THE EFFECTS OF EXERCISE AND RELAXATION ON THE ABILITY TO PERFORM A SIMPLE MENTAL TASK

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Master of Science

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by

Darrell W. Divine

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George C Milton
Approved for the Major Department

Samuel C. Boyle
Approved for the Graduate Council

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CHAPTER I

I. INTRODUCTION

Many experts in the field of physical education contend that certain types of physical activity stimulate the learning process. The research has been directed into many different areas of physical education. For example, studies to investigate muscular tension and the influence it exerts upon the efficiency to do a mental task or work. Another area of interest concerns the detrimental effects of rest pauses to performance of a mental task. Other studies reported the problem of methods of improvement, comparing mental practice to traditional physical practice. Progress has been made comparing the physically fit individual to an individual in poor physical condition on a mental task performance.

The majority of the investigators' interests were in studying the relationship of exercise, physical fitness, or physical practice being conducive to the learning process. To substantiate the beliefs of the physical educator, studies and experiments using different combinations of time, physical activity, and mental task would aid in strengthening the physical education position in education.

II. STATEMENT OF THE PROBLEM

The purpose of the study was to determine the effects of exercise and relaxation on the ability to perform a simple mental task. This study specifically attempted to compare the effects of exercise and relaxation upon the performance of a simple mental task by high school boys and girls.

III. DEFINITION OF TERMS

Mental practice. The act of doing a physical act mentally, e.g., the imaginary dribbling of a basketball.

Figure-letter association test. A test in which a figure represents a letter. The figure is given and is associated with a letter in an example or key.

Relaxation. In this study, relaxation was the subjects sitting or standing, talking, and drinking a "coke" in the students' concession stand.

Exercise. In this study, exercise referred to the subject's treatment of walking up and down two flights of stairs repeatedly.

CHAPTER II

REVIEW OF LITERATURE

The Review of Literature has been divided into four separate areas. The first area includes studies concerned with the influence of muscular exertion on the efficiency to do a mental task or work. The second area deals with the influence of mental and physical practice in performing a physical task. The third area of research deals with the effects of physical fitness on the ability of mental performances. The fourth area includes studies concerned with the effects of exercise and relaxation on the ability to perform a simple mental task.

Bills, in 1927, undertook a study to determine whether increased muscular tension exerts any influence upon the efficiency to do a mental task or work. In this study, tension was applied as the subjects were doing a mental task. The subjects in this study were nine advanced college students. This group was composed of four women and five men. In comparing scores Bills found that muscular tension of the form and amounts used did increase the efficiency of mental task of the kinds tried.[1]

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[1]A. G. Bills, "The Influence of Muscular Tension on the Efficiency of Mental Work," American Journal of Psychology, 38:227, 1927.

In a later study by Zartman, the problem of exercise upon mental effort was attacked differently than Bills. Zartman employed eighteen university students to act as subjects. This group included twelve women and six men. Zartman and Bills used the same type problem-solving, but here is where their studies differed. Zartmen wanted to use something less distracting than the dynamometer employed by Bills. He concluded most of the subjects drove automobiles. A device simulating the brake pedal on an automobile was used instead of the dynamometer. It was found that increasing the tension of the right leg does not in itself definitely increase the efficiency of solving arithmetical problems.[2]

Kimble and Bilodeau attacked another area of the problem of the physical facilitating the mental. They investigated the belief that during rest pauses there occurs s recovery from the effects of practice which are detrimental to performance of simple work. Results of their study indicates that if the length of work period was held constant, performance of simple work may be increased by lengthening

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[2]E. N. Zartman and H. Cason, "The Influence of an Increase of Muscular Tension on Mental Efficiency," Journal of Experimental Psychology, 17:673, 1934.

the rest period. With the period constant and the length of work time increased, the output significantly decreased.[3]

Twining, in 1949, conducted experiments in the area of physical practice, mental practice, and subjects receiving no practice. The subjects were thirty-six college men. Using random selection Twining divided them into three groups of twelve each. The study covered twenty-one days. The data gathered indicated an improvement in all the group. The practice in this study was ring tossing. The group receiving physical practice improved their score on ring tossing 137 per cent from the start of the experiment until its termination. The t-ratio of this group was 6.44 which was highly significant at the .01 level of confidence. The group receiving mental practice improved their score 36 per cent. The t-ratio of this group was 3.80 which was a significant improvement at the .01 level of confidence. The third group receiving neither physical or mental practice had a t-ratio of .083 which was not significant.[4]

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[3]Gregory A. Kimble and Edward A. Bilodeau, "Work and Rest as Variables in Cyclical Motor Learning," Journal of Experimental Psychology, 39:150, April, 1949.

[4]W. E. Twining, "Mental Practice and Physical Practice in Learning a Motor Skill," Research Quarterly, 20:432, October, 1949.

Another study to determine mental-physical learning was conducted by Start. Thirty-five, twelve year old boys were tested to determine their accuracy at the basketball underarm free throw. Between the first and second test the subjects were given nine periods of five minutes duration of mental or physical practice, depending on the group assignment. The significant gain obtained could not be related to the initial score for either group.[5]

Clark, employing one hundred and forty-four high school boys, conducted a study concerning mental practice as compared to physical practice, and their effectiveness in learning or developing a motor skill. All of the boys were allowed five basketball free throws to loosen up their arms and shoulders. They were then given twenty-five test basketball free throws. The number made and missed was recorded for use at the end of the study. The physical practice group continued this procedure for fourteen days. The mental practice group received no further instructions for fourteen days. The physical practice group improved 44 per cent from the initial test to the final test. The mental practice group improved 26 per cent from the initial test to the final

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[5]K. B. Start, "Relation Between Intelligence and the Effect of Mental Practice on the Performance of a Motor Skill," Research Quarterly, 31:644, December, 1960.

test. Both groups made highly significant gains. The physical practice group had a t-test score of 10.5 at the .01 level of confidence and the mental practice group had a t-test score of 7.7 at the .01 level of confidence.[6]

Silla, in a two year study in Russia, brought in another area experiment. Using students at the Tallinsh School Boarding House, Silla conducted experiments to study the physically fit student's effects on a mental task as compared to those students categorized not as physically fit. The mental ability of the students was determined before the study began. The students were tested during the study and at its end. At the end of the study Silla concluded that pupils who were physically fit did much better at a mental test than those students not as physically fit.[7]

In studies conducted in 1964, Hart, using sixty sophomore women at Springfield College, concluded that physical fitness is not a general predictor of academic

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[6]L. Verdelle Clark, "Effect of Mental Practice on the Development of a Certain Motor Skill," Research Quarterly, 31:560, December, 1960.

[7]R. B. Silla, "The Influence of Systematic Physical Education on the Mental Work Efficiency of Children," Theory and Practice of Physical Culture, 1:49-52, 1963.

success. It is, however, high enough to be considered as a necessary factor for the improvement of academic index in the general education of students.[8]

Gutin, using fifty-five male college students as subjects, found no difference in an exercise group and a control group to perform a complex mental task. He found, however, a significant relationship existed between the degree of fitness improvement and the degree of mental task improvement. The study lasted twelve weeks.[9]

McAdam and Stoppel conducted experiments more closely related to the stated problem. A large number of seventh and eighth grade girls and boys were used as subjects. These subjects were divided into four groups: (1) exercise, (2) rest, (3) immediate retest, and (4) classroom instruction. All subjects were tested at the same time. After the treatments mentioned, the subjects were retested. The conclu-

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[8]Marcia E. Hart and Clayton T. Shay, "Relationship on Mental Ability Following Physical and Mental Stress," Research Quarterly, 35:443-445, May, 1964.

[9]Bernard Gutin, "Effect of Increase in Physical Fitness on Mental Ability Following Physical and Mental Stress," Research Quarterly, 37:211-220, May, 1966.

sion of the experiment was that no significant difference between the groups was established.[10]

McAdam and Wang, using a very similar study as McAdam and Stoppel, had different results. In this study it was established that there was a gradually increasing separation of performance in the mental task in favor of: (1) exercise groups and (2) the rest group over the other two groups. All four groups started at the same speed, but the thirty second plotting of scores showed more improvement in the exercise group and rest group than the other groups.[11]

A study was made by Giese, McAdam, Milton, and Wang to determine to what extent a single exposure to exercise would modify the performance of male college students in a paper and pencil symbol substitution type task. The subjects were four hundred and twenty-seven male college students selected at random within the physical education service classes and designated to one of four groups. The groups were exercise, rest, classroom instruction, and

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[10]Robert McAdam and David Stoppel, "The Role of Exercise in the Performance of a Simple Mental Task," (University of Minnesota, 1964), p. 1, (Mimeographed.)

[11]Robert McAdam and Peter Wang, "The Role of Exercise in the Performance of a Simple Mental Task in Adult Males," (University of Minnesota, 1964), pp. 1-7, (Mimeographed.)

immediate retest. The groups were given five minute tests and ten minute treatments. Results show no significant difference between exercise and other treatment groups in the fifteen minute performance of a simple mental task. A trend for the exercise group to rank high among the treatments in performance of the task, the per cent of subjects making errors, and the delay in the time when maximum errors were made, was true at the two schools where the study was made.[12]

The previous studies have used several approaches to the question: Can physical exercise help facilitate learning? This study was designed to help answer this question. This study will add to the knowledge in the areas of age groups, treatment, and time periods.

Relation of the study to the research. From the literature reviewed relating to this study, two ideas have been studied and tested. First, physical fitness effects the ability to perform a mental task. Second, physical activity before the performance of a mental task facilitates the performance of that task. This investigator hoped to substantiate the second idea.

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[12]Peter Wang, George Milton, Robert McAdam, and David Giese, "Exercise and Performance of a Simple Mental Task." (University of Minnesota, 1966, pp. 1-14, (Study Number 3), (Mimeographed.)

CHAPTER III

PROCEDURES

I. GENERAL OVERVIEW

The purpose of this study was to determine the effects of exercise and relaxation on the ability to perform a simple mental task. In this study, using a simple pencil and paper figure-letter association test, this investigator tested and retested all subjects enrolled in his assigned classes at the Parsons, Kansas High School.

The subjects were divided into three groups by the method of card shuffling. Each subject's name was printed on a three-by-five note card. The cards were shuffled with the names of the subjects down so they could not be seen by the investigator and dealt into three separate stacks. The first stack became Group I or retest group, the second stack became Group II or exercise group, and the third stack became Group III or relaxation group. This procedure was followed in each of the investigator's five classes. Each of the five classes contained a segment of the total of each group. In the foregoing procedure, complete randomization was used. No discrimination because of sex, race, or class was employed.

II. SUBJECTS

This study involved all students enrolled in the investigator's classes at Parsons, Kansas High School The assigned classes included two classes of American History, one class of American Government, one class of Economics, and one class of Sociology.

Fifty-two girls took part in this study. Four of the girls were Negroes, the other forty-eight were Caucasian. Of these fifty-two girls, twelve were in Group I or retest group, twenty were in Group II or exercise group, and twenty were in Group III or relaxation group. Group I had eight junior girls and four senior girls. Group II had seventeen junior girls and three senior girls. Group III had fourteen junior girls and six senior girls. The junior girls' and boys' ages ranged from sixteen to seventeen and the senior girls' and boys' from seventeen to eighteen.

Forty-nine boys took part in the study. Seven of the boys were Negroes, the remainder were Caucasian. Of the forty-nine boys, twenty-one were in Group I, fifteen were in Group II, and thirteen were in Group III. Group I included eleven junior boys and ten senior boys. Group II contained eight junior boys and seven senior boys. Group III contained seven junior boys and six senior boys.

On the day of the experiment the subjects wore their regular school clothes. From the time the subjects were seated when they first entered the room until the test booklets were collected by the investigator after the final test, twenty-four minutes elapsed. This included five minutes to hand out test booklets and give instructions, five minutes for the initial test, a one minute time period between the initial test and treatment, a five minute treatment, a one minute time period between treatment and final test, a five minute final test, and a two minute time period to complete the information and collect the test booklets. All subjects were tested the same day but at different time periods; that is, at the time the subjects schedule called for the investigator's class. The investigator had the assistance of two persons designated in advance of the testing program.

III. TESTING PROCEDURES

The day before the experiment took place, the subjects were oriented about the purpose of, and the procedures to follow on the test. The subjects were told about the treatments and the relationship between the treatment and performance. The subjects were also given their group assignments. The subjects were instructed to bring a pencil or pen to class with them on the testing day.

On the day of testing, after the subjects entered the room and were seated, all subjects were given a test booklet consisting of the test and answer sheet. The subjects were instructed to fill in the information on the answer sheet and not to proceed with the test until instructed. The information consisted of the subject's name, class, class period, identification number, and group assignment. The procedures to follow during the initial test, treatment period, and final test were again given.

On the command "start," the subjects opened their test booklets and began putting the appropriate letter in a space provided under each figure. The figure-letter associations or combinations were given at the top of each page of the test booklet. (See appendix for sample of the test.)

At thirty second intervals, the command "mark" was given by the investigator. At this command, the subjects placed a large mark (/) through the figure where they were at that time. They then proceeded with the test. This procedure was followed throughout the initial and final test. At the end of the five minute time period, the command "stop" was given. The subjects closed the test booklets and placed the tests and answer sheets under their desks. With this the first phase of the experiment was terminated.

The subjects were given a one-minute time period between the initial test and their treatment. In this time period Group I or retest group prepared to take the final test. New test booklets were given to each subject in Group I. Again the subjects completed the information requested on the front page, after which the final test was administered exactly as the initial test.

Group II or exercise group left the room with an assistant of the investigator and proceeded to the stairs leading to the second floor of the high school. The stairs were located at the north end of the north-south hall, approximately seventy feet from the testing room.

The exercise for Group II consisted of walking up and down two flights of stairs repeatedly. The first flight of stairs contained fourteen steps. The subjects took two or three steps on the landing, then up the second flight of stairs which contained eight steps. The subjects walked up and down the stairs in pairs, one pair following the other. As soon as the last pair reached the top of the stairs, they would turn around and start down. As soon as the last pair reached the bottom, they would turn around and start up the stairs again. This procedure of stair-climbing was maintained for the allowed five minutes of treatment time. The

five classes averaged nine trips up and down the stairs. At the end of the five minute treatment, the group returned to the testing room for their final test.

Group III or relaxation group left the room after the initial test with an assistant of the investigator. They proceeded to the concession stand which is located approximately fifty feet east of the testing room in the east-west hall. At the concession stand the subjects were given a "coke" and given permission to sit or stand, and talk. The assistant had the refreshment ready for the subjects. The assistant remained with the group to insure their relaxation. At the end of the five minute relaxation period, the subjects were returned to the testing room for their final test.

When the subjects re-entered the testing room they were given a new test booklet. The final test was given using the same procedures as on the initial test. The initial and final tests were the same test. Because of the time needed for the subjects to return from their treatment, they waited until after the final test to complete the information requested on the answer sheet. After all information was filled in, all test booklets were collected by the investigator and one assistant, and regular class was then continued.

IV. ANALYSIS OF DATA

The data in this study was the corrected mean scores, error mean scores on the initial and final tests, and the difference or gain between the two tests. The corrected mean scores and error mean scores of each group was analyzed to determine any significant differences in the groups.

CHAPTER IV

ANALYSIS OF DATA

I. INTRODUCTION

There were two statistical analysis computed in the studying of the effect of various treatments upon the success of high school students to do a simple mental task. These statistical methods were (1) the significance of the difference between correlated means and (2) analysis of variance.

II. ANALYSIS OF THE INITIAL TEST

One of the major variables in the success of any research design is the procedure in which the subjects were selected, categorized, and finally grouped. Such is the case in the present study. The investigator knew of the importance placed upon the grouping of subjects as past research pointed out. The need for strict adherence to random grouping has been noted; therefore, complete randomization of subjects into the various groups was used.

For illustration purposes the success of the random sample procedure of the study can best be demonstrated by

the mean score of correct responses and the mean of the errors made by each group on the initial test.

Group I or the immediate retest group had a correct mean score of 78.97 and an error mean score of 1.85. Group II or the exercise group had a correct mean score of 82.19 and an error mean score of 1.83. Group III or the relaxation group had a correct mean score of 83.35 and an error mean score of 2.68. Table I shows these results clearly.

TABLE I

THE CORRECT MEAN SCORES AND ERROR MEAN SCORES OF ALL GROUPS ON INITIAL TEST

Group	N	Mean Corrected Score	Mean Error
Group I (Retest)	33	78.97	1.85
Group II (Exercise)	35	82.19	1.83
Group III (Relaxation)	33	83.35	2.68

It is to be noted that Group I or retest group had an initial corrected mean score of 78.97 which was consider-

ably lower than Groups II and III. Yet this observed difference did not result in a significant statistical difference when the scores were subjected to analysis of variance. The results of the analysis of variance concerned with the correct scores of the three groups can be noted in Table II.

TABLE II

ANALYSIS OF VARIANCE FOR INITIAL TEST SCORES OF A SIMPLE MENTAL TEST

Source of variance	Sum of Squares	df	Mean Square	F	P
Among	351	2	175	.63	-
Within	27822	98	275		
Total	28173	100			

F needed for significance at .05 = 3.09

.01 = 4.82

Another slight difference between the groups in terms of the initial test performance is noted by the total number of errors made by Group III or relaxation group. The mean score for this relaxation group was 2.68, which is slightly higher than the other two groups. Again this difference was

not statistically significant when the figures were subjected to analysis of variance. Table III illustrates the results of the analysis of variance for mistakes on the initial test.

TABLE III

ANALYSIS OF VARIANCE FOR INITIAL TEST ERRORS ON A SIMPLE MENTAL TASK

Source of variance	Sum of Squares	df	Mean Square	F	P
Among	15	2	7	1.39	-
Within	576	98	5		
Total	591	100			

F needed for significance at .05 = 3.09

.01 = 4.82

III. THE SIGNIFICANCE OF THE MEAN GAIN FOR ALL GROUPS IN THIS MENTAL TASK

To establish the significance of the mean gains in the mental task, *t*-tests were computed, comparing the initial and final corrected scores for each of the three groups. In order to reach a significance, a *t* of 2.00 was necessary for the .05 level of probability, and a *t* of 2.65 was required

to be significant at the .01 level of probability. From Table IV it can be seen that a significant t ratio was obtained for all groups. This significant gain by all groups indicates some learning and/or improved performance of the test matter did occur, but yet a difference can be noted between the mean scores of both initial and final test scores. This difference is in favor of the exercise and relaxation groups. What this difference is in terms of importance to this study will be discussed later in Chapter V.

TABLE IV

THE SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE INITIAL AND FINAL CORRECT SCORES ON A SIMPLE MENTAL TASK

Group	N	Initial mean	Final mean	Mean difference	t	P
Group I (Retest)	33	78.97	100.26	21.29	4.46	.01
Group II (Exercise)	35	82.19	108.76	26.59	6.24	.01
Group III (Relaxation)	33	83.35	109.00	25.65	6.14	.01

t necessary for significance at .05 = 2.00

.01 = 2.65

IV. ANALYSIS OF ERRORS MADE ON FINAL TEST

One of the purposes of the present study was to investigate the effects of various treatments upon the accuracy or performance on a simple mental task. By using the results of mistakes made by each group, hopefully the investigator would gain insight into this area of concern.

Although it was pointed out early in this study that a slight difference did exist between the groups initially, this difference was not significant. This difference was both in corrected scores and errors.

In the present study the different treatment and their effects upon the accuracy performance followed the results reported in previous research in this area of human behavior.[13] Group III or relaxation group had the largest mean error score of 3.00 for the final test, followed by Group I or the retest group with a 2.32 mean error score. In terms of accuracy performance, Group II or the exercise group compiled the best mean error score of 1.89.

When the *t*-test for significance was applied to each individual group for improvement between the initial and

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[13]McAdam, *loc. cit.*

final test, there was no significance between these tests. Table V illustrates these mean error scores and the initial and final test.

TABLE V

TEST FOR SIGNIFICANCE BETWEEN INITIAL AND FINAL ERROR SCORE FOR ALL GROUPS

Group	N	Initial mean	Final mean	Mean difference	t	P
Group I (Retest)	33	1.85	2.32	.47	1.26	-
Group II (Exercise)	35	1.83	1.89	.06	.12	-
Group III (Relaxation)	33	2.68	3.00	.32	.28	-

t necessary for significance at .05 = 2.00

.01 = 2.65

V. ANALYSIS OF VARIANCE FOR DIFFERENCE BETWEEN INITIAL AND FINAL CORRECTED SCORES

The statistical procedure of analysis of variance was employed to determine if there was a significance between the three groups in terms of gains made on the simple mental task. To show that differences do exist between the groups,

a significant F must result from the statistical computations. When the statistical computations were made, a non-significant F of 1.44 resulted. To be significant at the .01 level, a 3.09 was necessary. Therefore, the 3.09 was too high for the F of 1.44. The non-significant F indicates that differences did not exist between the groups in large enough portions to result in a significant F. Table VI illustrates the analysis of variance results.

TABLE VI

ANALYSIS OF VARIANCE FOR ALL GROUP'S MEAN GAINS OR DIFFERENCE ON A SIMPLE MENTAL TASK

Source of variance	Sum of Squares	df	Mean Square	F	P
Among	356	2	178	1.44	-
Within	12510	98	123		
Total	12866	100	301		

F needed for significance at .05 = 3.09

.01 = 4.82

CHAPTER V

SUMMARY

The purpose of the study was to determine the effects of exercise and relaxation on the ability to perform a simple mental task. Specifically, this study attempted to compare the effects of exercise and relaxation upon the performance of a simple mental task by high school girls and boys.

The one hundred and one subjects were divided into three groups. Group I was the retest group, Group II was the exercise group, and Group III was the relaxation group. These groups were given a simple figure-letter association test of five minutes duration. After a one minute time period Group I was given a final test.

Group II, after the initial test and a one minute time period, was given a treatment of exercise. The exercise consisted of walking up and down two flights of stairs, which contained twenty-two steps, repeatedly. After the five minute treatment Group II returned to the testing room for the final test.

Group III, after the initial test and a one minute time period, was given a five minute relaxation period. The

relaxation consisted of sitting or standing, talking, and drinking a "coke." After the relaxation period Group III returned to the testing room for the final test. The initial and final tests for all groups were the same test, and the same procedures were followed on both tests.

There were two statistical analysis computed in the study of the effect of various treatments upon the success of high school students to do a simple mental task. These statistical methods were (1) the significance of the difference between correlated means and (2) analysis of variance.

Within the limits of this study the findings are:

1. All groups improved significantly at the .01 level of confidence between the initial and final tests.

2. The group receiving the treatment of exercise made the greatest gains. The difference in the gain between groups was not significant.

3. There was no significant difference between groups on the improvement made.

4. All groups showed an increase in errors between the initial and final tests.

5. The group receiving the treatment of exercise made the fewest errors on the final test.

6. The difference in error mean scores of the groups was not significant.

The corrected mean scores of each group on the initial test indicated the method of random selection employed by the investigator was appropriate. The difference came on the final test after the various treatments. This difference was in favor of the exercise group over the other two groups.

The conclusions of this study are as follows:

1. Generally speaking, a certain amount of learning occurs from the initial to final test which aids in performance.

2. Regardless of types of treatment, all groups will demonstrate significant improvement.

3. Generally speaking, exercise treatment will cause greater improvements in performance than other types of treatments.

4. Generally speaking, exercise treatment groups will have fewer errors than groups with other types of treatment.

These conclusions coincide with conclusions of Wang, Milton, McAdam, and Giese.[14]

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[14]Wang, loc. cit.

In the studies by the mentioned investigators, the results were primarily the same as in this study. No significant differences were found between groups, but a trend for the exercise group to rank high among the groups in performance of the mental task, and lowest in the per cent of subjects making errors. The subjects used in the studies mentioned ranged from seventh and eighth grade girls and boys to college men. This is not enough evidence to make a positive statement in favor of the exercise treatment, but a trend has been developed by other investigators and the trend showed in this study.

It is the recommendation of this investigator that further studies be made using subjects of different ages, grades, social-economic backgrounds, and mental ability. It is also recommended that different, mild, sweat-producing exercises be employed for investigation. The type of mental task should vary from the simple figure-letter association test to simple math problems. The mental task should be so designed that no subject be put at a disadvantage with other subjects. If this is done the question of why the trend of best performance is in favor of the exercise group might be answered.

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APPENDIX

Name_____ I.D. Number_____
Grade_____ Group Number_____
Class_____ Hour_____

The following test is a simple letter-figure association test. You will be allowed five minutes to work on the test. Please read the following instructions carefully.

1. Do not open test booklet until told to do so by the instructor.

2. At the top of each page is a key from which you will obtain the letter which goes with the figure in each box. Place this letter in the box below the figure.

3. At 30 second time periods, the instructor will say "mark." Complete the box you are on and mark it like the example shown. Then continue on. 

4. At the end of the five minute period the instructor will say "stop." At this command, close the test booklet and wait for further instructions.

5. Work as rapidly as possible, but at the same time accurately. We are interested in correct responses only.

6. Start at the left end of each line and work to the right, one row at a time. Do not skip around.

Test 1: 1st___ 2nd___ 3rd___ 4th___ 5th___ 6th___ 7th___
8th___ 9th___ 10th___

Test 2: 1st___ 2nd___ 3rd___ 4th___ 5th___ 6th___ 7th___
8th___ 9th___ 10th___