when the news of the discovery of gold reached the East.

8 20 275

1. Show that you understand the meaning of these words by listing them and using each in a sentence: compromise, secede, Republican, blockade, emancipate.

2. Make a chart of "Differences between the North and the South." Head one half "The South" and the other "The North." Under each head, list information in three columns: States, Occupations and Industries, Leaders.

3. Discuss how news reached people on the day President Abraham Lincoln was assassinated and on the day President John F. Kennedy was assassinated.

9 21 287

1. Make a chart titled "The Settlement of the Last West." Use main headings: Miners, Cowboys, Farmers. List important points under each wave of settlement.

2. Compare the pictures of cowboys on the range on pages 276 and 283 with the picture of the Plains farm family on page 286. Discuss the changes that took place on the Plains suggested by these pictures.

3. Study the pictures of cowboy's equipment on page 285. List five items and discuss the use of each item.

10 22 301

1. Make a chart of the inventions discussed in this chapter. List information in two columns: "Invention" and "Inventor."

2. Discuss what you think the railroads did to improve the United States.

3. Study the map on page 295. Discuss what happened to a shipment of iron ore once it left Minnesota.

11 23 314

1. Make a two-column comparison chart of "Family