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MODIFICATION OF STUDENT-TEACHER BEHAVIOR
AND ITS EFFECTS UPON PUPIL BEHAVIOR

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

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The Ohio State University

1973

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CHAPTER I

INTRODUCTION

Today's society is rapidly fluctuating and changing. Increasingly, institutions are held accountable for our changing society. Accountability within education illustrates this point.

Within education, behavior analysis has stressed accountability. Applied behavioral analysis has stemmed from the laboratory work of B. F. Skinner and has seen success in a variety of environments ranging from the teaching of foreign languages (Popham, 1969; Garcia, 1970) to helping delinquent youths (Wotkiewicz and Minor, 1969). These demonstrations show behavior change can be controlled and evaluated.

The educational setting has been reluctant, however, to fully accept such behavioral technology. Behavioral techniques have their critics. MacMillan and Forness (1970) disagree with learning explanations offered by behaviorists. They say these explanations are oversimplified and do not aid the teacher in selecting educational goals. Brophy (1971) dislikes the emphasis placed upon extrinsic motivation. Hartman (1971) has made a plea for more sophisticated research and validation in behavior modification studies. Other critics say the technique is often misused and that the alluded to attribute of individual attention cannot be done in the classroom.

Arguments such as these should generate valid research in the area of behavioral techniques. There is no reason why such techniques should not be tested to their fullest. This testing is necessary for
educating the public, recognizing and understanding possible limitations, and making any needed adjustments and modifications.

One specific area of testing must be in the area of teacher training. In past years, much has been said of the inadequacies of teacher training programs. The failure of educational programs to attain desirable outcomes has also been widely discussed (Clark, 1969; Goodman, 1964; Rafferty, 1963). Laymen and professional educators are attempting to determine where the responsibility lies when the student fails to learn. It has become apparent that the responsibility does not fall entirely upon the student. More and more responsibility is being focused upon the teacher and the school environment. As a result, it is becoming necessary to look for techniques that will eliminate such educational problems and facilitate more desirable results.

The average teacher and student-teacher are eager to put their skills to work and develop and maintain effective teaching methods. The student-teacher usually has some idea as to what methods should be used. However, once in the classroom it may be difficult to determine if his actions are appropriate, and as Krumboltz (1971) has said, teachers being trained need another source of high level feedback besides their students in order to develop good teaching behaviors.

Teachers returning to school for further study often express dissatisfaction with how limited their training and teacher preparation has been. They return to the graduate school setting in hope of finding ways of improving their teaching. The majority of those returning teachers fail to hit upon any methods they can really utilize. Behavioral analysis is one technique that can aid these teachers in becoming more effective in helping their students learn.
Behavioral analysis using modeling and verbal feedback are two
techniques being used more widely in teacher training programs (Silverman
and Kimmel, 1972; Adair and Kyle, 1969; Ward, 1970; Koran, 1970; and
Perlberg, 1968). These two types of information will allow the teacher
training programs to focus on behaviors that the beginning teacher will
need. There is, however, a definite need to substantiate the effects of
these two techniques in different educational settings.

Another specific area for validation is to determine if changing
student teacher behavior has some measurable effect on pupil behavior.
In addition, the effect of different types of modification interventions
upon teacher behavior with the resultant effect upon pupil behavior also
needs exploration. It is within this framework that a study is proposed
for the effect of modeling and verbal feedback on the frequency of student
teacher behaviors and its resultant effect on pupil behavior.

STATEMENT OF THE PROBLEM

1. What is the effect of modeling intervention and feedback on
student teacher behavior?

2. Does a change in student teacher behavior produce a change
in pupil behavior?

ANALYSIS

It was the purpose of this study to investigate the extent to
which the modification of student teacher behavior was effective in main-
taining or changing pupil behavior. To accomplish this purpose, this
study employed a multiple baseline design (Hall, 1971). This design was
used to determine the effect of modeling intervention and feedback on
student teacher behavior, and whether a change in student teacher behavior produces change in pupil behavior.

LIMITATIONS OF THE STUDY

The study was limited by the following factors:

1. The independent variables of modeling intervention, directions, target behaviors, and verbal feedback were employed;
2. An attempt was made to alter the behavior of two student teachers at The Ohio State University;
3. The target behaviors were observable and measurable with an inter-observer agreement of 80 percent or greater concerning the occurrence of selected behaviors.

HYPOTHESES

1. If there are inappropriate levels of student teacher behavior, there will be changes in the desired directions after intervention.
2. If the levels of inappropriate pupil behavior are below 85 percent, there will be an increase to above 85 percent in appropriate pupil behavior as student teacher behavior is modified.
3. If the level of appropriate pupil behavior is above 85 percent, it will be maintained as student teacher behavior is modified.

DEFINITIONS

For the purposes of this study, the following terms were defined:

Appropriate Behavior: Any pupil behavior that is considered to be contributing to the educational environment.
Ascending Baseline: The level of behavior that is increasing before intervention is made.

Baseline: The level at which behavior is occurring before attempts are made to modify it (Hall, 1971, p. 2).

Behavior: An observable response of the human organism.

Behavior Modification: An applied technique of the principles of operant psychology.

Descending Baseline: The level of behavior that is decreasing before intervention is made.

Event Recording: Making a tally of discrete events of a certain class, a frequency of events as they occur (Hall, 1971, p. 2).

Feedback: A broad term used to describe the information which results from the operator's own activity (Arnett, 1969).

Inappropriate Behavior: Any pupil behavior that is considered to be detracting from the educational environment.

Intervention: The act of exposing the subject to a variable in an attempt to modify his behavior.

Knowledge of Results: The process of external feedback, feedback coming from outside the operator (Holding, 1965).

Modeling Intervention: The act of providing another individual as a model in an attempt to modify a subject's behavior.

Multiple Baseline: Two or more graphs showing levels of the same behavior in two or more individuals or two or more graphs showing different levels of behavior in the same individual.

Operant Behavior: Observable actions that are developed and maintained by the environmental consequences associated with them.

Plachecck Recording: Making a tally, at a specified time, of the
number of a group of people engaging in previously determined appropriate behaviors and divided by the total number at that group (Hall, 1971, p. 2).

Premack Principle: This states that if one activity occurs more frequently than other, it will be an effective reinforcer for that other activity (Whaley and Malott, 1971).

Reliability: The percent of agreement of independent observers on what they have observed in the same subject during the same observation session.

Response Latency: The interval of time from the onset of the organizational directions from the teacher until the initiation of the appropriate responses by the pupils.

Target Behavior: The behavior toward which interventions are directed.

Time-out: A procedure which interrupts the potential for reinforcement for a period of time (Rushall and Siedentop, 1972).

BASIC ASSUMPTIONS

The following are assumed to be true:

1. High inter-observer reliability increases the probability that the subject's behavior was altered and not the observer's;

2. After modeling and feedback intervention on different behaviors of the same subject and different subjects, any changes that occur after intervention are a result of that intervention and reduces the probability that change was caused by chance.
CHAPTER II

REVIEW OF LITERATURE

The systematic application of operant techniques to affect behavior changes in educational settings has been well researched and documented. Researchers have investigated and modified disruptive and harmful behaviors, the time engaged in study behavior, and such skills as writing and attending to a task. However, there is a relative lack of the systematic application of behavioral principles to the area of teacher training. Despite the paucity of information related to this area, there are other areas of relevant research which will be useful in the discussion of this particular study. Three categories of research will be discussed: (1) research related to the importance of feedback; (2) research related to changing student teacher behavior; and (3) studies related to modifying student teacher behavior. A fourth category, the resultant effect of the modification of student-teacher behavior upon pupil behavior has generated very little formal research. It is due to the lack of information in this category that this study is undertaken.

Feedback in Learning

Many learning theorists feel that the rewards used in animal learning may have important implications for human learning (Holding, 1965, p. 20). This idea originated as a result of analyzing sequences of events used in the process of successive approximations. Successive approximation refers to the process of shaping a terminal response not already present in an organism's behavior (Smith and Moore, 1966, p. 98).
Shaping consists of identifying a desired target behavior and then reinforcing the behavior in an organism that most closely approximates the target behavior. Upon each occasion, the subject is required to exhibit a closer approximation to the target behavior in order to obtain a reinforcement. By this process, the individual's initial behavior has been shaped into a terminal behavior.

Within the last few years, feedback has been used for modifying behavior. However, many studies have merely confirmed the complexity of the different functions that feedback can have. Difficulty has been experienced in attempts to single out the difference between the reinforcing and informative aspects of knowledge of results. There is no conclusive proof that it functions as both. Annett (1969) shows that since there is no evidence of a drive reduction mechanism operating, knowledge of results is mostly informative. Skinner (1969) confirms this as he suggests guarding against the use of feedback and reinforcement interchangeably.

A study which resulted in an opposite conclusion done by Salzbory and his associates (1971), found that even though contingents access to play failed to improve letter writing accuracy, grading and feedback paired with contingent access to play did. This suggests that if reinforcement is to function properly, it must also give some information. This finding also infers that it might be the informative aspect of feedback that makes it reinforcing. Smith (1967) arrived at a similar finding for skill acquisition. He concluded that for skill acquisition, the important aspect is feedback information, not merely reinforcement or the temporal contiguity of events.
The further complexity of feedback function is reported by Zahank (1970). He developed an instrument that contained statements of classroom dialogue. Each category was made up of teacher verbal feedback, teacher solicitation and pupil response. The eighth grade pupils were asked to identify with the script and then answer questions concerning the effect of the feedback. The students felt that the feedback considered most stimulating and informing contained simple praise confirmation.

Panyon, Boozer and Morris (1970) demonstrated the effect of feedback upon performance as they increased the work output of non-professional personnel in a state mental institution for retarded children.

Fuller and Baker (1970) made an interesting observation regarding the effectiveness of feedback from a study they conducted using videotape feedback information for high school teachers in a middle class area. They found significant improvements in teacher behavior yet felt that feedback must be accompanied by shaping or some kind of focusing upon a target behavior or effective behavioral change will not occur.

Summary

Despite the complexity of the relationship between the reinforcing and informative components of feedback, it is still valid for use as an independent variable to change teacher behavior. It does work whether it is rewarding or informing, and may work best if it is accompanied by focusing upon a desired target behavior. As Annett (1969) has said, it might even be considered that motivation is feedback in action.

Changing Teacher Behavior

Several independent variables have been tested to determine the extent to which they affect teaching behavior. Studies have evaluated
these variables independently and in combination. Some of these variables have been utilized in teacher service programs. Examples of the different types of feedback are: microteaching techniques; verbal; videotape; and modeling intervention analysis. The majority of the teaching behaviors selected for studies have been of the verbal nature. The sources of feedback have come from various sources such as supervisors, fellow teachers, students, and self-analysis.

Jones (1969) tried to determine whether the presence of systematic feedback of first year teachers would produce verbal behavior patterns different than those of first year teachers without feedback. Results indicated that teachers with feedback interacted more with their students.

Thomas (1969) researched the feedback from students to teachers and his findings indicated that students had significantly different conceptions of what an "ideal" teacher should be. He felt that the justification of using feedback from students is questionable. Krumboltz (1971) also felt that teachers being trained need another source of high level feedback other than their pupils if they are to develop good teaching behaviors.

Graubard, Rosenberg and Miller (1971) conducted an interesting experiment using students for the modification of teacher behavior. One particular study used children ranging from 12 to 15 years of age who were taught to apply reinforcement techniques to teaching behaviors. Such techniques as asking for extra help, making eye contact with the teacher and making positive statements such as "It really makes me feel good when you help me," and "I really feel like working harder when you take the time to help me," and the "ah hah" reaction were used as positive reinforcement contingent upon teacher performance. Negative
reinforcement was also employed such as breaking eye contact and ignoring the teacher. The results indicated that the pupils could modify behavior. Even though most of the behaviors learned by the teachers were extinguished after the pupil reinforcement was withdrawn, the teachers did retain a less punitive manner. This is a classic example of what Skinner (1953) has labeled "counter-control."

A second study by Graubard et al. (1971) demonstrated the ability of a supervisor to change a teacher's tolerance for noise. The observers took baseline recordings on noise level in decibels. Then each teacher was praised generally for competence and specifically for tolerance of noise and freedom of expression allowed in their classrooms. The teachers were then informed that their classrooms were to be used as a model to provide other teachers the opportunity to see freedom and self-expression in a good teacher's class. Decibel recordings were later taken and results indicate that noise level tolerance increased, along with freedom of the pupils in the class.

Gage (1960) further demonstrated the effect that pupils have on their teachers. He provided sixth grade teachers with information from their student's ratings of what an ideal teacher should be. The teacher's behaviors began to change in the direction of these pupils' ratings.

Pollack (1971) conducted a study concerning the feedback of supervisor's consultation and its effect on teacher behavior. She wanted to see if behavior modification techniques could encourage teachers to spend a greater proportion of their time in teaching. She found an increase in appropriate teacher behavior as a result of the modification techniques but the teachers did not increase the amount of time spent in direct teaching activities. The teachers, however, felt they were spending more
time teaching. Tuckman and Oliver (1968) conducted a study that produced dissimilar findings. They found that teachers receiving feedback from their supervisors changed more in the opposite directions of the desired target behaviors.

Thomas (1971) conducted an investigation concerning self-analysis to junior high school teachers. He used videotapes to train teachers to count and graph specific categories of behavior. His results suggested that the process of defining a category of teacher behavior and requiring the teacher to analyze videotapes of their teaching with respect to the defined behavior, may be effective in generating teacher behavior changes. Adair and Kyle (1969) found videotape feedback evaluation procedures more effective than standard observation techniques in reducing rhetorical questions from elementary school teachers and increasing their percentage of probing questions. Ward (1970) concluded that differences in effectiveness did exist with the use of videotapes for analyzing elementary school teacher's behaviors. The variable involved was the amount of time in which the subjects utilized the evaluation procedures. Saudergas (1972) found that having teachers count, graph, and attempt to meet two different criterion rates of academic approvals effectively increased and decreased teacher rates of these approvals. This study utilized two different types of feedback, videotape and observation sessions from a supervisor. He indicated that there was little or no difference between behavior exhibited while videotaping and observing.

Summary

Feedback in several different forms has been shown to effectively change teacher behavior. The majority of feedback studies with teachers
has been of the verbal type using videotape and supervisor's consultations. It appears that the variables of the amount of time needed to evaluate feedback and the source of feedback are very important.

Changing Student-Teacher Behavior

Attempts at modifying student-teacher behavior have been employed in a variety of techniques. Some popular examples in the literature are modeling and microteaching.

Microteaching, minilessons, laboratory teaching and precision teaching are similar techniques requiring a teacher to learn a specific set of teaching skills and then apply these skills in a five or ten minute lesson with a group of four or five pupils. The lesson is videotaped and immediately after the lesson the teacher is given feedback. They can then replan and reteach the lesson.

Microteaching was studied by Borg (1969) and his results indicated that subjects that did not receive videotape feedback and did not practice in the microteaching format were not significantly different than subjects who did. Davis (1969) has shown that microteaching can change teaching behavior. Davis utilized a teaching laboratory that was very similar to the microteaching model. Brashear (1970) found, however, that behavior changes occurring during microteaching did not persist with time. Perlberg (1968) used microteaching techniques and portable videotape recorders to improve instruction in vocational-technical programs for intern teachers. He found very effective results for the intern-teachers but felt that to ensure effectiveness, a program should have reliable trained personnel and try to obtain cooperation on the part of the supervisor, cooperating teacher and the school principal.
Several people have studied the effects of modeling (Koran, 1970; Orme and Oliver, 1966; Rutherford, 1971; and Hill and Medley, 1968). Orme and Oliver (1966) studied modeling and feedback on the acquisition of a complex teaching strategy. Both verbal and pictorial feedback were considered. The conditions were self-feedback, prompting and confirmation. Covariance analysis revealed that pictorial modeling leads to greater gains. A contradicting piece of evidence from this same study revealed that modeling coupled with feedback produced obscure differences. Koran (1970) found that modeling is just as effective for teaching inquiring behavior as it is a technique for teaching problem solving. Lapan (1971) found that demonstration varies in effectiveness depending upon the criteria for success. Viewers are inclined to adopt parts rather than the entire demonstration activity.

Rutherford (1971) found videotape feedback to be ineffective yet Acheson (1964) reported that feedback in the form of television recordings improved teacher performance. Roush (1969) conducted a statistical analysis of videotape recordings as a feedback device for training intern teachers and found the following results: (1) the videotape recordings did not produce any significant changes as compared to no feedback; and (2) the time interval between sessions of viewing the videotapes made no difference in teaching behaviors. Such different findings suggest that feedback must meet a standard regardless of its source.

Rule (1973) compared three different types of feedback on teacher verbal praise, on-task contact and off-task contact. The categories of feedback were: (1) instructor's and experimenter's feedback; (2) videotape scoring of one's own behavior; and (3) direct intervention by the experimenter when the teacher fell below a certain criterion. She
found that direct intervention was the most effective in decreasing the rate of undesirable behaviors and for increasing the rates of desirable behaviors. Kiser (1969) compared videotape, audiotape, and regular feedback procedures on student teachers and found the greatest change with the group receiving videotape feedback. He felt that videotape feedback or a combination of videotape and audiotape together could be very effective in developing good teaching behaviors and that student-teacher supervisors should become trained in these feedback procedures.

Hughley (1973) found that the use of directed information feedback with cues for application of teaching strategies reduced the negative aspects of student-teacher behavior and increased their frequencies of positive behavior. Wetzel (1969) used behavior modification techniques for training teacher aids of young poverty area children. His modifications were aimed at increasing the frequency of positive verbal reinforcement for pupil exemplary conduct rather than negative verbal reinforcement for pupil disruptive behavior. After the modification intervention, there was a definite increase in the frequency of positive reinforcing verbal behaviors of the teacher aids.

Silverman and Kimmel (1972) showed the importance of immediate feedback for teachers-in-training. This study used wireless hearing aids and provided feedback to the training teachers while they were teaching. Results were very effective in changing the verbal behaviors of the intern teachers who has the hearing devices as opposed to those who did not have them. Silverman concluded that this type of feedback procedure was very effective for modifying certain behaviors of teachers in training.
Summary

Feedback has been seen to be very effective in changing student-teacher behaviors, especially in the form of modeling and audio-visual techniques. These approaches appear to be more effective than standard observational techniques that employ only verbal feedback. But, here again, the immediacy of the feedback to the teaching individual appeared to be an important factor.

Changing Pupil Behavior

The majority of research in this area deals with a direct attempt of changing pupil behavior through operant techniques (Hall et al., 1968; Hall et al., 1970; Hall, Cristler and Cronston, 1970; Staats and Butterfield, 1965; Glaser and Sarason, 1970; Ferritor et al., 1971; Nichols, 1970; and Sibley, 1970).

Vance Hall is a leader in the use of operant techniques and has successfully decreased the disruptive behaviors of students (1970), eliminated tardiness (1970), and increased the time students spent attending to academic tasks (1968). Glaser and Sarason (1970) performed a similar study using a token economy in the classroom to increase time spent on academic tasks and decreasing tardiness, delinquency, and truancy. Staats and Butterfield (1965) used a similar approach of reinforcement in teaching a delinquent 14 year old boy how to read.

Sibley (1970) conducted a study showing that a systematic utilization of social-reinforcement can significantly change a child's behavior, even when the target behaviors are more comprehensive than the single operant. Nichols (1970) found similar results when she applied a systematic program of concrete reinforcement and found it practical.
and effective in changing the learning styles and behaviors of previously unmotivated students.

Ferritor et al. (1971) conducted a study that produced some interesting findings. He utilized a reversal design for inner-city third graders with behavioral contingencies, performance contingencies, and a mixture of both with their effects on learning mathematics and certain in-class behaviors. He found that the behavioral contingencies improved attendance and decreased classroom disruptions but did not improve performance. The performance contingencies improved the percentage of correct math problems but attendance declined and classroom disruptions increased. These conclusions emphasized designing specific contingencies for specific target behaviors.

Walker (1972) conducted an interesting study using emotionally disturbed third and fourth grade students. By using an intervention technique of a token reinforcement system, he found a decrease in deviant pupil behavior at school. However, many families examined after this demonstrated more child deviancy at home and parental negativity than before the token intervention began. He concluded that a suppression of behaviors at school resulted in an increase in the same behaviors at home.

Widell et al. (1969) used feedback to teachers from videotapes and supervisors and found no significant difference in student achievement as a result of the change in identified teacher behaviors. On the other hand, Thomson and Cooper (1969) found that the use of hearing aid devices for immediate feedback greatly increased desired teacher and student behaviors.

With respect to defined on-task behavior for pupils, Kosier (1971) evaluated the effects of a behavior modification lecture upon
teachers and found an increase in the teacher's usage of compliments and a decrease in their usage of reprimands. This led to a greater percentage increase in the students engaged in on-task behaviors. Klein (1972) conducted a similar study and found that an increased teacher attention for defined pupil on-task behaviors did produce an increase in the pupils' on-task rate. These pupil increases were maintained when the contingencies were reduced but no additional significant increases occurred. Klein (1972) also found that the pupils' task completion rates did not correspond systematically to changes in experimental conditions.

Summary

The majority of the research dealing with changing pupil behavior has dealt with direct approaches. Operant techniques and the use of audio-visual techniques have been effective in changing pupil behavior directly. There is a relative lack of research dealing with attempts to effect student behavior by modifying teacher behavior first. The majority of research utilizing this approach has shown that a pupil behavior change can occur as a result of modifying teacher behavior first.

Summary of the Literature

A review of the literature revealed that although feedback is a good technique for changing teacher behavior, it is somewhat specific as to source, content, and the particular behaviors to which it is applied. Most of the studies reviewed were primarily concerned with some aspect of verbal behavior. Although these are very important teacher behaviors, physical educators more so than many classroom teachers, have to exhibit
behaviors in addition to the verbal ones. The influence of feedback on these behaviors will be of interest.

It is also evident that the research concerned with feedback on teaching behaviors in physical education is not formally reported in the literature. Besides Rushall (1969) and his work evaluating the effect of various reinforcers used as motivators for swimming, studies evaluating directive feedback to students (Hughley, 1973), Daughtery's (1971) adoption of interaction analysis, and Schwartz's (1972) behavioral model, research of this type is rare in the physical education literature.
CHAPTER III

PROCEDURE

The hypotheses state: (1) that if there are inappropriate levels of student teacher behavior, there will be changes in the desired direction after modification intervention; (2) that if the level of appropriate pupil behavior is below 85%, there will be an increase above 85% as student teacher behavior is modified; and (3) if the level of appropriate pupil behavior is above 85%, it will be maintained as student teacher behavior is modified. In order to test this, data were collected through the behavioral observation techniques of event recording and placheck. The data were analyzed by means of a multiple baseline design (Baer, Wolf, and Risley, 1968; Hall, 1971; Hall, Christler, Cranston and Tucker, 1970).

SUBJECTS AND SETTING

The subjects were two students of The Ohio State University enrolled in their student teaching field experience in the Columbus public elementary schools. They participated in this study during the third quarter of the 1972-1973 school year. They were male, aged 20 and 21, respectively, and were B+ students majoring in physical education. Both were from rural areas of Ohio and had had only one quarter experience practice teaching. Their prior experience was at the secondary level and this was their first experience with elementary level
children. Neither of the students were familiar with applied behavior analysis and had never utilized these principles when teaching.

Both were assigned to the Maize Road Elementary School in Columbus, Ohio. Maize Road School is a twelve year old, relatively small school of fourteen teachers. It is situated in the northeast area of Columbus, approximately five miles north of the university campus. Approximately 350 students came from the immediate area and attended kindergarten through the sixth grades. Approximately another fifty of these students were driven to the school from further areas. These students comprised the majority of the neurologically-handicapped students that were incorporated into the regular classes. All students participated in physical education classes for 30 minutes each week. The parents of these students would be most accurately described as middle class socio-economically. Students leaving this school went into Clinton Junior High and on to Brookhaven High School.

The gymnasium floor at Maize Road is about three-quarters the size of a regulation basketball court. The wooden floor is marked for basketball, shuffleboard, and baseball. The room has three solid walls with the south side being a stage area. The east and west walls contain basketball goals with tumbling mats hanging on the walls beneath these goals. This same room is used for a cafeteria and PTA meetings.

The student-teachers had the following equipment available: basketballs, softball bats, gloves and balls, soccer balls, plastic pins and kickballs, volleyball nets and balls, and beanbags. Depending upon their ages, sizes and abilities, the students played softball, kickball, volleyball, different tag games and basic games of throwing, hitting and catching.
OBSERVATIONS AND BEHAVIORS

The pupil behaviors were recorded by a technique referred to as placecheck (Hall, 1971). This consists of making a tally, at a specified time, of the number of students in the class engaged in a previously determined appropriate behavior. This number is then divided by the total number in that group. By multiplying the result by 100, the observer finds the percentage of those engaged in the appropriate behavior at that particular time. Pupil behavior was dichotomized into appropriate and inappropriate categories. Appropriate behavior that was considered contributing to the educational environment. Inappropriate behavior was any behavior that was considered detracting from the educational environment. Within each of these dichotomies, behavior was further classified into the two sub-categories of: (1) pupil-teacher interaction; and (2) pupil-pupil interaction. Examples of these behaviors are given in Table 1.

TABLE 1
EXAMPLES OF APPROPRIATE AND INAPPROPRIATE PUPIL BEHAVIOR

<table>
<thead>
<tr>
<th>Appropriate</th>
<th>Inappropriate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Looking at the teacher</td>
<td>Trying to talk to the teacher when the teacher is demonstrating, explaining, or talking to another student</td>
</tr>
<tr>
<td>without talking when the teacher is talking or demonstrating</td>
<td></td>
</tr>
<tr>
<td>Helping a classmate arrange materials after requesting permission</td>
<td>Hitting or pushing a classmate</td>
</tr>
</tbody>
</table>
A complete list of appropriate and inappropriate pupil behaviors is given in the appendix (See Appendix A). A second category of pupil behavior was that of response latency. This category is a time measure of the organizational cues the teacher emits to organize the class into an activity or change the class from one activity to another. This is measured as the interval of time from the onset of the teacher's organizational cues until the class initiates the appropriate response. An example would be the time taken from when the teacher begins to explain and organize a game to when the students begin the appropriate responses for that game.

Teaching behaviors are those behaviors emitted by the teachers in the process of instructing. Examples are "That was a good catch!" or "Stay in line and keep quiet!" Behaviors were recorded during a thirty minute period of regular physical education. The observer located himself on the gymnasium stage area that allowed observation of both the teacher and the students. This position was as inconspicuous as possible. A small, cassette tape recorder was used to cue the observer to record specific behaviors. This tape recorder could be plugged in or carried and operated on batteries. A small set of earplugs allowed only the observers to hear the recording directions. This allowed the classes to proceed uninterrupted. The observer made his recordings using a recording sheet (See Appendix B).

The format of this observation technique was as follows (see Figure 1):

<table>
<thead>
<tr>
<th>Event recording for teacher</th>
<th>Pupil placement</th>
<th>Rest interval</th>
<th>Event recording for teacher</th>
<th>Pupil placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 minute</td>
<td>10 seconds</td>
<td>50 seconds</td>
<td>1 minute</td>
<td>10 seconds</td>
</tr>
</tbody>
</table>

Fig. 1--Format of Observation
The first minute of observation was used for event recording of teacher behavior. At the end of the first minute, the tape recording directed the observer to stop event recording of the teacher and begin a ten second period used for pupil placecheck. The remainder of the second minute was as the observer wanted, as no recording was taken during this remaining time. This procedure continued for five one-minute periods of event recording and five ten-second periods of placecheck. At the end of the fifth placecheck, the observer was given one minute and fifty seconds to rest and no recording was taken during this period. At the end of the rest interval, the same recording procedure was followed for five more one-minute periods of event recording and five ten-second periods of placecheck. Instructions for the recording technique were given by the tape recorder. Teacher behaviors observed and recorded are defined as follows:

**Managerial**: This includes activities of preparation for engaging in a learning activity. Putting pupils into drill or squad formation or taking roll would be examples.

**Monitoring**: This includes observing the class as a group or directing attention to that subset of the class, or an individual student. No verbal or non-verbal interaction occurs. One tally is scored for each uninterrupted five second period that the teacher engages in this behavior.

**No activity**: Here the teacher fails to exhibit any verbal or non-verbal activity relevant to the classroom activity. He would have no type of interaction with the class. Examples would be looking out the window or getting a drink of water while students perform.

**Positive feedback for any skill attempt**: This is an open demonstration that the teacher is pleased with the behavior or he gives information about the correctness of a behavior by verbal or non-verbal means
when the behavior is one specifically related to learning skills.

**Negative feedback for any skill attempt:** This includes the teacher's negative and non-verbal teacher reactions to a valid skill attempt by a student, including corrective feedback. This does not necessarily imply a punishing or menacing tone. An example would be "No, that is not right."

**Positive reaction to on-task behavior:** This includes all positive and non-verbal teacher reactions to student behaviors, other than skill attempts, considered essential to the teacher for orderly conduct of the class. An example would be praising a student for staying in line or staying in position in a game situation.

**Negative reaction to off-task behavior:** This includes all negative verbal and non-verbal teacher reactions to student behaviors that are defined by the teacher as interfering with the orderly conduct of the class. An example would be telling students to be quiet or stay in line.

**EXPERIMENTAL CONDITIONS**

In an effort to modify the subject's behavior, the experimenter provided a model for the subject by teaching the class while the subject observed during that entire class period from a position on the stage area. The subject returned to teaching at the next appropriate class period. After the subject taught the class, directed information feedback was given by the experimenter as soon after each session as was possible. For example, subjects were informed of appropriate times for giving skill feedback. Most often this direct feedback was immediately given after each session but sometimes there were two or three classes in
succession and feedback was delayed. Intervention was instituted beginning with Subject One. The directed information feedback consisted of instruction, graphic feedback, cueing and reinforcement, and goal setting.

Instructions

1. The experimenter requested the subjects to make an attempt to develop a learning climate of positive reinforcement in all their classes. Subjects were asked to increase rates of reinforcement doing well and to ignore student errors and mistakes.

2. Subjects were told that certain of their behaviors would be recorded but that this should not inhibit their teaching. Subjects were not told exactly what the behavior categories would be but were told that they would be shown at a later time.

3. Subjects were told that after a period of five sessions, they would be informed of the frequencies of their behaviors by categories for each of the previous sessions. Subjects were also told that after the fifth session, they could see their behavior frequencies at any time.

4. Subjects were informed that from time to time the experimenter would teach the class and provide a model for the subject. At this time, the experimenter would be emphasizing an increase in a particular category of behavior or a decrease in another. The subjects would just observe the class from the stage area when this occurred.

5. Subjects were asked to reduce possible situations where misbehaviors could occur. For example, putting students in proper position for a game could eliminate congregating and talking while the game was in progress.

6. Time out as a punishment was suggested. Subjects were reminded
to make their punishment stick. The stage was suggested as a punishment area for time-out.

7. The subjects were encouraged to teach the students how to organize themselves. It was suggested that students know that certain cues meant to organize in a specific manner. For example, color coding of groups aided in game organization. It was suggested that the subjects make their organizational cues as clear and concise as possible so to decrease time spent in organization. This was to teach self-management behaviors to the students and provide more time for activity.

8. Finally, subjects were encouraged to utilize the Premack Principle. This was using a higher frequency activity to strengthen participation in a lower frequency activity. (Rushall and Siedentop, 1972)

Graphic Feedback

This consisted of showing the subjects the frequencies of his behaviors for each category and making comparisons with previous sessions.

Cueing and Reinforcement

Specific examples of the use of good techniques were indicated and subjects were complimented for their efforts. This consisted of such behaviors as organizing students in such a way that would facilitate the start of a game or when changing from one activity to another.

Goal Setting

Goal setting was employed for categories of positive feedback for skill attempts and positive feedback for on-task behaviors. At present, there is no evidence of a specific number of behaviors that good teachers emit. Consequently, the experimenter suggested the subjects emit the maximum number of behaviors that was feasible and practical for any particular session.
Analysis and Design

Baseline Procedure

During baseline, the experimenter made no attempts to alter any of the student teacher's behaviors. No feedback of any of the behaviors related to this study was given to the subjects during this period. The subjects were not allowed to see any of the graphs or receive any verbal feedback from the experimenter.

The behaviors listed were observed and recorded on a tally sheet (Appendix B). A graph was made of the rate of student teacher behavior and the percentage of appropriate pupil behavior for each session. A baseline was considered established when: (1) there was no evidence of an ascending or descending baseline for five sessions; or (2) after five sessions the subject's behavior was moving in the direction opposite the desired results.

Information Feedback

Once the baseline was established, modeling intervention with feedback occurred. The intervention was not contingent upon teacher behavior reaching any criteria. Intervention occurred when a baseline was established. The first step in intervention was to use a direct model. This consisted of the experimenter teaching the class while the student-teacher observed the class for the entire session from the stage area. The modeling intervention stressed the positive aspects of teacher behavior categories and deemphasized the negative and managerial categories of behavior. The verbal information consisted of modifying specific categories of behavior in a specific order (See Figure 2).
The first classification for modification dealt with the concept of response latency. This was concerned with the amount of time that it took for the student teacher to give his directions to when the students began the appropriate response. The target behaviors were: (1) to have the student teacher make managerial cues very clear and concise so pupils would have more time available for activity; and (2) to reduce the number
responses the student teachers emitted as well as the time spent with each managerial response. Subject One taught seven classes before the first intervention and Subject Two taught nine classes.

After given this feedback, Subject One taught six more classes and Subject Two taught six classes before the next intervention was made. The second category of target behaviors was the positive reaction to pupil on-task behavior and negative reaction to off-task behavior. Here the target behavior was to have the student teacher increase his frequency of positive feedback for on-task behavior and decrease his frequency of negative feedback for off-task pupil behavior. After this intervention, Subject One taught five more classes and Subject Two taught six before any more intervention was made.

The third and final category for modification was the positive and negative feedback for skill attempts. The target behavior of this intervention was to increase the frequency of the student teacher's positive feedback for pupil skill attempts and decrease the frequency of negative feedback for pupil skill attempts.

After intervention on the third category of behavior, the student teacher did not receive feedback interventions for the other categories of behavior. Adjustments in the feedback for the specified categories that were necessary came in the form of additional information. In addition, statements were made about the student teacher's skill to reinforce for the appropriate behaviors. Student teachers were shown graphs of the frequencies of their other behaviors and compared these to previous recording sessions. The information feedback was personally administered by the experimenter and was delivered immediately following each thirty minute class period.
ANALYSIS AND DESIGN

The study was conducted in an applied setting. A multiple baseline design (Baer, Wolf, and Risley, 1968; Hall, 1971; Hall, Christler, Cranston and Tucker, 1970) was employed in the data analysis (See Figure 3). This design is among the techniques developed by behavioral scientists in efforts to handle data collected in applied settings. Seven teaching behavior categories in two subjects were observed along with a time measure of organization and a placemark observation for recording group behavior. These behaviors were observed under two conditions. These are seen in Figure 3 as baseline and modeling-information feedback (intervention). Under the first condition, referred to as a baseline, no feedback was given to any of the subjects on any of the behaviors. The baseline was considered established either once there was no trend evident after five sessions, or after five sessions the behaviors were moving in the direction opposite to the desired results. Once the baseline was established, feedback was instituted for each subject in turn (See Figure 2). Subject One received feedback between sessions 7 and 8 while Subject Two continued on the baseline. Subject Two received feedback between sessions 9 and 10. Subsequent and alternate interventions were made once a baseline was considered evident after a preceding intervention.

Interobserver Agreement

Six practice observation sessions for the purpose of pretraining observer skills were made prior to this study. These six sessions also served to determine if target behaviors in question were defined sufficiently to allow for 80% inter-observer reliability. Prior to the practice sessions, each observer was given a set of behavior definitions for both
Fig. 3--Example of a Multiple Baseline
student-teacher and pupil. The observers observed and recorded independently for the behaviors given to them. They were cued for recording responses of the teacher and pupils by means of a pre-programmed tape-recorder. Inter-observer agreement was determined by dividing the number of agreements by the agreements plus disagreements. This result is multiplied by 100 and gives the percent of agreement between two observers. An agreement was scored each time both observers had the same behavior occurring during the same time interval. If practice did not generate an average inter-observer reliability of 30 percent, behaviors were redefined until such an agreement was obtained.

Once the behavior categories were set and the study was underway, additional inter-observer reliability checks were made. Each subject's baseline and feedback conditions received five reliability checks. Reliability of the observations for each subject was analyzed by considering the agreement of independent observers on the total number of events observed, category reliability for each session, and reliability in classifying events for each subject.

The data collected for the student teachers consisted of tallies of events occurring in ten one-minute intervals. Frequencies were plotted for each behavior in each subject. For purposes of analysis the data were converted to rate per minute. Behavior rate per minute during baseline, behavior rate per minute during intervention, amount of rate increase or decrease, and the percent of increase or decrease were calculated for each subject.

Appropriate rates of pupil behavior were calculated in percentages and plotted on graphs. For purposes of analysis, these percentages were calculated into baseline rates, intervention rates, amount of rate
increase or decrease, and the percent of increase or decrease.

APPLIED AND NON-APPLIED RESEARCH

Baer (1968) discusses the differences and similarities between applied and non-applied research and feels they do not differ between that which discovers and that which applies. Both are attempting to find out what controls behaviors. The differences lie in that applied research is likely to look at behaviors and variables that are of interest to society, while non-applied research will look at any behavior or variable that is of interest to the experimenter. Behaviors and variables that occur in the social setting do not usually allow themselves to be manipulated repeatedly as do those that lend themselves to study in the laboratories.

The factors of reliability, causality, significance and generality are of utmost importance in any research study. The behavior scientist takes the same position on these topics. Reliability is established in very much the same way that it is used in parametric analysis. Repeated observations with independent observers allows the establishment of an index of inter-observer agreement as was previously mentioned.

The multiple baseline design is used for the purpose of demonstrating causality. Repeated modification of behaviors of the same class in different people or behaviors of different classes in the same person does show causality. With this design, the same behavior of two different individuals is measured at the same time. For example, intervention with the experimental variable is utilized on the behavior of one subject. Change in the level of behavior is compared with the continuing baseline measure of the second subject. If the level of behavior in Subject two
remains relatively constant and if intervention on subject two produces a similar change to subject one, then it is assumed that the experimental variable was responsible for the change of behavior in both subjects.

When the same experimental variable was utilized on subject two, causality became more evident as the behavior changed in the same direction. Moreover, the solidarity of causality increases as this procedure is repeated.

Significance in behavioral design refers to a comparison between the accomplished behavior change and the level necessary for social usefulness (Risley, 1969). Large changes in a few individuals or even one subject can be significant when this criterion is used. Social usefulness is likely to be determined by those individuals who deal directly with the behavior. Baer (1968) illustrates this point very well when he says:

In evaluating whether a given application has produced enough of a behavioral change to deserve the label (significant) a pertinent question can be, how much did that behavior need to be changed? Obviously, that is not a scientific question, but a practical one. Its answer is likely to be supplied by people who must deal with the behavior.

When a teacher expresses that a particular student has changed enough to be considered contributing to the learning atmosphere of the classroom, he is expressing a significance level for the behavior of that student. In such a case the opinions of the teacher may be more important than those of anyone else or of any statistic.

Generality should not be considered as a part of significance. It is important but behavioral scientists are concerned with more than the ability of an experimental variable to generalize to other situations. In behavioral research, one works first with a few subjects intensely in order to discover procedures which produce significant changes. Then
these procedures are applied to other subjects. In this way, the range of variations of the procedure required to procued significant changes in all subjects can be determined.
CHAPTER IV

ANALYSIS AND DISCUSSION OF THE DATA

The basic data for this study were teacher behavior and pupil behavior. Seven categories of teacher behavior were defined and event recording utilized for this data. Teacher behavior events were recorded during ten one-minute intervals of event recording per teaching session. These recordings were converted to rates per minute. Difference between teaching rates of behavior during baseline and intervention were plotted and further analyzed by considering the behavior profile of each subject, rate increase or decrease, and percentages of increase or decrease by category for each subject.

Pupil behavior was considered in two categories. One category was a time measure of the amount of time it required students to organize themselves into an activity once the teacher emitted organizational cues. These data were analyzed as differences between the time interval during baseline and during intervention. These data were further analyzed by considering rate increase or decrease, and percentages of increase and decrease between the baseline and different intervention periods.

The second category of pupil behavior was appropriate and inappropriate behaviors. Each of these categories was further divided into pupil-pupil interaction and pupil-teacher interaction. Pupil behavior was recorded using a system labelled placheck. Pupil behavior was recorded during a ten-second interval immediately following each one minute of event recording for teacher behavior. These recordings were
converted to percentages of appropriate pupil behavior. Differences between rates of appropriate pupil behavior during baseline and intervention periods were plotted. The data were further analyzed by considering rate increase or decrease between baseline and different intervention periods, and percentages of increase and decrease between the baseline and different intervention periods.

RELIABILITY

Subject Reliability

As a check on the experimenter's tally, an independent observer tallied behaviors during ten one-minute intervals during five observation sessions for each subject. Reliability checks were made during baseline and after each intervention. Reliability was calculated by three different methods. The first method gives the percent of agreement of the total number of events observed per session. The larger total of the independent observers' observations was divided into the smaller total (Hall, 1971). Table 2 shows the percent agreement of the total number of events recorded between experimenter and independent observer for each subject during the five sessions of reliability checks.

TABLE 2

RELIABILITY OF TOTAL NUMBER OF EVENTS OBSERVED FOR EACH SUBJECT

<table>
<thead>
<tr>
<th>Subject</th>
<th>Reliability Checks</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S₁</td>
<td>.94</td>
<td>.92</td>
</tr>
<tr>
<td></td>
<td>.92</td>
<td>.90</td>
</tr>
<tr>
<td></td>
<td>.90</td>
<td>.90</td>
</tr>
<tr>
<td></td>
<td>.92</td>
<td>.91</td>
</tr>
<tr>
<td>S₂</td>
<td>1.00</td>
<td>.85</td>
</tr>
<tr>
<td></td>
<td>.91</td>
<td>.86</td>
</tr>
<tr>
<td></td>
<td>.94</td>
<td>.92</td>
</tr>
<tr>
<td>Mean</td>
<td>.97</td>
<td>.90</td>
</tr>
<tr>
<td></td>
<td>.90</td>
<td>.88</td>
</tr>
<tr>
<td></td>
<td>.88</td>
<td>.93</td>
</tr>
<tr>
<td></td>
<td>.91</td>
<td></td>
</tr>
</tbody>
</table>
Agreement was well over the predetermined eighty percent for each reliability session for each subject. The average agreement for both subjects across all sessions was over 90 percent.

The second method of reliability yields the reliability of classifying events during each session. It was determined by computing the number of agreements and disagreements in each category and inserting the sums across all categories into the following formula (Hall, 1971, p. 18).

\[
\frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} \times 100
\]

Table 3 presents the percent of agreement in classifying events for each subject. Essentially, these figures represent the reliability of the accuracy of the observer in classifying discrete events in the seven category scale. Although the mean reliability in somewhat higher for the previous type of reliability, these mean percent agreements are also well over the predetermined 80 percent. The task of placing the teaching behaviors into the proper category was somewhat more difficult than merely selecting teaching behaviors of any category.

Originally, it was suspected that these two types of reliability would be quite similar. However, this did not prove to be so in all cases. Though reliability was identical for some checks, a comparison of Tables 1 and 2 indicates these two problems are not necessarily related. The difference in mean reliability of the total number of events observed and the mean reliability of classifying events is only one point in subject one and three points in subject two. This is a very small difference yet the differences do come by comparing individual
sessions. There is a six point difference in subject one's first and third session and an eight point difference between his fifth sessions for the two tables. Subject two had a ten point difference between his first session for the two tables. With the smaller reliability being in the classification of events category, it appears more difficult to put the behavior in its correct category than merely selecting teaching behaviors of any category.

**TABLE 3**

RELIABILITY OF CLASSIFYING EVENTS FOR EACH SUBJECT

<table>
<thead>
<tr>
<th>Subject</th>
<th>Reliability Checks</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>$S_1$</td>
<td>.88</td>
<td>.92</td>
</tr>
<tr>
<td>$S_2$</td>
<td>.90</td>
<td>.85</td>
</tr>
<tr>
<td>Mean</td>
<td>.89</td>
<td>.88</td>
</tr>
</tbody>
</table>

The third method of reliability was the percent of agreement between independent observers for categories one through seven. The larger total number of events observed in a given category by one observer was divided into the smaller total number of events tallied for the same category by the second observer. These percentages are found in Table 4.
TABLE 4
CATEGORY RELIABILITY FOR EACH SUBJECT

<table>
<thead>
<tr>
<th>Subject</th>
<th>Teacher Behavior Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>S1</td>
<td>.84</td>
</tr>
<tr>
<td>S2</td>
<td>.93</td>
</tr>
<tr>
<td>Mean</td>
<td>.88</td>
</tr>
</tbody>
</table>

With the exception of category four (skill attempt positive feedback) in subject one, all categories for each subject were over eighty percent. The difficulty experienced by the independent observer and the experimenter in recording the positive feedback for skill attempt category in subject one lay primarily in applying the definition to subject one's teaching style. Subject one had a frequency of saying "All right" and "good" toward no specific response by the students. This presented confusion for agreement between observers as one observer would tally each teacher response and the other observer would not. This generalized teacher response was not emitted with a high frequency and a small amount of disagreement drastically lowered the percentage.

Mean reliability was still well over the pre-determined 80%, despite the difficulty experienced in the above category.

PLACHECK RELIABILITY

Reliability for placheck observation was also calculated. This was done by the method of the total number of placheck recordings that were observed during each subject's classes for each session. Table 5 shows these data.
TABLE 5
RELIABILITY OF TOTAL NUMBER OF PLACHECK RECORDINGS
OBSERVED FOR EACH SUBJECT'S
CLASSES PER SESSION

<table>
<thead>
<tr>
<th>Subject's</th>
<th>Reliability Checks</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>C₁</td>
<td>.94</td>
<td>.93</td>
</tr>
<tr>
<td>C₂</td>
<td>1.00</td>
<td>.87</td>
</tr>
<tr>
<td>Mean</td>
<td>.97</td>
<td>.90</td>
</tr>
</tbody>
</table>

RESPONSE LATENCY RELIABILITY

Reliability was calculated here only by a method which gives the percent of agreement of the total number of events observed per session. (See p. 38 under Subject Reliability.) Table 6 shows the percent agreement of the total number of events recorded between experimenter and independent observer for each subject during the five reliability checks.

TABLE 6
RELIABILITY OF TOTAL NUMBER OF MANAGERIAL
EPISODES

<table>
<thead>
<tr>
<th>Classes</th>
<th>Reliability Checks</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>C₁</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>C₂</td>
<td>1.00</td>
<td>.91</td>
</tr>
<tr>
<td>Mean</td>
<td>1.00</td>
<td>.96</td>
</tr>
</tbody>
</table>

Agreement was well over the predetermined eighty percent for each reliability session of each subject.
Table 7 illustrates a comparison of the mean time of response latency for each observer during the reliability sessions on both subjects. Session one for subject one showed a difference of some eleven seconds and session three for the same subject revealed a 15 second difference. This problem was due to a definitional confusion. Observers were not sure when to begin the response latency recording.

TABLE 7
A COMPARISON OF MEAN TIME FOR RESPONSE LATENCY

<table>
<thead>
<tr>
<th>Observer Mean Time for Reliability Checks</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$S_1$ Observer 1</td>
<td>1:10</td>
<td>.41</td>
<td>3:30</td>
<td>.43</td>
<td>.58</td>
</tr>
<tr>
<td>$S_1$ Observer 2</td>
<td>1:21</td>
<td>.43</td>
<td>3:05</td>
<td>.48</td>
<td>.58</td>
</tr>
<tr>
<td>$S_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$S_2$ Observer 1</td>
<td>.53</td>
<td>.34</td>
<td>.44</td>
<td>1:08</td>
<td>.40</td>
</tr>
<tr>
<td>$S_2$ Observer 2</td>
<td>.52</td>
<td>.38</td>
<td>.44</td>
<td>1:09</td>
<td>.38</td>
</tr>
</tbody>
</table>

Overall, these data indicate a high degree of inter-observer agreement for classifying and timing response latency.

BEHAVIOR PROFILES OF SUBJECTS

The behavior rates of the student teachers presents a profile of teaching behaviors. It illustrates the way each has utilized his time. The plot of behavior rates reveals the individual style during baseline and after intervention. Following are the profiles for both subjects.
Subject One (S₁)

Subject one started his teaching experience by emitting high rates of managerial behavior and very low rates of other behaviors. The behaviors plotted during the observation sessions support this statement. Figure 4 presents the plot of the seven teaching categories.

The initial levels of behavior were primarily managerial and monitoring. Some time was spent emitting corrective feedback for skill attempts and responding to student off-task behaviors. Baseline rates showed that managerial, 1.5 responses per minute, and monitoring, 2.5 responses per minute, consumed a large portion of time while other behaviors were emitted at a very low rate. This is illustrated by the fact that negative reactions were .34 responses per minute. Positive reaction to on-task behavior was .07 responses per minute and positive feedback for skill attempts were .19 responses per minute. No activity behavior was the lowest at .02 responses per minute. Both positive and negative feedback are important teaching behaviors. This low level of total feedback only allows an average of six feedbacks per session, and four of these are negative.

After intervention with modeling and directed information feedback, the subject began to balance the proportion of time spent in various teaching behaviors. There was no direct intervention made upon monitoring behavior, and it continued to consume the larger portion of the subject's teaching time. There was a substantial decrease in managerial responses. There were smaller declines in negative reactions to off-task behavior and negative feedback for skill attempts. There was a considerable increase in positive feedback for skill attempts, but positive reaction to on-task behaviors showed very little change after intervention. There was no
Fig. 4.—Profile of Behavior Rates for Subject 1
directed intervention made on the no activity behavior and it remained at a very low rate.

Subject Two \((S_2)\)

Initially, subject two interacted more with the students than subject one and emitted a larger number of different behaviors. He was very active. Figure 5 illustrates the plot of the seven teaching categories.

The higher rates of behavior were negative feedback for skill attempts, monitoring, and the managerial categories. Reactions to off-task behavior were \(.57\) responses per minute, and positive feedback for skill attempts were \(.39\) responses per minute. Reactions to on-task behaviors and no activity behaviors were very low at \(.06\) and \(.01\) responses per minute respectively.

After intervention, Subject two began to balance the proportion of time spent in various teaching activities. There was an increase in the positive teaching categories of reaction to on-task behaviors and positive feedback for skill attempts. There were slight decreases in reactions to off-task behaviors and the total managerial categories. A substantial decrease was made, however, in the negative feedback for skill attempt behavior rate. Monitoring rates decreased as more time was spent emitting other teaching behaviors. No intervention was made directly for the no activity rates of behavior, but it remained virtually non-existent.

RATE AND PERCENTAGE CHANGE BY CATEGORY

Mean baseline rate, mean intervention rate, rate increase or decrease and percent increase or decrease were calculated by category for each subject. These are presented and discussed by category in the following paragraphs.
Fig. 5.—Profile of Behavior Rates for Subject 2
Managerial behaviors are necessary teaching acts. However, they do very little to directly affect student learning. As a teacher emits less of these, the more time there will be for more important instructional behaviors. As a result of this fact, modeling and information feedback for this category encouraged the subjects to teach self-management and attempt to lower their frequency of managerial behaviors.

Table 8 shows that the total managerial rates decreased. Subject one had the largest rate decrease, being 1.03 events per minute. This constituted a 65 percentage drop. Subject two had a rate decrease of .40 responses per minute which resulted in a percentage decrease of 35 percent.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Mean Rate Per Minute</th>
<th>Mean Rate Increase or Decrease</th>
<th>% Increase or Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Intervention</td>
<td></td>
</tr>
<tr>
<td>$S_1$</td>
<td>1.58</td>
<td>.55</td>
<td>-1.03</td>
</tr>
<tr>
<td>$S_2$</td>
<td>1.12</td>
<td>.72</td>
<td>-.40</td>
</tr>
</tbody>
</table>

The multiple baselines in Figure 6 offer very little evidence that the modeling and information feedback caused behavior changes. In subject one, there was a sharp increase in managerial behaviors. As the sessions continued however, a slow decline appeared. Subject one was probably influenced by variables other than the information feedback. Student teachers can see when students are not getting organized. Perhaps as a result
Fig. 6.—Rate of Managerial Behaviors
For Two Student Teachers
of intrinsic feedback in the situation and the students becoming accustomed to the teacher, the managerial rate slowly declined. Subject two showed a stabilization after the intervention, but then the rate increased slightly before it declined. Managerial behaviors were decreasing or very low for both subjects when feedback terminated.

Monitoring

It is necessary for a physical education teacher to closely watch pupil activity so that proper guidance and feedback can be given to the student. Excessive monitoring, however, consumes valuable time that could be spent emitting behaviors that directly affect learning. No feedback or direct intervention was made for this particular behavior category, but it is interesting to note the effects of intervention for other behaviors upon the monitoring rate for both subjects.

Table 9 illustrates the overall baseline of the monitoring rate. Subject one made very little change in his monitoring rate as a result of the interventions for other behaviors. Subject one's initial baseline was very high, 2.81 event per minute. With each monitoring event being five seconds in time, subject one was emitting almost 15 seconds of monitoring for each minute of observation. The overall baseline for subject one 2.56 events per minute. Subject two's initial baseline was 1.34 events per minute; but, as each intervention occurred and more time was given to other behaviors, subject two's monitoring rate decreased from the initial baseline rate to an overall behavior rate of .86 event per minute.
TABLE 9
RATE OF MONITORING BEHAVIOR AND PERCENTAGE CHANGE FOR TWO STUDENT TEACHERS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Baseline</th>
<th>Intervention</th>
<th>X Rate Increase or Decrease</th>
<th>% Increase or Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.81</td>
<td>after Int. 1</td>
<td>2.71</td>
<td>- .10</td>
</tr>
<tr>
<td></td>
<td>2.81</td>
<td>after Int. 2</td>
<td>3.18</td>
<td>+ .37</td>
</tr>
<tr>
<td></td>
<td>2.81</td>
<td>after Int. 3</td>
<td>1.61</td>
<td>- 1.20</td>
</tr>
<tr>
<td></td>
<td>2.81</td>
<td>total Int.</td>
<td>2.50</td>
<td>- .31</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.34</td>
<td>after Int. 1</td>
<td>.98</td>
<td>- .36</td>
</tr>
<tr>
<td></td>
<td>1.34</td>
<td>after Int. 2</td>
<td>.65</td>
<td>- .69</td>
</tr>
<tr>
<td></td>
<td>1.34</td>
<td>after Int. 3</td>
<td>.32</td>
<td>- 1.02</td>
</tr>
<tr>
<td></td>
<td>1.34</td>
<td>total Int.</td>
<td>.61</td>
<td>- .73</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.86</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+ Rate of percentage increase
- Rate of percentage decrease

The multiple baseline in Figure 7 shows the behavior rates for monitoring. The data cannot state a causal effect of an intervention upon this behavior category as no direct intervention was made. These data does indicate that chance can be working to change a behavior and that is important to focus intervention directly on a behavior in order to ensure a behavioral change. These data is included for possible interest concerning feedback interventions made on several behavior categories and the mixed changes that can occur upon a different behavior category.
Fig. 7: Rate of Monitoring Behaviors for Two Student Teachers

- Response Latency Intervention
- On and Off-Task Intervention
- Skill Attempt Feedback Intervention

Events Per Minute

Sessions

Subject 1

Subject 2
No Activity

This class of behaviors contributes nothing to the learning situation and as Figure 8 illustrates, these behaviors occurred infrequently.

No direct intervention was made for this category of behaviors, and as Table 10 shows, both subjects had a low overall rate of behavior.

TABLE 10

<table>
<thead>
<tr>
<th>Subject</th>
<th>Overall Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_1$</td>
<td>.02</td>
</tr>
<tr>
<td>$S_2$</td>
<td>.01</td>
</tr>
</tbody>
</table>

Skill Attempt Positive IF

There is strong evidence to suggest that positive information feedback often serves as positive reinforcement (Rushall and Siedentop, 1972). Positive reinforcement has demonstrated the ability to increase the probability of occurrence of a behavior (Skinner, 1953). Therefore, positive information feedback is considered one of the more important teaching behaviors. Subjects were told this was a very important teaching category and that an increase in the behavior rate was desired.

Modeling was given emphasizing a high rate of positive feedback for skill attempts. Feedback consisted of instructions, graphic feedback, cueing and reinforcement. Both subjects were asked to provide the feedback at every available chance.

Table 11 shows that both subjects demonstrated rate increases for this category. Subject one had a rate increase from .19 events per minute
Fig. 8.--Rate of No Activity Behaviors for Two Student Teachers
during baseline to .69 events per minute during intervention. This represents a .50 event per minute rate increase and a percent increase of 263%. Subject two had a .39 event per minute baseline and increased this to 1.62 events per minute during intervention. This represented a rate increase of 1.23 event per minute corresponding to a percentage increase of 315%. These increases may appear small, but the initial levels were very low and rose to a level of one every two minutes for subject one and over one each minute for subject two.

**TABLE 11**

RATE OF SKILL ATTEMPT POSITIVE IF AND PERCENTAGE CHANGE FOR TWO STUDENT TEACHERS

<table>
<thead>
<tr>
<th>Skill Attempt (+)</th>
<th>Mean Rate Per Minute</th>
<th>Mean Rate Increase or Decrease</th>
<th>% Increase or Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁</td>
<td>.19</td>
<td>.69</td>
<td>+ .50</td>
</tr>
<tr>
<td>S₂</td>
<td>.39</td>
<td>1.62</td>
<td>+1.23</td>
</tr>
</tbody>
</table>

+ Rate or percentage increase

Figure 9 shows the multiple baseline for this category. It gives strong support to modeling and feedback intervention causation. With subject one, the increased rate began and with subject two the rate showed a sharp increase after modeling and intervention. The level in subject one began to lower, but the baseline for subject two stabilized at a higher rate.
Fig. 9--Rate of Skill Attempt Positive IF for Two Student Teachers
Skill Attempt Negative IF

Subjects were told to emphasize the positive aspects of student behavior, but that some type of negative information, especially in the form of corrective feedback, was very important in the learning process. Nevertheless, the modeling intervention emitted very few negative feedbacks for pupil attempts and the subjects were told the desired direction for this behavior category was down. Subjects were encouraged to be primarily positive in their interactions with students. Rates and percentages for this category are found in Table 12.

TABLE 12
RATE OF SKILL ATTEMPT NEGATIVE IF AND PERCENTAGE CHANGE FOR TWO STUDENT TEACHERS

<table>
<thead>
<tr>
<th>Skill Attempt</th>
<th>Mean Rate Per Minute</th>
<th>Mean Rate Increase or Decrease</th>
<th>% Increase or Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-)</td>
<td>Baseline</td>
<td>Intervention</td>
<td></td>
</tr>
<tr>
<td>S₁</td>
<td>.43</td>
<td>.23</td>
<td>-.20</td>
</tr>
<tr>
<td>S₂</td>
<td>1.30</td>
<td>.74</td>
<td>-.56</td>
</tr>
</tbody>
</table>

- Rate or percentage decrease

Subject one exhibited a relatively small rate decrease of .20 event per minute, yet, this constituted a decline of 46%. Figure 10 shows a sharp decrease in subject one’s behavior rate after modeling intervention and feedback. Subject two was exhibiting a 1.30 events per minute rate of behavior during baseline, and this decreased to .74 events per minute, a rate decrease of .56 events per minute. Subject two’s percent of decrease was 43 percent. The data revealing the decrease in subject one’s behavior after intervention strongly suggest that behavior changes
Fig. 10--Rate of Skill Attempt Negative IF for Two Student Teachers
were due to the modeling intervention and feedback. The data does not support this conclusion for Subject two as there was an increase after intervention and the behavior rate was also increasing at the end of the study.

**On-Task Positive Reaction**

Just as contingent positive reinforcement is considered one of the best means of increasing the probability of correct skill occurrence, it is considered one of the best means of increasing and maintaining appropriate behavior in the gymnasium. Modeling and intervention feedback stressed the importance of increasing rates of positive reinforcement for appropriate gymnasium behavior. In addition to the modeling intervention, both subjects were given graphic feedback, cueing and reinforcement.

Subjects found this class of behaviors the most difficult to emit. The very low baseline rates revealed an inhibition or unawareness of emitting this behavior. Nonetheless, both subjects were able to increase their rates.

Table 13 shows that subject one raised his behavior rate per minute from .07 during baseline to .10 behaviors per minute during intervention. This constituted a mean rate increase of .03 and a percentage increase of 42 percent. Subject two had the greatest increase. His baseline rate was .01 behaviors per minute, yet increased to .31 behaviors per minute. This resulted in a rate increase of .30 events per minute, a percentage increase of 3,000 percent. This represents the largest percentage increase of all the categories.
TABLE 13

RATE OF ON-TASK REACTIONS AND PERCENTAGE CHANGE FOR TWO STUDENT TEACHERS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Mean Rate Per Minute</th>
<th>Mean Rate Increase or Decrease</th>
<th>% Increase or Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Intervention</td>
<td></td>
</tr>
<tr>
<td>S₁</td>
<td>.07</td>
<td>.10</td>
<td>+ .03</td>
</tr>
<tr>
<td>S₂</td>
<td>.01</td>
<td>.31</td>
<td>+ .30</td>
</tr>
</tbody>
</table>

+ Rate or percentage increase

The multiple baseline in Figure 11 shows that modeling and feedback interventions were the cause of the behavior changes as the control operant level remained low while the intervention level increased. But, both subjects found difficulty in maintaining their increases, and the increased levels of behavior did not appear to persist with time, although subject two's rate was increasing at the end of the observation sessions.

Off-Task Negative Reaction

Attention often serves as a positive reinforcer. Consequently, subjects were informed to ignore minor disruptions and demonstrate to students that they could receive attention for emitting appropriate behaviors. Punishment was to be used only when necessary. When it was used, subjects were instructed to make sure it was effective. Subjects were further told it would be difficult to completely eliminate behaviors in the class, but that they should make an effort to decrease rates of these behaviors.
Fig. 11.—Rate of On-Task Positive Reactions for Two Student Teachers
Table 14 shows that both subjects managed a mean rate decrease. Subject one dropped his rate from .34 to .06 for a .28 mean rate decrease. This represented an 82 percentage decrease. Subject two dropped his baseline rate from .57 events per minute to .31. This was a mean rate decrease of .26, a 45 percentage decrease.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Mean Rate Per Minute</th>
<th>Mean Rate Increase or Decrease</th>
<th>% Increase or Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Intervention</td>
<td></td>
</tr>
<tr>
<td>$S_1$</td>
<td>.34</td>
<td>.06</td>
<td>-.28</td>
</tr>
<tr>
<td>$S_2$</td>
<td>.57</td>
<td>.31</td>
<td>-.26</td>
</tr>
</tbody>
</table>

- Rate or percentage decrease

The multiple baseline in Figure 12 demonstrates causality in this category as subject one's rate decreased upon intervention, while subject two's rate remained high. Causality was further demonstrated as subject two's rate decreased sharply after intervention upon his baseline rate.

PUPIL BEHAVIOR PROFILES

Plachek

Changing the behavior of student-teachers must have some effect on the pupil these students are teaching. It was one of the purposes of this study to see what this effect would be.
Fig. 12—Rate of Off-Task Negative Reactions for Two Student Teachers
Table 15 shows that percentage of appropriate behavior for both student-teacher's classes were above 85 percent. The table also illustrates that after the first intervention on subject one's class, the percentage of appropriate behavior had a mean rate increase of .03, and a corresponding 3 percent increase. Comparing the baseline percent of appropriate behavior with the percentage after the second intervention showed a mean rate increase of .04, a 4 percent increase. Comparing the baseline percent of appropriate behavior with the rate after the third intervention showed a mean rate increase of .06, a 6 percent increase. This data reveals that appropriate behavior percentages increased with each intervention. This occurred even though the original baseline was relatively high at 87 percent. Comparing the initial baseline with the overall baseline after the three interventions showed a mean rate increase from 87 percent to 91 percent, a mean rate increase of .04, and a corresponding 4 percent increase.

The classes of subject two also had a relatively high initial baseline of appropriate behavior. Comparing the initial percent of appropriate behavior with the rate after the first intervention revealed no increase and the percentages remained the same. However, after the second intervention, the percent of appropriate behavior increased from .88 percent to 94 percent, a mean rate increase of .06, and a corresponding 7 percent increase. Comparing the initial baseline percent of appropriate behavior with the rate after the third intervention revealed a mean rate increase of .04, a 4 percent increase. Comparing the initial baseline rate with the overall rate after the three interventions revealed an increase from .88 percent to 91 percent, a mean rate increase of .03. This constituted a 3 percent increase.
### TABLE 15
PERCENTAGE OF APPROPRIATE PUPIL BEHAVIOR AND PERCENTAGE CHANGE FOR TWO STUDENT TEACHERS

<table>
<thead>
<tr>
<th></th>
<th>% of Appropriate Behavior</th>
<th>Mean % Increase or Decrease</th>
<th>% Increase or Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Intervention</td>
<td></td>
</tr>
<tr>
<td>Interven. I</td>
<td>.87</td>
<td>.90</td>
<td>+.03</td>
</tr>
<tr>
<td>Interven. II</td>
<td>.87</td>
<td>.91</td>
<td>+.04</td>
</tr>
<tr>
<td>Interven. III</td>
<td>.87</td>
<td>.93</td>
<td>+.06</td>
</tr>
<tr>
<td>Total</td>
<td>.87</td>
<td>.91</td>
<td>+.04</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>% of Appropriate Behavior</th>
<th>Mean % Increase or Decrease</th>
<th>% Increase or Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Intervention</td>
<td></td>
</tr>
<tr>
<td>Interven. I</td>
<td>.88</td>
<td>.88</td>
<td>+.00</td>
</tr>
<tr>
<td>Interven. II</td>
<td>.88</td>
<td>.94</td>
<td>+.06</td>
</tr>
<tr>
<td>Interven. III</td>
<td>.88</td>
<td>.92</td>
<td>+.04</td>
</tr>
<tr>
<td>Total</td>
<td>.88</td>
<td>.91</td>
<td>+.03</td>
</tr>
</tbody>
</table>

*Rate or percentage increase*
Fig. 13.—Percent of Appropriate Student Behavior for Two Student Teachers' Classes

- Response Latency Intervention
- On and Off-Task Intervention
- Skill Attempt Feedback Intervention

Sessions

Baseline

Percentage
The data and the multiple baseline in Figure 13 illustrate that even though pupil appropriate behavior was relatively high to begin with, it maintained itself and even made small increases as changes were made in student-teacher behaviors. The data also reveal that appropriate pupil behavior increased with each intervention, with the exception of the first intervention made on subject two.

Response Latency

Teaching students to organize themselves quickly is a result of good teaching cues. Both student teachers were encouraged to make organizational cues and direction very clear and concise in order to organize students quickly and have more class time for student activity. This behavior category was a time measure of how long it took for students to organize into activity once the organizational cues had been given to them.

Table 19 illustrates a mixed effect as a result of intervention for this category. Subject one's class had a mean baseline rate of 63 seconds. After intervention, this dropped to 16 seconds to a rate of 47 seconds. This constituted a 25 percent decrease in the amount of average time for students to organize into activity.

Subject two's classes showed an increase in mean time for organization. Subject two's class increased from a baseline rate of 42 seconds of response latency to 50 seconds. This constituted an 8 second increase and a percent increase of 19 percent.
TABLE 16
RATE OF RESPONSE LATENCY AND PERCENTAGE CHANGE IN
TWO STUDENT TEACHERS' CLASSES

<table>
<thead>
<tr>
<th>Classes of</th>
<th>Average Latency Per Cue</th>
<th>Mean Response Increase or Decrease</th>
<th>% Increase or Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Intervention</td>
<td></td>
</tr>
<tr>
<td>$S_1$</td>
<td>63 sec.</td>
<td>47 sec.</td>
<td>-16 sec.</td>
</tr>
<tr>
<td>$S_2$</td>
<td>42 sec.</td>
<td>50 sec.</td>
<td>+8 sec.</td>
</tr>
</tbody>
</table>

+ Rate or percentage increase
- Rate or percentage decrease

Figure 15 shows the multiple baseline for this category. The graphs reveal a mixed effect as a result of intervention. Subject one's classes displayed an immediate reduction in the time taken to organize themselves after the modeling and information feedback. The time interval oscillated for a period of seven sessions and then began to stabilize. Subject two's classes made an increase in response latency after the modeling for the class and information feedback for the teacher. The rate then decreased and remained low and stable until twenty-first and twenty-second sessions.

The average for both these classes is close to fifty seconds. These data suggest that there may be an average amount of time that it takes for a class to organize itself into a particular activity.
Fig. 14—Mean Response Latency for Student Teachers' Classes
SUMMARY

The data substantiated the fact that certain behavior changes observed in the subjects did occur. The probability of changing observational behaviors and recording changes in behavior on the part of the experimenter are reduced by the high interobserver agreement in all categories. Overall reliability of all categories of teacher and pupil behaviors are well over the predetermined eighty percent.

Behavior profiles are overall pictures of each subject and their classes' baseline and intervention rates of behavior. Teacher behavior categories of managerial, skill attempt positive feedback, skill attempt negative feedback, on-task positive feedback, off-task negative feedback and the pupils' category of appropriate behavior all changed in the desired direction. The resulting effect for the category of pupil response latency was mixed. Subject one's class decreased in this category while subject two's class showed an increase.

Baselines for most of the intervened categories reveal causation as control baselines are stable upon intervention with the target subject. Causation was exhibited in some categories while not in others.
In an effort to determine the extent to which a behavioral focus in physical education teacher training is effective in the acquisition of appropriate teaching behaviors, this study examined the changes in teacher behavior and its effects upon pupil behavior. Data for both teacher and pupils were analyzed as the differences between rates of teacher behavior and percent of appropriate pupil behavior during baseline and after modeling intervention with accompanying feedback.

The literature indicates that modeling and feedback can effect change in behaviors. There is some disagreement as to whether the qualities are reinforcing or informing. Regardless of this disagreement, the motivational effects are substantiated. Most attempts to change teaching behaviors have concentrated on antecedent events. Modeling and microteaching are examples of this. A few studies, however, have employed consequential events. These for the most part have concerned themselves with areas of education other than physical education. Very few studies have concerned themselves with teaching behavior in physical education (Daughterty, 1971; Schwartz, 1972), and the effect of the operant model in such a setting has been given little utilization (Hughley, 1973).

Subjects were two male students of Ohio State University enrolled
in their student teaching experience in the Columbus Public elementary schools. They were assigned to the Maize Road Elementary School. The pupils observed were in these classes.

Student teachers were observed for ten one-minute intervals of event recording. Pupils were observed for a ten-second period, termed placheck, immediately following student teacher observation. A time interval termed response latency was also taken considering how long it required students to organize themselves into activity upon cues from the teacher. Teacher behavior rates, placheck percentages of appropriate pupil behavior and response latency intervals, were taken both prior to and after modeling intervention with feedback.

Modeling consisted of the experimenter teaching the class and emphasizing a particular teaching behavior. Feedback came after a modeling intervention and consisted of instructions, cueing and reinforcement, and graphic feedback. Five periodic reliability checks for the teacher yielded 91 percent agreement for the total number of events observed and 89 percent for classifying events. Placheck reliability yielded 92 percent for the total number of events observed and 92 percent for category reliability. Response latency reliability yielded 99 percent for total number of events observed and 99 percent for classifying events.

By means of the multiple baseline design for both subjects and classes, behavior rates, percentages of appropriate behavior, and response latency intervals during baseline and intervention were compared.

CONCLUSIONS

Within the limits of this study, and as a result of analyzing the multiple baselines, the following conclusions were drawn.
(1) Managerial, positive feedback for skill attempts, and on-task positive reactions were the major teacher behavior categories in this study. Both response latency intervals and percent of appropriate pupil behavior were the major categories for pupil behavior. The primary effort was to decrease the managerial category, the negative feedback for skill attempts, the negative reactions to off-task behaviors for the teacher, and the response latency interval for the pupils. An increase in the teacher rates of positive feedback for skill attempts, on-task positive reactions, and percentage of appropriate pupil behavior was also a primary aim. Though some graphic feedback and reinforcement was given on categories of monitoring and no-activity, it was minimal. There was some indication in one subject that the concentrated effort to increase positive feedback for skill attempts and positive reactions to on-task behavior, contributed to a corresponding decrease in the category of monitoring.

(2) Relatively large decreases occurred in teacher categories of negative feedback for skill attempts, and the negative reaction to off-task behavior. Relatively large increases were made in teacher rates of positive feedback for skill attempts and positive reactions to on-task behaviors. The managerial categories were already in a descending baseline and no definite conclusions can be drawn. Consequently, it was concluded that modeling and information feedback consisting of graphic information, instructions, cueing and reinforcement were effective in producing teaching behavior changes of selective categories in the subjects of this study.

(3) During baseline conditions, it was noted that teacher control was primarily of an aversive and negative nature. Subjects were constantly informing students of what they should not do rather than what they should
do. It was concluded that beginning teachers in this study were primarily negative.

(4) It was expected that by increasing teacher rates of positive feedback for skill attempts and positive reactions to on-task behavior, a decrease in monitoring rates would occur. This happened in only one subject and the other subject maintained a high monitoring rate. Consequently, a certain behavior may not change as a result of a change in other behaviors. It was concluded from this study that for effective change to occur a behavior must be focused upon directly.

(5) During baseline conditions, behavior rates of positive and negative feedback for skill were largely very low. Subject two was emitting a relatively high rate of negative feedback for skill attempts and this was the only exception. This data suggests that student teachers in this study were likely to emit very low rates of feedback, either positive or negative.

(6) The effect of reducing the response latency interval for student organization for activity was mixed. One subject's classes reduced it's response latency interval while the other made an increase. The end result of both these changes were about 50 seconds. The data from this study suggest that perhaps there is an average time it takes for a class to organize itself for activity once organizational cues have been given.

(7) It was expected that students were emitting a high percentage of appropriate behavior, it could be maintained while changes were made in teacher behavior. Appropriate pupil behavior even showed a small increase from a relatively high initial level. It was concluded, in this study that a desired change in teacher behavior maintained existing percentages of appropriate pupil behavior.
In general, it can be concluded that in this study modeling and information feedback for specific behaviors did affect behavior changes in physical education student teachers. These changes in student teacher behavior maintained any existing levels of appropriate pupil behavior.

Further observation indicates that the practice of rewarding on-task positive reactions was most difficult. Subjects referred to this category as awkward and felt uncomfortable reinforcing behaviors they expected of their students. Furthermore, results showed that positive feedback for skill attempts was an easy category to emit despite the fact that initial feedback was of a negative nature. Most positive statements tended to fall into a generalized category of a "universal good" for any pupil behavior. These generalized positive statements were given in a variety of situations despite suggestions to be specific and to use variety for reactions and feedback.

In addition, both subjects found the regular presence of the observer to be inhibiting. Perhaps videotape or peer observers would have eased the pressure of the presence of the regular observer.

RECOMMENDATIONS

The persistence of newly acquired behaviors into the subject's first and succeeding years of teaching would be an interesting follow-up for this study. The literature indicates that some behaviors are non-persisting. Moreover, if these behaviors are non-persisting, data need to be gathered concerning how long they do persist and what frequency of feedback is necessary to sustain them.

It would be necessary to determine recommended rates of behavior for good teachers and what would be considered good percentages of
appropriate pupil behavior. A study compiling mean rates of teaching behaviors for experienced teachers and mean percentages of appropriate pupil behavior would be of great interest.

The use of videotape, peer observers, or a one-way mirror for the observer might ease the pressure of the presence of regular observers. If peer observers are to be used, it would be necessary to determine the effect of peer feedback on teaching behaviors. Videotape analysis has been employed in other areas of education. However, such an analysis appears to offer special problems in physical education settings. One-way mirrors might be the best for concealing the observer, yet it is difficult to find physical education settings that utilize such a device. Efforts to solve these problems are necessary.
APPENDIX A

LISTING OF APPROPRIATE AND INAPPROPRIATE BEHAVIORS

I. Appropriate Interactions

A. Pupil with teacher:
   1. Initiating a verbal interaction with the teacher in an appropriate manner;
   2. Looking at the teacher (without talking) when the teacher is talking or demonstrating;
   3. Responding in an appropriate manner when called upon by the teacher;
   4. Carrying our explicit directions from the teacher (within 5 seconds if the directions specify movement or verbal responses);
   5. Putting away or getting our materials at the request of the teacher;
   6. Arranging materials at the request of the teacher.

B. Pupil with pupil:
   1. Watching another child called upon by the teacher (without talking);
   2. Helping a classmate arrange materials after request of the teacher;
   3. Helping a classmate put away materials after requesting permission;

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4. Interacting with a classmate in an appropriate manner:
   a. Providing positive feedback for performance information;
   b. Providing negative feedback for performance information;
   c. Exhibiting appropriate behavior with other students;
   d. Talking with a classmate when no instruction is being given and it is not disrupting the class;
   e. Cheering your classmates performance;
   f. Waiting for the proper time to perform.

II. Inappropriate Interactions

   A. Pupil with teacher:
      1. Trying to talk to the teacher when the teacher is demonstrating, explaining, or talking to another student;
      2. Ignoring the teacher when she is demonstrating or explaining;
      3. Failure to carry out explicit directions from the teacher within a five second period;
      4. Performing an activity other than the one explained and demonstrated by the teacher.

   B. Pupil with pupil:
      1. Talking with other classmates when another child has been called upon by the teacher to perform or respond;
      2. Talking with other classmates when the teacher is talking or demonstrating;
      3. Helping a classmate to arrange materials without the permission of the teacher;
      4. Helping a classmate to put away materials without permission of the teacher;
5. Interacting with other classmates in an inappropriate manner:
   a. Pushing, hitting or tripping;
   b. Moving materials so a classmate cannot perform in an appropriate manner;
   c. Not allowing a classmate to perform in an appropriate manner;

6. Knowingly providing inaccurate information feedback for a classmate:
   a. Telling someone the wrong score;
   b. Telling a classmate the wrong directions.
APPENDIX B

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