

A COMPARISON OF THE EFFECTIVENESS
OF VARIOUS MOTIVATIONAL TECHNIQUES
UPON THE PERFORMANCE OF A
SPORTS SKILL TEST

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ABSTRACT

A COMPARISON OF THE EFFECTIVENESS OF VARIOUS MOTIVATIONAL
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By

Dianne Kaye Gates

The purpose of this study was to investigate the effectiveness of three motivational techniques upon the performance of college women on the Dyer Tennis Test in order to determine which technique, or techniques aid in the performance of a learned skill.

The subjects used for this study were female undergraduate students from four beginning tennis classes of Michigan State University. Twenty women were randomly selected from each class and comprised one of the four groups. Eighty students were initially chosen, however, in the final analysis 75 were available for use in the study. Each group was administered the test under a particular form of motivation. Those motivational techniques utilized were:

- Group I -- Control
- Group II -- Competition with own score
- Group III -- Competition with classmate of equal ability
- Group IV -- Class grade based on performance

The groups received one pre-trial after which the actual testing began consisting of three trials of 30 seconds each. Individual scores were the sum of the three trials. The mean, standard deviation, analysis of variance and the Scheffe t-test were employed to compare the effectiveness of the various techniques.

The mean of each of the experimental groups was greater than the mean of Group I, the controls, nevertheless, no significant difference was detected between Group I, II or III. However, the analysis of variance and the Scheffe t-test did show a significant difference in Group IV. This group showed an increase in performance above that of Groups I, II or III at both the five and one percent level of significance.

The results of the present study suggest that in order for beginners in tennis to want to improve themselves, they must be motivated by some concrete method such as grades. This method is a tangible, status symbol which appears to have more effect upon performance than the non-rewarding, external and verbal motivational techniques.

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TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION.	1
Introduction.	1
Need for the Study.	3
Purpose of the Study.	4
Hypothesis.	4
Definition of Terms	4
Limitations of the Study.	5
II. REVIEW OF THE LITERATURE.	6
Laboratory Studies.	6
Classroom Studies	12
Psychomotor Studies	18
Summary	23
III. RESEARCH METHODS.	25
Selection of Subjects	25
General Procedures.	26
Statistical Treatment of Data	27
IV. RESULTS AND DISCUSSION.	28
Results	28
Discussion of the Results	30
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	34
Summary	34
Conclusions	35
Recommendations	36
BIBLIOGRAPHY	37

Chapter	Page
APPENDICES	
Appendix	
A. Dyer Tennis Test -- 1938 Revision.	42
B. Test Instructions	44
C. Raw Data of the Control and Experimental Groups	45

LIST OF TABLES

Table	Page
1. Range, Mean and Standard Deviation for Each Group	29
2. One-way Fixed Effects Analysis of Variance	31
3. Significance Between Group Means	31
C-1. Raw Data for Group I--Control.	45
C-2. Raw Data for Group II--Competition with Own Score. . . .	46
C-3. Raw Data for Group III--Competition with Classmate of Equal Ability.	47
C-4. Raw Data for Group IV--Class Grade Based on Performance	48

CHAPTER I

INTRODUCTION

Introduction

One of the traditional definitions describing motivation is the actions that result from the primary, homeostatic drives or secondary drives based upon them (24). Motivation creates a homeostatic imbalance or tension. More recently, however, added interest has been focused around external causes and sources of motivation in contrast to the inner drives. It now appears that motivation restricted to biological terms is not broad enough to include the entire range of human motivation. Psychological and sociological needs can effectively take the role as motivators as well as physiological needs (36). For example, setting a goal not only serves as a reward for learning, but also as a motivator (33). Harlow makes clear that "external stimulation (other than tissue injury) is as significant a source of behavior elicitation as internal stimulation." He continues his thesis by saying:

"...on purely theoretical grounds external stimulation is at least as basic and important a source of behavior elicitation as internal stimulation, and that there is no justification on phylogenetic, ontogenic, or physiological grounds for assuming that motives aroused by one source are more basic or important than motives aroused by the other" (19:25).

In light of this, educators generally agree that their biggest challenge is to instill the desire into students to want to do what they ought to do (42) which is most frequently accomplished by manipulating external motivational techniques. A well known concept regarding learning is that "an individual must be interested in a particular task before effective learning can occur" (36:172). A student should be excited about the task at hand in order for learning to take place. Therefore, it is of great importance that the teacher be well informed and skilled in sound motivational techniques so that he can capture the student's attention and elicit this excitement in the student.

Motivation is that factor which influences attention on a given subject or object and determines the amount of time spent on a given task (9). It is evident that motivation plays an important role in the learning and performance of motor skills as well as in the academic situation. To make an overall generalization of motivation, it can be said that (1) fairly high levels of motivation improve learning in most motor tasks; (2) a high level of motivation seems to be advantageous in learning and performing tasks in which speed, strength, and endurance are incorporated; (3) high levels of motivation seem to interfere with learning fine muscle tasks, coordination, balance and complex movements.

According to the Yerkes-Dodson Law, complex tasks are performed best when motivation or drive are relatively low, but simple tasks need relatively high motivation. It is, therefore, evident that motivation and performance form a complex relationship. Performance

increases only up to a point as motivation increases. From that particular degree of performance, continual amounts of motivation then tend to degrade further achievements. This is especially apparent in complex skills. High levels of motivation and tension produce improper techniques and thus hamper adequate learning and performance (36).

Need for the Study

Motivation and incentive conditions have a great influence on learning and performance in numerous tasks. Those conditions and/or techniques most extensively used are verbal instructions and inducements of various methods and kinds (13). It is, therefore, imperative that educators understand the kinds of motives, and know when and how to use them when attempting to influence the learning and performance of the child (3).

Many of the motivational techniques utilized by classroom instructors are effectively employed while, on the other hand, some techniques prove to produce neutral or negative results.. There are certain techniques that motivate students of a particular age which would not be effective for another age group. The types of motivation used depend upon the age, personality, the task and usually the sex of the student. Much responsibility lies upon the teacher to practice the best techniques in motivating students. A great deal of research yet remains as to the best techniques to employ in motivating students of all age groups.

Purpose of the Study

It was the purpose of this study to investigate the effectiveness of three motivational techniques upon the performance of the Dyer Tennis Test in order to determine which technique, or techniques aid in the performance of a sports skill test. The techniques selected for this study were: competition with own score, competition with classmate of equal ability, and class grade based on performance.

Hypothesis

None of the motivational techniques utilized will prove to be more effective than the control group.

Definition of Terms

For the purpose of this study, the general term motivation will be defined as a state of the individual initiated from outside factors which produce a response.

Motivational techniques are those factors which are externally used to arouse and direct a person's behavior or performance. The techniques utilized in this study were:

Control group -- no outside motivational techniques employed.

Competition with own score -- the subjects were encouraged to outdo each of their previous individual scores.

Competition with classmate of equal ability -- competition between matched pairs of subjects.

Basis for grade -- fifty percent of the student's grade depended upon her performance.

Limitations of the Study

1. Four instructors taught the classes from which students were drawn for this study. There was, nevertheless, a similar course outline followed by each instructor which facilitated the learning of identical content. However, the type of motivation employed is unique to each instructor. This, in turn, affects each student in a different manner depending upon the student's personality.

2. Inherent in this type of study dealing with human behavior are the numerous physiological and psychological factors which may vary from day to day and from teacher to pupil. In addition, it is realized that self-esteem and desired goals are constituents of the human personality which affect the testing situation. Such intangible variables are unique to the individual and cannot be controlled.

3. Three of the four tennis classes were tested inside because of inclement weather conditions. The weather for the class tested outside was a sunny, spring day.

4. It is recognized that the effectiveness of the experimenter and her attitude toward the testing procedures may have influenced the achievement and performance of the students.

CHAPTER II

REVIEW OF THE LITERATURE

Many types of motivational techniques have been employed in the laboratory as well as the classroom, but for the physical education teacher who is genuinely interested in methods of effective teaching, those studies done in the actual classroom situation would be more beneficial to him. However, laboratory studies must not be minimized for their value is of equal importance in the study of motivation. The review of literature is divided into the following categories:

- Laboratory studies
- Classroom studies
- Psychomotor studies

Laboratory Studies

Fairclough (11) tested the hypothesis that motivating a movement response in one part of the body should transfer to speed up movement in another part. Forty male college students were tested as to their speed on a hand movement test and a foot movement test, 20 of whom were controls and 20 who received sound or shock as a motivator. It was found that motivated improvement can transfer from one part of the body (hand) to another (foot) to cause improvement of speed in it. There was a significant motivated improvement in hand reaction time which produced a significant transfer of the motivation effect which resulted in improved speed on the foot retest. The movement time

also showed a significant improvement from hand to foot, but reaction time resulted in a larger transfer than movement time. It was noticed that the only time transfer occurred was when the test was performed under motivated conditions.

The findings of Henry (21) are similar when he concluded that motivation produced by electric shock has a desirable influence in speeding up the reaction and movement time. He states: "this speed-up is transferable, at least within limits, from one type of reaction or movement to another and from one stimulus mode to another."

Munro (32) aspired to test the length of retention of this increased speed transferred from a motivated simpler response. He tested 60 male college students on the ball snatch movement, then they pressed a treadle receiving an electric shock with a slow response. The treadle press speeded up their reaction time which was transferred to another ball snatch movement test. It was found that by using a control group that received no electric shock that the majority of improvement was the result of the electric shock motivation. Six groups of ten men each were tested than retested at intervals of one, three, five, seven, nine and eleven weeks. This was to test the amount of time until retrogression to initial speed of movement appeared. It was found that a period of seven weeks was required for the increased speed transferred from a motivated response to retrogress to initial movement speed.

In a study with 12-14 year old boys, Hipple (23) found no significant differences in reaction, and movement times or muscular tension between Whites and Negroes while unmotivated. However, when

motivated by a loud sound, the experimental group showed significant improvement in reaction and movement times and muscular tension within the White subjects. The Negro experimental subjects improved with motivation but the change was not a significant one.

A study was done by Ryan (39) where shock plus three additional motivational conditions were utilized. He found no difference in performance as a result of the various conditions. He tested 80 male subjects on grip strength measured by a hand dynamometer with the use of (1) verbal encouragement, (2) simple instruction, (3) feedback and (4) shock as motivators. In addition, he also investigated the effect of the motivational conditions at varying levels of performance. As previously, he found no difference in performance between these groups. Ryan concluded that subjects in physical performance tests appear to be highly motivated and show an interest in their outcomes. Nevertheless, the question still remains as to what the outcomes would have been if no motivational techniques were used at all. Also the question is raised as to why there were no differences observed in physical capacity tests under high motivation and low motivation when it is known that this does not appear to hold for performance of learned skills.

The findings of Fishel (12) on a test for muscular strength were similar to those of Ryan when he concluded that physical performance tests tend to motivate the subjects without additional outside factors necessary. Each subject in the study was tested for his maximal strength then put into a control and experimental group to be retested under the influence of motivation. Both groups received

verbal encouragement while the experimental group was also told they were being tested with those standards of NASA. Ego-involvement, therefore, was introduced and served as a motivator. He found no difference between the control and experimental groups thus concluding that the nature of the task was motivating in itself.

Johnson (26) categorized junior high school boys into pre-pubescent, pubescent, and post-pubescent groups and tested them on the bicycle ergometer. One trial was non-motivated and another trial was motivated by encouragement and urging by the experimenter. The amount of effect of the test was observed in terms of work output and cardiovascular rate. Differences in work output were found between the groups but not between the motivated and non-motivated trials. Motivation decreased the rate of cardiovascular recovery and frequently caused nausea. These situations were not evident in the non-motivated trial.

Ulrich and Burke (49) also studied motivation as it affects physical performance and found that motivational techniques indicating success were more beneficial to the mechanical efficiency of the body than when no motivators or motivators indicating failure were employed. They tested college men and women on the bicycle ergometer under encouraging and discouraging reports of failure on work output. It was also included in their finding that men and women react similarly to motivational stressors.

Various motivational situations were applied to ten groups of college males on an exhaustive exercise using the elbow flexion ergograph. Nelson (34) employed such motivators as: verbal

encouragement, competition, ego-involvement, observer's presence, competition with Russians, air force space program and others. All the subjects were given a pre-exercise strength test then were administered the actual test. No significant differences were found between these two trials in any group. The groups which showed the lowest means were: (1) normal instruction, (2) instructor interest, and (3) verbal encouragement. The highest motivating situations were: (1) ego-involvement, (2) air force space program, and (3) individual competition. Nelson concluded that no one situation was more significant than another in either group. Murray (33) points out, however, that human subjects perform better on a task when they become ego-involved in it.

Wilkinson (53) studied the effect of three motivational techniques on the performance of muscle endurance by young boys. The test was proctured on an ergograph with verbal encouragement, verbal discouragement and level of aspiration as motivators. The boys were divided equally into three groups then given the test once again. Results showed that all techniques were effective but no significant differences were found between them.

Like Wilkinson, Hartrick (20) found no one incentive to be better than another in his study to determine the effectiveness of three types of motivating techniques upon the performance of an endurance exercise. He tested college men on a bicycle ergometer under conditions of an audience, a money reward, and competition with own record. His findings did reveal, however, an increase in the

mean from the first trials to the last where motivating techniques were added, but no one technique was more effective. He concluded that higher levels of endurance than normal can be attained when motivators are used.

Isometric training programs were conducted by Hansen and Johnson and Nelson. Both studies used various motivational techniques during the training program. Hansen (18) collected data on an initial trial, from each training session, and from a final test and found no significant difference between the five motivators he used. He concluded that no one incentive proved to be more effective than another.

Johnson and Nelson (25) used four motivators during the training period and found that the motivated groups showed significant gains in strength as compared with the non-motivated group. The authors stated that all motivated groups improved in strength, however, they did not mention which technique, if any, was more effective. It was evident that the level of strength attained was dependent upon the level of motivation applied during the training and testing period.

In studies of knowledge of results and performance in the presence of spectators, both Berridge and Singer found interesting results. Berridge's study (4) was undertaken in order to analyze competition under three different conditions: (1) alone, without knowledge of results, (2) alone, with knowledge of results, (3) in front of others with results announced to everyone. Sixty-one

subjects were tested on a leg dynamometer under these conditions. In mean scores, the third condition scored the highest, 616.5 pounds. The second condition had a mean of 568 pounds and condition one had a mean of 536 pounds.

Singer (44) found that the presence of spectators affected the athlete and non-athlete in different ways. Each subject was given ten trials on a stabilometer with and without spectators in the room. It was found that the athletes were, in general, improving until the arrival of the spectators (trials four, five, six) at which time they, more or less, reached a plateau. On the contrary, the non-athletes continually did better throughout the trials who seemed to be unaffected by the spectators.

Classroom Studies

Classroom studies are characterized by the utilization of motivational techniques and skills which could be used in testing students of a normal physical education class. They use no special apparatus or instruments which would be difficult for the teacher to understand or employ.

Gerdes (15) studied the effects of various motivational techniques on the performance of several physical items. He also wanted to determine if any of the techniques employed would result in significantly better performance. His sample included 100 college students who were randomly assigned to five groups of 20 each. A different motivational technique was applied to each of the five groups. Those techniques were: verbal encouragement, team competition, use of previous scores, retesting and the control

group. Gerdes concluded from his findings that motivational techniques were effectively employed in producing better performance. The greatest difference occurred when the use of the best of three scores was employed as the motivational technique. But because the difference was not that significant, Gerdes had to say that no method was singularly most effective.

Strong (48) wanted to determine the effect of six motivating factors on the performance of sixth grade children on physical fitness tests. He had 434 boys and girls divided into seven groups with the following motivating factors utilized: (1) competition with another group, (2) competition with a classmate of nearly equal ability, (3) competition with a classmate of markedly different ability, (4) competition with himself, (5) level of aspiration (6) competition with class record, and (7) the control group. Strong collected his data on six of the seven tests of the AAHPER Youth Fitness Test (excluding pull-ups), and the bent arm hang under motivated and non-motivated conditions. He found that the mean gains of the motivated groups were greater than the mean gains of the control group. It was also found that the level of aspiration and team competition were more effective in producing better performance than the other motivating techniques.

A study of the effects of various motivational techniques on the performance of the jump and reach test was conducted by Martin (30). She used 80 college women who were tested in four groups of 20 each. The groups each had a different motivating factor:

- Group I -- control, no factor.
- Group II -- given immediate information concerning performance.
- Group III -- performance in the presence of the group -- given no information as to their own performance or that of the other groups.
- Group IV -- performance in the presence of a group -- given information as to their own performance and that of the other groups.

The following conclusions were drawn: (1) the informed group surpassed the uninformed group in performance, (2) the informed group tested in the presence of others improved the most. Upon reviewing her findings, Martin suggested that the subjects who knew they would receive their scores, either alone or in the presence of others performed better than those who received no scores. This indicates that information concerning results is important to the student and that he should know he will receive this information prior to the test.

Chevrette (7) developed a study to determine the effects of peer observation on the performance of physical test by elementary children. In this study, as opposed to that conducted by Martin, the subjects were not given information concerning their scores, nor were they encouraged by the experimenter. The test consisted of the vertical hang, grip strength and the shuttle run. Peer group observations were in the form of: (1) unobserved, (2) in front of members of the same sex, (3) in front of members of the opposite sex, (4) in front of a mixed group. It was found that no significant differences were present in the performance of girls under any peer observation groups, and likewise, the boys demonstrated no differences in the hand grip strength and vertical hang. However, significant differences did

occur in the boys' shuttle run in the presence of girls as observers either alone or in the mixed group. He then concluded that peer observation groups do, in fact, affect the performance of fourth grade children.

Caskey (6) experimented with three motivational techniques with children in grades one, two, three on the standing broad jump. Her techniques were: (1) verbal motivation, (2) visual incentive in regard to previous trials by lines on the mat, and (3) visual incentive in regard to the child's height which was marked on the mat. It was found that the visual motivational techniques were significantly better than verbal motivation for elementary children.

Hanley (17) also utilized verbal encouragement and disparagement as motivating conditions compared with other motive-incentive conditions. After the students were tested on the Miller Wall Volley Test of badminton playing ability, the findings revealed that the subjects showed improvement under the motive-incentive condition, but no greater improvement was evident for the verbal encouragement conditions.

Fifteen male students with low Physical Fitness Index were interviewed and observed by Wall (50) in order to classify them as motivated or non-motivated. Following a five-week developmental exercise program the subjects were retested on the PFI. Findings showed that the motivated group did not improve its mean PFI any more significantly than the non-motivated group.

Hesse (22) designed a study to examine the effects of self and team competition on seventh, eighth, ninth grade girls. She used the

standing broad jump and the 30 yard dash as performance measures. Each subject engaged in these tests under the two competitive situations. The findings indicated that the physical tests were not significantly affected by self and team competition. The data did reveal, however, that self competition served as a greater incentive of achievement than team competition.

In another study utilizing competition as a motivating factor, Start and Herbert (46) found that group competition produced stress in some subjects which increased their hesitancy and fumbling.

Clawson (8), on the other hand, found team competition produced positive improvements in college archery classes. Nevertheless, student set levels of aspiration was superior to team competition in her study.

In a pin bowling class, Walters (51) compared the personal distance ratings, the social integration and adjustment of motivated and non-motivated women. Thirty-six women consisted of the motivated group and were motivated by various techniques throughout the unit. Sixty non-motivated subjects received no special motivating techniques. The Cowell Personal Distance Ballot was given to both groups. It was found that both groups built friendly ties among each other, but the motivated group showed more evident signs of this than the non-motivated group. It was also concluded that a better bowler was a more accepted group member than a poor bowler.

A study by Rushall (38) was done to compare the effects of reinforcers as motivators in a swimming situation. These reinforcers were: (1) coach's attention, (2) candy, (3) money, and (4) a control

group which received no reinforcement. In the coach's attention group, encouragement was given as the swimmer ended his lap. Under candy and money condition, the subjects received one M & M and one cent respectively for each lap completed. The results revealed that the candy and money were comparable in their effect and were stronger reinforcers than the coach's attention or the control group. Rushall concluded that the extrinsic reinforcers were more effective than non-extrinsic conditions. After working with children and teens in the study, he suggested that the procedures should be different for both groups.

Rochelle and others (37) found that the psychological effects of softball throwing without a warm-up period were not greatly evident when subjects were motivated by a money reward. Forty-six students were divided into two groups and alternated warm-up and no warm-up to eliminate any practice effects. The subjects who had no warm-up were given the incentive of a money reward for each throw greater than the established norm. A significant difference was found between trials one and three when no warm-up preceded the test, but no differences were found when warm-ups were given.

McCall (29) used personal motivational techniques and verbal praise as motivators for attendance and completion of projects at an arts and crafts program. The subjects, third and fourth graders, were assigned to control and experimental groups. After two periods a week for four weeks it was found that personal motivational techniques were, in fact, effective in improving attendance, but that high achievement alone sufficed to sustain high attendance,

disregarding the motivating techniques. It was, therefore, evident that arts and crafts teachers should strive to improve skill level of students which would, in turn, help to improve attendance and interest.

Brunner (5) aspired to find out what type of men continued physical activity after graduation from schools and universities. Sixty men were divided into two groups: participants and non-participants in vigorous physical activity. Both groups were given a check list and questionnaire which were descriptive of personality traits. It was found that the participants had more characteristics of an introverted person. One objective of physical educators is to instill within the student the desire to continue in physical activity after school. This objective was not being met when these subjects were in school. In their opinion, they said that a greater variety of activity was needed with more emphasis on enjoyment of participation rather than competition.

Psychomotor Studies

One of the most widely used techniques in controlling and manipulating the motivation level of individuals is special verbal instructions or influence. Fleishman (13) reported, however, that there is little evidence that this type of motivation is sufficient to change the performance level in psychomotor activities. He did a study on the basis of this assumption to compare low-ability trainee airmen with high-ability airmen. The major finding was that

supplementary motivation instructions made no difference in overall performance of the low-ability subject. On the other hand, these instructions did make a difference in the performance of high ability subjects.

Whittemore (52) studied the influence of competition on a printing task. He concluded that: (1) all subjects produced more when competing, (2) the slower subjects profit most from competition, (3) competition enhances speed rather than quality, (4) all subjects do poorer when under competition as compared to non-competition, (5) the quality of work of the individual is slightly greater under non-competition than under competition, and (6) there is no significant difference in quality of work when subjects are competing in small groups than with one another. Whittemore finalized by saying that competition between groups with cooperating members is equal or better than rivalry between single persons. This is seen in both practice and theory. This agrees with those findings of Allport (1) who concluded that, in the case of a motor task, the influence of a group tended to increase the quality and quantity of work over and above that work done when subjects performed alone.

Contrary to the findings of Whittemore and Allport, Sims (43) discovered that the individual-motivation (i.e., one person competing against one other person) was superior to group-motivation and group motivation was slightly superior to no motivation other than that which comes as a result of learning. These findings were verified by college students who were administered a rate of reading and a substitution test.

The purpose of a study by Ryan and Lakie (40) was to test the hypothesis that a person desiring to avoid failure would perform better under neutral or non-competitive situations, while a person with a high motive to achieve would perform better in a competitive situation. Forty subjects were ranked on the need for Achievement and the Taylor Manifest Anxiety Test. Their performance on a ring peg test was measured under competitive and non-competitive situations. It was found that the subjects who ranked high on the Manifest Anxiety scale and low on need for Achievement performed better during competition. The more anxious an individual is, the better he does in a non-competitive situation free from pressure, whereas the individual with a high desire to succeed improves his performance during a competitive situation.

Spence, Faber and McFann (45) dealt with studies of high and low anxious individuals in the learning of paired associates. It was generally found that high anxious subjects performed better than low anxious subjects when competition was minimized. In a second experiment, the high anxious subjects performed more poorly than the low anxious in which competition was theoretically stronger. The authors attributed these results to the "anticipatory and preverative tendencies" which are manifested in strong competing responses.

Sarason (41) found high motivating instructions to be more harmful for high anxious individuals but beneficial for low anxious individuals.

Noble (35) employed verbal motivating techniques on a two-hand tracking skill. Four hundred subjects worked on the test for 32

minutes. At the end of each quarter of practice 100 subjects were selected at random for additional verbal instructions. This study revealed no significant differences in gains from the pre- to post-treatment between the control and experimental groups. The author speculated these findings to be a result of the current level of individual motivation and the lack of proper knowledge of results in the tracking task.

In a study utilizing reward, neutral and punishment conditions as motivators, Stevenson (47) found that verbal approval resulted in more efficient performance on a simple motor task than when using verbal reproof or neutral techniques with mentally retarded children.

Anderson (2) set up an experiment to test the level of aspiration that children will make for themselves. Two groups were given a cancellation test, one being a control group with no motivation and another the experimental group which was motivated by knowing their previous score. Those in the lowest rank of achievement set goals past achievement, while those in the upper rank set goals below past achievement. It was also evident that the experimental group did significantly better than the control group, indicating that the level of aspiration was related to "goodness" of achievement.

Meade (31) found that motivation can distort time perceptions. He had 120 male college students taking tests in a laboratory under low motivated conditions as compared to high motivated conditions.

He concluded that when motivation is low the behavior of the subject is not affected by cues to progress. However, when motivation is high, progress becomes important, therefore, time perceptions are distorted.

Katchman (27), on the other hand, found that on pre-stress trials the high- and low-anxious individual did not differ in the amount of time taken to complete the test. On post-stress trials the high-anxious individuals displayed an increase in time while the low-anxious individuals showed a decrease in time to complete the test.

Kight and Sassenrath (28) reported on high achievement motivation and high test anxiety of students who were administered tests by programmed instruction. It was shown that students with high achievement motivation or high test anxiety required less time to complete the test, made fewer mistakes and scored higher on retention tests. Generally, it was concluded that highly motivated subjects worked much more efficiently than less-motivated subjects.

Summary

Most studies, especially those done in the laboratory and those utilizing physical fitness tests in the classroom, revealed an improvement in performance of the particular task when motivating techniques were employed. Nevertheless, it was not a frequent occurrence for the authors to indicate which motivating technique was more effective. Consequently, in the majority of the conclusions, it was found that no one motivating condition was more beneficial than another. This was evident in studies by Ryan (39), Fishel (12), Nelson (34), Wilkinson (53), Hartrick (20), Hansen (18), Gerdes (15). It was concluded in many instances that subjects in physical performance tests appeared to be highly motivated showing an interest in the outcomes, and that the level of performance attained was dependent upon the level of motivation applied during the testing period.

Those studies which used shock as a motivator: Flairclough (11), Henry (21), Munro (32) generally agreed that shock produced greater motivation in individuals, it influenced speed and reaction time, and tense subjects were highly motivated.

Strong (48) found the level of aspiration and team competition to be of most benefit in physical fitness testing of sixth grade children. Martin (30) suggested children should be informed of their previous scores, Chevrette (7) concluded that peer observation influenced the performance of fourth grade boys and Caskey (6) found that for elementary children visual motivational techniques were most effective.

Of the studies using sport skill tests as measurements of performance, Hanley (17) showed that verbal encouragement was better than discouragement. Rushall (38) utilized reinforcers as motivators for swimmers which produced positive results.

There was little agreement among the findings when various forms of competition were used as a motivator. This is especially evident in the psychomotor studies. Whittemore (52) and Allport (1) contended that competition between groups increased performance more so than rivalry between single persons. Sims (43) defended the hypothesis that individual motivation was superior to group motivation. The competitive situation is also beneficial for the individual who desires to succeed as compared with the more anxious person -- Ryan, Lakie (40) and Sarason (41). On the contrary, Spence and others (45) found high anxious subjects performed more poorly under competition than low anxious subjects.

Meade (31) found that motivation distorted time perceptions. Kight and Sassenrath (28) reported that students with high achievement completed a test sooner than less-motivated subjects, and Katchman (27) found a difference in the amount of time required to finish a test between high and low-anxious individuals on a post-stress trial. The high-anxious showed an increase in time and the low-anxious a decrease in time.

CHAPTER III

RESEARCH METHODS

The purpose of this study was to investigate the effectiveness of three motivational techniques upon the performance of college women on the Dyer Tennis Test in order to determine which technique, or techniques aid in the performance of a sports skill test.

Selection of Subjects

The subjects used for this study were female undergraduate students from four beginning tennis classes of Michigan State University. Twenty women were randomly selected from each class and comprised one of the four groups. Eighty students were initially chosen, however, in the final analysis 75 were available for use in the study. The women represented various colleges from the university and ranged in age from 18-24 years. A different motivating technique was given to three of the four groups with the fourth as a control group. The motivating techniques selected for this study were randomly assigned to the following experimental groups: Group I -- the control, Group II -- competition with own score, Group III -- competition with classmate of equal ability, Group IV -- class grade based on performance.

General Procedures

The 1938 revision of the Dyer Tennis Test (10) was administered to the subjects from each class during the regular class period at a station removed from the other students. The test consisted of volleying the ball above a three foot marker on the wall and behind a five foot restraining line as many times as possible within a 30 second time period. The scores of three trials were recorded. The complete test appears in Appendix A.

Each subject being tested had three partners: one who counted the number of correct volleys and recorded the score on the subject's card, one who watched that no fouls were committed at the restraining line, and another partner who collected the balls. A box of tennis balls was placed to the right of the subject to facilitate continual play during the test. Each subject had a card with her name, age, height, weight, major, and space to record the number of hits for three trials. The total score was the sum of the three trials.

Before beginning the test, the rules and procedures were explained. Questions were then answered. The personal information on the cards was filled out by the subjects individually. All the groups received the same basic instructions, one pre-trial, then another opportunity for questions. This pre-trial was administered in order to familiarize the subjects with the test and to provide a comparison score for Group II. The instructions given to each group are found in Appendix B.

The control group, Group I, was told to hit the ball on or above the net line from the time they heard "go" until they heard "stop."

Group II, competition with own score, was encouraged to outdo each of their previous individual scores. This was done after each trial by asking the subject her score and verbally encouraging her to exceed it on the next trial. The subjects in Group III, competition with classmate of equal ability, were equated by the matching of similar scores obtained from the pre-trial on one day, matched by their score, then administered the actual test the next class period. They were told to compete with one another in order to exceed the score of their partner. After every trial, it was announced what score both subjects received. They were then verbally encouraged to outdo their partner on the next trial. The scores of the subjects in Group IV, class grade based on performance, were actually used as part of their term grade. The entire class was tested for this purpose from which 20 subjects were randomly selected for use in this study. The subjects were made well aware of the fact that their performance would affect their term grade before the testing was initiated.

Statistical Treatment of the Data

The one-way fixed effects analysis of variance was employed to express a measure of the total variability attributed to one or more of the experimental treatments. In order to determine what differences actually did exist between the various groups, the Scheffe t-test was then used.

CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this study was to investigate the effectiveness of three motivational techniques upon the performance of college women on the Dyer Tennis Test in order to determine which technique, or techniques aid in the performance of a sports skill test. Those motivational techniques employed were: Group I -- control, Group II -- competition with own score, Group III -- competition with classmate of equal ability, Group IV -- class grade based on performance.

Results

The mean, standard deviation, analysis of variance and the Scheffe t-test were used to compare the effectiveness of the various motivational techniques. Each experimental group produced a higher mean than the controls. The scores of Group I, the controls, had a range of 16-40 with a mean of 31.80, the scores of Group II ranged from 22-47 with a mean of 35.42, Group III had a range of 16-58 with a mean of 37.31 and the scores of Group IV ranged from 27-63 with a mean of 45.95. The largest standard deviation of 11.01 appeared in Group III. Table 1 presents the range, mean and standard deviation of each group.

An F ratio of 9.82 was detected by the one-way fixed effects analysis of variance. Since this F ratio was significant the Scheffe

TABLE 1.--Range, Mean and Standard Deviation for Each Group

Group	Range	\bar{X}	s.d.
I. Control	16-40	31.80	6.07
II. Competition with own score	22-47	35.42	7.06
III. Competition with classmate of equal ability	16-58	37.31	11.01
IV. Class grade based on performance	27-63	45.95	10.28

t-test was computed by comparing the means of each of the four groups. These t-tests produced a value of 27.33 between Groups I and IV and 14.75 between Groups II and IV which were both significant at the one percent level of confidence. The t-test between Groups III and IV detected a value of 9.06 which is significant at the five percent level. Thus it follows that the mean of Group IV differs significantly from that of Group I, II and III, but there are no significant differences between any of the other means. The results of the analysis of variance and the t-tests are presented on Tables 2 and 3.

Discussion of the Results

Hypothesis: None of the motivational techniques utilized will prove to be more effective than the control group.

Motivational techniques proved effective in enhancing the performance of the students and was evident by the fact that the mean of each of the experimental groups was greater than the mean of the control group. There was not, however, a significant difference between Group I -- controls, Group II -- competition with own score, and Group III -- competition with classmate of equal ability. Results showed that of these three techniques all aided in increasing performance but no particular one was singularly most effective. Such findings are comparable to Gerdes (15), Ryan (39), Wilkinson (53), Hartrick (20).

Explanations for the absence of significance in the first three groups could be assumed to be the high level of motivation present

TABLE 2.--One-way Fixed Effects Analysis of Variance

Source	SS	df	MS	F	F(.95)	F(.99)
Between	2158.45	3	719.48	9.82	8.19	12.18
Error	5422.22	74	73.27			
Total	7580.67	77				

TABLE 3.--Significance Between Group Means

Group	t-test	Significant
I - II	1.74	no
I - III	3.68	no
I - IV	27.33	yes*
II - III	.42	no
II - IV	14.75	yes*
III - IV	9.06	yes+

*significant at .01 level

+significant at .05 level

within the subjects at the time of testing. If a great degree of motivation existed in the subjects, the possibility that significant differences might not result between any groups is a likely assumption. French states, "an individual's pre-experimental motivation level is a significant variable affecting the degree to which a desired level of motivation can be aroused by instructions within the experimental situation" (14:236). On the other hand, it could have been possible that some or all of the subjects did not respond to the external forms of motivation, or that the control group was more highly motivated than Groups II and III. Consequently, whatever motivation was produced within the experimental groups was not detectable during the analysis (54).

The hypothesis can, in fact, be rejected when the results of Group IV -- class grade based on performance, are included in the discussion. As was previously mentioned, Group IV was more significant than Groups I and II at the one percent level and more significant than Group III at the five percent level. It appears from this data that Group IV produced greater results than the groups with competitive forms of motivation. The assumption can then be made that for these subjects, the motivation to improve their own status, such as a grade, has a more definite effect upon performance than the non-rewarding, external and verbal techniques. It becomes apparent that beginners must be motivated by some concrete method because they have not as yet had sufficient success to want to improve themselves without the added, tangible incentive.

Such results may be correlated with Murray (33) who observed that people possess a tendency to build up and establish a positive evaluation of themselves. This is, without a doubt, a forcible motive. Green and Stachnik (16) concluded that the more significant the consequences of a particular act or performance, the more control those consequences have upon the behavior of the individual. If such is the case in this study, it is evident that the motivational technique of class grade based on performance was an important and immediate consequence for which to strive. The attainment of a "good" grade would positively enhance pride in self. When personal pride is to be maintained by securing a positive grade (positive according to the standards of the individual), performance is likely to be increased.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to investigate the effectiveness of three motivational techniques upon the performance of college women on the Dyer Tennis Test in order to determine which technique, or techniques aid in the performance of a learned skill.

The subjects used for this study were female undergraduate students from four beginning tennis classes of Michigan State University. Twenty women were randomly selected from each class and comprised one of the four groups. Eighty students were initially chosen, however, in the final analysis 75 were available for use in the study. Each group was administered the test under a particular form of motivation. Those motivational techniques utilized were:

- Group I -- Control
- Group II -- Competition with own score
- Group III -- Competition with classmate of equal ability
- Group IV -- Class grade based on performance

The groups received one pre-trial after which the actual testing began consisting of three trials of 30 seconds each. Individual scores were the sum of the three trials. The mean, standard deviation, analysis of variance and the Scheffe t-test were employed to compare the effectiveness of the various techniques.

The mean of each of the experimental groups was greater than the mean of Group I, the controls. However, no significant difference was detected between Group I, II or III. The analysis of variance and the Scheffe t-test did produce, however, a significance in Group IV. This group showed a definite effectiveness in performance above that of Groups I, II or III at both the five and one percent level of significance.

The results of the present study suggest that in order for beginners in tennis to want to improve themselves, they must be motivated by some concrete method such as grades. This method is a tangible, status symbol which appears to have more effect upon performance than the non-rewarding, external and verbal motivational techniques.

Conclusions

From the results of the analysis of the data, the following conclusions were drawn:

1. Motivating techniques had a positive effect on performance as was evident by the fact that the mean of each of the experimental groups was greater than the mean of the control group.
2. The t-tests did not detect a significant difference between the mean of Groups I, II or III. Therefore, it was concluded that the motivating techniques of competitive form (competition with own score, and competition with classmate of equal ability) increased performance, but none was more effective than another.

3. The Scheffe t-test was able to significantly distinguish between the performance of Group IV -- class grade based on performance as compared with the other groups.
4. College women in beginning tennis classes are likely to increase their performance when they are motivated by a concrete, tangible method that enhances their own status rather than by the non-rewarding, external and verbal techniques.

Recommendations

Future research concerned with the effects of motivational techniques on the performance of sport skills should be directed along the following lines:

1. A personality or anxiety test should be administered to the subjects to determine the effectiveness of various motivating techniques according to the psychological make-up of the student.
2. A long range study needs to be undertaken using the same test and motivational techniques with different grade levels such as elementary, junior high, senior high and college age students. This could likewise be done with various skill levels.
3. Also of interest to the study of motivation would be the diversified manner in which the same motivation affects males and females.

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APPENDICES

APPENDIX A

DYER TENNIS TEST -- 1938 REVISION

APPENDIX A

DYER TENNIS TEST -- 1938 REVISION*

Organization:

Divide the group to be tested into units of four players each, and number them from one to four. Provide each player with a score card on which she writes her name. Then read the following description of the test to the group.

"The Backboard Test consists in rallying a tennis ball against the wall. The object of the test is to cause the ball to strike the wall on or above the net line as many times as you can in 30 seconds. (Pause) When I say 'Go!' start the test immediately. Drop the ball and let it hit the floor once, then put it in play against the wall. Continue to play it to the wall until I say, 'Stop!' at the end of 30 seconds. There is no limit to the number of times the ball may bounce before you hit it. You may volley the ball. The ball need not touch the floor before you play it except at the start and when a new ball is being put in play. You may use any stroke or combination of strokes. You must play all balls from behind this restraining line (indicate the line clearly). You may cross the line to retrieve balls, but any hits made while in such a position do not count. You may use any number of ball. If for any reason you lose control of the ball in play, do not try to retrieve it. Take another ball from this box (indicate clearly) and put it in play as you did at the start. Each ball striking the wall on or above the net line before the word 'Stop' counts as a hit and scores one point. You will each be given three trials today. The final score on the test is the sum of the scores on the three trials."

Demonstrate the following points:

1. Two balls in hand.
2. Start test by dropping ball, letting it hit floor at least once, then play it.
3. Rally a few times, showing volley.
4. Cross restraining line to retrieve a ball, a low hit to keep it in play and retreat for next shot.
5. Make a wild shot to show how taking another ball saves time. Put this new ball in play as at the start.

Test procedure and individual duties:

No. 1 takes the test. At the signal, 'Ready?' she stands anywhere behind the restraining line with her racquet and two balls prepared to start the test at the word 'Go!'

No. 2 counts the number of balls which strike the wall on or above the net line before the word 'Stop!' and enters them on the score card opposite the appropriate trial number. If any infringements are reported by No. 3 these are deducted before the score for the trial is recorded. A ball striking coincident with the word 'Stop!' does not count.

No. 3 watches the player in relation to the restraining line. She reports to the scorer at the end of the trial the number of hits, if any, made while the player was standing closer to the wall than the restraining line.

No. 4 collects the balls of her group before the start of a trial and puts them in the box. During the trial she collects and returns to the box any balls going out of play.

Each person takes the test in rotation. After No. 1 has had her first trial she assumes the duties of No. 2 while the latter takes the test; No. 3 and No. 4 remain the same. While No. 3 takes the test, No. 4 scores the hits, No. 1 and No. 2 assume the duties of No. 3 and No. 4 respectively. When No. 4 takes the test, No. 3 scores hits, and No. 1 and No. 2 remain the same. After each person in the entire group being tested has had one trial, the test is repeated in the same order until everyone has had three trials in all.

Answer questions. This organization will consume about ten minutes. Great care should be exercised in these preliminaries to make certain that the test procedure is clearly understood. The testing will then take place smoothly and accurately.

The examiner then assumes a position to the rear of the players with the stop watch, and begins testing the No. 1's who are to take the test at one time, usually one or two. Numbers 2, 3, and 4 of these groups will follow, and then the No. 1 of the next two groups, and so on until all have had one trial, after which the test is repeated twice in the same order. In case the group does not divide exactly into groups of four, adjust groups to suit.

*Dyer, Joanna Thayer. "Revision of the Backboard Test of Tennis Ability." Research Quarterly. 9:25-31, 1938.

APPENDIX B

TEST INSTRUCTIONS

APPENDIX B

TEST INSTRUCTIONS

Today you will take the Dyer Tennis Test. You may or may not have taken it before, so I will review the test for you.

Organization and procedures:

1. This test consists of rallying a tennis ball against the wall. The object is to hit the ball on or above the line on the wall as many times as you can in 30 seconds.
2. The test is started on the word "go." Drop the ball, let it bounce once then put it in play against the wall. After you have started, there is no limit to the number of times the ball may bounce before you hit it. You may hit it directly from the wall without a bounce if you like. Continue to play until you hear the word "stop."
3. All balls must be played from behind the restraining line. You may cross the line to retrieve balls, but any hits made while in such a position do not count.
4. If you lose a ball or it goes out of control, do not run after it, instead take another from the box and put it into play as you did at the start with one bounce.
5. You will be given one pre-trial, then three trials which will be recorded as your score. Each trial is 30 seconds.
6. Remember, you must stay behind the restraining line (any distance) and hit the ball on or above the net line.

Any questions?

Four of the 20 subjects were chosen at random and were instructed in the following manner: while one of you is taking the test, one will count and record the number of hits, one will watch for fouls at the restraining line, and another will collect the balls as they go behind the subject taking the test. After she is finished rotate around until all have completed the test.

Two groups of four subjects were administered the test simultaneously.

APPENDIX C

RAW DATA OF THE CONTROL AND EXPERIMENTAL GROUPS

TABLE C-1.--Raw Data for Group I --Control

Subject	<u>Trials</u>			Total
	1	2	3	
1	11	9	6	26
2	12	9	10	31
3	12	14	12	38
4	11	11	12	34
5	11	10	9	30
6	9	10	10	29
7	12	11	12	35
8	13	17	9	39
9	8	12	9	29
10	15	12	13	40
11	13	12	8	33
12	13	15	11	39
13	13	13	7	33
14	6	5	5	16
15	6	6	10	22
16	11	11	12	34
17	9	13	12	34
18	10	11	15	36
19	9	12	12	33
20	6	9	10	25

TABLE C-2.--Raw Data for Group II--Competition with Own Score

Subject	<u>Trials</u>			Total
	1	2	3	
1	12	12	13	37
2	13	11	10	34
3	8	5	10	23
4	11	11	11	33
5	13	12	15	40
6	10	9	10	29
7	9	9	15	33
8	14	13	9	36
9	8	7	7	22
10	12	15	16	43
11	12	15	13	40
12	8	8	12	28
13	13	16	14	43
14	13	10	18	41
15	15	12	18	45
16	10	11	9	30
17	20	13	14	47
18	15	10	11	36
19	10	10	13	33

TABLE C-3.--Raw Data for Group III--Competition with Classmate of Equal Ability.

Subject	Trials			Total
	1	2	3	
1	16	11	12	39
2	9	11	13	33
3	4	9	11	24
4	17	20	21	58
5	9	11	12	32
6	16	17	19	52
7	11	15	12	38
8	8	11	12	31
9	4	7	5	16
10	10	9	11	30
11	15	9	16	40
12	11	12	10	33
13	12	16	16	44
14	11	14	20	45
15	19	15	18	52
16	7	13	10	30

TABLE C-4.--Raw Data for Group IV--Class Grade Based on Performance

Subject	<u>Trials</u>			Total
	1	2	3	
1	14	11	15	40
2	15	18	16	49
3	11	11	5	27
4	17	14	20	51
5	21	23	19	63
6	13	13	15	41
7	17	20	23	60
8	12	18	11	41
9	14	16	13	43
10	11	14	13	38
11	15	16	13	44
12	20	15	25	60
13	21	16	16	53
14	19	13	19	51
15	15	16	21	52
16	17	12	18	47
17	9	10	9	28
18	19	18	20	57
19	13	13	16	42
20	13	8	11	32

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