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The effects of live modeling and specificity of verbal reinforcement on the modification of classroom behavior

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THE EFFECTS OF LIVE MODELING AND SPECIFICITY OF VERBAL REINFORCEMENT ON THE MODIFICATION OF CLASSROOM BEHAVIOR

BY

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ACCEPTANCE

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ABSTRACT

This study attempted to increase the frequency of student on-task behavior in two, third grade classrooms using live modeling and vicarious reinforcement. In a multiple baseline-counterbalanced treatments design two classrooms of students were exposed to live, peer modeling displays of on-task behavior. In one classroom the teacher praised the model, using behaviorally specific praise while the second classroom teacher used non-specific praise. Praise conditions were later reversed. It was hypothesized that after exposure to the modeling display: a) the frequency of on-task behavior would be increased over baseline levels to a pre-determined treatment outcome, b) behaviorally specific vicarious reinforcement would result in greater increases in target behavior than non-specific vicarious reinforcement, c) behaviorally specific vicarious reinforcement would result in greater across-setting-generalization of on-task behavior change, and d) on-task behavior would remain above baseline levels in both classrooms at a one week follow-up check. Results indicated that modeling was inconsistent in the direction of its effects on student on-task behavior, that behaviorally non-specific vicarious reinforcement, was associated with higher levels of on-task behavior in the treated and generalization classrooms, and although on-task behavior remained above baseline levels in one classroom it remained below baseline levels in the second classroom at a one week follow-up. Possible confounding variables, and limitations on the conclusions of this study were discussed.

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Chapter 1

Introduction

Various behavior modification techniques have been employed in classroom settings to decrease students' problem behaviors and increase desired ones. Classroom behavior modifiers have relied primarily upon direct methods of individual contingency management to change student behavior. Attempts to increase a behavior's occurrence usually involve the teacher dispensing a reinforcer to each student after he performs a desired (target) behavior. For example, Hall, Lund, and Jackson (1968) successfully increased student study behavior through the use of contingent praise.

MODELING

Modeling as a technique of behavior modification (Krasner and Ullman, 1965; Porter, 1968; Bandura, 1969) refers to a method of inducing the observational learning of behavior as opposed to direct, individual contingency management. A subject or observer acquires a behavior by simply watching someone else, the model, perform the desired behavior rather than by being given a reinforcer immediately after emitting the desired behavior.

The modeling procedure consists of the following. A particular behavior is enacted by one person, the model, while the subject observes this modeling display. The observer's subsequent performance of modeled behavior is then assessed and is either compared to his baseline (pretreatment) performance or to the performance of others not experiencing the modeling display. Depending upon the purpose of model exposure, increases or decreases in imitative behavior are ascribed to observational learning of model responses.

In his explanation of the observational learning process Bandura (1969, 1971) proposes that in various ways the observer becomes oriented (attends) to the modeling display and then perceives, codes, organizes and rehearses (overtly or covertly) the modeled response. When later tested for the learning of modeled behavior, motivational variables, such as reinforcers, activate the motoric reproduction of the learned, model behaviors by the observer. Thus, Bandura (1965b, 1969, 1971) and others (Walters and Parke, 1964) make a learning-performance distinction in modeling. "The observer acquires, through contiguous association of sensory events, symbolic or representational responses possessing cue properties" which can later elicit the observer's reproduction of the modeled behavior (Bandura, 1965a). In short, simple observation of another's behavior is the necessary condition for the observer to learn and have the potential to perform that behavior.

Bandura, Ross, and Ross (1963) and Bandura (1965b) have provided support for this "stimulus contiguity" theory of observational learning. In the latter study, aggressive models, who were either reinforced, punished, or experienced no consequences for aggression, were differentially imitated by observers. Results during post-testing indicated that subjects in the positively reinforced and no consequences model groups exhibited much more aggression than did the model punished group. When offered incentives for performance of modeled aggression during a second, later posttest, subjects in all groups reliably reproduced modeled aggression. Apparently, all subjects had equally learned the modeled aggression (as indicated by the second posttest), but differentially performed the modeled behavior as a function of model behavior consequences (as indexed by the first posttest).

The importance of rehearsal and reinforcement variables is not denied (Bandura, 1971). Indeed, although Bandura believes the main effect of such variables is on performance, reinforcement to the model or to the observer during rehearsal may increase the distinctiveness of relevant behaviors within the modeling display. These stimulus behaviors become more discriminable and the observer's attention is directed to them, thereby enhancing the opportunity for learning through contiguous association.

Paralleling the learning-performance distinction are the three effects of modeling (Bandura and Walters, 1963; Bandura, 1965a; 1971). The modeling effect refers to the acquisition of novel responses through observational learning. Responses already within the observer's repetoire and previously associated with reinforcement or punishment may decrease or increase in frequency (inhibitory or disinhibitory effects of modeling) after model exposure. The increased frequency of a response, currently in the person's repetoire and not previously associated with any social prohibition, following model exposure is referred to as the facilitation effect of modeling.

As a behavior modification technique in "classroom management" (O'Leary and O'Leary, 1972) modeling has been employed to obtain all three effects. Nixon (1969), Stewart (1969), Smith (1969), and Beach (1960) used symbolic models (audio tape and filmed models) of appropriate behavior to modify hyperactive classroom behavior, information-seeking behavior, inappropriate use of free time and achievement behavior respectively. Hosford and Soresen (1969) and O'Connor (1969, 1972) employed audio and video-taped models to increase classroom discussion and increase social interaction.

Although symbolic modeling methods as mentioned above are of legitimate interest to researchers in terms of media effects on observer behavior and provide effective and sophisticated control over relevant variables in modeling procedures, they seem less suited to classroom management efforts than live or "exemplary" models (Bandura and Walters, 1963). Live models seem especially appropriate to the classroom because of the lack of requirement for costly taping equipment, their relative accessibility, and their naturalness to the environment. Thus, live models seem more practical than symbolic models.

"Adjacent peer" studies (Broden, Bruce, Mitchell, Carter, and Hall, 1970; Kazdin, 1973), in which one of two adjacent students was contingently reinforced for appropriate behavior with teacher attention and teacher physical proximity, have shown increases in target attending behavior in both model and observer. The child directly reinforced for appropriate behavior was considered the model and his adjacent peer, the observer. Broden, et al (1970) and Kazdin (1973) suggested that the observer's study behavior increased as a result of observational learning and vicarious reinforcement (i.e. observation of the model's study behavior contingently reinforced with teacher attention). However, both investigators have acknowledged that other mechanisms, which were artifacts of their modeling procedure, may have influenced their results. Specifically, Broden, et al (1970) presented data suggesting that the social interaction (smiling, talking) between the model and adjacent observer set the occassion for and reinforced the observer's inappropriate behavior which occurred during the interaction. When contingent teacher attention increased model study behaviors incompatible with model talking and smiling, the model's social interaction behaviors were decreased, thereby eliminating the social support or maintaining stimuli for the observer misbehavior. In effect, when the model was behaving appropriately he was not engaging in "off-task" behavior and could not act as an elicitor of or reinforcer for the adjacent student's "off-task" behavior. As a result of the lack of these elicitors/reinforcers the adjacent student's "on-task" behavior may have also increased. Then, too, the possibility exists that the teacher's use of proximity as a reinforcer for the model's "on-task" behavior acted inadvertently as a discriminative stimulus for adjacent student attending behavior, teacher presence during previous periods of student "off-task" behavior having been associated with punishment. Thus, the efficacy of live modeling in classroom management has not yet been demonstrated unequivocally.

The first purpose of this study was to demonstrate that live modeling is an effective classroom behavior modification technique. Rather than use the "adjacent peer" method, an entire class was simultaneously exposed to a live modeling display of student target behavior, the teacher and model being physically but not visually separated from the student observers. To illustrate, the teacher-student modeling display was enacted at the front of the classroom several feet from the closest student. Also, observations of student target behavior were conducted immediately following the modeling display. During the observation period then, the teacher was not required to be any closer to students than during baseline observations. In this way teacher proximity to observer students was controlled.

BEHAVIORAL SPECIFICITY AND VERBAL REINFORCEMENT

The effectiveness of contingent, verbal reinforcement (praise) in modifying student behaviors has been amply demonstrated. However, certain parameters of verbal reinforcement have not yet been fully researched. One such area is that of the behavioral specificity of verbal reinforcement. Specifically, what are the relative effects of behaviorally specific verbal reinforcers ("Thank you for raising your hand to answer that question!") and behaviorally non-specific verbal reinforcers ("Good!" "Thank you!") upon the acquisition of target behavior? This question would appear to take on added significance for modeling procedures, especially in view of the attentional sub-processes involved in the observational learning process (Bandura, 1969; 1971). Briefly, in order for the model behaviors to be learned, the observer must discriminate the relevant model behavior from the modeling stimulus display. In Bandura's (1969; 1971) view, reinforcement to the model (vicarious reinforcement) serves to highlight the target model behavior. It is possible, then, that verbal reinforcement delivered to a model, specifying the appropriate behavior, could increase the discriminability of target behaviors which are embedded in the modeling display.

Presently there are no data contrasting behaviorally specific and non-specific direct or vicarious, verbal reinforcement effects. Cossairt, Hall, and Hopkins (1973) and Hall, Lund, and Jackson (1968) report the use of behaviorally specific and non-specific verbal reinforcement in direct contingency management studies. However, in neither of these studies was the use of behaviorally specific and non-specific reinforcement systematically varied and no statement of the relative effects of the two types of reinforcement procedures can be made.

Modeling investigations have been conducted in which appropriate behavior was specified through the use of instructions and feedback. Rappaport, Gross, and Lepper (1973) and Whalen (1969) found that video-taped modeling of therapy behavior (i.e. self-disclosure) was more effective in increasing appropriate therapy behavior when combined with explicit rather than general instructions about appropriate behavior. It is possible that behavior specification achieved through the use of behaviorally specific vicarious, verbal reinforcement may have similar effects when contrasted with behaviorally, non-specific reinforcement procedures on the modification of target student behaviors. Specifically, it was hypothesized that behaviorally specific vicarious, verbal reinforcement would result in greater increases in the frequency of target student behavior than would behaviorally non-specific vicarious verbal reinforcement.

GENERALIZATION

Generalization of treatment effects is an important goal of behavior modification since it is usually impossible to re-program all relevant contingencies of each environment in which the maladaptive behavior occurs (Peralta, 1972). Wahler (1972) has noted two important instances of generalization, within setting generalization and across setting generalization. The former refers to changes in non-target behaviors as well as target behaviors in the setting in which contingency changes have been effected; the latter refers to changes in target behaviors in settings where maintaining contingencies have not yet been directly manipulated. This paper was concerned with across setting generalization.

Any one or all of several factors may result in the across setting generalization of student behavior change. First, generalization will occur to the extent that the second, untreated setting is physically similar to the classroom in which behavior change was originally effected. Relevant dimensions of similarity may include teacher sex, classroom appearance, and student tasks or assignments. As similarity increases along these dimensions the probability may increase that student behavior changes occurring in the treated classroom will also occur in the untreated class.

Secondly, the teacher in the second classroom where no manipulation of behavior consequences has been enacted, may occassionally (intermittently) praise occurrences of the target student behavior, especially since the behavior has been chosen because of its desirability for teachers. Therefore, changes in an external reinforcement variable, teacher response to student behavior, may result in the generalization and persistence of student behavior change in the untreated classroom.

If external environment supports are lacking, student self-regulation may be responsible for across setting generalization. According to Kanfer and Karoly (1973) self-regulation consists of a self-monitoring evaluation-reinforcement process which allows a person's behavior to occur relatively independent of the external environment. In performing a behavior the subject receives response feedback or information from both external sources and his own self-observation. Comparing this feedback and a "subjectively held performance criterion" (Kanfer and Karoly, 1973) the subject makes a judgement (behavior above or below standard), the results of which serve as a cue for self-reinforcement.

One way in which self-regulation has been effected is through the observational learning of rules for responding or rule learning. Bandura and MacDonald (1963) reported that children's moral judgements were modified such that, following exposure to models exhibiting moral response styles opposite to observers' pretreatment style, observers changed their moral response in the direction of the modeled orientation. These observer response changes generalized to situations in which no model was present and to test stimuli different in specific content from that of the original observational learning situation. Subjects learned not only a specific response but a rule for responding (a moral orientation). In later discussion of these results Bandura (1969) proposed that rule learning had occurred through vicarious discrimination learning. Specifically, the observation of models responding in an invariant manner to diverse stimuli and observation of models being reinforced for this response style resulted in the observer abstracting the modeled response rule from the total modeling display, and in the observer's ability to make this correct response in later, slightly different situations.

In positing vicarious discrimination as the learning mechanism resulting in rule learning and in the generalization of observer response changes, Bandura (1969) also suggested that vicarious discrimination and, therefore, rule learning could be facilitated if the rule's "identifying characteristics are distinctly repeated in responses differing in other respects." Such a procedure, requiring many more modeling displays, would involve considerable effort, time, and increased attention demands upon behavior change agents, models, and observers. These demands may result in a decrement in rule learning and generalization, especially if contained in behavior modification attempts with young children whose attention spans are brief.

However, the use of behaviorally specific vicarious, verbal reinforcement may result in similar rule learning and generalization effects while involving fewer of the demands noted above. Such a reinforcement procedure states the reinforcement-behavior relationship ("Thank you <u>for</u> raising your hand...!") and verbally models the target student behavior ("...raising your hand to answer the question!"). Consequently, the observer is exposed to two modeling displays, the live modeling of target behavior and the verbal modeling contained in the verbal reinforcer. The temporal proximity of these two modeling procedures and the ease of emitting a verbal modeling statement markedly reduce attention and effort demands otherwise involved in the additional live or symbolic modeling displays as suggested by Bandura (1969). At the same time, the live modeling and verbal modeling procedures provide for the conditions (repetition of the response rule's identifying characteristics) which facilitate learning and generalization of behavior change.

Studies of the relative effects of behaviorally specific and non-specific verbal reinforcement on across setting generalization of treatment effects are lacking. Cossairt, Hall, and Hopkins (1973), using instructions, feedback, and occassional behaviorally explicit praise to produce differential teacher attention to appropriate student behavior, found that teacher behavior changes persisted at several, later post-checks during the school year. However, this generalization-across-time-effect (Baer, Wolf, and Risley, 1968) may have been the result of the reinforcing effect of contingent student appropriate behavior, which also persisted over time, rather than behaviorally explicit praise by the experimenters. Then, too, the relative effects of behaviorally specific and non-specific priase were not reported.

Therefore, it was the third purpose of the present study to examine the relative effects of behaviorally specific and non-specific vicarious, verbal reinforcement on the generalization of student target behavior. Baseline and post-modeling treatment observations were conducted in the treated classrooms. Similar observation phases were conducted later that day in untreated classrooms consisting of these same students. These latter observations were used to assess the relative effects of the two types of vicarious reinforcement procedures on across setting generalization.

In summary, the present study involved the presentation of a live modeling display of a student target behavior to two classes. While the model was verbally reinforced by the teacher for target behaviors in both classes, one teacher began the first treatment phase by using behaviorally specific vicarious verbal reinforcement and the second teacher began with behaviorally non-specific vicarious verbal reinforcement. When the next treatment phase was initiated the teachers changed vicarious reinforcement techniques, the teacher who began with specific vicarious reinforcement switching to non-specific and the teacher who began with non-specific vicarious reinforcement switching to specific. It was hypothesized that:

1.) The frequency of the student target behavior would be increased over baseline frequencies to a pre-determined treatment outcome following exposure to the modeling display while the frequency of non-target behaviors would remain relatively stable.

2.) Behaviorally specific vicarious, verbal reinforcers, (e.g. "Thank you for raising your hand to answer the question.") would be characterized by greater treatment effectiveness than would behaviorally non-specific vicarious, verbal reinforcers (e.g. "Thank you!").

3.) Behaviorally specific vicarious, verbal reinforcers would result in greater across-setting-generalization of target behavior change than would behaviorally non-specific vicarious, verbal reinforcers.

4.) Students' target behavior during a one week follow-up to treatment would persist above baseline levels while comparison behaviors would remain within their baseline levels.

Chapter 2

Method

Subjects

Subjects were third grade students ranging from 8 to 10 years of age and were drawn from Richmond Public Schools. Two pre-existing (intact) classrooms were used, precluding the randomized assignment of individual subjects into treatment groups. Racial composition of one class was 21% white and 79% black (N=30), while the second class was 17% white and 83% black (N=27). Selection of these classes was initially made through the school principal on the basis of the experimenter's request for classes within the age range whose teachers report the occurrence of problem behaviors. The final selection criterion employed by the experimenter himself was that the two teachers report at least one student problem behavior common to both of their classrooms.

The models were four student peers--1 white boy, 1 white girl, 1 black boy, 1 black girl--selected from one of the other third grade classes in the same school. During the baseline period, the teacher of this other third grade classroom was asked to have students write down the name of the student in their class with whom they would most like to work or study. Then, without knowledge of these results the teacher rank ordered each student as to the students' ability to cooperate in carrying out the modeling display, the teacher first having been informed as to the details of the modeling display. Finally, in accordance with race and sex criteria, those four students who were most frequently named by their classmates and who also received a high ranking for cooperative behavior were selected as models. (Due to parental objections concerning one child's participation one model chosen in this manner had to be dropped from the study. However, this model was replaced by a child from the same class who fulfilled the previously stated criteria.)

Materials

Previously prepared behavior recording sheets, consisting of behavior category columns (target, comparison, and teacher behaviors) and time interval (15 sec.) rows, were used to record data manually (see appendix). A "Breitling" stopwatch was used to assess time intervals.

Dependent Variable Measures

The experimenter and the two teachers formulated explicit definitions of student target and comparison behaviors. The target behavior in both classes was labeled "on-task" and the comparison behaviors "hand raising" and "blurting out". The respective definitions were"

> On-task (ON): 1.) the student being in seat (complete contact between student buttocks and seat, all four chair legs on the floor), 2.) the student is quiet (not talking with other students) and 3.) attending to his assignment (facing paper on desk with pencil in hand/facing his own open book/facing the blackboard or teacher.
>
> Hand-raising (HR): the upward extension

of a student's arm and hand to obtain teacher approval for student verbalizations directed to the teacher.

Blurting-out (BO): any student verbalization or noise directed at the teacher. A hand raise accompanied by any student verbalization was considered blurting-out rather than hand raising.

In addition teacher verbal behaviors emitted in response to these student behaviors were recorded. These teacher behaviors were labeled specific praise (e.g. "I like the way you're quietly sitting in your seat, reading your assignment.") and non-specific praise (e.g. "I like what you're doing.").

Experimental Design

The basic design of this research was a multiple baseline (Hall, Crisller, Cranston, and Tucker, 1970). The multiple baseline consists of initial baseline recordings of target and comparison behavior frequencies within the same spatio-temporal setting (Classroom A 9:00 to 10:00, Classroom B 9:15 to 10:00, Classroom C 2:15 to 2:45). After baseline "on-task" measures achieve a pre-selected criterion of stability, an experimental manipulation is introduced for the target behavior ("on-task"), while comparison behaviors remain relatively stable. Treatment effectiveness is indicated by the degree to which target behavior change approximates a pre-selected goal value for target behavior change.

To control for idiosyncratic teacher variable effects, initial assignment of specific and non-specific vicarious verbal reinforcement treatments were made randomly and in a counterbalanced manner. That is, a coin toss decided which teacher initiated treatment with the specific/non-specific praise technique. Following completion of the first treatment phase the teacher who began with behaviorally specific vicarious verbal reinforcement switched to the non-specific technique while the teacher beginning with non-specific vicarious reinforcement switched to the specific technique.

Recording Procedures

Five undergraduate psychology students were used as behavior recorders, one recorder assigned to each of the two experimental (treated) and one generalization (untreated) class and two who were to collect one week follow up data in the experimental classes. Prior to initial recording sessions all of the recorders were familiarized with the behavior definitions and recording procedures but were not informed as to the experimental procedure and expected results. Also, prior to initial recordings, each of the behavior recorders participated in two practice recording sessions with the experimenter, these practice sessions having been conducted in the actual experimental and generalization classes and involving recording procedures identical to those of actual baseline-experimental periods. Recording sessions were conducted Monday, Wednesday and Friday for a 20 minute period of the reading class. Recording sessions immediately followed the modeling display in the experimental classes.

A "Placheck" (Hall, 1971; Risley, 1971) procedure was used to record subject behavioral data. During the first 10 seconds of a 15 second interval the recorder made a visual-auditory sweep of the classroom, counting the number of subjects engaged in "on-task", "hand-raising" and "blurting out" behaviors and the number of subjects present in the classroom. During the last 5 seconds of the 15 second interval, the recorder entered this ratio in the time interval-behavior category space on the recording sheet. This procedure was then repeated for a total recording time of 20 minutes. The ratio quotients in each interval were then each multiplied by 100 yielding a percentage of subjects displaying a certain behavior. (Rather than observe an entire 27 or 30 subject class at one time the recorders viewed only one quarter of the class during any 15 second interval. The quarter of the class observed was randomly varied at one minute intervals.) Teacher behaviors were recorded by frequency count at similar 20 second intervals, a check being placed in the appropriate recording space for each specific praise response and a (-) being recorded for each non-specific praise response.

Inter-recorder reliability checks were made during each phase (baseline, modeling) of the multiple baseline procedure. One day during each phase, each of the recorders entered the other classroom and, with the recorder of that classroom, conducted a simultaneous but independent recording session for that classroom. These two sets of data were then used to compute inter-recorder reliability statistics using the Pearson product-moment correlation coefficient. This statistic was considered an index of the degree to which behavior recorders were using the behavior categories in a similar manner in the several classrooms (i.e. the degree to which recorders could agree whether or not a behavior was occurring). Since demonstration of an experimental manipulation's effect on a target behavior is premised upon a demonstration that the behavior is, first of all, occurring, inter-recorder agreement must occur at an acceptable level. The 5% level of confidence was designated as the criterion of sufficient recorder agree= ment.

Target behavior instability estimates (Tiller, 1973) were computed for the target behavior during baseline and treatment phases 1 and 2. The baseline observation days were split into consecutive halves and the frequencies summed and means computed for these sums. Then the sum of all baseline frequencies for a behavior were computed and this total was used to compute a grand mean. If the difference between the first and second half means ($\bar{X}_1$-$\bar{X}_2$) was greater than 20% of the grand mean ($\bar{X}_g$), then two more observations were to be made and a second instability estimate computed. (However, each phase was to last a maximum of six days). The behavior instability estimate indicated the stability of pre-treatment or baseline "on-task" behavior frequencies. If a relatively stable baseline was not achieved prior to introduction of the experimental manipulation, behavior change might be attributed to some other, unidentified factor rather than the treatment procedure.

Treatment effectiveness ratios (Tiller, 1974) were computed to assess the effectiveness of live modeling and vicarious reinforcement techniques for increasing on-task behavior to a predetermined goal level. Also the differential effectiveness of the vicarious reinforcement procedures upon across-setting-generalization of target behavior was assessed by using treatment effectiveness ratios. These ratios were based upon the untreated classroom (Classroom C) baseline and treatment phase "on-task" frequencies and upon the goal level of behavior for experimental classroom A. The goal levels for "on-task" behavior change were selected by the experimenter after consultation with the experimental classroom teachers (A and B). During the baseline recording phase teachers A and B were approached and asked to suggest a level of "on-task" behavior which they would consider "good". (The teachers were asked to structure their response in terms of a percentage of students "on-task" at any one time). For classroom A (and C) the goal level of "on-task" behavior was defined as 100% and for classroom B the goal was defined as 85% of the students being "on-task".

Treatment effectiveness ratios were computed for each of the classrooms - experimental classes A and B, generalization class C - during each treatment phase and for the follow-up measurement. These computations were accomplished in the following manner. Baseline behavior frequency (B) was subtracted from the observed amount of change in on-task behavior (T_o). The former (T_o-B) was divided by the latter difference (T_g-B) and this quotient was multiplied by 100 to yield a percent value of treatment effectiveness. $\left(\frac{T_o - B}{T_g - B} \times 100\right)$

<u>Procedure</u>

The general procedure consisted of the following. Initial contact was made with the principal and following his recommendation, the expermenter then interviewed teachers from the experimental classrooms to determine common problem behaviors. This was followed by gross (non-quantitative) observations of student and teacher behaviors during the class periods in which problem behaviors were reported to be occurring (i.e. experimental classrooms A and B observed from 9:00 a.m. to 10:00 a.m.; generalization classroom C observed from 2:15 p.m. to 2:45 p.m.).

Hypothesis 1, concerning the effectiveness of a live modeling display in modifying subject "on-task" behavior, was investigated by exposing subjects to a live modeling display of "on-task" behavior. The model entered the classroom at the beginning of the daily reading class period (9:00 - 11:00 a.m.), and took a pre-selected seat in the front of the classroom. This modeling display was incorporated into the first 5 minutes of the class period and immediately preceded that class period in which subject behavior was to be recorded.

The modeling display itself was preceded by an attention directing statement made by the teacher to the subjects and which approximated the following:

> We have been having trouble lately with too many students talking with each other and not doing their assignment. So, __________ (model's name) and I are going to demonstrate how to behave during the reading lesson.

The teacher then conducted a mini-lesson similar to but briefer than the planned lesson. The teacher and models were previously rehearsed in this mini-lesson and modeling display under the experimenter's direction. During the mini-lesson, the models demonstrated "on-task" behaviors (in seat, not talking, attending to his task), the teacher contingently praising the model for this on-task behavior. At the end of 5 minutes, the teacher instructed the model to return to his classroom. The model's exit from the classroom cued the behavior recorder assistant to enter the classroom and begin recording.

To investigate Hypothesis 2, concerning the relative effects of behaviorally specific and non-specific vicarious verbal reinforcement, the teachers in the experimental classes each followed slightly different vicarious reinforcement procedures. During the first treatment phase modeling display, one teacher delivered behaviorally specific vicarious verbal reinforcement (e.g. "I like the way you're quietly sitting in your seat and reading your assignment.") to the model contingent upon the model's on-task behavior. The second teacher initially used behaviorally non-specific vicarious, verbal reinforcers (e.g. "I like that.") in a similarly contingent manner during the modeling display. Following completion of the first treatment phase the teacher who began with the specific reinforcer treatment switched to the non-specific treatment and vice versa. Behavior recordings proceeded as during the first treatment phase.

Prior to the experimental manipulation (the modeling display and vicarious reinforcement procedures) baseline data on target, comparison and teacher behaviors were recorded. Immediately following the initial modeling display and during the reading period these same behaviors were recorded. Similar modeling displays, attention directing statements and subsequent behavior recordings were conducted for five days. The teachers were instructed to maintain their usual response style and rates in regard to student behaviors, this "usual response style and rate" being defined as no greater than a 5% fluctuation from their baseline response rate. A previous "adjacent peer" study (Broden, Bruce, Mitchell, Carter and Hall, 1970) in which one of two adjacent students (the model) was contingently reinforced for appropriate behavior with teacher attention and physical proximity, reported increases in target attending behavior in both model and observer. Broden, et al, (1970) attributed this target behavior increases to the effects of modeling and vicarious reinforcement. However, slight increases were also noted in teacher attention to observer student target behavior. Consequently, the results of Broden, et al (1970) were "clouded"; changes in observer student target behavior could not be attributed solely to the modeling-vicarious reinforcement procedures but may have also been the result of changes in teacher praise for observer student target behavior. To prevent such clouding of modeling-vicarious reinforcement effects in the present study, teachers were instructed to maintain their usual response style and rate as defined above.

Hypothesis 3, that behaviorally specific vicarious verbal reinforcement would result in greater across-setting-generalization, was investigated by monitoring students' "on-task" and comparison behaviors in another of their classes (Mathematics) occurring later in the day but involving the same teacher and classroom. While baseline and post-modeling observations were conducted in the experimental (reading) class, similar recordings of target, comparison and teacher behaviors were conducted in the generalization (math) class.

Hypothesis 4, that exposure to a modeling display during treatment phases will result in generalization of target ("on-task") behavior change across time, was investigated by conducting a follow-up recording session. One week after the completion of the final treatment phase and without reinstatement of the modeling-vicarious reinforcement procedures, behavior recorders re-entered the two experimental classes and conducted a 20 minute recording session identical to those of the baseline and treatment phases.

Chapter 3

Results

Inter-recorder Reliability

Pearson product-moment correlation coefficients were computed to assess inter-recorder reliability. All such paired comparisons were made using the 5% level of confidence as the criterion for sufficient reliability. These coefficients are presented in Tables 1, 2, and 3 for experimental classrooms A and B and generalization classroom C respectively.

Insert Table 1 about here

Insert Table 2 about here

Insert Table 3 about here

Baseline and experimental phase inter-recorder reliability values ranged from r = .25 df = 78 to r= 1.00, df = 78 (where the degrees of freedom were the number of pairs of observation intervals during the reliability recording sessions). Two of these coefficients were non-significant (Class A "on-task" and "hand raising" behavior at the follow-up measure).

In these two cases, additional inter-recorder reliability recording sessions, which would have allowed reassessment of the reliability of these measures, could not be conducted since the follow-up data was collected just prior to the Christmas holidays.

It should be noted that on most recording days the comparison subject behaviors ("hand-raising" and "blurting-out") and the associated teacher behaviors occurred at such low levels (often at zero levels) that inter-recorder reliability could not be assessed with the Pearson correlation coefficient. Since this phenomenon was observed to persist over several recording sessions, it was decided that reliability assessment for these behaviors under such circumstances would be made using the following formula for percentage of agreement:

$$\frac{\text{Number of Agreements}}{\text{Number of Agreements + Number of Disagreements}} \times 100$$

where agreement refers to both recorders noting the occurrence or the lack of occurrence of a behavior and where disagreement refers to one recorder noting occurence/lack of occurrence while the other recorder notes the opposite case. Acceptable inter-recorder agreement values was established as 80% (Johnson and Bolstad, 1973). These inter-recorder agreement values were also presented in Tables 1, 2, and 3. These values ranged from 72.9% to 100%. The former value was originally computed wrongly at a value above the 80% level. However, since it rather closely approximated the agreement criterion when re-computed, sufficient agreement would appear to have existed.

Behavior Instability Estimates

Since a target behavior should have achieved a stable frequency prior to the introduction of a treatment variable, "on-task" behavior in all three classrooms was subjected to an instability analysis. The results of these analyses were presented in Table 4, $d_{\bar{x}_1 - \bar{x}_2}$ indicating the difference between the means of the first and second halves of the observation

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Insert Table 4 about here

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period and 20% of the grand mean ($\bar{X}_G$) indicating the maximum acceptable instability. Inspection of Table 4 indicates that prior to the implementation of treatment phase 1, baseline percentages of "on-task" behavior had stabilized; obtained values ($d_{\bar{x}_1 - \bar{x}_2}$) did not exceed the maximum acceptable instability (20% $\bar{X}_G$).

Instability estimates were next computed for "on-task" behavior during the first four days of treatment phase 1. Inspection of Table 4 indicates that the target behavior had not yet stabilized under treatment phase 1 conditions in the two experimental classrooms, classroom A and classroom B, but had stabilized in the generalization classroom, classroom C. Ideally treatment phase 1 conditions would have been extended two more days in order to allow the target behavior to stabilize prior to introduction of the second treatment variable. However, since only a few weeks remained in the school semester and since treatment phase 2 and follow-up measures would require two of these weeks, treatment phase 1 could be extended only one more observation day. Following the additional observation day, instability estimates of "on-task" behavior were recomputed. The results shown in Table 4 indicated that "on-task" behavior had stabilized in classrooms B and C but that the obtained value for classroom A still exceeded acceptable limits of instability.

Following four days of treatment phase 2, instability estimates of "on-task" behavior were again computed. The results presented in Table 4 indicate that while "on-task" behavior had stabilized under treatment phase 2 conditions in classroom A, classroom B and C "on-task" behavior exceeded acceptable levels of instability. Insufficient time remained in which to extend treatment phase 2 observations and allow "on-task" behavior to stabilize in these two classrooms. Consequently, no further instability estimates were computed.

Treatment Effectiveness Ratios

To assess the effectiveness of live modeling and vicarious reinforcement techniques for increasing "on-task" behavior treatment effectiveness ratios were computed. The results indicated that classroom B "on-task" behavior had increased, treatment effectiveness ratio phase 1 = 36.12% and treatment effectiveness ratio phase 2 = 11.73%. However, in classroom A there was no change in "on-task" behavior in the predicted direction. In fact classroom A "on-task" behavior actually decreased from baseline measures during treatment phase 1 and remained below baseline during treatment phase 1 and remained below baseline during treatment phase 2.

To determine whether specific or non-specific vicarious reinforcement techniques were more effective for increasing student "on-task" behavior comparisons of treatment effectiveness ratios were made within each experimental classroom. Results indicated that in classroom B non-specific vicarious reinforcement (treatment phase 1) resulted in a treatment effectiveness ratio of 36.12% while the specific vicarious verbal reinforcement technique (treatment phase 2) resulted in a treatment effectiveness ratio of only 11.73%. In classroom A subjects "on-task" behavior decreased from baseline during treatment phase 1 (specific vicarious reinforcement) and remained below baseline levels during treatment phase 2 (non-specific vicarious reinforcement), although it did increase slightly above treatment phase 1 levels. That is to say, when treatment phases only were compared within each classroom, non-specific vicarious verbal reinforcement resulted in greater percentages of subjects "on-task" in classroom B., and both types of vicarious reinforcement resulted in decreased percentages of subjects "on-task" in classroom A.

Inspection of Figures 1 and 2 indicated that "hand-raising" and "blurting-out" appeared to remain relatively stable from baseline through both treatment phases in both experimental classes. However, as also

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Insert Figure 1 about here

Insert Figure 2 about here

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indicated in Figures 1 and 2 very low percentages of subjects were engaging in "hand-raising" and "blurting-out". Comparison behaviors were occurring so infrequently as to be insensitive to a generalized treatment effect or to extraneous variable effects.

To determine whether specific or non-specific vicarious reinforcement techniques were more effective in producing across-setting-generalization treatment effectiveness ratios for generalization classroom C were compared during treatment pahse 1 (specific vicarious reinforcement) and treatment phase 2 (non-specific vicarious reinforcement). As discussed earlier the across-setting-generalization classroom, classroom C, was an afternoon class consisting of subjects from classroom A. Although these subjects were exposed to the model in classroom A, no model was presented in classroom C itself. (It was not possible to obtain data on across-setting-generalization for experimental classroom B due to re-scheduling of student subjects by school authorities.) When behaviorally non-specific vicarious reinforcement was used in classroom A, classroom C "on-task" behavior was decreased below baseline levels. (see Fig. 3). Again the multiple baseline pro-

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Insert Figure 3 about here

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vided that comparison subject behaviors should remain relatively stable. While "hand-raising" and "blurting-out" appeared to remain relatively stable from baseline through both treatment phases, these comparison behaviors occurred at low rates and, therefore, were insensitive to possible generalized treatment or confounding variable effects.

Finally, treatment effectiveness ratios were computed to assess the effects of the modeling and vicarious reinforcement variables on the persistence of changes in student "on-task" behavior. While classroom B "on-task" behavior remained above its baseline level (treatment effectiveness ratio - 37.67%), classroom A "on-task" behavior remained below its baseline level (see Figs 1 and 2). In both classrooms A and B at follow up measurement "hand-raising" and "blurting-out" behaviors were within baseline levels.

Additional Data Analysis

Because of the unexpected decrease in the percentage of subjects "on-task" in classroom A during treatment phases 1 and 2 further analyses of these data were made. Usually a decrease in target behavior ("on-task") following introduction of a treatment variable (modeling-vicarious reinforcement) suggests that the treatment variable is acting as a punisher rather than a reinforcer. This possibility would be further supported if "on-task" behavior was found to increase later in the recording session, the effect of any punisher being greatest immediately after its application.

To investigate the possibility that the modeling display was acting as a punisher for subject "on-task" behavior the mean percentage of subjects "on-task" at one minute intervals during baseline, treatment phase 1, and treatment phase 2 in classroom A were presented graphically in Figures 4,5, and 6. Comparison of baseline "on-task" percentages (Fig. 4) with treat-

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Insert Figure 4 about here

Insert Figure 5 about here

Insert Figure 6 about here

---

ment phases 1 and 2 percentages (Figs. 5 and 6) revealed an overall decreasing trend in the level of "on-task" behavior between baseline and treatment phases. Even more striking was a pattern of increased variability in the percentage of subjects "on-task" following the 9:30 recording interval and persisting until the end of the recording session. This pattern of variability was present during both baseline and treatment phases. Such variability in "on-task" behavior during baseline and treatment phases suggests that the modeling display exercised little if any control over subject "on-task" behavior in classroom A.

Finally, although this research was not designed to investigate the differential effects of model attributes (race, sex), data from the experimental classrooms A and B were examined to determine whether any relationship was indicated between model race and sex and the percentage of subjects "on-task". The number of increases and decreases in the percentage of subjects "on-task" associated with model race and sex characteristics are presented in Table 5. These results indicated that the white model was associated with four of the four increases in "on-task" behavior while no differences in "on-task" behavior were associated with model sex in classroom A.

Insert Table 5 about here

In classroom B the white model was associated with two of the three increases in "on-task" behavior and the male model with two of the three increases.

Chapter 4

Discussion

The hypotheses were not confirmed by the results. First, although in one classroom (B) introduction of a modeling display of "on-task" behavior appeared to result in increases in student "on-task" behavior, a comparable modeling display was associated with decreases in student "on-task" behavior in the second experimental classroom (A). In other words, opposite results were obtained with the same techniques. Secondly, in contrast to predicted results behaviorally non-specific vicarious verbal reinforcement was associated with greater percentages of "on-task" behavior than was specific vicarious reinforcement. Also, in contradiction to the third hypothesis not only did subject "on-task" behavior decrease from baseline levels during one treatment phase in the across-setting-generalization classroom (C) but non-specific vicarious verbal reinforcement was associated with higher levels of "on-task" behavior than was specific vicarious reinforcement. Thus, although the effects of the vicarious reinforcement and modeling variables upon subject "on-task" behavior in the original experimental classroom (A) seemed to generalize to untreated classroom C, the direction of these effects and the conditions under which they occurred were in contradiction to those hypothesized. Finally, at follow-up measurement "on-task" behavior remained above baseline levels in one experimental classroom (B) but below baseline in the second experimental classroom (A).

The inconsistency in the direction of modeling treatment effects between the two experimental classrooms A and B was especially puzzling. That is, why did modeling of "on-task" behavior increase "on-task" behavior in one class while decreasing this same behavior in the second classroom? In view of the previously reported successes of live modeling for increasing appropriate classroom behavior (Broden, Bruce, Mitchell, Carter, and Hall, 1970; Kazdin, 1973) the decreases in subject "on-task" behavior in the present research seemed worthy of further examination.

There would seem to be several possible factors which may have singly or in combination contributed to the marked differences in modeling display effects upon "on-task" behavior. The decrease in classroom A "on-task" behavior might be accounted for by the differences in classroom A and classroom B baseline "on-task" behavior. Although classroom A's baseline "on-task" behavior was occurring at a rate well below the teacher's goal, it was occurring at a relatively high rate when compared to baseline "on-task" behavior in the other experimental classroom (B). Consequently, when the modeling treatment was applied to classroom

A target behavior a "boomer-rang" effect may have occurred, resulting in decreased classroom A "on-task" behavior. Previously Lepper, Greene and Nisbitt (1973) have reported that when an attempt was made to increase an already high rate of behavior, that behavior decreased. However, Lepper, Greene and Nisbitt employed a technique (contingently applied direct reinforcement) different from that which was employed in the present research (modeling and vicarious reinforcement). It will remain for future research to investigate further the critical conditions of this boomer-rang hypothesis. Specifically, where any target behavior is occurring at a relatively high rate during baseline subsequent attempts to increase that behavior through modeling or direct reinforcement should result in a decrement in the rate of the target behavior.

This explanation, however, does not account for all aspects of the data. Inspection of classroom A data revealed that introduction of the modeling display had no consistent effect upon student "on-task" behavior. In classroom A during baseline initially high percentages of "on-task" behavior were followed by an extended period of variability in "on-task" behavior percentages. This same trend was observed to persist during both treatment phases. If the modeling display had been acting as an effective treatment variable then the target behavior should have become less variable regardless of whether the target behavior was increased or decreased. Student "on-task" behavior seemed to be occurring relatively independent of the modeling display. Indeed, one possible interpretation of this increasing variability trend is that the initially high percentages of "on-task" behavior represent periods in which the task had just been assigned and few students have completed the assignment, resulting in a large percentage of students being "on-task". The later, more variable percentages of "on-task" behavior represent periods in which some students had completed their assignment and with no additional assignment "on-task" behavior became irrelevant; the probability that students would persist in "on-task" behavior decreasing. In effect, once they had completed their assignment students had no alternative but to be "off-task", a behavior which directly competed with and, therefore, lowered the probability of "on-task" behavior.

It is also possible that one particular aspect of the modeling treatment, the attention directing statement, may have been responsible for the decrement in classroom A "on-task" behavior. The attention directing statement was made by the teacher to all students as a group, regardless of their individual baseline performance, prior to the administration of the modeling display in both experimental classrooms

A and B. It was assumed that this cue to observe the model and change one's behavior in the direction of the model's behavior would affect only those students who were predominatly "off-task". That is, those students who were frequently "off-task" during baseline were being cued that their behavior was inappropriate and to observe the model so that they could learn to be increasingly "on-task" themselves. At the same time it was believed that students already engaging in higher rates of "on-task" behavior would discriminate that this cue was not being applied to them and that they would maintain their high rate of "on-task" behavior. However, this discrimination may not have occurred, especially in view of the facts that the attention directing statement was made to all students and that direct reinforcement of student "on-task" behavior occurred at low rates. A possible result of the failure of good-behaving students to understand that their high rate of baseline "on-task" behavior was not being labeled as inappropriate was that high rate "on-task" behavior students began behaving differently from their baseline behavior, i.e. "off-task". The magnitude of the effect of this failure to discriminate would seem to vary with the number of students already engaging in relatively high rates of "on-task" behavior, the greater the number of students already engaging in high rates of "on-task" behavior, the greater the increase in "off-task" behavior during treatment phases. Relative to classroom B, classroom A was characterized by a greater percentage of students who were "on-task" during baseline. Therefore, a greater potential existed for classroom A students to mis-apply the attention directing statement to themselves and, consequently, display the increased "off-task" behavior that was apparent during treatment phases 1 and 2.

It would seem then that simply providing a model who demonstrates a target behavior and who is reinforced for the target behavior does not guarantee that the target behavior of observers will be increased. Specifically, the results of the present study have indicated that modeling of "on-task" behavior by a student peer and vicarious reinforcement of this model by the teacher may not result in increases in subject "on-task" behavior. Such a conclusion does not seem congruent with the results reported by Broden, Bruce, Carter, Mitchell and Hall (1970) and Kazdin (1973). Rather, other variables such as the relative rate of subject baseline target behavior, and demand characteristics of the target behavior itself may affect the magnitude and direction of the modeling-vicarious reinforcement effects. Future research involving the use of models and vicarious reinforcement to modify classroom behavior should investigate the effects of these possibly relevant variables upon target behavior.

Less amenable to explanation was the greater effectiveness of behaviorally non-specific vicarious reinforcement (rather than specific) for increasing student "on-task" behavior. Again, this result was contradictory to the hypothesized result and somewhat incongruous with previous modeling research which indicated the greater effectiveness of explicit (vs. general) instructions and feedback upon acquisition of client therapy behaviors (Rappaport, Gross, and Lepper, 1973; Whalen, 1969). Perhaps the critical difference between this previous therapy research and the present classroom management study was that clients were being asked to learn relatively novel behaviors (e.g. self-disclosure) or were being asked to learn a particularly difficult discrimination while the students were already performing the target behavior ("on-task") at a moderate rate. In the case of a novel response specific instructions, and presumably specific reinforcement, might provide additional information which would be facilitative of response acquisition (Bandura, 1971; Kazdin, 1973) while the additional information relayed through specific vicarious reinforcement to a subject who has already learned the response, albeit to a moderate degree, may be superfluous. That is, while there may exist a lower range of response rates at which behaviorally specific reinforcement is more effective in increasing a particular response, there may be little or no difference in the effects of behaviorally specific and non-specific reinforcement upon response rates at some higher response rate. Future research might attempt to empirically define this "point of diminishing returns" for behaviorally specific reinforcement treatments in classes whose baseline behavior rates are different - i.e. two classrooms whose baseline rates of target behavior might be characterized as low would be exposed to models receiving behaviorally specific and non-specific vicarious reinforcement and two classrooms whose baseline behavior might be characterized as moderate would be exposed to models receiving behaviorally specific and non-specific vicarious reinforcement.

However, the conclusion that non-specific vicarious reinforcement was more effective than specific vicarious reinforcement should be considered especially tentative since it is based upon data from only one of the two experimental classrooms, classroom B, the "on-task" behavior of classroom A having decreased during both treatment phases. Lacking the counterbalancing control for treatment order effects which would have been afforded by classroom A data, preceding specific vicarious reinforcement with non-specific vicarious reinforcement as was done in classroom B may have weakened the effect of specific vicarious reinforcement upon student "on-task" behavior. Also, without the data of classroom A it cannot be conclusively stated that the effects obtained in classroom B were not the result of the interaction of the treatment variables with some unidentified student or teacher variable particular to that classroom, i.e., without classroom A data to replicate the data trends of classroom B, the results of classroom B cannot be generalized from that specific classroom population.

A final problem delimited the conclusions of this study. Comparison behaviors were low rate behaviors. In the multiple baseline design used in the present study the purpose of comparison behaviors was to act as a type of control procedure. That is, the comparison behaviors were to be sensitive to the effects of variables other than the treatment variables which might be introduced at the same time as the treatment variable and which might be responsible for changes in student behavior. However, due to their low rate the comparison behaviors had little likelihood of being affected by any environmental stimulus change and were, therefore, insensitive to potentially confounding variables. Consequently, the possibility could not be excluded that variables other than the modeling-vicarious reinforcement treatments were responsible for changes in student "on-task" behavior. To avoid repetition of this problem, future research employing the multiple baseline design should set a minimum acceptable level for baseline target and comparison behaviors prior to beginning any recording. Should the rate of any behavior not meet this minimal level then other comparison or target behaviors would be chosen to replace the low rate behavior.

Table 1

Inter-recorder Reliability Values for Classroom A

Recording Phase	Behavior						
	On Task	Teacher Response	Hand Raising	Teacher Response	Blurting Out	Teacher Response	Teacher non-verbal Response
Baseline	.635[a] df=46	100%[b]	97.9%	100%	100%	100%	No data
Treatment 1	.554 df=46	100%	72.9%	100%	100%	100%	.617 df=78
Treatment 2	.554 df=46	100%	100%	100%	97.9%	100%	.595 df=78
Follow-up	.244 df=30	100%	.29 df=30	100%	100%	100%	No data

[a]Reliability computed using the Pearson correlation coefficient.

[b]Reliability computed using the percent of agreement formula.

Table 2

Inter-recorder Reliability Values for Classroom B

Recording Phase	Behavior						
	On Task	Teacher Response	Hand Raising	Teacher Response	Blurting Out	Teacher Response	Teacher non-verbal Response
Baseline	.812[a] df=46	100%[b]	100%	100%	100%	100%	.25 df=78
Treatment 1	.835 df=46	100%	100%	100%	100%	100%	.698 df=52
Treatment 2	.32 df=46	100%	91.6%	100%	100%	100%	.40 df=78
Follow-up	.68 df=46	100%	97.9%	100%	100%	100%	No data

[a]Reliability computed using Pearson correlation coefficient.

[b]Reliability computed using the percent of agreement formula.

Table 3

Inter-recorder Reliability Values for Classroom C

Recording Phase	Behavior						
	On Task	Teacher Response	Hand Raising	Teacher Response	Blurting Out	Teacher Response	Teacher non-verbal Response
Baseline	.301[a] df=38	100%[b]	.843 df=38	100%	95%	100%	1.00
Treatment 1	.661 df=46	100%	.90 df=46	100%	.377 df=46	100%	1.00 df=78
Treatment 2	.683 df=46	100%	.857 df=46	100%	100%	100%	.288 df=78
Follow-up	.462 df=46	100%	97.9%	100%	95.8%	100%	No data

[a]Reliability computed using the Pearson correlation coefficient.

[b]Reliability computed using the percent agreement formula.

Table 4

On-task Behavior Instability Estimates

Recording Phase	Classroom		
	A	B	C
Baseline			
d- $\bar{x}_1 - \bar{x}_2$	2.74	1.05	0.91
20% $\bar{X}_G$	14.70	9.73	11.50
N[d]	4	4	4
Treatment 1			
d- $\bar{x}_1 - \bar{x}_2$	13.70	7.02	2.25
20% $\bar{X}_G$	6.98	12.21	7.88
N	5	5	3
Treatment 2			
d- $\bar{x}_1 - \bar{x}_2$	1.18	17.04	17.20
20% $\bar{X}_G$	8.93	10.58	11.11
N	4	4	4

[d]Number of observations upon which the instability estimate was based.

Table 5

Number of On-task Behavior Increases and Decreases as a Function of Model Sex and Race

Classroom A	Model			
	white	black	male	female
Number of Increases	4	0	2	2
Number of Decreases	0	4	2	2
Classroom B				
Number of Increases	2	1	2	1
Number of Decreases	2	3	2	3

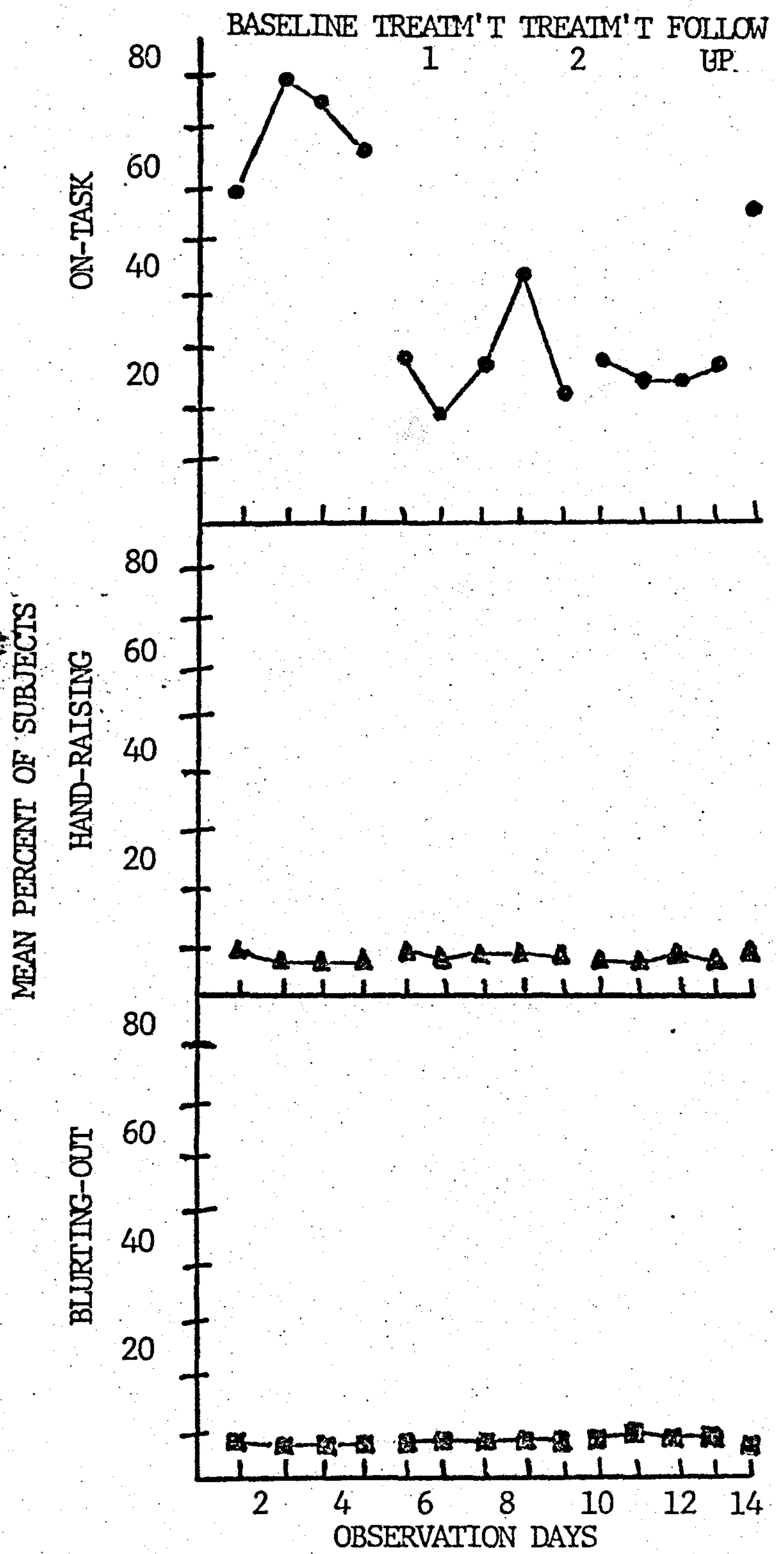

Fig. 1. Mean percent of classroom A subjects on-task, blurting-out and hand-raising across baseline and treatment phases.

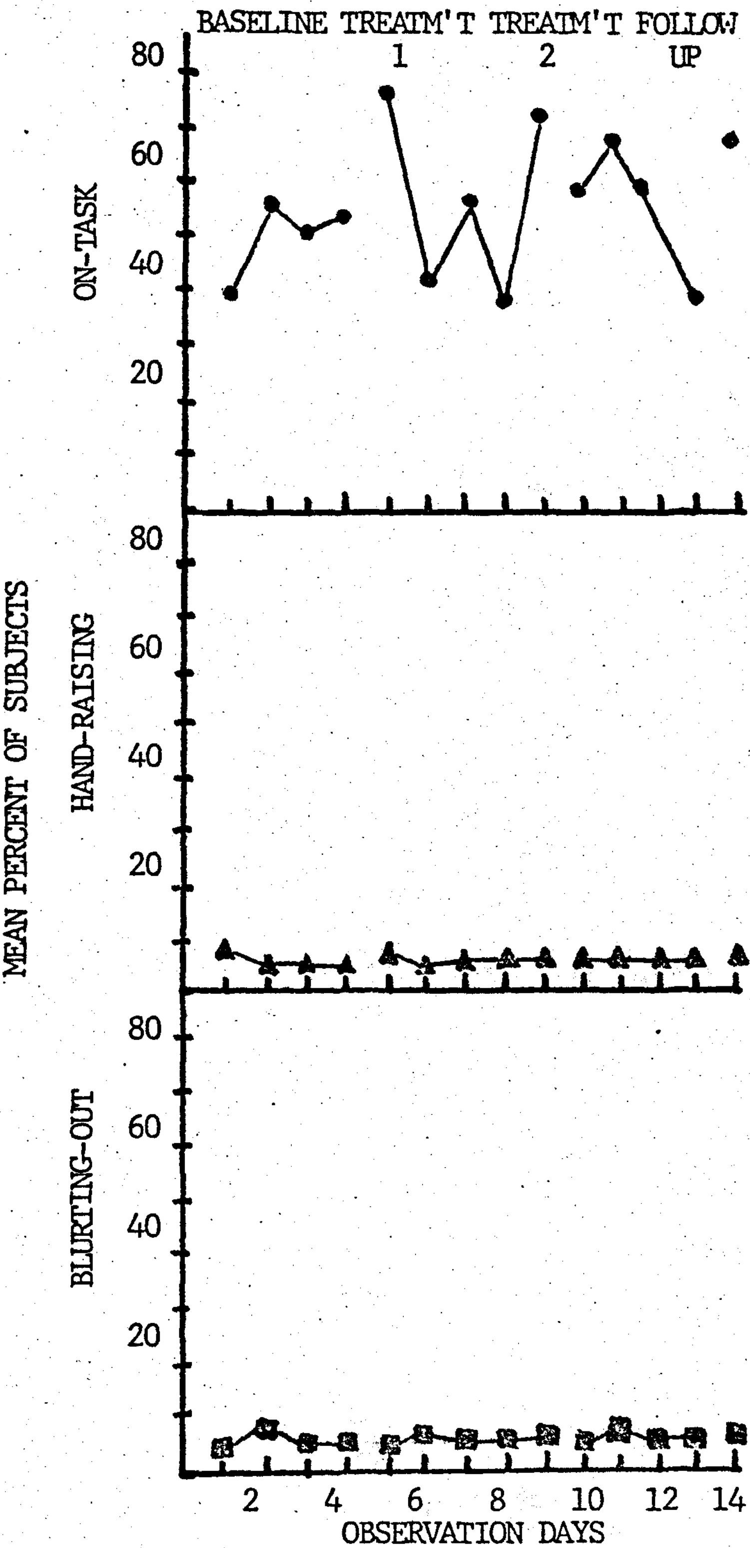

Fig. 2. Mean percent of classroom B subjects on-task, blurting-out and hand-raising across baseline and treatment phases.

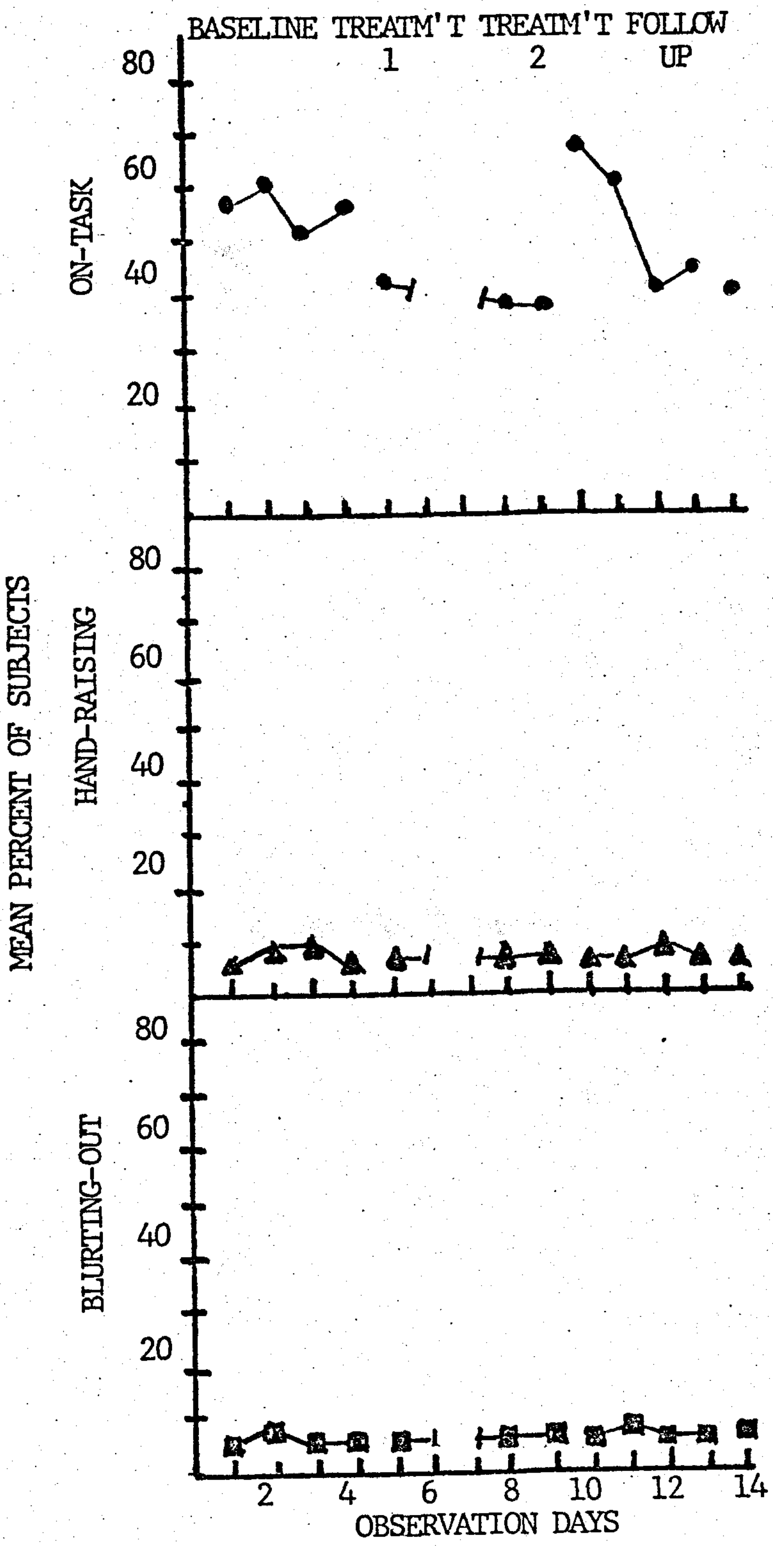

Fig. 3. Mean percent of classroom C subjects on-task, blurting-out and hand-raising across baseline and treatment phases.

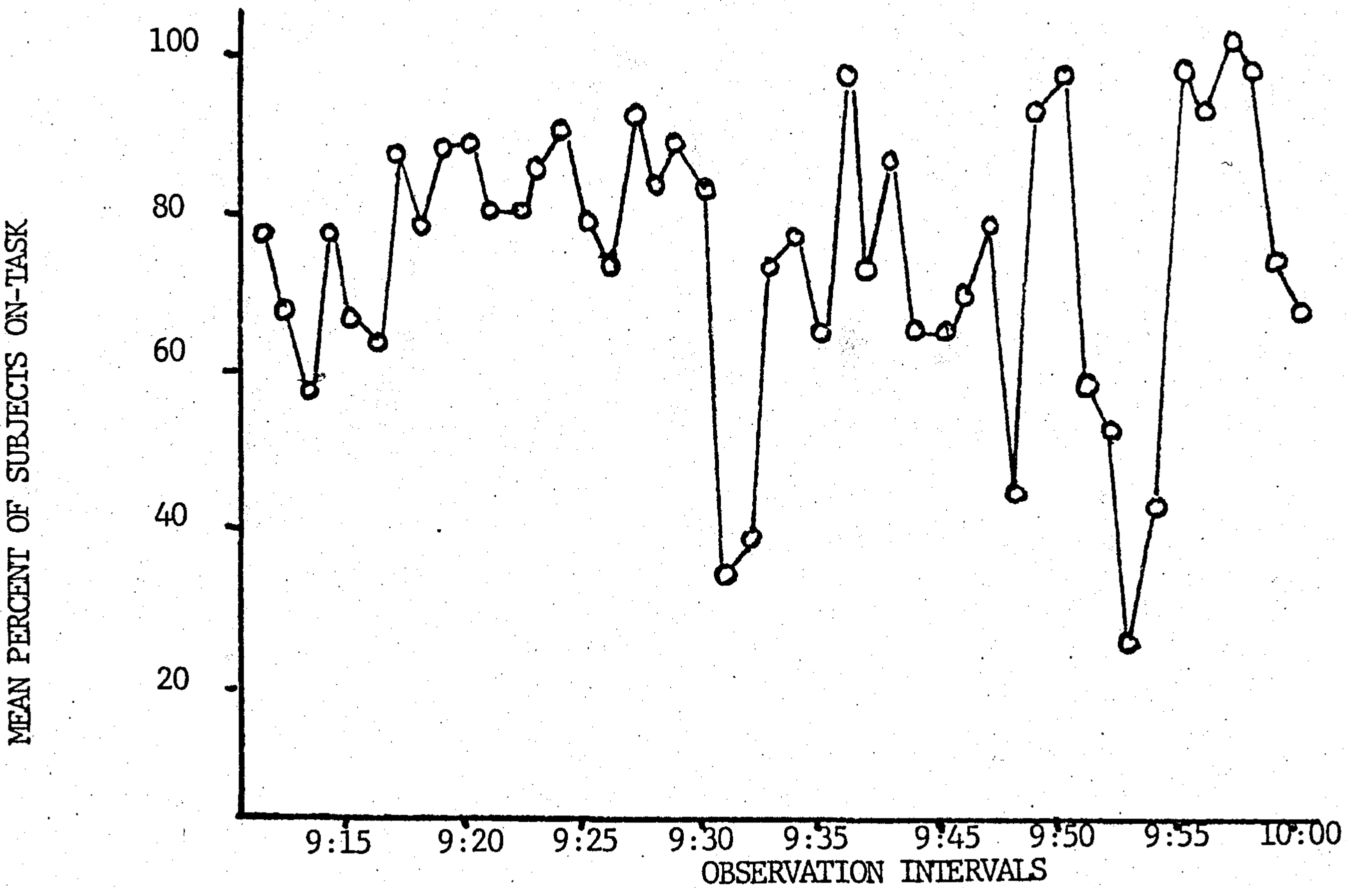

Fig. 4. Mean percent of classroom A subjects on-task at one minute intervals across all baseline observation intervals.

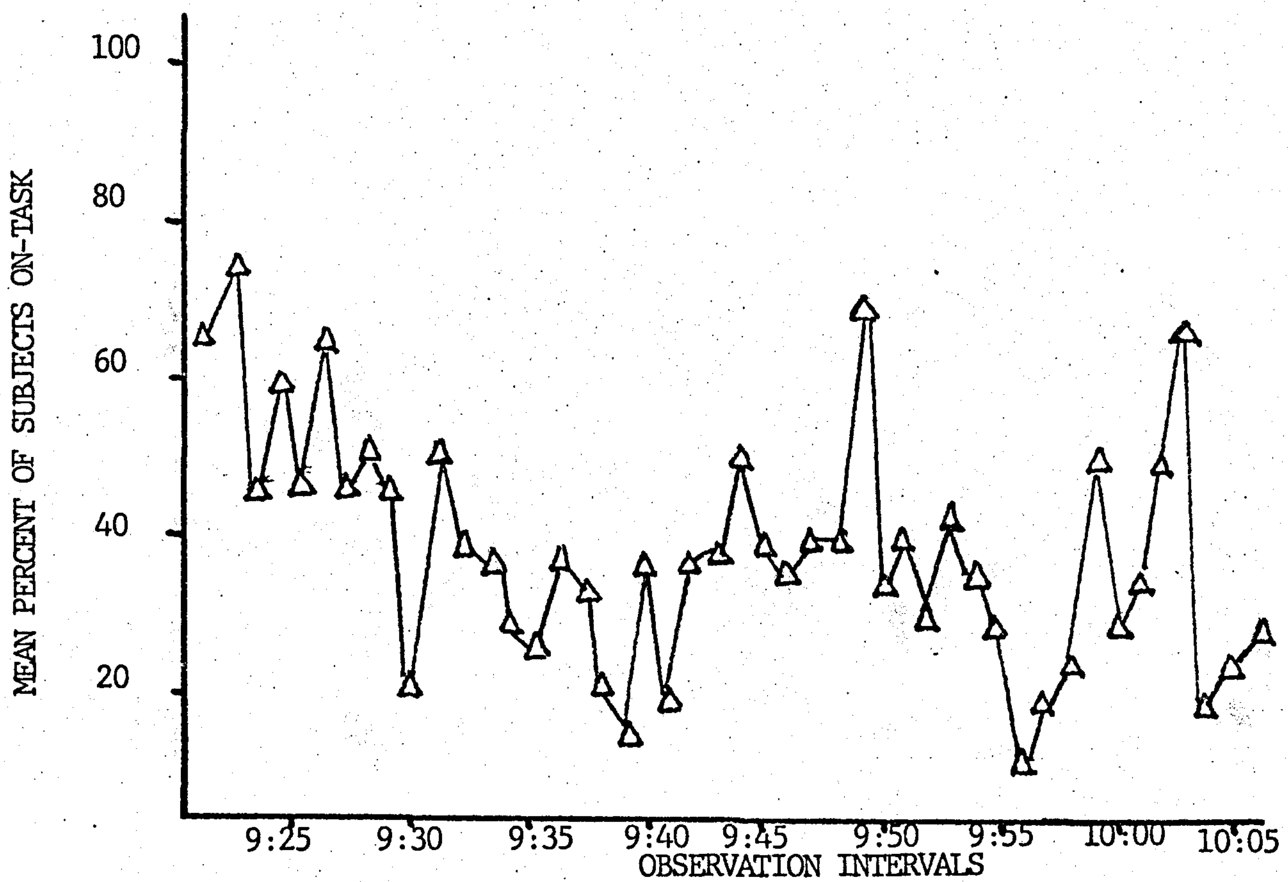

Fig. 5. Mean percent of classroom A subjects on-task at one minute intervals across all treatment phase 1 observation intervals.

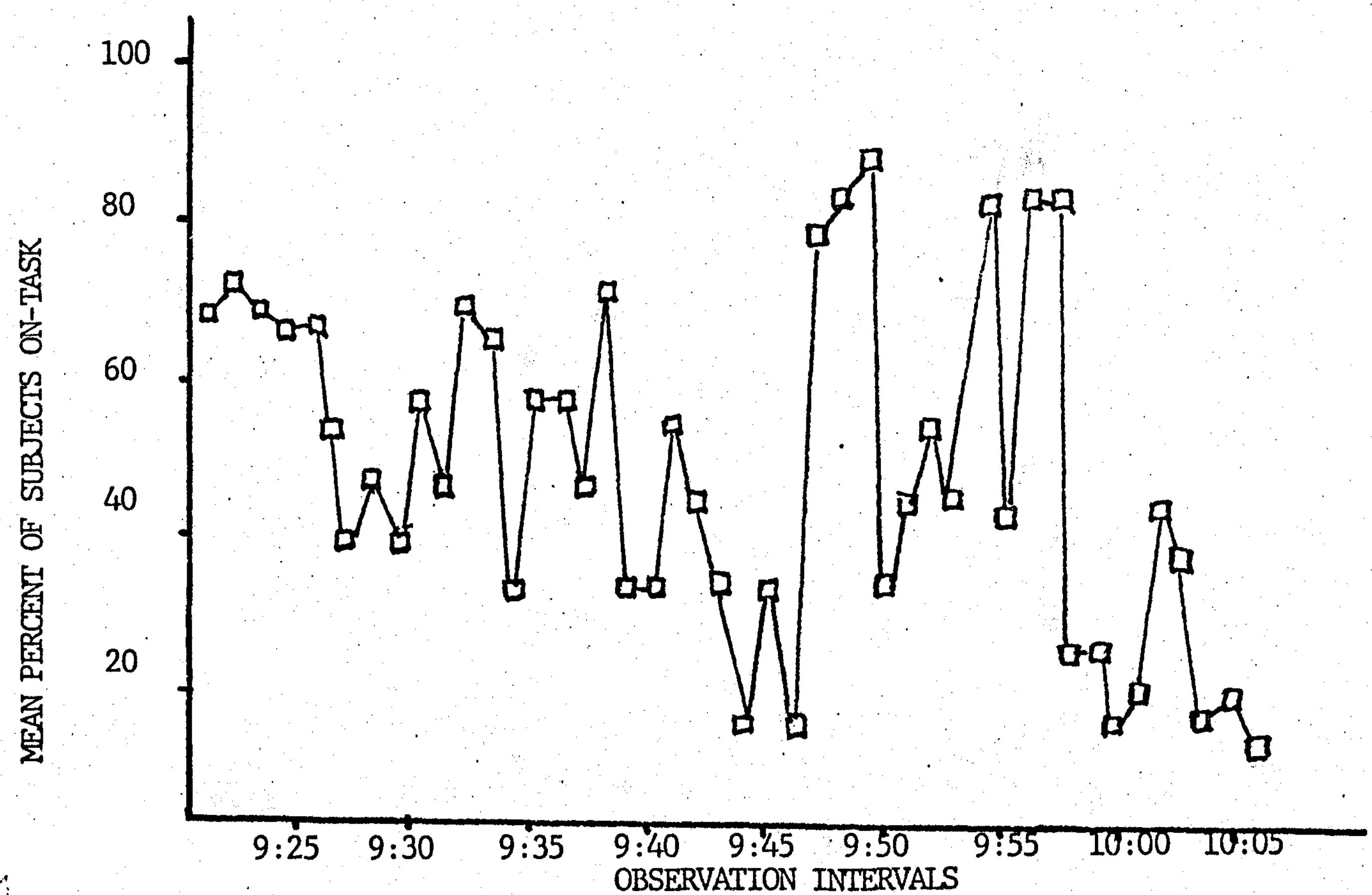

Fig. 6. Mean percent of classroom A subjects on-task at one minute intervals across all treatment phase 2 observation intervals.

Appendix

a			b						c
			ON	T	HR	T	BO	T	
II	15								
	30								
	45								
	1 MIN								
III	15								
	30								
	45								
	2 MIN								
IV	15								
	30								
	45								
	3 MIN								
I	15								
	30								
	45								
	4 MIN								
I	15								
	30								
	45								
	5 MIN								
IV	15								
	30								
	45								
	6 MIN								
II	15								
	30								
	45								
	7 MIN								
III	15								
	30								
	45								
	8 MIN								

[a] Section of the classroom observed during the following one minute interval.

[b] Teacher response associated with preceeding student behavior.

[c] Number of students in the section of the classroom being observed.

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Vita

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