

THE RELATIONSHIP BETWEEN MOTOR SKILL ACTIVITY CHOICE
AND THE ACQUISITION OF SKILL AND
ATTITUDES TOWARD PHYSICAL EDUCATION
IN SEVENTH GRADE BOYS

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This study compared the acquisition of skill and attitudes toward physical education manifested by seventh grade boys who were provided with choice during a basketball unit to those of seventh grade boys who were not provided with choice. The subjects were pre and posttested using portions of the AAHPER Basketball Skills Test Manual for Boys and the Kneer Attitude Inventory. The data were analyzed using a multivariate analysis of variance. Following a significant multivariate F value, a post hoc analysis was conducted on each dependent variable. Results of the univariate analysis showed that there was no significant difference between the groups on the dribble test. Neither group improved on the underbasket shot, perhaps due to the complexity of the skill. Subjects in the control (no choice) group demonstrated higher degree of skill on the foul shot test after instruction, while the members of the experimental (choice) group performed

significantly better on the speed pass test. Members of the experimental group reported more positive attitudes toward physical education, although these results reflected a significant disordinal interaction between the groups. The investigator determined that some of the results of this study may be explained by applying Gentile's (1972) notion of a continuum of open and closed skills. The findings of the present study suggest that physical educators might do well to apply a shared decision making (choice) method of instruction when teaching open motor skills, and to use a teacher directed (no choice) method of instruction to facilitate the learning of closed motor skills. Skills that fall in between open and closed might be taught equally as well by either method of instruction.

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To my wife Kathy,
and to my Mother and Father

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Chapter I

INTRODUCTION

One might assume that providing students with choice in the physical education setting would result in more favorable attitudes held by the students toward physical education. One might also logically assume that giving students choice in regards to skill activity would enhance the acquisition of skill by said students. In fact, a review of literature on choice and/or decision making concerning school children reveals that there is a considerable lack of completed research to support such assumptions. This study was undertaken to determine whether or not providing choice in physical education would promote skill acquisition and improve student attitudes toward physical education.

The need for a study such as this one becomes apparent when the lack of a valid body of knowledge about teaching (Goldberger, 1978:23), particularly in the field of physical education, is considered. Studies by J. Hurwitz (1978), Mancini, Cheffers, and Zaichkowsky (1976), and Martinek, Zaichkowsky, and Cheffers (1977) concerning student decision making (choice) in physical education are positive contributions, but clearly invite further research in this area.

In view of the need for further research on student choice/decision making in physical education, this study sought to

determine if students who were given the opportunity to share in the decision making process during a basketball unit would acquire skill more effectively and develop more positive attitudes toward physical education than students who were not provided with choice during a basketball unit.

STATEMENT OF THE PROBLEM

The purpose of this study was to determine the relationship between motor skill activity choice and the acquisition of skill, as well as the attitudes toward physical education associated with seventh grade boys.

HYPOTHESIS

It was hypothesized that seventh grade boys who were provided with choice during a basketball unit would develop more favorable attitudes toward physical education, and demonstrate a greater proficiency in acquisition of skill than seventh grade boys who were not provided with choice during a basketball unit.

DELIMITATIONS

1. The sample was delimited to seventh grade boys enrolled at Soule Road Middle School in Liverpool, New York.
2. The subjects' ages ranged from 11 to 12 years.

LIMITATION

Subjects studied were not randomly assigned to groups. Rather, the groups constituted a sample of convenience from

a natural educational setting.

DEFINITION OF TERMS

The following are definitions of terms as they were used for the purpose of this study:

Choice: The opportunity to share in-class decisions concerning learning experiences.

Learning Experience: Period of time during which one or more students are involved in:

1. competitive participation (game, contest, relay)
2. motor skill performance in non-competitive situations (dancing, practicing, drilling, exercising, problem solving, exploring, "doing," "trying")
3. receiving mediated information about the subject matter of physical education (reading, looking at pictures/posters/charts, watching a film/film-strip/videotape/slide, listening to an instructional tape/record) (R. Hurwitz, 1979:3).

Attitude: A latent or nonobservable, complex, but relatively stable behavioral disposition reflecting both direction and intensity of feeling toward a particular object, whether it be concrete or abstract (Kenyon, 1968:567).

Motor Skill Activity: A physical activity provided as a means for improvement (or practice) of a physical education skill or movement.

Motor Skill Acquisition: The integration of movements into pattern for some purpose (Lawther, 1966:68).

TRIPAC: A coding system designed to determine a Teacher's Role In Providing Activity Choice (R. Hurwitz, 1979).

Chapter II

REVIEW OF LITERATURE

In this chapter, literature which influenced the development of this study is discussed. This chapter consists of three parts. First, literature concerned with student choice (decision making) is presented. Secondly, studies of student attitudes and attitude measuring scales are identified. Finally, the third section of this chapter offers a review of literature pertaining to skill acquisition and skills testing.

LITERATURE ON STUDENT CHOICE (DECISION MAKING)

Each individual's sharing in decision making is a means of practicing a democratic way of life (Lumley, 1979:23). According to Lumley, human values such as individuality, freedom of speech, press, and religious practices (all of which are important expressions of the democratic way of life), are fostered by an active process of individual participation in decision making. Active participation requires good decision making skills. Russell and Roberts (1979) found that decision making skills can be taught at the elementary school level. Russell and Roberts taught a seven step decision making process to 17 elementary school children, and found that these children could achieve significantly greater scores on dependent measures of decision making ability, as compared to children

who did not receive such training. Given the opportunity then, children can develop decision making skills; thereby assuming increasing responsibility for their own behavior, and becoming less dependent upon others.

Physical education teachers can actively contribute toward the development of decision making skills among their students. Heitmann and Kneer (1976:239) stated that teachers must constantly guide the student in the decision making process, giving and explaining options (or choices) to their students, as well as making students aware of the possible consequences of their decisions. In this way, children can be taught to accept the responsibility of their decisions in light of the consequences of their choices.

Teaching decision making skills to students is a skill in itself, that teachers can develop by allowing their students to become more active in the decision making process. This thought appears to be supported by R. Hurwitz (1977:29) who wrote:

As you begin to let your students make some choices about their learning experiences, more and more of your reluctance to do so will dissipate, you'll become more confident in giving choice, and you'll discover many more creative and different ways of doing it.

Hurwitz championed the giving of choice as a way to enhance learning, promote better attitudes toward physical activity, increase student enjoyment, as well as a way to help alleviate non-participation and discipline problems.

Mosston (1966) offered a spectrum of teaching styles within which a teacher of physical education could function. The underlying theme of Mosston's spectrum of teaching styles is

the shift of decision making by the teacher to student decision making. Mosston proposes the increase in the quality of decisions made by students as a method of developing freedom and independence for the learner.

Freedom of choice has been found to have effects on student attitudes toward instruction. Myrow (1979) found that students who were free to choose study topics had a higher affect for the material offered than did students who had topics randomly assigned to them. Myrow determined that providing choice led to greater student enjoyment of study material, and stimulated students in terms of their engagement to the learning task.

Mancini, Cheffers, and Zaichkowsky (1976) studied the effects of decision making on attitudes and interaction in elementary children in a physical education setting. The investigators compared two treatment groups: one in which the teacher made all the decisions and one in which the children were encouraged to take part in the decision making process. Students involved in decision making were given choice of apparatus, choice of activity at each piece of apparatus, choice of whether or not to take part in activities, and choice of time allotted throughout the period of instruction. Results of the study indicated that children involved in the decision making process exhibited more positive attitudes toward physical education, as well as increased interaction with their teachers.

In a similar study, Martinek, Zaichkowsky, and Cheffers (1977) determined that a teacher directed approach in which children do not share in the decision making process is better than a decision making model when motor skill development is the prime concern. By contrast, the authors learned from the

same study that students who shared in decision making concerned with curriculum selection, time allotment, amount of student interaction, amount of student mobility, and student evaluation displayed more positive self concepts than did students not included in decision making.

The literature then, would seem to support Mancini, Cheffers, and Zaichkowsky (1976) in their assumption that students who are enjoying a program are more receptive to what is being taught and are more willing to learn. Their contention that children should be given the opportunity to share in the decision making process in class (even if their decisions may be poor ones), is likewise supported in the recent literature on decision making.

LITERATURE ON STUDIES OF STUDENT ATTITUDES

A review of current literature pertaining to student attitudes demonstrated the importance of studying this phenomenon; and was used to determine which of the many scales to measure student attitudes would be best suited for this study.

Walker et al. (1973:77) promoted a familiar expression in education - "Teaching for the intangibles." Walker described an intangible as something difficult for us to define or measure objectively; such as character, sportsmanship, or citizenship. These qualities would include personal attributes such as loyalty, appreciation, ideals, and attitudes. Physical education has often been credited for the development of such qualities, but claims such as "sport builds character" are easily stated, but difficult to prove. As Carpenter stated,

Lack of evidence, lack of analysis of our freely philosophized aims, lack of controlled research in regard to accomplishments of these aims ... there is a need for truly scientific evidence that we accomplish some of the things we claim to do. We are convinced that we achieve many of these purposes, but what we need to produce is unquestionable evidence that such is the case (Carpenter, 1944:479).

Some attempts have been made to study attitudes in physical education. Heitmann (1966) compared success in achievement (skill and knowledge) with attitudes toward physical education. Heitmann found that some students who were successful in improving their achievement scores reported a dislike for the experience. According to Heitmann, the reaction of these students was to the method and predetermined goals set by a demanding teacher. Perhaps a unit in which students are allowed to share in the decision making process would result in more favorable student attitudes toward physical education. The concept that students' attitudes toward physical education are affected by the manner in which the students are taught is further supported by Heitmann and Kneer who wrote,

(A student's attitude is) his reflection of the way the subject matter is brought to bear on the student: its relevancy to the individual, the degree of success that can be attained, how congruent it is with one's value system, and how it contributes to self-esteem (Heitmann and Kneer, 1976:54).

In another study concerning student attitudes toward physical education, Ray (1968) determined that attitudes of girls with low physical fitness scores were significantly lower than those of girls with high fitness scores.

Simon and Smoll (1974:407) cited that while attitudinal assessment has been a prime concern of social psychologists, educators have shown increasing interest in student attitudes.

Numerous attitudinal studies within the field of physical education have been published, including studies of attitudes toward physical education by Adams (1963:91-94), Richardson (1960:638-43), and Wear (1950). McCue (1953:205-209) examined attitudes toward intensive competition. Studies of student attitude in relation to sportsmanship (McAfee, 1955:120), and conditioning (Anderson, 1966) have also been reported.

The many attitude measuring scales that have come into existence in the field of physical education (as in other subjects), attest to the importance that is attached to attitudes of students to the various subjects. Bowdlear (1928:75-77) was a pioneer in the development of attitude scales in physical education when he designed a primitive check-chart in 1928 (Martens, 1979:239). The Wear Attitude Inventory (1951) was designed to measure the direction and intensity of a student's attitude toward physical education as an activity course; later Wear (1955) proposed two equivalent forms of 30 statements each. Kneer (1956) revised the Wear Attitude Inventory in order to adapt its reading level to the eighth grade and above. Cheffers, Mancini, and Zaichkowsky (1976:30) identified several other widely used scales to measure various attitudes in physical education, including scales by Kenyon (1968), Edington (1968), Plummer (1952), Penman (1967), Dell (1965) and McGee (1956).

A survey of attitudinal scales in physical education literature made clear that the Kneer Attitude Inventory, geared to an eighth grade reading level, would be the most appropriate one for the purpose of this study.

SKILL ACQUISITION AND SKILLS TESTING LITERATURE

The term "skill" implies abilities used efficiently and effectively as the result of experience and practice. Welford (1976:14) explains that the study of skill has developed greatly since the 1940's. Previously, the study of skill was largely concerned with manual operations in industry. The study of skill has since included a broad range of intellectual, social, and more recently, athletic activities. Cratty (1967:11) notes that the physical educator has a unique opportunity to study factors accompanying learning and motor performance.

It is generally thought that there are three phases included in the acquisition of skill; the cognitive phase, the fixation phase, and the autonomous phase (DeCecco, 1968:232). During the cognitive phase of skill learning, the teacher provides information that aids the learner in intellectualizing the skill. During the fixation phase, the task is practiced repeatedly until the behavior becomes fixed. Lastly, during the autonomous phase, increasing speed and accuracy in the skill is demonstrated by the learner; by now an expert (Walker, 1973:69).

Much of the literature concerned with motor skill acquisition would seem to support the idea of less emphasis in traditional, teacher-directed skill activity and more emphasis on student decision making as a means of facilitating skill acquisition (Heitmann and Kneer, 1976:91). Vannier, Foster, and Gallahue (1973:7) encourage using a variety of teaching

approaches for skill development, with greater emphasis on the individual child. Gentile (1972:19) encouraged shared decision making between teacher and student during the initial or beginning stage of skill acquisition. The idea of students becoming involved in the planning process is supported by Manahan (1972:50-51). Manahan, while finding that a teacher-directed course of action was more favorable when prompt acquisition of skill was the prime concern, also noted that many students enjoyed being creative and were successful in planning ways to refine their own motor skills.

Other writings dealing with skill acquisition further support student choice (McKinney, 1977:18). As Arnold (1978) states,

In attempting to understand the process of acquiring motor skill, it is useful to view the learner as an active, problem-solving, decision-making processor of information (page 84).

There are many areas of physical education which require proper measurement and evaluation; including muscular strength and endurance, body mechanics, knowledge, cardiovascular and cardiorespiratory efficiency, skill, and so on (Mathews, 1973:10). Sports skills tests are designed to measure the basic skills used in the playing of a specific sport.

The Athletic Badge Tests of 1913 are generally recognized as the first sports skills tests ever devised (Collins and Hodges, 1978:3). Brace, in 1924 pioneered the use of the T-scale method for constructing norms (Mathews, 1973:21). Other early skills tests were developed by Cureton, French, and Scott prior to 1930 (Montoye, 1978:178-182). More recently, the American Alliance for Health, Physical Education and Re-

reation (AAHPER) has sponsored the development and publication of fifteen sport activities tests.

The sport of basketball has an abundant quantity of developed skills tests dedicated to it. Collins and Hodges (1978:67-134) identified several well-constructed basketball skills tests, including ones by: Johnson (1934), Young and Moser (1934), Dyer et al. (1939), Knox (1947), Koski (1950), Leilich (1952), Stroup (1955), Cunningham (1964), AAHPER (1966), Pimpa (1968), and Harrison (1969).

For the purpose of this study, portions of the AAHPER basketball skills test (1966) were selected.

Chapter III

METHODS AND PROCEDURES

This chapter is divided into three parts. First, preparations that preceded data collection are described. Secondly, procedures for the data collection are explained. Finally, a description of the research design used for this study is offered.

PREPARATION FOR DATA COLLECTION

A pilot study was conducted in order to determine the feasibility of a project such as this. Following the pilot study, it was apparent to the investigator that this study would be practical and would be a positive contribution to research within the field of physical education.

Included in the preparations needed for proper data collection were the selection and grouping of the subjects, the selection and training of the coders involved, and the selection of the tests used for the purpose of this study. The following is a description of each of these preparations.

Selection and grouping of subjects

The subjects included in this study were seventh grade boys enrolled at Soule Road Middle School in Liverpool, New

York. Soule Road Middle School is one of four middle schools in the Liverpool Central School District. Permission to study this population was granted by the Principal of Soule Road Middle School, Dr. Lee DeCoste. The age of the subjects ranged from 11 to 12 years. A total of 48 boys were studied; 21 in the experimental (choice) group, and 27 in the control (no-choice) group.

Because the subjects involved in this study were assigned to their classes by the guidance department at the outset of the school year, a random sampling to determine grouping was not possible. Rather, a sample of convenience was used.

Two classes of seventh grade boys were studied. One class was randomly assigned as the experimental group, while the other class automatically became the control group. The instructor for both classes was the author of this study.

Selection and training of coders

Before the data collection was initiated, two coders were selected and trained to evaluate the instruction offered in this study. Both coders were full-time experienced physical education teachers at Soule Road Middle School, and were selected because of their interest in, and enthusiasm with the project, as well as their availability for the duration of this study.

Both coders received approximately three hours of training with the TRIPAC coding system (R. Hurwitz, 1979). The purpose

of the TRIPAC (Teacher's Role In Providing Activity Choice) coding system, in the words of its author is to allow coders to:

... record the kinds and amounts of choices that a physical education teacher gives students regarding different aspects of their learning experiences (Hurwitz, 1979:3).

One coder was trained during the previously mentioned pilot study carried out prior to this study. The other coder was trained following the pilot study. Involved with training of the coders were tape recordings and video tapes, as well as an initial explanation and orientation of TRIPAC. Intercoder reliability was established at .82, considered to be an acceptable level for supporting the involvement of the coders in the study.

Selection of tests

Before the collection of data was undertaken, tests to measure basketball ability and student attitudes toward physical education were selected.

The Kneer Attitude Inventory was selected to measure the students' attitudes toward physical education. As previously noted, the Kneer Attitude Inventory was deemed the most appropriate measure of student attitudes for this study, because of its junior high (8th grade) reading level. The same test was used for both the pretest and posttest. The test included 40 inventory items, each of which offered 5 possible responses: Strongly agree, Agree, Undecided, Disagree, and Strongly disagree. The response considered most favorable to physical education received a score of 5. A subject's score on the in-

ventory was the sum of the scores made on the individual items. According to this method of scoring, a high score would indicate a favorable attitude toward physical education.

For the purpose of this study, portions of the AAHPER Basketball Skills Test Manual for Boys were used as a measure of basketball ability. Tests to measure skill in shooting free throws (foul shots), shooting ability from under the basket, speed of continuous passing and catching, and dribbling speed around obstacles were included in the study. In consideration of time allowed for this study, only 4 of the 9 AAHPER basketball skills tests were incorporated into this study. The four tests included were selected on the basis of their measurement of the basic skills of shooting, ballhandling, dribbling, and passing. As recommended by AAHPER, the skills tests included in this study were intended to be used by the students as a way of improving abilities in the fundamental skills of the sport of basketball. During the basketball unit in which this study was carried out, the subjects in both groups were provided with practice time to improve the skills measured by the aforementioned tests.

PROCEDURES FOR DATA COLLECTION

The basketball unit for each of the groups was started on February 2, 1981, and ended on March 27, 1981. Each class alternated meeting either two or three times each week. During the first week of the unit, both groups were asked to

complete the Kneer Attitude Inventory, and were pretested with the four AAHPER basketball skills tests previously mentioned in this paper. The last week of the unit saw the students being posttested with the same AAHPER basketball skills tests and the Kneer Attitude Inventory. One week later the students were again asked to respond to the Kneer Attitude Inventory, due to administrative problems and time constraints. While both classes were idle for one week during the winter recess, subjects were provided with instruction for a total of five weeks apart from the two weeks that they were being tested.

The learning environment for the subjects was determined by their grouping. Subjects included in the control group (no choice) were required to participate in a motor skill activity each class that was determined for them by the investigator. While the activities varied from one class to another, these activities were offered as a means of developing the skills tested during this study. Subjects included in the experimental group (choice) were given the opportunity to choose from among five motor skill activities each class meeting. These activities, set up as stations, were offered also as a means of developing the skills tested during the study. Members of the experimental group were given the opportunity to participate in any or all of the activities offered, and the grouping at each station was determined by the subjects themselves. Each group was given the opportunity to participate in a game situation during each class session, following an activity time, as outlined above.

Members of the control group played on teams selected for them by the teacher, and played by rules determined for them by the teacher. Members of the experimental group were allowed to nominate four captains, who chose their own teams. All subjects in the experimental group shared in the decision making process when the rules and time allotment for the game situation were determined. Members of the control group had no such opportunity to share in the decision making process.

In order to check as to whether or not choice was provided, each group was videotaped five times. These videotapes were then coded with TRIPAC. By viewing the videotaped classes, the two coders were able to code the structuring interactions. A structuring interaction is "a communication between the teacher and one or more students during which the dimensions of a subsequent learning experience for the class period are set forth, negotiated, or decided" (R. Hurwitz, 1979:3), and is the TRIPAC unit of analysis. Each structuring interaction included seven learning experience dimensions: activity, location, timing, equipment/materials, group structure, group composition, and group role. The coders determined the amount of choice provided (if any), by assigning numbered codes to each structuring interaction. The learning experience dimensions thereby received one code each, ranging from 1 to 6; "1" denoting that no choice was given, and "6" representing the highest amount of choice possible. A summary of the coding tallies produced by the coders is shown in the appendix to this study.

RESEARCH DESIGN

The nonequivalent control group design (Campbell and Stanley, 1963:47-50) served as the research design of this study. Involved in said design was an experimental group and a control group, with each group being pretested and posttested. As previously mentioned, a sample of convenience was used. Campbell and Stanley describe this type of sampling as "naturally assembled collectives."

Chapter IV

RESULTS AND DISCUSSION

The purpose of this study was to determine the relationship between motor skill activity choice, skill acquisition, and attitudes toward physical education. The subjects were 48 seventh grade boys enrolled at the Soule Road Middle School in Liverpool, New York. Two physical education classes being taught by the investigator were used as the two treatment groups. The subjects in one of these groups (experimental group) were provided with the opportunity to choose from among several motor skill activities, and to share in the decision making process. The subjects in the other treatment group (control group) were afforded no such decision making opportunities, nor were they offered choice with regard to motor skill activity. In accordance with the nonequivalent control group design, subjects from each group were pretested and posttested; thus providing a means to measure change in attitudes and skill development. (The investigator is aware of the problem of intact classes when used as the experimental unit).

This chapter includes six sections dealing with the results and discussion. The results of the treatment validation are presented in the first section. The reliability of the data is presented in the second section. A multivariate

analysis of the data is offered in the third section. Presented in section four is a univariate analysis of the data. In section five, a multivariate analysis of standardized gain scores is provided. Finally, a discussion of the results is offered in the sixth section of this chapter.

TREATMENT VALIDATION

The TRIPAC coding system (Hurwitz, 1979) was used to identify the predominant teaching patterns used in the experimental (choice) and control (no choice) classes. The intercoder agreement of the TRIPAC data was 80%. In other words, with a total of 70 opportunities to determine to what extent choice was (or was not) being offered, the two coders agreed 56 times. When the control group classes are considered alone, the coders concurred 30 out of 35 times producing an 85.7% intercoder agreement. The reliability of the coding for the experimental group classes was determined to be 74.3%, as the coders agreed 26 times out of a possible 35.

It should be noted here that the aforementioned results were determined by the number of times that the coders agreed on the teacher's actual role in providing activity choice. This does not take into account the instances in which the coders agreed that choice was (or was not) offered, but did not agree on the extent (teacher's role) to which choice was provided. For the purpose of this study, knowing whether or not choice was used in the class presentations takes precedence, while

the teacher's role in providing choice is of secondary importance. In light of this, a more reliable figure for intercoder agreement of the experimental group classes would be 91.4%, as the coders agreed 32 out of 35 times that either choice was offered during the lesson or it was not offered at all. Furthermore, when it was determined that the coders agreed on the provision of choice in the control group classes 31 out of 35 times, the intercoder reliability was determined to be 88.6%. Finally, when only the presence of choice (or lack thereof) was considered, the total intercoder agreement of the TRIPAC instrument was 90%. In tables 4.1 and 4.2 further analyses of the TRIPAC coding results are presented.

Table 4.1

Summary of the Results of the
TRIPAC Coding Analysis for the
Experimental (Choice) Group Classes

| Coding Session | # of codes other than 1 | Total Codes (2 Coders) | % of Choice Codes (2-6) |
|----------------|----------------------------|---------------------------|----------------------------|
| 1 | 9 (8) ^a | 14 (12) | .643 (.667) |
| 2 | 10 | 14 | .714 |
| 3 | 9 (8) | 14 (12) | .643 (.667) |
| 4 | 11 (10) | 14 (12) | .786 (.833) |
| 5 | 10 | 14 | .714 |
| total | 49 (46) | 70 (64) | .700 (.734) |

Number in parenthesis indicates only those events in which Coders agreed; that is, when there was reliable data.

Table 4.2

Summary of the Results of the
TRIPAC Coding Analysis for the
Control (No Choice) Group Classes

| Coding Session | # of Codes other than 1 | Total Codes (2 Coders) | % of Choice Codes (2-6) |
|----------------|----------------------------|---------------------------|----------------------------|
| 1 | 1 (0) ^a | 14 (12) | .071 (.000) |
| 2 | 7 (6) | 14 (12) | .500 |
| 3 | 1 (0) | 14 (12) | .071 (.000) |
| 4 | 2 | 14 | .143 |
| 5 | 1 (0) | 14 (12) | .071 (.000) |
| Total | 12 (8) | 70 (62) | .171 (.129) |

^aNumber in parenthesis indicates only those events in which Coders agreed; that is, when there was reliable data.

Using only the reliable data the average percent of cases in which choice was given in the experimental group classes was 71.9% (66.7%-83.3%). On the other hand, the average percent of cases in which choice was provided in the control group classes was only 12.9% (0%-50%).

The analysis of the TRIPAC coding data confirms that the independent variable (method of teaching) was manipulated, and that the "choice" and "no choice" labels can be considered appropriate.

RELIABILITY OF THE DATA

The reliability of the data was determined by calculating an alpha coefficient. Quantitatively, the resultant values are identical to an intraclass correlation coefficient, as suggested by Safrit, 1976. All items involved in this study

were pre and posttested, and two trials were taken on each test. The mean of the two trials was used in the analysis of the data.

Dribble Test

An alpha value of 0.82 indicated fairly good reliability for the dribble pretest. There was no trend across test trials and the correlation between trials was 0.70. Thus, the mean of the test trials was selected as one measure of motor skill performance. The reliability of the dribble posttest was also fairly good, reflected by an alpha value of 0.81. As with the dribble pretest, there was a fair correlation; indicated by an intertrial correlation value of 0.69. However, unlike that of the dribble pretest, there was a trend across the test trials on the posttest. This trend was evident by an F value of 11.18 ($p < .01$). The means of the dribble posttest were 11.0 and 10.2 seconds.

Underbasket Shot Test

The pretest for the underbasket shot test revealed only fair reliability; indicated by an alpha value of 0.78. Between trials, the correlation of 0.64 offered only a moderate correlation, while an F value of 0.69 revealed that no trend across trials was evident. Results of the underbasket shot posttest showed similar values (alpha=0.78), with the exception of a significant trend ($F=4.87$) across trials ($p < .04$). The means of the underbasket shot posttest were 6.3 and 7.1.

Foul Shot Test

Acceptable test reliability continued to be the norm as the initial foul shot test score demonstrated a fair reliability, with an alpha value of 0.81. An F value of 16.97 ($p < .001$) indicated a significant trend between test periods, and a fair correlation (0.69) was evident. The means of the test trials for the foul shot pretest were 2.5 and 3.5. Similarly, the posttest scores for foul shooting demonstrated a fair level of reliability ($\alpha = 0.77$). Unlike the pretest, however, the posttest scores showed no trend between test trials. Similar to that of the pretest, a fair degree of association between trials was apparent, as a correlation of 0.67 was computed.

Speed Pass Test

The fourth and final skill test was the speed pass test. Very good reliability was manifested by an alpha score of 0.92 on the pretest. There was no trend ($F = 0.57$) across trials, and pretest scores revealed a good (0.86) correlation between the test trials. Lastly, posttest scores for the speed pass test were shown to have a good reliability ($\alpha = 0.84$), no trend ($F = 0.02$) across trials, and a fair correlation (0.73).

An analysis of the reliability of the data indicated that the data were acceptable, and that using the means of the test trials was justified in all cases. Using the means was justified even in the cases where there was trend, because the satisfactory correlation between trials in these cases indicated that order was maintained between individuals and that systematic factors (learning, fatigue, etc.) were affecting trial means.

MULTIVARIATE ANALYSIS OF THE DATA

A multivariate analysis of variance was computed on the five dependent measures used in this study; the dribble test, underbasket shot test, foul shot test, speed pass test, and the attitude inventory. The multivariate analysis was performed on the difference (or gain) between pre and posttest scores, for each dependent measure. Results showed an approximate F value of 9.37 with a probability level less than .001. Because the multivariate F was significant, a more detailed, univariate (post hoc) analysis of variance was required to determine where the difference existed.

UNIVARIATE ANALYSIS OF THE DATA

A series of univariate analyses were used to determine where significance or differences between the two treatment groups existed. As was mentioned earlier in this study, the nonequivalent control group design was used for this research project. This research design was required as the subjects had already been assigned to their respective classes (groups) before the onset of the study. Therefore, the univariate analysis of the data was done using pre and posttest scores, rather than difference scores. This method was necessary to determine whether or not the treatment groups were equal initially.

Five variables were measured over time; the dribble test, the underbasket shot test, the foul shot test, the speed pass test, and the attitude inventory. Essentially, the univariate

analysis was used to determine whether the groups were different or not, and to note improvement over time. The univariate analysis was used also to determine if a differential change in the groups existed, based on the type of instruction they received.

Dribble Test

A two way analysis of variance with repeated measures indicated that there was no significant difference between the two treatment groups regarding the dribble test. An F value of 60.11 (see Table 4.3) showed that there was a significant improvement from pretest to posttest. The test for interaction was non-significant, indicated by an F value of 0.02. In other words, while both groups improved over time on the dribble test, the change in performance was not effected by the different treatments (choice/no choice) offered.

Table 4.3

Summary of the Analysis for Repeated Measures Design
on the Dribble Test Scores of the Choice
(Experimental) and No Choice
(Control) Groups

| Source | df | SS | MS | F |
|-----------------|----|--------|-------|--------------------|
| Among Subjects | | | | |
| B | 1 | 18.29 | 18.29 | 2.25 |
| Subject(s) | 46 | 373.49 | 8.12 | |
| Within Subjects | | | | |
| A | 1 | 46.73 | 46.73 | 60.11 ^a |
| AB | 1 | 0.00 | 0.00 | 0.02 |
| AS | 46 | 35.76 | 0.78 | |
| Total | 95 | 474.25 | | |

^a $p < .001$

Underbasket Shot Test

The results of the underbasket shot test indicated that there was no significant difference between the two treatment groups. While not significant however, an F value of 3.94 just failed significance at the .05 level (see Table 4.4). Neither of the groups improved over time, as shown by an F value of 2.26. Lastly, an F value of 1.27 indicated performance from pre to posttesting was not affected by instruction.

Table 4.4

Summary of the Analysis for Repeated Measures Design
on the Underbasket Shot Test Scores
of the Choice (Experimental)
and No Choice (Control)
Groups

| Source | df | SS | MS | F |
|-----------------|----|--------|-------|------|
| Among Subjects | | | | |
| B | 1 | 51.85 | 51.85 | 3.94 |
| Subject(s) | 46 | 605.73 | 13.17 | |
| Within Subjects | | | | |
| A | 1 | 8.76 | 8.76 | 2.26 |
| AB | 1 | 4.95 | 4.95 | 1.27 |
| AS | 46 | 178.54 | 3.88 | |
| Total | 95 | 849.83 | | |

Foul Shot Test

An analysis of the foul shot test data showed that there was no significant difference between the treatment groups (F=2.43). There was a notable improvement between the pretest and the posttest, as indicated by an F value of 26.54 (see Table 4.5). A significant interaction (F=7.72) indicated

that a test for simple main effects was needed (see Table 4.6); because as Kirk has stated, "Whenever a significant interaction occurs it is a signal to an experimenter that interpretation of tests of main effects must be qualified" (p. 177). Results showed that while there were no initial differences, subjects in the control (no choice) group demonstrated a higher degree of skill with regard to foul shooting after instruction (posttest means $M=4.65$ and 3.24 , respectively).

Table 4.5

Summary of the Analysis for Repeated Measures Design
on the Foul Shot Test Scores of the
Choice (Experimental) and
No Choice (Control) Groups

| Source | df | SS | MS | F |
|-----------------|----|--------|-------|--------------------|
| Among Subjects | | | | |
| B | 1 | 16.83 | 16.83 | 2.43 |
| Subject(s) | 46 | 318.91 | 6.93 | |
| Within Subjects | | | | |
| A | 1 | 26.04 | 26.04 | 26.54 ^a |
| AB | 1 | 7.57 | 7.57 | 7.72 ^b |
| AS | 46 | 45.14 | 0.98 | |
| Total | 95 | 414.49 | | |

^a $p < .001$

^b $p < .01$

Table 4.6

Summary of the Analysis of Simple Main Effects
on the Foul Shot Test Scores of the Choice
(Experimental) and No Choice
(Control) Groups

| Source | SS | df | MS | F |
|-------------------|---------|----|--------|--------------------|
| B at a_1 (Pre) | 0.911 | 1 | 0.911 | .230 |
| B at a_2 (Post) | 23.486 | 1 | 23.486 | 5.935 ^a |
| Error (Pooled) | 182.025 | 46 | 3.957 | |

^a $p < .05$

Speed Pass Test

The results of the analysis of the speed pass test data are comparable to those of the foul shot test. There was no significant difference between the groups (see Table 4.7). However, an F value of 22.86 demonstrated a significant improvement over time, indicating a difference between the treatment groups for the speed pass test. Furthermore, a significant interaction dictated a test of simple main effects (see Table 4.8). Results indicated that the subjects representing the control (no choice) group started out with a higher speed pass skill level. Further study showed the treatment groups to be at roughly the same level of skill at the time the posttest data was collected.

In an attempt to account for the initial difference between the groups, an analysis of covariance (see Table 4.9) was computed to statistically adjust the skill levels of the groups. This procedure is generally recommended in non-equivalent control group designs (Cook and Campbell, 1979). An F value of 14.49 ($p < .001$) revealed a significant treat-

ment effect. The adjusted means were 12.62 seconds for the choice group and 12.75 seconds for the no choice group. The results indicated that after the statistical adjustment, members of the experimental (choice) group performed significantly better on the speed pass test than did members of the control (no choice) group.

Table 4.7

Summary of the Analysis for Repeated Measures Design on the Speed Pass Test Scores of the Choice (Experimental) and No Choice (Control) Groups

| Source | df | SS | MS | F |
|-----------------|----|--------|-------|--------------------|
| Among Subjects | | | | |
| B | 1 | 21.32 | 21.32 | 1.90 |
| Subject(s) | 46 | 517.12 | 11.24 | |
| Within Subjects | | | | |
| A | 1 | 26.25 | 26.25 | 22.86 ^a |
| AB | 1 | 27.39 | 27.39 | 23.85 ^a |
| AS | 46 | 52.82 | 1.15 | |
| Total | 95 | 644.91 | | |

^a $p < .001$

Table 4.8

Summary of the Analysis of Simple Main Effects on the Speed Pass Test Scores of the Choice (Experimental) and No Choice (Control) Groups

| Source | SS | df | MS | F |
|-------------------|---------|----|--------|--------------------|
| B at a_1 (Pre) | 48.494 | 1 | 48.494 | 7.828 ^a |
| B at a_2 (Post) | 0.197 | 1 | 0.197 | 0.032 |
| Error (Pooled) | 284.984 | 46 | 6.195 | |

^a $p < .05$

Table 4.9

Summary of the Analysis of Covariance on the
Speed Pass Test Scores of the
Choice (Experimental) and
No Choice (Control)
Groups

| Source of Variation | Sum of Squares | df | Mean Square | F | Signif. of F |
|---------------------|----------------|----|-------------|--------|--------------|
| Covariate | 141.564 | 1 | 141.564 | 79.061 | 0.000 |
| Treatment | 25.936 | 1 | 25.936 | 14.485 | 0.000 |
| Error | 80.576 | 45 | 1.791 | | |
| Total | 248.076 | 47 | 5.278 | | |

Attitude Inventory

Concerning the results of the Kneer Attitude Inventory, an analysis was done on the mean scores. A significant interaction was determined, as shown by an F value of 8.12 ($p < .05$). A plot of cell means revealed an apparent disordinal interaction. This effect is due to the fact that the control (no choice) group changed by a decrease (7 points) in the mean attitude score from the pretest to the posttest. Conversely, the average attitude score for members of the experimental (choice) group was raised by 2.5 points. These results showed that after instruction, members of the control group were reporting less desirable attitudes toward physical education (although not significantly different from those of the experimental group). Meanwhile, subjects included in the experimental group reported more positive attitudes toward physical education after being taught with a method of instruction which provided them with decision making opportunities. Marasculio and Levin (1970) have recommended that

significant disordinal interactions may be investigated by a contrast testing for a differential effect. This analysis indicated a significant difference between the choice and no choice groups. However, tests of simple main effects on both pretest and posttest scores revealed no significant differences between the groups. Table 4.10 provides a summary of the analysis done on the attitude inventory data.

Table 4.10

Summary of the Two-Dimensional Analysis for Repeated Measures Design on the Attitude Inventory Scores of the Choice (Experimental) and No Choice (Control) Groups

| Source | df | SS | MS | F |
|-----------------|----|----------|--------|-------------------|
| Among Subjects | | | | |
| B | 1 | 40.00 | 40.00 | 0.05 |
| Subject | 46 | 34231.25 | 744.16 | |
| Within Subjects | | | | |
| A | 1 | 195.42 | 195.42 | 2.89 |
| AB | 1 | 549.33 | 549.33 | 8.12 ^a |
| AS | 46 | 3113.73 | 67.69 | |
| Total | 95 | 38129.73 | | |

^a_p < .05

MULTIVARIATE ANALYSIS OF STANDARDIZED GAIN SCORES

A multivariate analysis of variance was performed (see Table 4.11) using scores from all four of the motor skills tests and the Kneer Attitude Inventory. The gain scores from pre to posttest for each variable were used; and for those tests (dribble and speed pass) where a lower score indicated

better performance, the signs were reversed. Each of the motor tests was converted to a Z score and a composite motor score was determined, as well as a standardized attitude score. The multivariate analysis of variance using the standardized motor and attitude scores resulted in a significant F value of 8.05 ($p < .001$). The univariate post hoc tests showed that the groups differed on the attitude measure, with the choice group showing a more positive attitude toward physical education. An F value of 1.01 indicated that there was no difference on the composite motor test.

Table 4.11

Summary of the Multivariate Analysis of Variance
of the Composite Motor and Attitude Scores
of the Choice (Experimental) and
No Choice (Control) Groups

| Variable | Hypoth. SS | Error SS | Hypoth. MS | Error MS | F | Signif. of F |
|----------|---------------|-------------|---------------|-------------|-------|-----------------|
| Attitude | 12.27 | 34.73 | 12.27 | 0.75 | 16.26 | .000 |
| Motor | 0.16 | 7.40 | 0.16 | 0.16 | 1.01 | .320 |

DISCUSSION

The purpose of this study was to determine the effect of motor skill activity choice on the acquisition of skill, and attitudes toward physical education in seventh grade boys. The TRIPAC coding system confirmed that the independent variable was manipulated and that the "choice" and "no choice" group labels were correct. The reliability of the data was shown to be adequate, although some items should probably have had more than two trials.

The results of the data analysis disclosed no significant findings attributable to instructional method concerning the dribble and underbasket shot tests. The dribble test data showed that while both groups improved, there was no significant difference between the groups. These results disagree with other studies concerning decision making (or choice). In a study of the effects of decision making on motor skills and self concept, Martinek, Zaichkowsky, and Cheffers (1977) determined that a teacher directed (no choice) approach appeared to be best for the development of motor skills. It should be noted here that Martinek et al. used The Body Coordination Test (a test of motor skill ability), while the present study used portions of the AAHPER basketball skills test for boys. More precisely, the task of Martinek et al. was to study motor ability; which implies a quality of generality inasmuch as an ability is a trait which is reasonably stable over time. Conversely, the present study was concerned

with skill acquisition. A skill, which is modified by training, practice, etc., is more specific to task. In a similar study, Schempp (1977) examined the effects of two decision making models on learning gymnastic skills. Schempp determined that a teacher decision making (no choice) model of teaching was superior to a shared decision making (choice) model for fifth and sixth grade boys and girls learning specific gymnastic skills.

It seems clear that the current literature favors teacher directed (no choice) methods of instruction to enhance motor ability and motor skill learning. It might have been expected, therefore, that the present study would show that the control group profited in skill acquisition by not having been given choice during instruction; this was not entirely the case, however, and the results at first appear somewhat inconsistent.

The foul shot and speed pass test results indicated an improvement in skill level that could be attributed to the method of instruction offered (choice or no choice). Further analysis was required, and tests of simple main effects were computed for both skill tests. The results showed that initially, the treatment groups did not differ in foul shooting ability, while a posttest analysis revealed a distinct advantage for members of the control group. Other studies lend support to this result. Martinek, Zaichkowsky, and Cheffers (1977) determined that a teacher directed approach appears to be best for the development of motor skills. In a similar study, Schempp (1977) concluded also that a teacher decision making model was superior

to the shared decision making model, in a study concerning specific gymnastic skills.

Although improvement was also noted on the speed pass test, an analysis of the data revealed that the treatment groups differed at the time that the pretest data was collected. Members of the no choice (control) group started out with a higher speed pass skill level. Following instruction, the choice (experimental) group improved to a level of skill nearly equal to that of the control group. It was thought that perhaps the improvement of the experimental group on the speed pass test might be attributed to the fact that this group simply had more room to "catch up" or improve. An analysis of covariance was conducted to account for the initial difference between the treatment groups by statistically adjusting their levels of skill to a comparable point. The results were significant; indicating that the choice method of instruction better enhanced the students' speed pass skill than did the no choice method of instruction.

Because members of the control group performed better on the foul shot test and members of the experimental group demonstrated a better proficiency for speed pass skill, it appears that these results contradict one another, with respect to motor skill acquisition. The fact that neither group was shown to be superior to the other on the dribble test further confounds matters. A study of current research in the field of physical education indicates that these results may be more harmonious than it first appears. Gentile (1972) identified two types of

skill--"open" and "closed"--and classified motor skills according to an open-closed continuum. Closed skills include motor tasks performed under stationary environmental conditions. Gentile determined that skills that are performed "under conditions in which the regulatory events are changing position in space (that is, are themselves in motion)" are open skills (page 5). In other words, the foul shot might be considered a closed skill, as there is a stable environment; the shooter releases the ball fifteen feet from the basket every time. While the speed pass also involves the subject throwing the ball from a predetermined distance (9 feet) every time, in this case the ball rebounds off a wall back toward the passer. The way in which the ball returns to the subject is determined by many factors: how hard it is thrown, how high, etc. Because of this variability, the speed pass might be described as an open skill. In this light, it may be seen that a more directed method of teaching is needed to enhance the acquisition of a closed skill (in this case, foul shooting). Meanwhile, the results of the speed pass test indicate that providing choice may be a more desirable method of instruction when an open skill is being taught. Spaeth-Arnold (1981) indicated that the method of instruction should be matched to the demands of the task. Following Gentile's (1972) work, Spaeth-Arnold discussed the nature of the task as being critical. As Gentile (1972) stated, "All the operations a teacher performs in an attempt to facilitate skill learning are directed toward helping the student match his movement to the environmental

demands. The nature of the environmental requirements, therefore, affect not only the performer but the strategies employed by the teacher" (page 6). Gentile (1972) concluded that teaching methods that are useful in promoting the acquisition of a closed skill may be erroneous for, and even detrimental to the acquisition of an open skill. Therefore, in order for effective teaching to take place, analysis of the nature of the task (or skill) to be learned is required. The fact that the control (no choice) group subjects were required not only to practice the foul shot during each class session but to also use the method taught by the instructor may have benefited the students while learning this closed skill. The choice of whether or not to practice the foul shot, as well as the choice of how to practice may have actually hindered the members of the experimental (choice) group in this case. Conversely, when learning an open skill (speed pass), the students offered choice were able to perform better than those not provided with choice. Schmidt's (1975) schema theory strengthens this position. Schmidt's theory asserts that variability of practice promotes stronger recall, which in turn enhances performance.

Gentile's (1972) work may offer some further insight to the results of this study, relative to the dribble test findings. As was noted earlier, there was no significant difference between the treatment groups, although both groups demonstrated improved dribbling skill. Perhaps the reason that neither treatment was found to be more advantageous is that the dribbling for the

subjects involved was a skill that would fall somewhere near the middle of Gentile's (1972) continuum of open and closed skills. Gentile (1972) asserts that as individuals become more proficient at a skill, the skill becomes less open and more closed for these individuals. The mean scores of the dribble test ranked between the 90th and 95th percentiles for 11 and 12 year olds on the AAHPER Basketball Skills Test for Boys. Meanwhile, the means of the speed pass test scores reported for both treatment groups fell between the 60th and 65th percentiles for 11 and 12 year olds on the AAHPER basketball skills test previously noted. Although both the dribble and speed pass appear to be open skills, the aforementioned percentile rankings indicate that the subjects from both treatment groups were more proficient on the dribble test than on the speed pass test. This proficiency on the dribble test may indicate that the dribbling skill of the subjects was becoming less open. Because the skill of dribbling was neither open nor closed, but probably somewhere near the middle of the open-closed continuum; it is not surprising that the methods of instruction included in this study had a similar effect on the treatment groups.

The F value pertaining to the groups taking the underbasket shot test, although not significant at the .05 level, was approaching significance ($p=.07$). It is important to note here that it is possible that an improvement in the reliability of measures would have reduced measurement error (the alpha values for the pre and post tests were both 0.78). The underbasket

shot test was the only item included in this study in which there was no significant improvement shown by either treatment group. Perhaps the reason for the failure by either group to show improvement over time is the complexity of this particular skill. It was thought that when compared with the other shooting skill (foul shot test) used in this study, the underbasket shot might be viewed as a more difficult skill to acquire. The complexity of the underbasket shot may have been compounded by the demand for speed and stress not included with the foul shot test. Billing (1980) determined that the difficulty of motor skills can be identified by studying the complexity of the essential features of motor behavior (perceptual awareness, decision making, the production of the motor act, and feedback information); the combination of which results in total complexity. There was no time constraint for the foul shot test, while the underbasket shot test score was the number of baskets made in 30 seconds. In addition to this time constraint, the subject was required to recover each shot made or missed in order to continue shooting, whereas on the foul shot test, each shot was recovered by another player and returned to the shooter. The percentile scores based on age per test scores in number of baskets made provided by the AAHPER Basketball Skills Test Manual for Boys indicate little change from the 25th to 75th percentiles for 11 and 12 year olds. This would appear to lend support to the assertion that the underbasket shot is a complex skill for seventh graders to master.

In view of this, it is not surprising that neither group showed improvement for this particular skill, as it appears that more practice is necessary in order that improvement may be shown.

As was noted earlier in this study, students not provided with choice (control group) during instruction reported less positive attitudes toward physical education. These results are consistent with other studies. Mancini, Cheffers, and Zaichkowsky (1976) found that with elementary children, those involved in decision making displayed more positive attitudes toward the program than did children who were taught in a setting where the teacher made all of the decisions. In another study, Piraino (1977) also concluded that a student decision making model was the better approach for stimulation of positive attitudes toward physical education. Both of the aforementioned studies measured student attitudes by using the Cheffers and Mancini Human Movement Attitude Scale (CAMHM). The CAMHM specifically measures the attitudes of lower elementary children toward the teacher, the facilities, and certain processes evident in the human movement program (Cheffers, et al. 1976:31). In another study concerning elementary children, Martinek, et al. (1977) studied the effects of decision making on motor skills and self concept. Similar to measuring attitudes, measuring self concept is the study of an affective measure; a kind of attitude toward the self. Martinek, et al. (1977) determined that a shared decision making (choice) approach has a definite positive effect on promoting self concept. Martinek (1978) studied the effects of decision

sharing on body concept, and found no significant difference between groups that either shared in the decision making process or were included in a teacher-directed program. It should be noted here that Martinek's (1978) study was concerned with body concept, while the present study examined student attitudes toward physical education.

While the studies mentioned above all concerned elementary school children, the investigator knows of no other study in which junior high school students were studied with regard to decision making models of instruction.

In attempt to simplify the analysis, a composite motor skill and attitude score were analyzed. Previous research had generally shown that teacher decision making instructional models facilitated motor skill acquisition while student decision making instructional models facilitated affective processes. The results of the composite motor skill score and attitude score analysis only partially support these conclusions. Although the standardized attitude gain score analysis showed that the choice group reported more positive attitudes toward physical education, this merely reflected the significant differential effect contrast previously mentioned. The absence of a clear-cut posttest difference between groups seriously limits the inferences which can be drawn. The composite motor analysis further confounds matters since the groups differed initially on the speed pass test; these adjustments were not made in the composite analysis. Thus, one motor skill (foul shot) profited

by having the teacher make the decisions, another (speed pass) benefited by the shared decision making (choice) approach, one (dribble) was affected equally by the two methods and finally, one skill (underbasket shot) was unaffected by the method of instruction.

Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

In summary, it was the purpose of this study to investigate the relationship between motor skill activity choice, skill acquisition, and attitudes toward physical education. The 48 subjects were seventh grade boys enrolled at the Soule Road Middle School in Liverpool, New York, and were between the ages of 11 and 12. Two treatment groups were formed by using naturally assembled classes. One group was randomly assigned as the experimental (choice) group, while the other class automatically became the control (no choice) group. The method of instruction used in each case was evaluated by two coders who were selected and trained before the study began.

Attitudes toward physical education were measured by the Kneer Attitude Inventory, and portions of the AAHPER Basketball Skills Test Manual for Boys were used to measure skill acquisition. Data was collected twice during the study; once at the onset of the study as a pretest of each variable, and again at the conclusion of the basketball unit, in which the variables were posttested. The length of the unit was seven weeks.

The reliability of the data was determined by calculating coefficient alpha for each variable. Each variable was found to be sufficiently reliable and further analysis was performed on the means of the two trials given for each motor test.

Differences between the data collected from both groups were determined by computing a multivariate analysis of

variance on the five dependent variables measured: the dribble, underbasket shot, foul shot, speed pass, and the attitude inventory. Following a significant multivariate analysis, a series of univariate analyses were computed on each variable. Finally, a multivariate analysis of variance was performed using standardized gain scores from the four motor skill tests and the Kneer Attitude Inventory.

The data analysis revealed that members of the control group performed significantly better than their counterparts in the experimental group on the foul shot test (univariate post hoc). An analysis of covariance showed that the members of the experimental group were more proficient on the speed pass test after a statistical adjustment was made to bring the two groups to a comparable pretest level of skill. Furthermore, the univariate analysis performed on the dribble test scores showed that the two treatment groups improved equally. The univariate analysis of the underbasket shot test data showed no improvement for either treatment group. Finally, a univariate attitude analysis revealed that the experimental group reported more positive attitudes toward physical education, although the posttest scores were not significantly different.

CONCLUSIONS

Within the limitations of this study, it can be concluded that there may be an interaction between the method of instruction used and the task (or skill) to be learned. The results of this study showed that perhaps a closed skill (such as the foul shot)

may be acquired more effectively by students taught with a teacher directed (no choice) method of instruction. On the other hand, students offered choice during instruction may fare better than those not provided with choice when learning an open skill (such as the speed pass). The dribble test results indicated that a skill that falls nearer to the middle of Gentile's (1972) open-closed continuum may be taught equally well by varying methods of instruction.

Perhaps teachers of physical education should consider the results of this study and analyze the nature of the task when planning their teaching strategies; doing so might be advantageous to the learner.

RECOMMENDATIONS FOR FURTHER RESEARCH

A further study of this nature is encouraged with the following recommendations:

1. Retention tests should be used and transfer of skill studied to determine whether short term effects will hold up over time and for other motor skills.
2. More test trials for each variable are encouraged.
3. Different motor skill activities should be used, with emphasis given to open and closed motor skills.
4. A record of the frequency and types of choices made by subjects in the experimental group should be kept.
5. Subjects from another grade level, e.g. high school students, should be studied.

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APPENDIX
SUMMARY OF THE TRIPAC CODING RESULTS

TRIPAC CODING FORM

Coder _____

Teacher Coded _____

Date _____

Time or Class _____

CODES: 1-Director 2-Nominator 3-Namer 4-Solicitor 5-Inviter 6-Encourager
7-Other

Learning Experience Dimension

| Interaction | Activity | Location | Timing | Equipment/ Materials | Grouping | | |
|--------------|----------|----------|--------|-------------------------|----------|------|------|
| | | | | | str | comp | role |
| No Choice #1 | 1,1 | 1,1 | 1,1 | 1,1 | 1,1 | 1,1 | 2,1 |
| No Choice #2 | 2,2 | 1,1 | 1,1 | 1,1 | 2,1 | 3,3 | 2,2 |
| No Choice #3 | 1,1 | 1,1 | 1,1 | 1,1 | 1,3 | 1,1 | 1,1 |
| No Choice #4 | 1,1 | 1,1 | 1,1 | 1,1 | 1,1 | 1,1 | 6,4 |
| No Choice #5 | 1,1 | 1,1 | 1,1 | 1,1 | 1,1 | 1,1 | 6,1 |
| Choice #1 | 2,2 | 1,1 | 3,4 | 1,1 | 2,2 | 3,1 | 3,3 |
| Choice #2 | 3,3 | 3,6 | 3,3 | 1,1 | 1,1 | 3,3 | 3,3 |
| Choice #3 | 3,3 | 4,4 | 3,1 | 1,1 | 1,1 | 3,5 | 6,6 |
| Choice #4 | 3,3 | 3,3 | 3,1 | 1,1 | 3,5 | 3,3 | 6,6 |
| Choice #5 | 3,3 | 4,4 | 1,1 | 1,1 | 3,3 | 3,4 | 6,4 |
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