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THE USE OF BEHAVIOR MODIFICATION TECHNIQUES
IN A SPORT ENVIRONMENT

DISSERTATION

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

By

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The Ohio State University
1974

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ACKNOWLEDGMENTS

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CHAPTER I

INTRODUCTION

Sports, games and other play forms have been a prominent part of almost every culture. In spite of this phenomenon scholars have shown little inclination to undertake theoretical and scholarly studies into the world of sport. Psychologists, who purportedly are interested in the study of behavior have displayed a general insouciance toward behavior in sport environments. American physical educators have supported the contention that physical education and sports experiences were fruitful environments for changing behavior but generally have neglected to verify their claims with research. A perusal of the literature does indicate, however, that contemporary scholars are discovering sports as a legitimate field of study and are beginning to undertake serious investigations of the subject.

Greater and greater emphasis on improvement in sport performance has led to increased interest in psychological dimensions as well as the already predominant inquiry into the physiological aspects of performance. In the last decade, coaches and physical education teachers have expressed a need to know more about the principles of motor learning, growth and development, motivation for high performance, interpersonal relationships, and the ability to assess and
utilize diverse personality traits of an individual in sport. Herein lies the beginning of sport psychology.

The International Society for Sport Psychology was established in 1965 in Rome. This international organization permitted scholars to exchange information and opinions on various facets on psychological research related to sport. Prior to 1960 little research emphasis had been given to the psychological and social dimensions of human athletic endeavors. A few European countries, mainly Russia, Germany and Czechoslovakia had established Institutes of Sport whose efforts were partially directed toward understanding the psychological problems of athletes engaging in international competition (Vanek and Cratty, 1970, p. 7). In contrast, the English-speaking coaches were inclined to place more emphasis on physiological and technological aspects of sport so that there was little direct contact among coaches, psychologists and the athlete.

Eastern European countries have maintained their interest in the psychology of sport, perhaps, because of their primary focus upon success in international competition. After the 1960 Melbourne Olympics, coaches in these countries began to perceive the importance of the knowledge and the use of sound psychological principles in the training of their athletes (Vanek and Cratty, 1970). Experimental and descriptive approaches have employed such measures as personality scales, assessments of single traits, intelligence scales, sociograms, and tests evaluating various perceptual abilities and/or motor performances (Cratty, 1973). The results of these studies have attempted
to describe and compare the athletes in general, athletes in particular, female vs. male athletes, and to contrast the athlete vs. the non-athlete.

Russian sports psychologists initially directed their research toward the exploration of various psychological evaluation techniques, including personality testing, intelligence testing, and psychomotor testing. More recently, Russian scientists have become involved in the study of guidelines for psychological preparation of the superior athletes (Vanek and Cratty, 1970). The Schultz method of "Autogenne training" (Schultz, 1956) has been employed and coupled with electronic monitoring of physical and psychological readiness. Another recent concern has been investigation of the psychology of small group interactions.

German psychologists have also been interested in studying athlete behavior. They progressed from a general study of motor learning to sending German teams to high altitude training sites in Bulgaria, as well as to pre-Olympic training in Mexico in 1966-1967. Prominent roles were played by Mathesuis and Mueller who worked with Kunath at the University of Leipzig. These scientists utilized subjective measures to report athletes' feelings as well as various tests of psychomotor performance, concentration and mental ability after being exposed to high-altitude stresses in Mexico City, Bulgaria and in the laboratory at the University of Leipzig (Vanek and Cratty, 1970, p. 13).

The National Society of Sport Psychologists in Czechoslovakia has attempted to work very closely with the coaches and athlete within
the country's borders. Starting in 1954, the Society instituted seminars for the coaches and presently maintains an office to which coaches and athletes may come to consult with physicians and psychologists concerning their problems. Psychologists, headed by Vanek accompanied the Czechoslovakian Olympic team in 1968 in Mexico where they conducted extensive psychological research in cooperation with the team members. In recent years Czechoslovakian psychologists have shown concern with motor performance and learning, personality and psychotherapy, personality of coaches, as well as sociometric studies of interaction within sport teams (Vanek and Cratty, 1970, p. 27).

Although the United States coaches and physical educators have primarily been preoccupied with the physiological and technological aspects of sport; and their colleagues, the psychologists, have previously shown little concern for the psychosocial parameters of sport, there has been a growing interest in sport psychology as a legitimate area of study in the last ten years.

In 1962 Ogilvie and Tutko of the Department of Psychology at San Jose State University in California began to investigate the personality traits of various athletic performers. From these studies several articles, presentations and two books have emerged. The first book entitled Problem Athletes and How To Handle Them was published in 1966 and the second book, co-authored by Thomas Tutko and Jack Richards, Psychology of Coaching, was printed in 1971. Ogilvie and Tutko were proclaimed by Cratty to be the "only two men in the United States at the present time whose primary interests centered around the superior athlete." (Vanek and Cratty, 1970, p. 22) These men have been retained
by several collegiate and professional coaches to advise them of matters concerning the personality dynamics of players.

American authors in both psychology and physical education have begun to narrow the gap between the theoretical and practical applications of psychology and sport. Moore (1970), Singer (1972), Frost (1971), Lawther (1972), and Cratty (1970, 1973) have all written books which attempt to bring to the practitioner, the teacher, coach and athlete, information gleaned from the literature about the psychological dimensions of sport to aid in their work.

A few physical education professional preparation programs in the United States have initiated undergraduate courses in sports psychology, but the course content is still diverse. A psychologist at the Colorado State University is presently working with the U. S. ski team (Sage, 1973, p. 3).

That there seems to exist a wide difference in the definition of sports psychology between the eastern European countries and the United States was recently noted by Ryan (1973). He felt that sports psychology as a "scientific study of human behavior as influenced by participation in or observation of sporting activities" (p. 2) would reasonably describe the work of the European sports psychologists, whereas, the American scholars have simply applied psychology to sports, mainly in the areas of motor learning, motor development and social psychology.

Likewise, Sage (1973) has suggested that the eastern European countries are way ahead of us in taking their sports psychology research into the playing fields, courts, and locker rooms. To close this gap, Sage suggests that the American sports psychologists begin to take
their research onto the sports field where the "variables in the dynamic setting which cannot be duplicated in the laboratory and which are critical to the learning and performance occur." (p. 7)

Just as sports psychology is a new and struggling sub-field or division of psychology, the discipline of psychology itself has shown a continuous development and subsequent decline of different systematic positions or schools of thought in its century-old history.

One of the current approaches in psychology is the area of operant conditioning. The theory and principles of operant psychology has been largely derived from the work of B. F. Skinner. In 1913 Watson made a sharp break with the popular psychological and psychoanalytic conceptions of his time and defined clearly the behavioristic approach. Skinner further developed the concept of behaviorism. His primary concern was in explaining how behavior is controlled by the environment without recourse to mental events. He felt that the most effective approach to psychology, the science of behavior, was the study of the conditioning and extinction of operant behaviors. Skinner contended that behavior could be modified by environmental consequences and refused to utilize other explanatory systems.

Skinner and his followers conducted a great deal of research on infra-human organisms and human subjects on numerous problems of learning. Their studies included the role of punishment in the acquisition of responses, the effect of different schedules of reinforcement, discrimination learning, and generalization, among others.

Skinner effectively demonstrated a wide range of applicability of operant conditioning when he published Science and Human Behavior in
1953. In this book he extended his system into broader areas, such as social behavior, religion, psychotherapy, and education. Schulz has pronounced that *Science and Human Behavior* "was a major impetus for a drastic reconceptualization of procedures for changing behavior in schools, hospitals, and outpatient facilities." (O'Leary, Daniel, and O'Leary, 1972, p. 9)

Operant psychology viewed traditional psychological problems through the medium of behavioral analysis. To further their research and findings, the Skinnerians, in 1958, established the *Journal for the Experimental Analysis of Behavior* because of the unwritten requirements of the existing journals concerning subject sample size and statistical analysis. Since that time professional journals such as *Behavior Research and Therapy*, *Journal of Applied Behavior Analysis*, *Behavior Therapy*, and *Behavior Therapy and Experimental Psychiatry* have also appeared.

Just as the general field of psychology turned its attention to the application of its laboratory findings to the clinical setting after World War II, so did the followers of Skinner begin to apply their experimental findings to the alteration of behavior in the clinical settings in the early 1960's. The principles and technology of behavior modification were employed in psychiatric hospitals, correctional centers, army psychiatric units, and delinquent centers. The clinic and laboratory became as one.

To show further application, Holland and Skinner (1961) published a self-instruction text to enable a student "to instruct himself in that substantial part of psychology which deals with the analysis of
behavior — in particular the explicit prediction and control of the
behavior of people." (p. vii) Others, such as Krasner and Ullman
(1965), furthered the application of behavior analysis:

It (the book) is also designed to reveal the inadequacy of
popular explanations of behavior and to prepare the student for
rapidly expanding extensions into such diverse fields as social
behavior and psychopharmacology, space flight, and child care,
education and psychotherapy. (p. vii)

Hively (1972) in 1972 was asked by the Assistant Secretary of
Planning and Evaluation of the U.S. Department of Health, Education,
and Welfare to make a report on the application of behavior analysis to
education. Hively foresaw that applied behavior analysis could be
expanded into 1) public education in techniques of self-management and
family problem solving, 2) along with existing consulting services
(Kansas, Western Michigan, Oregon, Utah, etc.) a further expansion of
local institutes and follow-up consultive services to train a variety
of community people who work with children in the effective use of
incentive systems, 3) an easy exchange of management-system adaptations
that local groups make to commercial instructional materials, and
4) citizen training and an economic incentive program. This is evidence
that policy makers are becoming interested in the possibilities of the
technology of applied behavior analysis.

In 1968 Skinner applied the use of behavior analysis to educa-
tion in his book, The Technology of Teaching. The mid-60's saw the
growth of operant psychology and its practical application to human
learning and motivation. A prominent behaviorist, Bijou (1968), stated
that as a group the behavior analysts

... can offer a set of concepts and principles derived
exclusively from experimental research: we can offer a methodology for applying these concepts and principles directly to teaching practices; we can offer a research design which deals with changes in the individual child (rather than inferring them from group averages); and we can offer a philosophy of science which insists on observable accounts of the relationships between individual behavior and its determining conditions. (p. 66)

Although the preponderance of early applied behavior analysis activity was in the "special education" classroom, educators and psychologists soon began to apply the principles and techniques to the entire range of "normal" education. O'Leary and O'Leary demonstrated this in a book on classroom management published in 1972. This text not only supplied the reader with a set of principles and research evidence documenting the efficacy of such procedures in the classroom, but it discussed how teachers can implement such techniques in remedial and preventative ways.

Researchers turned their efforts to investigating academic behaviors, such as the development of cognitive skills and study behaviors; and nonacademic behaviors, such as disruptive or inappropriate behavior. Not only were the experimenters concerned with specific behaviors in normal and special classrooms, but they also employed behavior analysis with students ranging from pre-school age to collegians. Some of the teacher training institutes began to investigate the potential of a behavior modification approach for teachers.

Just as applied behavior analysis has been utilized in various educational and social environments, it appears that behavior modification has much to offer to sports and physical education. Despite the demonstrated effectiveness of the application of operant psychology,
this approach has been largely neglected in the literature and by practitioners of physical education and sport (McKenzie and Rushall, 1971).

Just recently, two authors, Rushall and Siedentop, published a text titled The Development and Control of Behavior in Sport and Physical Education. (1972) This publication applied the theories and principles of the operant school of psychology founded by Skinner. This text sought to give to the practitioner systematic techniques and strategies for developing and maintaining behaviors in physical education and sport. Even though the primary focus of the text emphasized the development of skilled motor behaviors, concomitant principles of behavior control considered the total functioning of the individual performer within his environment.

It is with this increasing interest in the area of sports psychology and the growth of the use of applied behavior analysis in many human environments, that this investigator chose to design a study to determine the effects of the application of applied behavior analysis techniques in a sport environment. If, as demonstrated in the literature, skill and social behaviors can be modified and maintained, then applied behavior analysis might be useful as a method for field research in a sporting environment. In support of this, Sage stated:

The problem is that up to now we have given too much emphasis to laboratory research at the expense of field work and we have tried to make sports behavior prescriptions based upon laboratory findings when what we need is findings from the sports field which can then be applied in the sports field. (Sage, 1973, p. 7)

It is with this intention in mind that this investigator used a coach and her team members as subjects in this study.
Purpose of Study

The purpose of this investigation was to determine the effects of the application of applied behavior analysis techniques in a sport environment.

The intent of the study was:

(1) to investigate the degree to which coaching behavior can be modified,

(2) to offer evidence as to whether the general changes in the coaching behaviors will affect a spectrum of behaviors of team members, and

(3) to investigate the degree to which coaching behavior can be used specifically to change targeted player behavior.
CHAPTER II

REVIEW OF LITERATURE

The use of applied behavior analysis in the sport environment has been exiguous and limited to only a few specific athletic settings. However, in spite of this lack of empirical research on the use of behavior modification techniques in the sport environment, there are several areas of related research which are relevant to the study. The following categories will be discussed:

(1) Research related to applied behavior analysis in education.

(2) Research related to applied behavior analysis in sport and physical education.

The lack of research in the second category was a primary reason for undertaking this study.

Research Related to Applied Behavior Analysis in Education

Research in the classroom setting has dealt with academic behaviors, i.e. development of cognitive skills such as reading, spelling, and arithmetic; and nonacademic behaviors that are classified as classroom behavior problems which interfere with the ongoing educational process. Studies have been conducted in both the normal classroom and
the special classroom to which students were assigned on the basis of a
diagnostic problem, i.e. retarded autistic, emotional problem, severe
behavioral problem, juvenile delinquent, learning disability, or low
achievement. Much of the research in the normal classroom is an out-
growth of the success experienced in the investigations with the
atypical classroom setting age groups. Not only have the experimenters
been concerned with specific behaviors and normal and special class-
rooms, but they have also employed applied behavioral analysis studies
to students ranging from pre-school to higher education.

**Academic Behavior**

One of education's primary functions has been the acquisition of
cognitive skills. Increase in knowledge and skill in subject matter,
i.e. spelling and reading (McLaughlin and Malaby, 1972; Sulzer and
others, 1971; Lovitt and others, 1971), handwriting (McLaughlin and
Malaby, 1972; Salzberg and others, 1971), history and geography (Glynn,
1970), arithmetic (Kirby and Shields, 1972), and composition output
(Brigham, Graubard, and Stans, 1972) have all been demonstrated through
the effective use of the reinforcement principles. Edlund (1972)
studied the effect of a probable reinforcer given for correct responses
on intelligence test scores. The experimental group, given the rein-
forcer, scored statistically significantly higher on the I.Q. test.
The effects of behavioral and performance contingencies on classroom
behavior and on academic performance were investigated by Ferritor,
et al. (1972) and they found that increase in academic performance in
arithmetic drill exercises did not necessarily occur as attending
behavior increased and disruptive behavior decreased. Only when reinforcement was contingent upon correct work was there an increase in the number of arithmetic problems worked correctly.

Goetz (Goetz and Baer, 1971; Goetz and Salmonson, 1972) centered her studies on the development and measurement of creativity in both block building and easel painting and found that through use of various reinforcements she was able to increase creative behavior of children.

Traditional methods of college instruction have been compared with methods utilizing reinforcement principles. The applied behavior analysis methods have been shown to produce superior academic performance (Born and others, 1972a; Born and others, 1972b; McMichael and Corey, 1969; Shepard and MacDermont, 1970). Johnston and O'Neill (1973) further investigated the influence of minimum performance criteria and grade levels on college student academic performance and demonstrated that the criteria controlled performance to a high degree as students would immediately change to attain new criteria put into effect.

School-Social Behavior

One important type of behavior that interferes with education in a classroom is disruptive or inappropriate behavior. In a series of studies (Madsen and others, 1968; Madsen, Becker, and Thomas, 1967; Thomas, Becker, and Armstrong, 1968; Becker and others, 1967; McLaughlin and Malaby, 1972) behaviors such as out-of-seat responses of children, excessive noise, disturbance of others, talking out in class,
etc. were reduced by contingent teacher attention, rules paired with praise for following rules, and token systems contingent on appropriate conduct. Barrish, Saunders, and Wolf (1969) decreased out-of-seat behavior and talking-out responses through use of natural classroom consequences, i.e. extra recess, first in line, and display of name on blackboard.

A variety of techniques, methods, and situations applied to disruptive behaviors are appearing more recently in the literature. Good behavior games (Barrish, Saunders, and Wolf, 1969), group reinforcement techniques (Herman and Tramontana, 1971), and the power of peer reinforcement (Solomon and Wahler, 1973) for reducing disruptive behavior have all been demonstrated in recent studies. Realizing that behavior modification techniques can often be burdensome or cumbersome, some experimenters have attempted to investigate, with success, the effectiveness of using self-recording (Braden, Vance, and Mitts, 1971) and self-regulation (Balstad and Johnson, 1972) techniques to modify disruptive classroom behavior.

Hewitt studied (1972) the program of delayed consequences on the elimination of disruptive classroom behavior in a special education home cottage environment and suggested that the program could be adapted to the normal public school. He proposed that reinforcing materials and activities that are a natural part of the setting (e.g., recess, access to art, gym, and music classes; or an opportunity to leave school early) could be employed.

Brown and Copeland (1971) utilized the playing of basketball with the school principal for fifteen minutes during the lunch hour as
a reward for decreasing a high rate of disruptive behavior of a boy subject in the third grade.

Once disruptive behaviors are under control the teacher must engage the pupil in effective academic behaviors such as: study, attending, and following instruction behaviors. Significant gains have been achieved in increasing the time spent in study behavior (Hall, Lund, and Jackson, 1968; Hall, Panyan, and others, 1968; Mawhinney and others, 1971). Attentive classroom behaviors by students of various ages have been modified through effective use of teacher attention (Broden and others, 1970), group contingencies (Packard, 1970), vicarious reinforcement (Kazdin, 1973), and self-control (Glynn, Thomas, and Shee, 1973).

Coesairst, Hall, and Hopkins (1973) employed the systematic use of experimenter's instructions, feedback, and feedback plus social praise to increase teacher praise for student attending behavior of three elementary school teachers. It was noted that intervals of student attending behavior increased with the introduction of teacher praise. Teacher attention contingent upon proper conduct in a kindergarten class demonstrated an increase in percentage of instructions followed (Schutte and Hopkins, 1970).

A recent informative study (Pinkston and Reese, 1973) demonstrated the existent role of teacher attention in maintaining a dangerous behavior, aggression in a preschool child's behavior to his peers, as well as an imposed use of contingent teacher attention to increase his low peer interaction.
Salzberg (1972) chose an elementary school to investigate the
behaviors concomittant with freedom and responsibility in an academic
setting. He developed a strategy of awarding freedoms contingent upon
associated responsible behaviors. The target students' rate of work
progressed four times the normative rate of their public school-age
peers and "they began to demonstrate behavior that the teachers would
call responsible." (p. 62)

Teacher Behavior

As applied behavior analysis becomes increasingly involved in
education many researchers in teacher training institutions are turning
their efforts to possible procedures for developing performance competencies of teachers. Research has shown that specific instructions in
the principles of operant psychology, how the theory is applied in the
classroom, and implicit or explicit instruction as to teacher behaviors
in the classroom do not lead to reliable changes in the teacher
behaviors (Madsen, Becker, and Thomas, 1967; Hughley, 1973). Thus,
various training techniques have been investigated to ascertain their
effectiveness in accomplishing this goal. Feedback procedures have
been found to be relatively successful in changing behaviors for at
least as long as the feedback strategies were in effect (Cooper,
Thomson, and Baer, 1970; Cossaïrt, Hall, and Hopkins, 1973; Hughley,
1973).

Feedback supplied by classroom observers (Cooper, Thomson, and
Baer, 1970) and videotape recordings (Thomas, 1971) have both been
investigated. Rule (1972) compared three different techniques for
modifying teachers' behavior: instructions plus feedback from the experimenter, video feedback, and direct intervention procedure, and concluded that direct intervention was superior in decreasing rates of undesirable teaching behaviors and increasing those that were desirable. (p.285)

Using videotaping as the media, Saudergas (1972) systematically applied criterion rates of praise by the teachers to gain effective increase and decrease teacher rates. The subjects were asked to count, graph, and meet two different criterion rates within the study.

Hall, et. al. (1968) took their experiment directly into the public schools and worked with three beginning teachers who were already employed by school systems. These researchers found that the subject teachers were able to carry out successful behavior modification procedures after an initial explanatory session of fifteen to thirty minutes at the beginning of each experimental condition and daily feedback of the results.

In conjunction with the Hall study mentioned above, experimenters (Hall and others, 1971) have demonstrated that teachers alone can serve as a primary experimenter and as either the primary or the secondary classroom observer. These researchers further state that "teachers can develop effective observation and reinforcement procedures, can carry out experimental manipulations, and therefore can use behavioral analysis as a tool in their classrooms." (p. 148)

The behavior analysis model implies that teacher training must be experiential and that teacher-trainees must develop behavior modification skills that can be assessed and modified. "To train teachers,"
Siedentop stated (1972, p. 29) "is to modify teacher-trainee behavior." Several researchers have investigated observation scales that could be used to measure and assess such teacher behaviors in various school environments (Beyer and Calchera, 1971; Pollack, 1971; Rushall, 1973; Siedentop, 1973).

A further extension of the operant psychology theory was applied to the significance of the expectations and attitudes of teachers toward students. Retish (1973) found that overt teacher reinforcement did result in significant gains in the poorly esteemed students as compared with their control group. Even though the poorly esteemed students did gain in acceptance by their peers, the teacher's perception of the target subjects did not change as the result of the procedure. This study indicates that "teachers can use overt reinforcement techniques to alter the social position of students." (p. 44)

Research Related to Applied Behavior Analysis in Sport and Physical Education

Applied behavior analysis has been used sparingly in sports and physical education. Researchers, physical educators, and coaches are beginning to turn their attention to the possibility of application of operant psychology to their specific environments. The modification of specific-behaviors of individuals, both students and coaches, is being investigated. A few studies of the modification of a repertoire of behaviors of a number of individuals are appearing. Various behavioral strategies and techniques that have been investigated in the classroom are being transferred to the gymnasium, pool, court, and fields.
Teacher trainers are assessing measuring teacher behaviors that would be essential and/or unique to the physical educator and coach.

**Skill Performance**

The strategy of shaping (Rushall and Siedentop, 1972, p. 199) was employed by Rushall (1970) to change a swimming skill behavior in a butterfly swimmer. Likewise, Muir (Rushall, 1973a) utilized this procedure of shaping to change the form of an incorrect kicking action in the front crawl swimming stroke in a young inexperienced swimmer. Feedback and performance criterion aided in the complete suppression of the problem behavior.

Young (1973) studied the effects of various reinforcement contingencies on a second grade physical education class. Although an increase in appropriate behaviors occurred, there was not a corresponding increase in skill acquisition.

**School-Social Behavior**

Problem behaviors of poor attendance and tardiness of team members at regularly scheduled swimming practices was reduced by an addition of a publicly displayed "attendance board" and self-recording procedures. The number of absentees was reduced by 45 per cent, late arrivals were reduced by 63 per cent, and early departures were completely suppressed. (McKenzie, 1972)

Team coaches, concerned with the effort and amount of swimming being done in practices, instituted, under the direction of the experimenters, a "program board" and a self-recording procedure to
increase the rate of swimming under the experimental and postcheck conditions (McKenzie, 1972). The represented group increase was 27.1 per cent.

McKenzie and Rushall (1973) used two techniques of behavior control in an attempt to decrease the occurrence of several inappropriate behaviors among team members in a competitive swimming environment. The four undesirable behaviors were defined as: 1) changing strokes, 2) unnecessary stopping, 3) not completing a full pool length, and 4) failure to push off. The first experimental condition, which was the coach's self-recorded positive and negative interaction with each swimmer, resulted in diminished rates of occurrence in the inappropriate behaviors under study. During this praise and reprimand condition, approximately one-half of the interactions were praise statements. The second experimental condition employed the use of a behavior game called "disqualification", (p. 6) in which a material reward and verbal reinforcement to the winning team from the coaches were contingent upon the correct responses by each member of the team. This behavior game condition exhibited the greatest response suppression.

The effect of four types of reinforcers in swimming were contrasted by Rushall and Pettinger (1969). Candy, money, coach's attention and an achievement board were presented as consequences of swimming laps in a set order and time period. The candy and money had a stronger effect upon work output than the other two reinforcers. Noticeable, though non-significant, trends appeared in the reactions of the various age groups to the different reinforcers. The younger group
reacted strongly to the candy and money while the older group responded more favorably to the coach's attention and achievement board.

Just as the employment of a token-system has been extensively investigated in the classroom setting, Hutchinson and Siedentop (1972) undertook to test the feasibility of utilizing token systems in a physical education class for multiple handicapped children. A dichotomous behavior was utilized. Appropriate behaviors were defined as attending to the activity and/or teacher, and participating in the activity in an appropriate manner. The token system was found to be effective in modifying and maintaining appropriate behaviors in a physical education class for deaf-retarded children.

Because of his scepticism of the traditional processes of producing stereotypes of coaches and athletes, i.e. personality assessments and isolated impressions used to indicate general behavior descriptions, Rushall (1973b) employed direct observational procedures to evaluate behavior scales with the Dalhousie Coach Observation Schedule and the Dalhousie Athlete Observation Scale. These two scales defined productive behaviors that would be emitted by coach and athlete. Productivity was defined as "the percentage of time spent in a sporting environment in the pursuit of behaviors which are likely to produce some behavior change." (p. 3) The research was conducted in several environments in various sports, (men and women's basketball, ice hockey, men's volleyball, synchronized swimming, and Canadian football). In the athlete analysis, one "good" and one "poor" performer in the same environment were observed in a "quasi-yoked" manner. It was found that "good" athletes were consistently more productive than
"poor" athletes during the same total span of observation time. In all environments, coaches and athletes varied in their productivities from day to day and there were large variations between individuals in each sport. The athletes varied their category frequencies and rankings independently of the behavior patterns of their coaches. Rushall concluded that "The results directly conflict with the assertions of those who use personality and attitude inventories and who claim consistent behavior tendencies in the results of their studies." (p. 114)

**Teacher-Coach Behavior**

Just as the skill and social behaviors of athletes and students have been analyzed so have some researchers turned their attention to the analysis and modification of teacher-trainee/coach behaviors.

A competency-based preservice elementary physical education program was compared to a conventional program by Grabin (1973). The results indicated that the competency-based group, both the teachers and their pupils, performed better on the knowledge test and the AAHPER Fitness Test. The experimental group teachers performed better on teaching skills (behaviors).

Rife (1973) found that modeling and feedback were effective in changing teacher behaviors. He concluded that these desirable changes in teaching behaviors maintained an existing high level of appropriate pupil behaviors.

In a study by MacEachern (1972) eight student teachers were analyzed on seven categories of behavior according to the Dalhousie Teacher Observation Schedule. When the student teachers received
feedback they changed their behavior but in activities and classes where no consequences were provided the student teachers' behaviors did not change.

In an effort to determine the extent to which a behavior focus in physical education teacher training is effective in the acquisition of appropriate teaching behaviors, Hughley (1973) examined the differences between rates of teacher behavior during the baseline and intervention in which the subjects were given directed information feedback. The tool used to assess the student teacher behaviors was the O.S.U. (Ohio State University) Teacher Behavior Scale (Siedentop and Hughly, in press) in which eight categories were defined. The results showed that behavior changes were observed and recorded and that directed information feedback when given on specific behaviors can effect behavior changes in physical education teachers.

The preceding two examples serve to demonstrate the efficacy of applied behavior analysis for changing behavior in the practice teaching experience. Rushall (1973) reported a study in which a swimming coach requested some assistance to make himself a better and more effective coach. The coach's behavior was observed and recorded with the use of the Dalhousie Coach Observation Scale and the results showed that the coach displayed predominantly negative and critical behaviors. Instances of feedback and reward were rarely observed. A repertoire of rewarding and feedback behaviors and appropriate vocabularies were developed for the coach to use. The study was undertaken over a period of several months and permanent effective changes were achieved. This application of applied behavior analysis presented a method for
allowing self-evaluation of behaviors as well as developing behaviors through self-administered contingencies.

This experimenter devised a study to further investigate the use of behavior modification techniques to a particular sport environment which would study the degree to which a female basketball coach's behavior could be modified and to offer evidence as to whether the changes in her repertoire of behaviors would affect a spectrum of behaviors in her basketball team members.
CHAPTER III

PROCEDURES

This study was divided into two phases, each consisting of a series of interventions, on a dual-baseline design (Hall, 1971). Following the baseline recording, Phase I consisted of interventions on the target behaviors of the coach and continued recording of the performers' behaviors. In Phase I the performers' behaviors were recorded and observed to see if any general change in performer behavior occurred as a result of the general change in the coach's behavior. In Phase II, the coach was made aware of the targeted player-behaviors that had not been affected in Phase I and used her newly modified behavior to specifically change performer behavior.

Definitions

The terminology pertinent to this study is as follows:

**Behavior** - Refers to the things that people do that are observable and capable of reliable measurement.

*Operant Behavior* - Refers to all behaviors whose development has been primarily influenced by events which follow them.

*Behavior Modification* - Refers to the use of the principles of operant psychology to change behavior.
Event Recording - Refers to the frequency count of a specific behavior as it occurs.

Duration Recording - Refers to the elapsed time of the occurrence of a specific behavior.

Interval Recording - Refers to the division of the observation session divided into equal time for the purpose of recording behaviors.

Operant Level - Refers to the rate of behavior responses occurring before modification is attempted.

Plachek - (Planned Activity Check) At given intervals the observer counts as quickly as possible how many individuals are engaged in a specified behavior, recording the total.

Baseline - Refers to a pre-intervention record of a behavior.

Intervention - The introduction of an independent variable in an attempt to modify behavior.

Directed Information Feedback - A knowledge of performance given to the subject through verbal instruction, graphs, and cues.

Reliability - Refers to the degree to which independent observers agree on what they have observed in the same subject during the same observation period.

Subjects

The subjects were a young female basketball coach and her college junior-varsity team, and four randomly selected team members.

The coach was a senior student in college who had volunteered to coach the junior-varsity team for the experience. She had already completed her student teacher experience and wanted additional experience in the athletic environment. She had previously been a member
in the varsity level of basketball competition during both her high
school and collegiate career. The coach had had no exposure to the
principles of applied behavior analysis prior to this investigation.

The four team members were members of the junior-varsity basket-
ball squad. The coach was asked, prior to the beginning of the study,
to rank the team members as to her expectations, high or low, and then
two participants from each "level of expectation" were randomly
selected. Subject one was a junior and it was her first year of inter-
collegiate basketball competition. She was classified in the low
expectation level. Subject two was a sophomore with one year of inter-
collegiate basketball experience and was given a rating of low expecta-
tion. Subjects three and four were both freshmen and ranked high in
expectation by the coach.

Sport Environment

The sport environment was a women's intercollegiate basketball
team during a twelve-week season. The squad consisted of twelve mem-
ers under the tutelage of one coach and two managers. Practices were
held regularly Monday through Thursday and occasionally on Sunday for
a two-hour period. The total number of practices during the study was
28 combined with a six-game intercollegiate schedule. The format and
sequence of each practice usually included warm-up drills, instruction
and skill work, scrimmage, and free-throw practice.

The Observers

Four female observers were hired by the experimenter to attend
the training sessions and the scheduled basketball practices. These
four observers were upperclass college students who had previously taken a physical education course in which they learned the principles of applied behavior analysis.

Two of the observers concentrated on the observation of the coach's behaviors and the other two were responsible for observation of the performers' behaviors. During the training sessions and the days on which reliability checks were scheduled, all four observers were on duty. On all other days, one recorder for coach behavior and one recorder for performers' behavior were present.

Behavior Definitions and Observation Procedures

Coach Behavior

Behavioral definitions. The behaviors emitted by the coach were divided into seven categories and defined as 1) managerial events, 2) monitoring, 3) no activity, 4) skill attempt, positive information feedback, 5) skill attempt, negative information feedback, 6) positive reaction to on-task behavior, and 7) negative reaction to off-task behavior (119). The behavior categories described in detail are:

Category 1. Managerial events - Referred to coach behaviors that provided a discriminative stimulus function indirectly related to learning. This included establishing order, directing the players to change activities, and giving directions for equipment, etc. It also included roll taking, marking down performance scores, and other forms of record keeping directly related to current behavior of students. These behaviors were primarily coach initiated.
(discriminative function) and were not coach reactions to player disturbances (consequential function). This behavior was observed by event recording.

Category 2. Monitoring - Referred to watching the squad as a whole, a subset of the squad, or an individual student. No verbal or non-verbal interaction occurred. This behavior was observed by duration recording.

Category 3. No activity - Referred to all coach behaviors in which visual contact was broken and no verbal or non-verbal interaction occurred. Included looking out the windows, being out of the gym, talking to non-players, and record keeping not directly related to immediate behavior of team members. This behavior was observed by duration recording.

Category 4. Skill attempt, positive IF - Referred to all positive verbal and non-verbal coach reactions to an appropriate skill attempt by a team member. The coach openly demonstrated pleasure with the skill behavior of an individual. It conveyed more than a "that's right, go on" statement. It conveyed a positive feeling. It could have been verbal (e.g. "Team stop! Ruth just made a fine defensive move and I want you to see it." ) or it could have been non-verbal (e.g. excited clapping). This category included coach feedback for student answers about skills and strategies. Examples include a coach's reinforcing behavior such as a pat on the back or expression like "a beautiful job" and "excellent" following a student's
efforts to perform a skill. This behavior was observed by event recording.

Category 5. Skill attempt, negative IF - Referred to all negative verbal and non-verbal coach reactions to an appropriate skill attempt by a team member, including corrective feedback. It did not necessarily imply a punishing or menacing tone. An example is a coach's reaction such as "No, that is not it" or "You can do better than that" following a player's efforts to execute a skill. Corrective feedback referred to statements such as "Your hands were too high" or "Your knees were bent". This behavior was observed by event recording.

Category 6. Positive reaction to on-task behavior - Referred to all positive verbal and non-verbal coach reactions to on-task player behaviors other than skill attempts. The coach openly demonstrated pleasure with the group or individual. It conveyed a positive feeling. An example would be a statement such as "Thank you for your attention" following a student's attentive behavior. This behavior was observed by event recording.

Category 7. Negative reaction to off-task behavior - Referred to all negative verbal and non-verbal coach reactions to off-task player behavior. An example is a statement such as "Stay in line" following a student's being out of line. A coach staring silence following a student's disruptive behavior
is a non-verbal example. This behavior was observed by event recording.

Recording procedure and equipment. A cassette tape was programmed to be divided into equal time intervals of five minutes. At the sound of a single buzz the observers were to commence recording. At the end of the five minutes a double-buzz signal was heard and the observer was given a one-minute rest before the next recording interval would begin. Observations were made for ten five-minute intervals during each practice session.

The apparatus used for recording the behaviors was the Rustrak Event Recorder (A portable recording apparatus, 1972) with eight channels. The events and durations were recorded on pressure-sensitive charting paper by the individual event pens. Each time the observer saw an event behavior she was instructed to push the appropriate button, and if it was a duration behavior, she was required to hold down the button until the behavior ceased.

During the training session and the reliability checks, the coach observers utilized a modified form of the OSU Teacher Behavior Scale Rating Form (see page 33).

The coach observers were advised to become familiar with the seven behavior categories that were designated to be observed. They were instructed to secure the tape recorder, tape cartridge, earphones, and Rustrak event recorder before entering the practice session. Once inside the gymnasium they were told to be unobtrusive as possible, not to interact with the performers, and to position themselves so that the
## COACH BEHAVIOR RATING SCALE

<table>
<thead>
<tr>
<th>Behavior Category</th>
<th>Recording by 5 minute intervals</th>
<th>Total</th>
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<tbody>
<tr>
<td>1. Managerial</td>
<td>Event</td>
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<td>2. Monitoring</td>
<td>Duration</td>
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<td>3. No Activity</td>
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<td>4. Skill attempt</td>
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<td>5. Skill attempt</td>
<td>negative IF</td>
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<td>6. On-task positive</td>
<td>reaction</td>
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<td>7. Off-task negative</td>
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coach's behaviors could be constantly visible and audible. They were made aware that it was imperative for them to be at their station early so that they would start recording immediately when the junior-varsity practice started.

**Participant Behaviors**

The analysis of the performer behaviors served as an assessment of the nature of participation in a basketball training session. The analysis focused on the 1) length of managerial episode, 2) amount of participation, 3) levels of effort applied to performing a defined task, 4) inter-personal reactions, and 5) performance skills.

The performers' behaviors in detail are:

**Category 1. Managerial episodes** - Refers to the lapse of time from the occurrence of a managerial behavior emitted by the coach to the start of the next activity. The next activity may have been input or feedback by the coach, the beginning of a specific drill in which at least 80 per cent of the team members were active, or the beginning of a scrimmage. The recorded duration of time from the start of the episode until the episode was terminated was called response latency.

**Category 2. A. Participation, non-participation** - The athlete was executing a physical activity whose aim was to increase the level of performance of the participant (i.e. participating in drills, participating in conditioning exercises, participating in an inter-squad scrimmage).
Participation for the ten-second interval was recorded as P. For non-participation the observer recorded an N.

B. Flachek - During the ten-second interval the observer scanned the gymnasium from left to right and recorded the number of participants engaged in a physical activity whose aim was to increase the level of performance of the participants.

Category 3. Effort - This referred to the level of effort the athlete applied to performing a defined task such as practicing a skill or following a conditioning program. This was an estimate of how hard the person was working during the ten-second interval.

(a) Maximum - This implied that the observer considered the level of effort to be maximum or very high. It was not obvious that the performer was saving any effort potential. The observer would mark M for this estimate.

(b) Adequate - This implied that the observer considered the level of effort to be adequate; i.e. it was neither maximal nor minimal. The observer marked S for this estimate.

(c) Inadequate - This implied that the observer considered the level of effort to be inadequate; i.e. it was below satisfactory; the performer appeared to be loafing. An I was recorded for this estimate.

Category 4. Performer interaction - The athlete interacted verbally or
non-verbally with another performer or the group within the ten-second interval.

(a) Positive - The athlete interacted verbally or non-verbally with another athlete or group by providing encouragement, positive sanction, feedback, or pleasant correction. Non-verbal positive interaction may have included an encouraging action, clapping of hands, a "thumbs-up" signal, etc. A plus (+) was recorded for this behavior.

(b) Negative - The athlete interacted with another athlete or group verbally or non-verbally within the ten-second interval. Verbally, the athlete may have conveyed animosity or displeasure in the tone and content of the confrontation. Non-verbal interaction consisted of a physical gesture displayed in a negative manner. A minus (-) was recorded for this behavior.

(c) No interaction - A zero (0) was recorded for this behavior.

Category 5. Performance skills -

(a) Shooting percentage - Referred to the number of goals attempted and shots made during the inter-squad scrimmage. The observer recorded all of the baskets attempted by the athlete and circled those shots that were made.

(b) Rebounding - Referred to all offensive and defensive rebounds secured by the athlete. Those data were collected by event recording during the inter-squad scrimmage.
(c) Turnovers - Referred to the athlete being responsible for a loss of possession of the ball without a goal attempt (tie-ball, illegal dribble, traveling, and a poor pass).
This behavior was observed by event recording.

Recording procedure and equipment. A cassette tape was programmed to be divided into equal time intervals of ten seconds. A single buzz would sound to signal the start of recording for ten seconds and a double buzz signal would indicate to stop observing and record for five seconds. Thus, observations were made for ten seconds and then recorded for five seconds during the skill, drill, and instructional phase of the practice session. A specific daily record sheet was designed for this recording. (See page 38)

The observer watched subject one for ten seconds and recorded for five seconds and then shifted attention to subject two, watched for ten seconds and recorded for five seconds; watched subject three and recorded; watched subject four and recorded; and then turned her attention back to subject one, etc. This procedure of interval recording allowed each subject to be observed for ten seconds each minute.

After every eight intervals (approximately every two minutes) the observers were instructed to take a "Placheck" on the number of team members actively participating. During the ten-second interval the observer would scan the playing area and count how many team members were actively participating and record it on the daily record form. (See page 38)
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</tbody>
</table>

**CODE**

- **Participation - P**
- **Non-Participation - N**
- **Effort**
  - Maximum - M
  - Adequate - S
  - Inadequate - I
- **Interaction**
  - Positive - (+)
  - Negative - (-)
  - No Interaction - (0)
When the coach signaled that an inter-squad scrimmage would begin, the performer observers were instructed to lay aside their present rating sheet and turn to the rating sheet designed specifically for the scrimmage. (See page 40) This scrimmage recording continued until the end of the practice session.

The performer observers were advised to become familiar with the behaviors that were to be recorded. They were instructed to secure the tape recorder, tape cartridge, earphones, pencil, clip board, and the two daily recording sheets. Once inside the gymnasium, they were told to be unobtrusive as possible, not to interact with the performers, and to position themselves so that the four selected subjects could be seen and heard at all times. The observers were made aware that it was imperative for them to be at their station early so that they could start recording immediately when practice started.

Establishing Reliability

The training sessions for the four observers were conducted using a college varsity basketball coach and her team. After each session the observers would retire to an isolated area to compare their ratings and to discuss differences. The training continued until the reliability was above the accepted level of 80 per cent for each behavior category. A total of five sessions was conducted for the coach's-behavior recording and four sessions for the performer-behavior recording.
### SCRAMMAGE RATING SHEET

<table>
<thead>
<tr>
<th>Date</th>
<th>Duration of Scrimmage</th>
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**Event Recording**

1. **Shooting Percentages:**

2. **Rebounding:**

3. **Turn-overs:**

---

### Recording Details

- **Shooting Percentages** - Record # of subject each time she attempts a goal and circle number if made.
- **Rebounding** - Record # of subject each time she successfully secures an offensive or defensive rebound.
- **Turn-over**

### Participation of Subjects (duration recording)

<table>
<thead>
<tr>
<th>Subject 1</th>
<th>Subject 2</th>
<th>Subject 3</th>
<th>Subject 4</th>
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Experimental Procedure

Baseline

The operant levels of both the coach and the four team members were recorded during the baseline period. The baseline data were recorded for seven scheduled practice sessions before experimental conditions began. Neither the coach nor the players were aware of the target behaviors that were being observed. The coach was observed for the required ten five-minute intervals and the players throughout the instructional and scrimmage phases of the practice sessions.

Phase I

Phase I of the study consisted of a series of three interventions on the coach's behavior in which one or two of the seven coach's behaviors were selected for target behaviors. The single independent variable of directed information feedback was employed at each intervention. The feedback consisted of instructions, graphic feedback, cueing and reinforcement, and goal setting. The performers' behaviors continued to be recorded in a baseline condition. The strategies for the three interventions were as follows:

Intervention 1. Intervention 1 consisted of introducing the coach to the two target behaviors, skill attempt-positive information feedback (Category 4) and skill attempt-negative information feedback (Category 5). The strategy of Intervention 1 consisted of defining the two behaviors, graphically showing the data to the coach, and verbal and written instructions. The written instructions to the coach were as follows:

1. You should focus on things the students do well rather than always correcting errors.

2. You should use modeling whenever it is possible so that other students can see this interchange.


4. Vary your reinforcement -

   Non-verbal
   a. pat on the back
   b. clapping hands
   c. smiling

   Verbal
   a. a great pass, Jane
   b. you really got off the floor that time, Ellen
   c. beautiful shot, Gail
   d. excellent defensive more, Patti
   e. splendid defense, gang
   f. very good, Kris, you kept your eye on the ball this time
   g. great
   h. that's very good
   i. the offense is looking better
   j. fantastic pursuit, Maureen
   k. terrific fake, Carol
   l. I never saw you jump so high, Carol
   m. perfect play
5. Reinforce only those skill behaviors that you want. Don't overdo! Don't be phony!

6. For those players who are underachievers, use the shaping procedure.

Reinforcement through graphic feedback and verbal praise contingent upon her performance was consistently given to the coach after each practice session following the initial intervention on Categories 4 and 5.

**Intervention 2.** The target behaviors for Intervention 2 were the positive reaction to on-task (Category 6) and negative reaction to off-task behavior (Category 7). The strategy consisted of presenting the coach with the two target behaviors by giving their definitions and verbal examples, graphic performance results, and verbal and written instructions. The written instructions to the coach were:

1. You should focus on things the students do well rather than always correcting inappropriate behaviors.
2. Use modeling whenever possible.
4. Reinforce only those behaviors that you want. Don't overdo! Don't be phony!
5. Those players who usually do not obey or do not usually give their complete attention - use the shaping procedure.
6. Praise those who are working on their individual skills.
7. Vary your reinforcement -
Non-verbal
   a. pat on the back
   b. clapping hands
   c. smiling

Verbal
   a. Sally, you really are helping the team
   b. your attitude is great today
   c. I appreciate your attention
   d. you have been working very hard
   e. you are giving me 110 per cent
   f. that's the way to get that equipment out
   g. all those who have attended all the practices
certainly deserve a pat on the back
   h. thank you for coming over quickly, now we can get
to work

Reinforcement through graphic feedback and verbal praise contingent upon her performance was consistently given to the coach after each practice following the initial intervention on Categories 6 and 7.

**Intervention 3.** Managerial episodes (Category 1 of participants' behaviors), response latencies, managerial events (Category 1 of the coach's behaviors) were the target behaviors for Intervention 3. Definitions, graphic feedback, written and verbal instructions were given to the coach. The experimenter suggested a specific goal for these behaviors as this intervention was discussed. The written suggestions for this intervention were as follows:
1. Post your practice schedule, giving time and what follows next.

2. Assign group into two squads so that they break up easier.

3. Whenever the team responds appropriately be sure to give verbal reinforcement. This can be done with individuals, small groups, or a team as a whole.

4. A definite signal for assembling should be developed.

5. When changing activities, the coach should gain attention with a designated signal and give clear and full instructions for the next organizational pattern.

6. Use of stop watch. The coach can have a stop watch and record the amount of time it took them to assemble. Give the team feedback as to how they did.

7. Don't overdo it. Don't be phony. Don't underestimate the effects of some simple and sincere words of appreciation.

Reinforcement through graphic feedback and verbal praise contingent upon her performance was constantly given to the coach after each practice session following the initial intervention on Categories 1 of the participants' behaviors and Category 1 of the coach's behaviors.

Phase II

Phase II of the study consisted of two interventions. Each intervention was accompanied with direct information feedback to the coach of the target behaviors of the group and individual subjects' behavior analysis. At this point of the experimental conditions, the coach's behavior became the independent variable and the performers'
behavior became the dependent variable. At no time during the investigation did the performers know who or what behaviors were being recorded. The observers continued to record the coach behaviors so that assessment and feedback was given to the coach throughout the 28 practice sessions.

The strategies for the two interventions were as follows:

**Intervention I.** The coach was made aware of the definition and results of the plachecks (Category 2b). The percentage of actual group participation was graphically shown to the coach and verbal and written instructions were supplied by the experimenter. The individual subject participation, non-participation (Category 2a) were also shown to the coach for feedback on these individual performers. The written instructions for Intervention I were as follows:

1. Drills should be designed so that the maximum number of performers could get maximum amount of participation.
   a. Utilize as many basketballs as possible.
   b. Take advantage of as many baskets available as possible.
   c. Put the group into smaller squads for more active participation. Standing in line is not active participation.

2. Minimize the amount of verbalization for explanation. Perhaps you could utilize non-practice time for verbalization and practice time for actual active practice.
3. Continuing to decrease the managerial episodes (Category 1) should increase the amount of possible time for active participation.

4. Reinforce those students who make attempts to take meaningful active participation opportunities.

5. Use modeling for reinforcement.

6. Organize the practices so that the time can be spent most beneficially in active participation.

**Intervention 5.** Evidence of performance levels of the four subjects on performer interaction (Category 4) was revealed to the coach. This feedback was in the form of individual graphs of the four subjects. The strategy for Intervention 5 was graphic feedback, and verbal and written instructions. The written instructions were as follows:

1. Praise or recognize those who show positive verbal or non-verbal interaction to another team member or the team as a whole.

2. Give reinforcement immediately after the desired response.

3. Set a possible goal with the team by suggesting that all team members interact in a positive way sometime or many times during that practice. Some general feedback on their rate of response at the termination of the practice should be given.
Experimental Analysis

Reliability

Reliability checks were used to provide added confidence that it was the behavior and not the observers' recording of the behavior which changed from one intervention to another. The independent observers were not made aware of the experimental conditions in effect.

Computing of the reliability was expressed in numerical terms. The percentage of agreement on all of the behavior categories, except for Category 1 of the participants, was computed by dividing the number of instances of agreement on the observers' records by the total number of agreements plus disagreements. The quotient was then multiplied by 100 and the resulting figure was the percentage of agreement between the records (Hall, 1971, p. 18).

Reliability on Category 1 of the participants' behavior (managerial episode) was determined by dividing the record of the observer with the lower figure by the record of the observer with the higher figure and multiplying by 100 (Hall, 1971, p. 18).

During the pre-baseline observer training reliability checks were required for every observation. Before baseline observations were started, consistent reliabilities above 80 per cent were required for all behavior codes. Once the experimental conditions were initiated, five intermittent reliability checks were recorded for the coach observers and five for the observers of the performers.
Analysis of Data

The basic research design for this investigation was a dual-multiple-baseline. One baseline was employed to measure the behavior of the coach and the other to measure the performers' behaviors. The designated behaviors of the coach, the team, and the four selected subjects were measured prior to instituting any experimental procedure. An experimental procedure was then introduced for one or more of the behaviors. At subsequent points, the procedure was instituted for the second, then for the third, etc. If there were successive changes in the behaviors at the points where the interventions were instituted, a cause and effect relationship between the behavior and the condition was demonstrated.

The outline of the design interventions and behaviors is as follows:

I. Phase I - Coach's Behavior
   A. Intervention one
      1. Positive information feedback (Category 4)
      2. Negative information feedback (Category 5)
   B. Intervention two
      1. Positive on-task (Category 6)
      2. Negative off-task (Category 7)
   C. Intervention three
      1. Managerial episodes (Category 1 of participants' behaviors)
      2. Managerial events (Category 1 of coach's behaviors)
II. Phase II - Participants' Behaviors

A. Intervention one - group active participation (Category 2B)

B. Intervention two - performer interaction (Category 4)

In Phase I, the first intervention on Categories 4 and 5, and consisted of event recording of positive information feedback and negative information feedback. These discrete events were totaled for each fifty-minute practice session prior to and following the experimental condition.

The second intervention consisted of Category 6 and 7 (positive on-task and negative off-task) and, likewise, consisted of event recording. The total number of each of these responses was recorded for the 28 fifty-minute observation sessions, prior to and succeeding the intervention.

Categories 1 of participants' behaviors and 1 of coach's behaviors (managerial episodes and managerial behaviors) were the target behaviors for the third intervention. The managerial episodes were measured with duration recording and managerial behaviors by event. The total amount of time spent in managerial episodes in each session was recorded, and the sum total of managerial responses was reported.

Phase II was initiated by targeting in on the amount of group active participation (Category 2B) through the use of the placheck. The number of team members participating during the ten-second intervals were recorded. The maximum amount of possible participation was then divided into the actual number of team members engaged in the behavior.
By multiplying the result by 100 the per cent of those engaged in active participation during the drill and skill section of the session was recorded.

Intervention two of Phase II considered interval recording of performer interaction. The number of intervals in which each team subject interacted was divided by the maximum number of intervals to find the percentage of positive interacting behaviors for each of the selected four subjects.

Any increase or decrease in the rate of response of any of the target behaviors was demonstrated by computing the mean and the per cent of increase and decrease.
CHAPTER IV

RESULTS

Data Presentation

Reliability

Seven reliability checks on the seven coaching behavior categories were taken throughout the entire study. The results of these checks are shown in Table 1. Sessions two and three represent the agreement between the observers during the baseline. Reliability checks were then taken in sessions 10, 14, 19, 27, each of which followed an intervention.

TABLE 1

PER CENT OF AGREEMENT ON RELIABILITY CHECKS ON COACH'S BEHAVIORS

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>85</td>
</tr>
<tr>
<td>3</td>
<td>95</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>14</td>
<td>84</td>
</tr>
<tr>
<td>19</td>
<td>97</td>
</tr>
<tr>
<td>23</td>
<td>97</td>
</tr>
<tr>
<td>27</td>
<td>98</td>
</tr>
<tr>
<td>Mean</td>
<td>93.7</td>
</tr>
</tbody>
</table>
Seven reliability checks were also taken on performer behavior categories. Table 2 shows the results of these seven checks. Sessions two and three were scheduled during the baseline period, while sessions 10, 14, 19, and 27 were the reliability checks that followed each of the five interventions.

**Table 2**

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Categories</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5a</td>
<td>5b</td>
<td>5c</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>84</td>
<td>95</td>
<td>94</td>
<td>99</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>91</td>
</tr>
<tr>
<td>3</td>
<td>89</td>
<td>92</td>
<td>95</td>
<td>95</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>10</td>
<td>86</td>
<td>89</td>
<td>98</td>
<td>97</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>89</td>
</tr>
<tr>
<td>14</td>
<td>91</td>
<td>88</td>
<td>96</td>
<td>97</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>92</td>
</tr>
<tr>
<td>19</td>
<td>96</td>
<td>93</td>
<td>98</td>
<td>97</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>89</td>
</tr>
<tr>
<td>23</td>
<td>93</td>
<td>95</td>
<td>97</td>
<td>97</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>94</td>
</tr>
<tr>
<td>27</td>
<td>97</td>
<td>93</td>
<td>100</td>
<td>93</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>88</td>
</tr>
<tr>
<td>Mean</td>
<td>90.9</td>
<td>92.1</td>
<td>96.9</td>
<td>96.4</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>89</td>
</tr>
</tbody>
</table>

**Phase I**

Phase I of the study consisted of three interventions on the coach’s behavior in which one or two of the seven coach’s behaviors were selected for target behaviors. Intervention 1 focused on Categories 4 and 5; Intervention 2 focused on Categories 6 and 7; and Intervention 3 focused on Categories 1 and 2.
**Intervention 1.** The purpose of Intervention 1 was to increase the rate of positive information feedback responses and to decrease the number of negative feedback responses. Intervention 1 involved giving the coach feedback on the rate of positive and negative information feedback responses she gave to the team members after skill attempts.

Table 3 graphically shows the significant increase in the number of positive feedback responses and the decrease in negative information feedbacks by the coach throughout the 28 sessions. Table 4 indicates the mean change and percent of change for both Categories 4 and 5.

**Intervention 2.** The purpose of Intervention 2 was to increase the positive on-task responses and decrease the negative off-task responses to the players non-skill behaviors. Table 3 demonstrates an increase in both Categories 6 and 7 and Table 4 displays the mean change and percent of change. Even though the positive on-task responses show a marked per cent of increase, this behavior was not occurring at a significant rate after Intervention 2.

**Intervention 3.** Managerial episodes (Category 1 of performer behaviors) and response latencies, and managerial events (Category 1 of coach's behaviors) were the target behaviors for Intervention 3. The purpose of this intervention was to decrease the amount of time consumed in managerial episodes and response latencies, and to reduce the number of managerial events emitted by the coach during the episodes. Intervention 3 occurred after session 16. The results of the intervention on both these categories are given in Tables 5 and 6.
<table>
<thead>
<tr>
<th>Category #4</th>
<th>Positive Information Feedback</th>
<th>Minutes</th>
<th>M=0.56</th>
<th>M=1.19</th>
<th>M=1.23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category #5</td>
<td>Negative Information Feedback</td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
<td>M=0.89</td>
</tr>
<tr>
<td>Category #6</td>
<td>Positive On-Task</td>
<td>M=0.002</td>
<td>0.15</td>
<td>I.2</td>
<td>0.06</td>
</tr>
<tr>
<td>Category #7</td>
<td>Negative Off-Task</td>
<td>M=0.01</td>
<td>0.15</td>
<td>I.2</td>
<td>0.07</td>
</tr>
</tbody>
</table>

**TABLE 3**

**EVENTS PER MINUTE OF COACH BEHAVIORS, CATEGORIES 4, 5, 6 AND 7**

**Graphs**

- Category #4: Positive Information Feedback
- Category #5: Negative Information Feedback
- Category #6: Positive On-Task
- Category #7: Negative Off-Task
TABLE 4
RATE PER MINUTE OF CHANGE IN COACH BEHAVIORS,
CATEGORIES 4, 5, 6, AND 7

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean Rate in Baseline</th>
<th>Mean Rate After Intervention</th>
<th>Mean Change</th>
<th>Per Cent of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pos. Inf. Feedback</td>
<td>0.56</td>
<td>1.23</td>
<td>+.67</td>
<td>+119.6</td>
</tr>
<tr>
<td>Neg. Inf. Feedback</td>
<td>1.19</td>
<td>.89</td>
<td>-.30</td>
<td>-25.2</td>
</tr>
<tr>
<td>Positive On-Task</td>
<td>.002</td>
<td>.06</td>
<td>+.058</td>
<td>+2900.0</td>
</tr>
<tr>
<td>Negative Off-Task</td>
<td>.01</td>
<td>.07</td>
<td>+.03</td>
<td>+75.0</td>
</tr>
</tbody>
</table>

Table 5 graphically shows a non-significant increase in mean events per managerial episode, a slight decrease in mean lengths of each episode, and a reduction of over a minute in mean total time spent in managerial episodes during the practice sessions following Intervention 3. Table 6 (page 58) demonstrates the mean change and per cent of change of Category 1 of coach's and performers' behaviors.

Phase I also consisted of analysis of subsequent changes in player behavior as a result of the intervention strategies on the coach's behaviors.

Table 7 (page 59) shows the active participation behavior patterns of the four randomly selected player-subjects during the 21 sessions of Phase I. No significant change in active participation in any of the four subjects occurred as a result of any of the first three interventions.
TABLE 5
CATEGORY 1 OF COACH BEHAVIORS AND CATEGORY 1
OF PERFORMER BEHAVIORS

<table>
<thead>
<tr>
<th>Category #1</th>
<th>Coach</th>
<th>Event Per Episode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category #1</th>
<th>Performer</th>
<th>Length Of Episode (Response Latencies)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Time</th>
<th>Spent In Managerial Episode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Graph](image)
Table 6 (page 60) demonstrates the per cent of positive interaction by the four subjects during Phase I. The rate of positive social interactions by any of the subjects did not increase or decrease as a result of any of the three interventions.

Player effort by the four subjects during Phase I is displayed in Table 9 (page 61). The high per cent of adequate and maximum effort recorded was not affected by any of the three interventions.

**Phase II**

Phase II of the study consisted of two interventions on the participants' behaviors which did not display any effective change as a result of the change in the coach's behavior in Phase I or which indicated that a change would be desirable. The first intervention in Phase II was on participation (Category 2) and Intervention 2 was on social interaction (Category 4). Intervention on effort (Category 3)
<table>
<thead>
<tr>
<th>Subject</th>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject 1</td>
<td><img src="#" alt="Graph" /></td>
<td><img src="#" alt="Graph" /></td>
<td><img src="#" alt="Graph" /></td>
</tr>
<tr>
<td>Subject 2</td>
<td><img src="#" alt="Graph" /></td>
<td><img src="#" alt="Graph" /></td>
<td><img src="#" alt="Graph" /></td>
</tr>
<tr>
<td>Subject 3</td>
<td><img src="#" alt="Graph" /></td>
<td><img src="#" alt="Graph" /></td>
<td><img src="#" alt="Graph" /></td>
</tr>
<tr>
<td>Subject 4</td>
<td><img src="#" alt="Graph" /></td>
<td><img src="#" alt="Graph" /></td>
<td><img src="#" alt="Graph" /></td>
</tr>
<tr>
<td>X - absent</td>
<td><img src="#" alt="Graph" /></td>
<td><img src="#" alt="Graph" /></td>
<td><img src="#" alt="Graph" /></td>
</tr>
</tbody>
</table>

**Table 7:**

Per cent of player participation during phase I.
TABLE 8

PER CENT OF PLAYER POSITIVE SOCIAL INTERACTION DURING PHASE I

Subject 1

Subject 2

Subject 3

Subject 4

X – absent

Sessions
TABLE 9

PER CENT OF PLAYER EFFORT DURING PHASE I

Subject 1

Subject 2

Subject 3

Subject h

X - absent

Sessions

I.1  I.2  I.3
was deemed not to be necessary and no interventions were planned for performance behaviors.

**Intervention 1.** This intervention consisted of two parts, group participation and individual subject participation. The purpose of this intervention was to increase the amount of active participation occurring in the practice session.

Group participation was investigated through the use of place-checks. Table 10 shows that during the first 21 sessions the mean amount of group participation was 31 per cent. Following the intervention strategy, the mean amount of group participation increased to 54 per cent, an increase of 74 per cent.

Mean per cent in baseline = 31%
Mean per cent after intervention = 54%
Mean Change = 23%
Per cent of Change = 74%

**TABLE 10**

MEAN PER CENT OF GROUP PARTICIPATION

![Graph showing percentage of group participation over sessions with interventions I.1, I.2, I.3, and I.4 marked. The graph peaks at 100% after each intervention and drops back down before the next intervention. The baseline is marked at 31%.]
Individual subject participation change is graphically displayed in each of the subsequent Subject Tables, 11, 12, 13, and 14. The mean change and per cent of change in participation are given in Table 15 (page 68).

The per cent of participation for all four subjects coincided very closely with the group participation increase so individual interventions were not indicated. As Table 15 demonstrates, Subjects 2 and 4 showed the greatest per cent of change.

**Intervention 2.** The purpose of Intervention 2 was to increase the per cent of intervals in which the subjects were recorded as having emitted positive interaction responses. Positive social interaction behavior and the resulting behavior change is shown in the individual subject charts. (See Tables 11, 12, 13, and 14.)

Table 15 presents significant increases in per cent of change of all four subjects but the number of sessions in which this behavior was recorded limits the conclusions that can be drawn.

**Participants' performance behaviors.** No intervention was instituted on the performance behaviors of the four subjects, but these behaviors were continuously recorded to investigate if changes in the coach's behavior would affect a change in the subjects' performance behaviors. Table 20 (page 74) compares the four subjects in the three performance behaviors and their final shooting percentages.

Table 16 gives the performance behavior pattern of $S_1$. This participant was attempting shots at the basket at a mean rate of .07 shots per minute per session. She was averaging .09 offensive and
TABLE 11

SUBJECT ONE: CATEGORIES 2, 3, AND 4

Participation

Social Interaction

Effort

X - absent

\[ M = 34.8\% \]
\[ M = 46.4\% \]

\[ M = 0.7\% \]
\[ M = 16\% \]
TABLE 12
SUBJECT TWO: CATEGORIES 2, 3, AND 4

Participation

Social Interaction

Effort

X = absent

Sessions

M = 33%
M = 53.8%
M = 1%
M = 3%
TABLE 13
SUBJECT THREE: CATEGORIES 2, 3, AND 4

<table>
<thead>
<tr>
<th>Participation</th>
<th>Social Interaction</th>
<th>Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M = 41%$</td>
<td>$M = 12.7%$</td>
<td></td>
</tr>
<tr>
<td>$I.1$</td>
<td>$M = 55%$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I.2$</td>
<td>$M = 35.3%$</td>
</tr>
</tbody>
</table>

X - absent

Sessions
TABLE 1
SUBJECT FOUR: CATEGORIES 2, 3, AND 4

<table>
<thead>
<tr>
<th>Participation</th>
<th>Social Interaction</th>
<th>Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>M = 36.7%</td>
<td>M = 3.5%</td>
<td></td>
</tr>
<tr>
<td>M = 58.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X - absent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sessions: 1, 5, 10, 15, 20, 25, 28
TABLE 15
PER CENT OF CHANGE IN PARTICIPANTS' BEHAVIORS
CATEGORIES 2 AND 4

<table>
<thead>
<tr>
<th></th>
<th>Mean Per Cent in Baseline</th>
<th>Mean Per Cent After Intervention</th>
<th>Mean Change</th>
<th>Per Cent of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>34.8</td>
<td>64.4</td>
<td>+11.6</td>
<td>+33.33</td>
</tr>
<tr>
<td>Social Inter.</td>
<td></td>
<td>18.0</td>
<td>+17.3</td>
<td>+4271.43</td>
</tr>
<tr>
<td>S2</td>
<td>33.0</td>
<td>53.8</td>
<td>+20.8</td>
<td>+63.03</td>
</tr>
<tr>
<td>Social Inter.</td>
<td></td>
<td>3.0</td>
<td>+2.9</td>
<td>+29000.00</td>
</tr>
<tr>
<td>S3</td>
<td>41.0</td>
<td>55.0</td>
<td>+14.0</td>
<td>+31.15</td>
</tr>
<tr>
<td>Social Inter.</td>
<td>12.7</td>
<td>35.3</td>
<td>+22.6</td>
<td>+177.95</td>
</tr>
<tr>
<td>S4</td>
<td>36.7</td>
<td>58.6</td>
<td>+21.9</td>
<td>+59.57</td>
</tr>
<tr>
<td>Social Inter.</td>
<td>3.5</td>
<td>15.7</td>
<td>+12.2</td>
<td>+34.857</td>
</tr>
</tbody>
</table>

defensive rebounds per minute for each session and causing .08 turnovers per minute per session. Her final shooting percentage for the practice scrimmage games during the season was 9 shots for 95 attempts, a percentage of 9.47. (Table 20)

Subject 2 (Table 17) attempted 107 shots during the scrimmage games for a mean rate of .22 shots per minute per session. She made 31 of these shots for a 31.78 shooting percentage. (Table 20) Her rate per minute of offensive and defensive rebounds was an average .17 per session. She averaged .06 turnovers per minute.
TABLE 16
RATE PER MINUTE OF PERFORMANCE BEHAVIORS:
SUBJECT ONE

<table>
<thead>
<tr>
<th>Shots Attempted</th>
<th>Rebounds</th>
<th>Turnovers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sessions
0 - no scrimmage
X - absent
TABLE 17
RATE PER MINUTE OF PERFORMANCE BEHAVIORS:
SUBJECT TWO

Shots Attempted

Rebounds

Turnovers

0 - no scrimmage
X - absent
Table 18 demonstrates the performance behavior patterns of S3. This participant was attempting shots at a mean rate of .16 per minute. Her final shooting percentage for the scrimmage games was 24.4%, making 34 shots out of 104 attempts. (Table 20) Turnovers averaged .06 per minute per session and she had a mean rate of .15 offensive and defensive rebounds per minute in each session.

Subject 4 (Table 19) attempted an average of .15 shots per minute during each scrimmage game and ended up with a 24.4% scrimmage game shooting percentage for the season, 22 for 99 attempts. (Table 20) Subject 4's rate per minute of offensive and defensive rebounds was an average of .09 per session. She averaged .09 turnovers per minute.

Discussion of Data
Reliability
At no time in any coach behavior categories did the reliability fall below the 80 per cent criterion level. The frequent 100 per cent agreements occurring in Categories 3, 6, and 7 were probably due to the low frequency of occurrence of these three behaviors.

The lowest mean reliability for performer category was Category 6 which was recorded via plachec check techniques. Even though the 89 per cent was well above the accepted level, the observers experienced some difficulty in coming to exact agreements due to the often sudden change of activity during the ten second interval.

The high level of reliability resulting in Category 3, the measurement of levels of effort, was not anticipated by the experimenter. Table 2 does demonstrate that the mean average of 96.9 per cent
### TABLE 18
RATE PER MINUTE OF PERFORMANCE BEHAVIORS:
SUBJECT THREE

<table>
<thead>
<tr>
<th></th>
<th>Session 0</th>
<th>Session 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sh o t s Attempted</td>
<td>1.1</td>
<td>0.00</td>
</tr>
<tr>
<td>Rebound s</td>
<td>1.3</td>
<td>0.50</td>
</tr>
<tr>
<td>T u r n o ve rs</td>
<td>1.2</td>
<td>1.00</td>
</tr>
</tbody>
</table>

O = no scrimmage
X = absent
| TABLE 19

RATE PER MINUTE OF PERFORMANCE BEHAVIORS:
SUBJECT FOUR

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shots Attempted</td>
<td>Rebounds</td>
<td>Turnovers</td>
</tr>
<tr>
<td>Events</td>
<td>Events</td>
<td>Events</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>1.1</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>

0 - no scrimmage
X - absent
<table>
<thead>
<tr>
<th>Subject</th>
<th>Shots Attempted Rate/Minute</th>
<th>Shooting Percentage</th>
<th>Rebounds Rate/Minute</th>
<th>Turnovers Rate/Minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject 1</td>
<td>.07</td>
<td>9.47</td>
<td>.09</td>
<td>.08</td>
</tr>
<tr>
<td>Subject 2</td>
<td>.22</td>
<td>31.78</td>
<td>.17</td>
<td>.06</td>
</tr>
<tr>
<td>Subject 3</td>
<td>.16</td>
<td>32.69</td>
<td>.15</td>
<td>.06</td>
</tr>
<tr>
<td>Subject 4</td>
<td>.15</td>
<td>24.44</td>
<td>.09</td>
<td>.14</td>
</tr>
</tbody>
</table>
agreement by the observers indicates that effort can be measured by two independent observers with a high level of accuracy.

The high reliabilities found in Categories 5a, 5b, and 5c were due to the easily defined performance categories of shooting, rebounds, and turnovers.

Phase I

Three interventions on the coach's behavior were made in Phase I. Intervention 1 consisted of intervention on Categories 4 and 5, Intervention 2 on Categories 6 and 7, and Intervention 3 focused on Category 1 of both the coach and performers' behavior.

Intervention 1. The data from Tables 3 and 4 does indicate that:

1. The coach did focus on and respond with more positive information feedback after skill attempt responses by the team participants following the intervention strategy.

2. Negative information feedback responses by the coach did decrease following the intervention strategy.

3. All four subjects did show an increase in their amount of active participation immediately following Intervention 1 even though their percent of active participation per session did return to their baseline level in later sessions. (See Table 7)

Intervention 2. The data from Tables 3 and 4 leads to the following discussion.
Table 3 shows that positive on-task reactions were almost non-existent prior to the intervention preceding the twelfth practice session. Once the intervention strategy was initiated, the positive reaction responses by the coach increased only slightly and with some difficulty expressed by the coach-subject. The experimenter found it necessary to attempt to set goals for the coach prior to each session and even these were not often met. The results of Intervention 2 are outlined below. The coach-subject expressed reluctance to give positive reaction to expected desired behaviors.

1. The intervention strategy was successful in increasing the number of positive on-task responses by the coach. The very large percent increase was due to relatively non-existent occurrence of this behavior prior to the experimental condition.

2. The strategy for Intervention 2 was to increase the coach's behavior of Category 6 and decrease the behavior in Category 7. The data clearly demonstrates that even though Category 6 increased, so, too, did the coach's behavior of Category 7.

3. No discernible effect on the participants' behaviors as a result of Intervention 2 seems evident. (Tables 7, 8, and 9)

Intervention 3. Managerial episodes (Category 1 of coach's behavior), response latencies, and managerial events (Category 1 of performers' behavior) were the target behaviors for Intervention 3. The discussion and results are as follows:

1. A goal of two managerial behaviors per episode was set by the experimenter during the strategy for this intervention, but Table 6
indicates that, in actuality, there was a very slight increase in this behavior following the intervention. Managerial behaviors per episode remained virtually at the same number of responses as the operant level. This increase would not be considered significant as two managerial events per episode would be considered as appropriate and three not excessive.

2. The intervention strategy was effective in reducing the mean duration of time from the start of the managerial episode until the episode was terminated (response latency). (See Tables 5 and 6) The goal of 30 seconds per episode suggested by the experimenter was met by the coach-subject.

3. Even though the total time the coach consumed out of the 50-minute observation period for managerial episodes before the intervention does not appear to be excessive, the total time per session was reduced as a result of the intervention.

4. No discernible effect on the participants' behaviors as a result of Intervention 3 seems evident. (Tables 7, 8, and 9)

No interventions on monitoring behavior (Category 3) and no activity (Category 4) were made in this study. This decision was made by the experimenter because the baseline level of these two behaviors was acceptable.

Phase II

Phase II of the study consisted of two interventions on the participants' behaviors which did not display any effective change as a result of the change in the coach's behavior in Phase I or which
indicated that a change would be desirable. The first intervention in Phase II was on participation (Category 2) and Intervention 2 was on social interaction (Category 4). Intervention on effort (Category 3) was deemed not to be necessary and no interventions were planned for performance behaviors. The two behaviors were participation and social interaction.

**Intervention 1.** This intervention consisted of two parts, group participation, and individual subject participation. Tables 10 and the individual subject tables (Tables 11, 12, 13, and 14) show the results. The discussion and results are as follows:

1. Directed information feedback on the amount of active group participation that was given to the coach was effective to change the behavior of the coach and as a result of this change increased the percentage of active group participation during each session following the intervention.

2. No intervention on the individual subject was necessary as the increase in each subjects' participation paralleled that of the group participation increase. (See Table 10)

3. All of the four subjects show a large increase in the amount of active participation per session as a result of the intervention strategy. Subjects 2 and 4 made the most significant increases.

**Intervention 2.** Social interaction was the target behavior for the last intervention. Positive social interaction behaviors were presented in Tables 11, 12, 13, and 14. The discussion and results are as follows:
1. With the exception of $S_3$ who had a mild rate of positive responses, positive social interaction behaviors by the subjects during the conditioning and skill-drill phase of the practices were almost non-existent during the baseline period.

2. The positive social interaction behavior of the subjects was not affected until this specific behavior was instituted into an intervention strategy.

3. Because of the lack of practice sessions remaining in this study it can only be concluded that all of the subjects started an ascending trend of positive social interventions following the intervention.

Participants' performance behaviors. No interventions were instituted on the performance behaviors of the four subjects. The discussion on the individual subjects and performance behavior patterns is as follows:

Subject 1. Subject 1 was randomly selected from the low expectation group as was designated by the coach prior to the opening of formal practices. The performance behavior pattern of this participant is shown in Table 16.

The shots attempted chart shows a high rate of shooting attempts the second session but then this behavior tends to decrease throughout the remainder of the study. Subject 1's mean rate of .07 shots per minute was the lowest rate of any of the other subjects. (Table 20) None of the scheduled interventions appeared to have any effect on this
subject's shooting behavior. The shooting percentage of 9.47 indicates that this subject was placed properly in the low expectation group.

Offensive and defensive rebound behavior does not appear to have been effected by any of the five interventions as this behavior remained fairly stable throughout the season.

Turnovers per minute in each of the sessions by S1 do show a tendency to decline even though the desirable behavior pattern in this category would show a definite decline. The chart does not indicate that the existing slight decline was due to any change of behavior of the coach through planned intervention.

Subject 2. Subject 2 was also randomly selected from the designated low expectation group. The performance behavior pattern of this subject is shown in Table 17.

The shots attempted chart indicates an increase in rate of shooting attempts per minute as the season progressed. This increase does appear to occur after Intervention 1 of the coach's behavior (positive and negative information feedback) but then the rate of responses does drop down almost to operant level in later sessions. The chart does demonstrate that the subject did increase her rate of shots attempted per minute and Table 20 shows her mean of .22 shots per minute to be the highest of the four subjects. Her shooting percentage was the second highest score. The placement of this subject into the low expectation group does not bear up with the collected data of this study.

Subject 2's rebounding ability appears to have improved as her rate of rebounds increased as the season progressed. Even though
session 17 shows a drop below the baseline behavior level, the rate of responses did increase after the interventions were initiated. A steady increase in number of rebounds appears after Intervention 1 but a sudden drop occurred in session 17.

The turnover behavior appears to have increased throughout the study instead of the desirable trend of decreasing.

Subject 3. The data on the performance behaviors of S3 demonstrates that the coach decided correctly when she placed S3 in the high expectation group. In Table 18, the shots attempted chart shows that S3 did increase her rate of shots per minute as the season progressed and her mean rate of .16 shots per minute was the third highest of the four subjects and her shooting percentage of 32.69 was the highest. (Table 20) Even though the subjects' shots attempted per minute increased, the experimenter can discern no specific intervention which influenced this increase.

The rebound behavior chart does show a slight increase pattern on this behavior. Again, no intervention in this study seems to have influenced this behavior specifically.

Subject 3's rate of turnovers per minute appears to have remained stable throughout the season even though a reduction in this behavior category would have been desirable.

Subject 4. Subject 4 was randomly selected from the high expectation group. The performance behavior pattern of this participant is shown in Table 19.

Subject 4 was attempting shots at a mean rate of .15 per minute, and there appears to be a slight decrease in this behavior category
during the latter practice sessions. Table 20 shows this subject's shooting percentage to be only the third highest, a 24.84%, which could indicate that the coach rated this participant's ability too high.

The rebound behavior shows a slight increase in the participants rebounding behavior but there does not appear to be any apparent relationship between a scheduled intervention and a change in this behavior category.

This participant's turnover behavior occurred at a high rate at the beginning of the study and a reduction in this behavior does not seem discernable. This subject's mean rate of turnovers of .14 per minute puts her in first place over the other three subjects.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

With the increasing interest in the area of sports psychology and the growth of the use of applied behavior analysis in a variety of human environments, this study undertook to determine the effects of applied behavior analysis techniques in a sport environment. The intent of the study was to investigate 1) the degree to which coaching behavior could be modified, 2) if the resulting change in the coach behavior affected player behavior, and 3) the degree to which coaching behavior could be used specifically to change targeted player behavior.

Tutko, Ogilvie, and Richards (1962, 1965, 1966, 1968, 1971) and their work in the personality assessment of the athlete have brought to the coach practical tools for application in the sport environment. The contributions of Rushall and Siedentop (1967, 1968, 1970, 1972, 1973) on applied behavior analysis in sport and physical education are beginning to call attention to the employment of behavior modification techniques on the courts, fields, gymnasiums, and in the pools. It was because of this lack of extensive research in the use of the reinforcement theory that this experimenter chose to further investigate the use of behavior modification techniques in a particular sport environment.
The subjects were a young female basketball coach, her basketball team, and four randomly selected team members who were involved in the junior-varsity program on the college level.

This study was divided into two phases, each consisting of a series of interventions on a dual-multiple baseline. Phase I called for interventions on coach behavior and analysis of any subsequent changes in player behavior. Phase II called for specific interventions on specific participant behaviors if the changes effected in coach behavior in Phase I failed to show changes in individual player behaviors.

Periodic reliability checks yielded agreements in all behavior categories well above the criterion level of 80 per cent.

Behavior rates during baseline and interventions were compared by examining mean change in behavior and per cent of change. Multiple baselines were used to analyze the degree to which changes in behavior were due to the intervention and not to any variable that was unaccounted for in the study.

Seven behavior categories were observed and tallied for the coach-subject for ten five-minute intervals during each of the scheduled 28 practice sessions. Five behavior categories served as assessment of the nature of participation of the four randomly selected participants. Three dichotomous behavior categories were recorded with the use of ten-second intervals throughout the skill and drill portion of the practice sessions and three performance behaviors through event recording during the practice scrimmages.
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sessions and the mean time per managerial episode were reduced effectively through the use of directed information feedback. No substantial change became evident during the experimental conditions in the number of managerial events necessary for the coach to control the activities of the team members. Through instruction by the experimenter the coach shifted managerial control to other aspects of the environment other than her behavior to gain better organizational techniques. Through these better organizational techniques (i.e. posting practice schedule, using more basketballs, shorter lines in drills) more time could be devoted to actual play and practice.

**Player Behavior**

1. With the exception of active participation, general changes in the coach behaviors during Phase I did not affect a change in the spectrum of behaviors of the four participants.

2. Directed information feedback given to the coach on group participation was effective in increasing the amount of active group participation. The relatively low amount of active group participation prior to intervention does not appear justifiable when you consider the physical demands placed on the participants of this particular sport during actual competition. Better drills and use of existing facilities and equipment was the outcome of this intervention.
Individual Subjects

1. The amount of the individual active participation coincided with the increase in the group active participation so no intervention was necessary.

2. Positive social interaction was almost non-existent in two of the subjects and occurring at a low rate in the other two subjects during baseline conditions. Although increases did start to appear following the Phase II intervention, a definite conclusion relative to social interaction can not be made due to the short experimental period under which this behavior was recorded. The low rate of occurrence of positive social interaction during the baseline was interesting as physical educators and coaches are quick to defend sports and athletics as a means to develop good social values in their participants and yet it doesn't appear that these behaviors were present even though these participants had had previous experience in athletic competition.

3. The ranking by the coach of high expectations and low expectations prior to the opening of formal practices did not hold true to the actual performance data collected on the four participants. Subject two, who was ranked in the low expectation group proved to more of an asset relative to performance behaviors to the team than S4. Subject two did have the lowest rate of social interaction behaviors and this might have led the coach to ranking her in the low expectation group.
The performance behavior of committing turnovers did not show a significant reduction as the season progressed. Just "playing the game" did not affect a reduction in this undesirable behavior, so it appears that a coach must single out this behavior and design a strategy to reduce the number committed by the players.

In general it can be concluded that applied behavior analysis techniques can be used to modify a coach and team members' behaviors. Since the general changes in the coach behaviors, with the exception of active participation, did not affect change in the team members, it appears that desirable and undesirable behaviors must be increased or decreased through planned intervention on the target behavior.

A further finding indicates that the practice of rewarding on-task positive reactions was most difficult for the subject-coach to perform. We as teachers or coaches find it difficult to praise students for doing what is expected of them.

**Recommendations**

A study similar to this could easily be conducted in a high school sport environment with more emphasis on appropriate or inappropriate behaviors more likely to be present in the participants.

Further identification of specific coach behaviors and sub-division of existing categories which would coincide with established traits of a coach would be valuable assistance in coaching methods professional courses.
A study compiling mean rates and identification of coaching behaviors of experienced coaches who have proven to be successful by our present standards would be of great interest. Working with a local athletic league and correlating the mean rates of the individual coach behavior and their success in the league would give some evidence of valuable coach behaviors.

If athletics persist in claiming that desirable traits and values are gained through participation then further identification of and measurement of relative behaviors should be studied and presented through qualified behavior research.
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