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Changes in Social Concept of Self as Related to Posture Improvement

Harvette C. (Polly) Brown
Central Washington University

CHANGES IN SOCIAL CONCEPT OF SELF AS RELATED TO POSTURE IMPROVEMENT

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Harvette C. (Polly) Brown

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Everett A. Irish, COMMITTEE CHAIRMAN

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Darwin J. Goodey

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Albert H. Poffenroth

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

For many years there has been much discussion about how important posture is to health and to a person's well-being. However, little has been done in scientific research to measure what a person actually believes about his or her posture. It has further not been tested as to whether "good" or "bad" posture has anything to do with the "inner" feelings a person may have.

Wells (21:31) observed that:

> So much has been written about posture, we tend to think that the subject has been thoroughly explored and there is nothing left to learn about it. As a matter of plain fact we actually know relatively little about it. To be sure, there are many things we believe about it, but few of our hypotheses have been tested.

The fact that few of our hypotheses have been tested has prompted the present research.

I. THE PROBLEM

Statement of the problem. The purpose of this study are twofold. They are (1) to determine the degree of relationship between one's self-concept and standing posture as found in high school sophomore girls, and (2) to determine the effects that improvement of postural

defects has on the individual's self-concept. This study is limited to girls enrolled in sophomore physical education classes at Wenatchee High School during the 1964-65 school year.

Sub-problems. Other problems of this study are: (1) Selection and orientation of a usable posture measuring device, (2) selection and orientation of a self-concept measuring device, (3) selection of sets of exercises to be used for postural improvement, and (4) organization, analysis, and interpretation of data.

Factors affecting the study. There were several external factors, which are common to most public school situations that could not be controlled in this study. Some of the specific limitations of this study are as follows: (1) No measure was made of the personal effort in performing the postural exercises, (2) the New York State Posture Rating Chart is a subjective instrument and is not definitive enough for precise ratings of postural changes, and (3) students from the Special Education Program were in the independent group and this may, or may not, have had an influence upon the performance of the regular students within this class.

Assumptions of this study. In order to complete this study the following assumptions were made: (1) The Adapted California Q-set (Form III) is a valid and objective test and that the revision of this test in which emperical validity was established, is also valid within the limitations of the test, (2) the New York State Posture Rating Chart is a valid instrument, and (3) that it is possible to improve posture by participation in a well-designed exercise program.

II. DEFINITIONS OF TERMS USED

Health. This is to be defined as a state of mind and body, an over all feeling of well being.

Personality assessment. In this study the term 'personality assessment' is used by the Q-sort method as a means of measuring self-concept.

Posture. In this study the term 'posture' is related to static position, or standing posture.

Self-concept. In this study the term 'self-concept' refers to the way an individual perceives herself in relation to her own body and body structure.

CHAPTER II

REVIEW OF THE LITERATURE

Many research studies have investigated anterior-posterior and lateral standing posture. A few research studies have investigated self-concept and body-image or body-cathexis. However, nowhere in the related literature were there found any studies dealing with the relationship between self-concept and posture improvement. The related research reviewed in this chapter is arranged under three general headings: (1) Measurement and significance of self-concept, (2) measurement of posture and posture exercising, and (3) posture, psychological factors and mental health.

I. MEASUREMENT AND SIGNIFICANCE OF SELF-CONCEPT

The problem of personality assessment has been with us from the beginning of time. Originally, when a man desired to size up another man, he had only his eyes and ears by which to do it. Primitive man was primarily concerned with physical appearances and the loudness of his leader's voice. Later, the skill with which a man handled the tools of war and the hunt became an important factor in analysing his abilities (11:8).

These are the roots of case history which modern students of personality use to understand a person. Together with other techniques, the psychiatrist still relies strongly on what he hears and sees to indicate the presence of mental illness in a patient. The beginning of psychological tests can be traced back to the first sampling of behavior under crudely controlled conditions as a means of gauging total or future behavior of an individual. The initiation ceremonies of primitive peoples served this purpose. Tribal judgments of a man were based on how many skins, or scalps he had collected (11:8).

Kahn and Martin (11:9) in their evaluation of personality testing feel that:

> Each method of assessment has its own peculiar advantages and weaknesses. Taken as a whole, the available methods of judging a human being--both primitive and their modern counterparts--are grossly inadequate to the job, and always will be. We can conceive of no magic method that will accurately reflect the infinite complexities of the human personality, its variegated nuances, fathomless depths, or unpredictability in new situations. Most critics of psychological methodology expect too much. Most defenders of this methodology promise too much. The human being with over nine billion unpredictable cortical synapses defies predictable adherence to any known laws. Yet we must somehow deal with this colossus--the human personality--if we are to have any kind of a science of behavior. We certainly cannot give up before we start. Neither can we admit failure because success is not always complete.

Self-concept testing is one approach to understanding, predicting or diagnosing human behavior, mental health and personality. Several types of tests have been devised to evaluate the self-concept. The Q-sort technique was used by Engel (7:211-15) to study the stability of adolescence over a two year period. She found that the self-concept did remain relatively stable for this two year period. She also found that the Q-sort technique had a test-retest reliability of .68 which can be considered as moderately stable.

Brown (3:280-2) used the Minnesota Counseling Inventory to compare the personality factors present in college dropouts to the personality factors of those who remained in college. It was found by scores made on the Minnesota Counseling Inventory that male dropouts tended to be irresponsible and nonconforming, and the typical female dropout was withdrawn and depressed. Conclusions drawn from this study indicated that the Minnesota Counseling Inventory could be used as a counseling tool by colleges to determine potential dropouts and to counsel those with high scores.

Hatfield (9:87-89) measured self-concept of student teachers to see if there was a relationship between self-concept and success in student teaching. Stephenson's Q-technique, which is a 407 item forced

choice test, was used to evaluate self-concept. It was found that success in student teaching was related to the adequacy of feeling a student had about himself as a person.

II. CONSTRUCTION OF PSYCHOLOGICAL TESTS

Constructing a psychological test is no easy task. The construction of the California Q-set, the one used in this study, is a good example. Block (1:Ch.IV) in his development of the California Q-set expressed some ninety personality variables in item form, "aiming at a comprehensive coverage of the personality domain as viewed by contemporary clinicians." From the ninety personality variables 108 items were selected for the California Q-set by a step by step evaluation of the statements to be used. Each item was carefully worded so that it would not have a "double barrelled" meaning, and "either or" implication, correlate or overlap with another item. Value judgments were avoided by wording an item in a neutral and unevaluative form.

The California Q-set has been revised three times. Each time it was revised, suggestions by psychologists that had used it in research studies were utilized. The California Q-set (Form III) in its final form consists of

100 items. It is in current use in research projects at the Institute of Human Development, in the Veterans Administration, at the Palo Alto Medical Research Foundation, at the University of California Medical School, and as a teaching device at the University of California (1:Ch.IV).

Validity for the California Q-set (Form III) for the "optimally adjusted personality" was established by nine experienced clinical psychologists.

> The average inter-correlation among the nine definitions of optimal adjustment was .78, implying by the Spearman-Brown formula that the reliability of the composite description is .97. Individual clinicians, who on the average are equivalent to those contributing toward the counsensual definition, may expect their own formulations of optimal adjustment to correlate about .87 with the composite (1:44).

Naumann (17:159-60) developed an adapted form of the California Q-set (Form III). He considered the 100 item California Q-set (Form III) too extensive and technical to use with undergraduate college students who have had no training in mental health concepts. Naumann further states:

> . . . that 50 Q statements are an optimum number in terms of unsophisticated sorter's interests and abilities. For this reason the upper and lower 25 items of the California Q-set, Form III were selected, as they were found to describe the 'optimally adjusted personality' (3, p. 146).

Thus, Naumann's adapted form of the California Q-set (Form III) consisted of 50 "high" and "low" items in terms of mental health concepts.

Validity for the Adapted California Q-set (Form III) was established by a use-reuse reliability. It was found that "Pearsonian r's ranged from .78 to .96 with a mean r of .85, which may be considered fairly acceptable" (17:159-60).

The Adapted California Q-set (Form III) has been used with young and middle-aged adults in group dynamic situations, with college students in different courses, and with military personnel in a group counseling situation (17:159-60).

III. MEASUREMENT OF POSTURE AND POSTURE EXERCISING

Several types of instruments have been devised to measure posture in the anterior-posterior and lateral standing position. They fall generally into two catagories: (1) objective and (2) subjective.

Cureton (5:348-63) used the Cureton-Gunby Comformateur, an objective instrument, and subjective judgment of judges to measure standing posture. The purpose of the study was to see if there was a relationship between posture and health status. His conclusions were that

development of good posture required consideration of the mental, physiological and morphological aspects.

Flint (8:141-6) used the Lovett and Reynolds gravity line technique, an objective instrument, to measure standing posture. She felt the gravity line appears basic to the evaluation of posture but used as a single objective score, is not a satisfactory or meaningful measure of standing posture. However, a plumb line, as used in the Massey Posture Test, can serve as a suitable device for ascertaining segmental alignment. Her conclusion was that the Lovett and Reynolds gravity line test and the Massey plumb line test could be used together as an objective method of evaluating posture.

The New York State Posture Rating Chart, the measuring instrument selected for this study, is considered a subjective tool by Willgoose, (23:205-7) Meyers and Blesh (15:270-2). The New York State Posture Rating Chart, is part of the New York State Physical Fitness Test. Ostrow (18:7) did much of the basic research for the fitness tests, including the New York State Posture Rating Chart, as part of his doctoral dissertation. The basic research was completed in 1956. In the fall of 1956 New York State administered the fitness test, including the New York State Posture Rating Chart, to 12,626 pupils in public schools to provide data for the standardization of the test (18:8).

The New York State Posture Rating Chart consists of figure drawings illustrating three types of posture for thirteen different body parts. One side of the chart contains examples found in lateral posture and the opposite side of the chart contains the illustrations for anterior-posterior posture. Each of the figures contains a score of 5, 3, or 1, which rates the body segment in the desired position (5), or a moderate deviation (3) and a marked deviation (1). A plumb line is used to assist in an accurate evaluation of the body parts (15:270-71).

At the present there is no scientific authenticity reported for the validity of the New York State Posture Rating Chart. However, on the basis of professional personnel and teacher experience with it, this rating chart represents a decided contribution to postural appraisal. It gives a clearer objective basis for subjective judgment (15:271).

A letter received from Gerald Hase, Supervisor of Physical Education and Recreation of the New York State Education Department, indicates that reliability for the New York State Physical Fitness Screening Test and the New York State Physical Fitness Test is now being established but is not available for public use at this time. A copy of this letter is included in Appendix F, page 87.

Posture exercising. Before starting an exercise program a subject should be taught something of the

fundamentals of movement as related to her own body. When teaching good standing, the use of clues such as standing tall, chest high, and distributing the body weight evenly between the ball and heel of the foot will be of benefit. The use of manual correction will also help the subject feel good posture. During physical activities the teaching of correct form in running, skipping, hopping, throwing and other skills used in sports will develop the feeling of correct posture and correct body movement (12:Ch. IX).

The purpose of a posture exercise program is to: (1) Restore and maintain a normal balance between opposing muscle groups, (2) strengthen antigravity muscles so that they can withstand the downward pull of gravity, (3) develop and reinforce neuromuscular pathways that will contribute desirable posture and movement patterns, and (4) develop an awareness of one's own posture and quality of movement (22:5).

A few fundamental principles should be applied in selection of exercises for a program in physical education and posture exercising. Some of these are: (1) Keep the exercise simple, (2) the exercise should be localized so that distracting factors will not prevent accurate and vigorous positions and movement, (3) have a broad base of support to make the exercise easier, (4) the line of

gravity should be over the base of support, and (5) when the purpose of the exercise is to develop strength, use the overload principle (4:14-15). A copy of the exercises used in this study is included in Appendix C, pages 65-80.

IV. POSTURE, PSYCHOLOGICAL FACTORS AND MENTAL HEALTH

There has been little scientific work done which relates posture to psychological factors and mental health. Deaver (6:221-28) in 1933 completed a study in which he relates posture to mental and physical health. He used the Harvard Silhouette Charts, an objective measure, as a basis for evaluating posture, Rogers Physical Capacity test for physical fitness, Thurstone Personality Schedule and the Allport Ascendancy-Submission Reaction test to evaluate mental stability. In his summary of the above tests as they relate to each other he found that the relation between posture and the other factors was not great. He found a slight tendency for physical fitness and health to be related to posture, but there was no relation between personality integration and posture.

Moriarty (16:221-25) in 1952 used the Iowa Posture Test for a subjective evaluation of good and bad posture of 250 school children. She wanted to find if there was an association between poor posture and many physical,

mental, and emotional disorders. She found that children with poor posture had more fatigue, self-consciousness, hearing defects, timidity and were more underweight than children with good posture.

Secord and Jourard (19:343-47) felt that most of the current research in personality was devoted to the individual's personal world. They felt that an individual's attitude toward his body was important to a theory of personality. Their study is concerned with the attitude of body cathexis, which means the degree of satisfaction or dissatisfaction with various body parts. To measure the individual's attitude toward his body, the Maslow Test of Psychological Security-Insecurity was used. Conclusions drawn from this study indicate significant relationships exist between feelings of the self and feelings toward the body.

Wylie (24:160) feels that even though details of body characteristics have not been specified by personality theorists, it is safe to say that body characteristics which are lowly regarded may undermine self-concept and highly valued body characteristics should enhance self-concept.

Current literature makes reference to mental health and posture. Johnson, et al (10:25) says:

> There is no way to ascertain exactly how much of an impact posture has on the emotions or vice

> versa but a pretty good indication of a relationship between the two can be witnessed in hospitals for the mentally disturbed. The patients who are there to undergo therapy show their inner turmoil in their postures.

Mathews (14:232) in his book of Measurement in Physical Education makes reference to Glassow who says:

> Erect posture enhances the feeling of well being. There is in the ability to consciously stand well the same joy which comes from a skill. To know that you know how to stand well, that you can and are standing well, gives a feeling of self-confidence and poise . . . .

Broer (2:88) in her book on Efficiency of Human Movement refers to Wells as saying:

> Study is needed to determine the psychological implications of position and movement. It is certainly obvious that position is expressive of mental attitude. The question that needs to be investigated is the extent to which mental attitude can be influenced by changes in patterns of position and movement.

In conclusion, a review of the related literature seems to indicate that technique of measuring personality and posture are still controversial and much research still needs to be done in both areas.

CHAPTER III

PROCEDURE

SELECTION AND DESCRIPTION OF THE TESTS

The entire experiment, including the pre-testing and post-testing and the posture exercise program was carried out over a fourteen-week period. Prior to the beginning of the study several preliminary steps were taken. After a review of literature and scanning several types of posture measuring devices, it was decided that the posture test developed by the New York State Education Department for their Physical Fitness Program would be most suitable for this study. Information supporting the selection of this test as a tool for measurement is contained in Chapter II.

The New York State Posture Rating Chart is designed to measure anterior-posterior posture and lateral posture in the standing position. There are six profiles which evaluate the lateral position of the head, shoulders, spine, hips, ankles, and feet when viewed from the posterior position. There are seven profiles that evaluate anterior-posterior positioning of the neck, chest, shoulders, upper back, trunk, abdomen and lower back when viewed from a lateral position. A plumb line is used in both the

posterior and lateral positions to enable an accurate evaluation of deviations from the vertical. Each profile has a score of five, three or one. The score of the profile which applies to the subject being tested is recorded on the right hand side of the chart.

The possible range of score on the New York State Posture Rating chart is from 13 to 65. For the purpose of this study the original scoring column was changed so that scores from the pre-test and post-test could be recorded on the same posture rating sheet. A copy of the test and a description of the test administration is included in Appendix B, pages 61-64.

The Minnesota Counseling Inventory was originally chosen to measure self-concept. After consulting the counseling department at Wenatchee High School, it was decided that this test would not be appropriate to use with high school students. Therefore, with the aid of Dr. Gerald Gage, Department of Psychology at Central Washington State College, the Adapted California Q-set (Form III) test was chosen as a measure of self-concept as interpreted from a personality assessment score. The Adapted California Q-set (Form III) is a Q-sort test of fifty statements: twenty-five of the statements are "positive" adjustment statements for the optimally adjusted person and belong on the right half of the scoring scale (5-9); twenty-five

of the statements represent "negative" adjustment and belong on the left half of the scale (0-4). Any statement that is misplaced by a person taking the test is counted as a "maladjustment" item and one point is subtracted from the total adjustment score of 50. Thus a person's "Adjustment Score" can be any even number from 0 through 50. Support of the Q-sort technique as a tool for assessment of personality is included in Chapter II.

The Adapted California Q-set (Form III) which was originally designed for young and middle-aged adults was revised by the writer so that tenth grade high school students could understand the meanings of the statements. Empirical and face validity for the revised version of this test was established by Dr. Gerald Gage and his associates, Department of Psychology, Central Washington State College. For the remainder of this study, the revised version of the Adapted California Q-set (Form III), will be referred to as the Revised Adapted Q-set. A copy of the test and the directions for administering and scoring it are included in Appendix A, pages 56-60.

To receive approval from parents of students that would be used in this study, a dittoed letter was sent home with all students who were eligible to participate in the study. A copy of the letter is included in Appendix D, page 87. The parents were asked to sign and return the form, stating whether their child could or could not

participate in the study. Of the eighty-six students in the three class groups, the parents of only four students would not allow their child to take part.

DEVELOPMENT OF THE EXERCISE PROGRAM

Exercises to be used in this study for postural training and postural improvement in the experimental and independent groups were recommended in a bulletin published by the State University of Iowa (13:7-11) and Posture Exercise Handbook developed by Katharine F. Wells (22: Ch. IV-V).

Exercises selected from the Iowa State Bulletin, (13:7-11) which will be called Set I hereafter in the study, had five different series of exercises which were grouped according to the different areas of the body. Series a, were exercises to correct faulty standing posture; series b, exercises for strengthening abdominal muscles; series c, exercises to strengthen muscles of upper back, shoulders and neck; series d, exercises for flexibility and general strengthening; and series e; exercises for strengthening muscles of feet and ankles. A copy of these exercises is included in Appendix C, pages 65-80.

Exercises selected from the Posture Exercise Handbook (22:Ch. IV-V) which will be called Set II hereafter in the study, were an additional set to be used later in

the study. Series a of this set were exercises for chest, shoulder, and upper back flexibility; and series b were exercises for the lower back and hamstring flexibility. A copy of these exercises is included in Appendix C, pages 64-80.

DEVELOPMENT OF THE QUESTIONNAIRE

A questionnaire was developed to be given to the experimental and independent study groups at the end of the study to see if the subjects felt that any personal benefits had been gained from the posture training and posture exercise program. A copy of the questionnaire can be found in Appendix E, pages 83-85.

SUBJECTS

Eighty-two subjects, all girls enrolled in sophomore physical education classes at Wenatchee High School, were used at the beginning of the study. Due to withdrawals from school and schedule changes at second semester, seventy-three subjects completed the study. The subjects were divided into three classes. Selection for these classes was made during the registration procedure by the counseling department at Wenatchee High School. Each class participated in a different program for the purposes of this study.

Experimental group. This group was girls enrolled in second period sophomore physical education. They were chosen to be the experimental group because more facilities were available that could be used for posture training, posture improvement exercises and the physical activity program at this time of day. The physical activity program consisted of volleyball and basketball during the fourteen week study.

At the beginning of the study there were thirty-one students in this class and thirty of them participated in the study. One girl did not have parental consent to take the Revised Adapted Q-set test but was able to take part in the posture training and posture improvement program. Because of schedule changes at second semester three students were transferred to other classes which left twenty-seven girls to complete the study.

Independent group. This group of girls was enrolled in the fifth period sophomore physical education class. They were chosen to be the independent group because they had been specially selected to be in this class. Selection was made on the basis of the following criteria: (1) Low fitness scores made on the Kennedy Fitness Tests, (2) recommendations from junior high school counselors for students that had minor physical disabilities such as obesity, asthma, hay fever, slight cases of poliomyelitis

and (3) for students that had found physical activity distasteful. There were also four students from the Wenatchee Schools Special Education Division program enrolled in this class. Physical activities during the fourteen week study were volleyball and basketball.

At the beginning of the study there were twenty-three students in this class and twenty of them participated in the study. Three girls did not have parental consent to take the Revised Adapted Q-set but were able to take part in the posture training and improvement program. One girl withdrew from school, therefore nineteen girls completed the study.

Control group. This group of girls was enrolled in the sixth period sophomore physical education class. The group was chosen to be the control group because all facilities were being used during this hour and it was felt that the physical activities program would be neglected if this group had been given the posture training and posture improvement program. Physical activities during the fourteen week study were volleyball and basketball.

At the beginning of the study there were thirty-two students in the class and all participated in the study. Because of schedule changes at second semester, five students were transferred to other classes which left twenty seven girls to complete the study.

Group samples. Since complete class groups were used, it cannot be assumed that subjects were selected at random or that groups were equal in self-concept and posture. In the analysis of data section the scores from the pre-test were evaluated to determine if differences existed between groups at the beginning of the study.

ORIENTATION OF SUBJECTS

Before the start of the study the program was explained to each of the groups participating. At this time a copy of the letter to receive parental consent was given to each subject and it was requested that the letter be returned with the parents signature signifying either approval or disapproval.

As the Revised Adapted Q-set test was being explained to the subjects it was emphasized that results of the test would not be made available to the subjects. It was further emphasized that the test would be used as a measuring device only and not as an analytical tool. However, during the explanation of the New York State Posture Rating Chart, the subjects were encouraged to ask questions concerning their posture evaluation and to ask for individual help with their posture problems.

At this time the subjects were told that they would not be graded on the posture training and posture improvement program. They were encouraged to do the

exercises for their own self-improvement.

TEST ADMINISTRATION

Pre-testing. On the first day of the fourteen week period, the Revised Adapted Q-set personality assessment test was administered to all subjects in each of the three groups. Each subject was given a heavy piece of paper 2 inches by 24 inches that had been numbered from 0 through 9 and a set of fifty items which were on individual pieces of paper. The student was asked to read each item carefully and place the item on the scale according to how the subject rated herself. All items that did not pertain to the way she felt about herself would be placed on one of the lower numbers, 0 through 4 (least like me). If the item pertained to the way she felt about herself it would be placed on a higher number, 5 through 9 (most like me). At the end of the test each number 0 through 9 was to have five items on it. If a number had more than five items on it, a choice had to be made and an item had to be moved to another number. The complete instructions, a copy of the test and recording sheet is included in Appendix A, pages 56-60.

The subjects were given as much time as they needed to complete the test. As the subject completed the test she was asked to clip each pile of items onto the numbered card with a paper clip, along with the name of the subject.

This was done to insure accurate recording of the test results.

The entire test was carefully supervised by the instructor.

On the second, third, fourth and fifth days the New York State Posture Rating Charts were administered. A plumb line was used to enable the instructor to be accurate in evaluating posture. As each subject was evaluated she was asked to stand in what she thought to be correct standing posture. A subject from the group being tested recorded scores on the New York State Posture Rating Chart as they were given by the instructor. A second copy of the New York State Rating Chart was made at this time to be given to the subjects at the beginning of the exercise program.

Experimental and Independent groups. As each subject finished with the posture rating, the instructor discussed the posture evaluation with the subject and explained what posture defects were present and how these defects might be helped or corrected.

Control group. In this group posture was rated in the same manner except no mention was made of posture defects or how or whether these defects could be corrected.

Post-testing: Experimental and independent groups.

Five days before the end of the study the Revised Adapted Q-set was administered to subjects in the experimental and independent groups. Before taking the Revised Adapted Q-set, a questionnaire was given to each subject so they could evaluate any personal benefits they believed they had received from the posture training and posture improvement program. A copy of the questionnaire is included in Appendix E, pages 83-85.

The remaining four days of the study were devoted to administering the New York State Posture Rating Chart. As the subjects finished with the posture rating, the instructor evaluated what progress had been made during the posture training and posture improvement program. Suggestions were made as to what further work needed to be done to improve their posture.

Control group. Five days before the end of the study the Revised Adapted Q-set was given to all subjects in this group.

The remaining four days were devoted to administering the New York State Posture Rating Chart.

In both the Revised Adapted Q-set and the New York State Posture Rating Chart the instructions were the same as in the procedure for the pre-testing.

EXERCISE PROGRAM

Experimental and independent groups. These two groups met for physical education classes five days a week. Four days a week were devoted to the posture training and posture improvement program along with other physical education activities. The fifth day of each week the boys and girls physical education classes were combined for a unit in social dancing.

The first day of the exercise program was devoted to talking about posture and the possible causes for posture defects. The second copy of the New York State Posture Rating Chart was given to each subject so that they would have a visual picture of their posture at the present time.

The entire class period during the second and third days of the posture training and posture improvement program, were spent in learning how to do the exercises recommended in Set I. The entire class participated in series a, exercises designed to improve faulty standing posture; the class was then divided into four groups. Each group of subjects was assigned to a different series of exercises which had been labeled and taped on a card. When the subjects completed the exercises on the assigned card they would then move to the next station and do the exercises on the card at that station. The subjects

continued doing this until all four series of exercises were finished, thus completing the entire exercise set.

After the third day of the exercise program, the subjects were allowed fifteen minutes to complete this set of exercises. Five minutes were allowed for the series of exercises to correct faulty standing posture and two and one-half minutes for each of the other four series.

This phase of the posture training and posture improvement program continued for four weeks. In order to keep interest stimulated and to allow the subjects to concentrate on only their specific posture defects, a second set of exercises was introduced. One series of the second set of exercises were for the chest, shoulder, and upper back flexibility; the second series of the second set of exercises were for the lower back and hamstring flexibility. The subjects were allowed to choose either one or both series of exercises in the second set. They were then allowed twelve minutes to complete the exercises before starting with other physical activities.

The first and second set of exercises were used on alternate days for the remainder of the study for a total of forty-five days in the exercise program.

Control group. This group met for physical education classes five days a week. Four days a week were

spent with physical education activities, which were volleyball and basketball. No exercise program was used with this group. The fifth day of each week the boys and girls physical education classes were combined for a unit in social dancing.

METHOD OF HANDLING THE DATA COLLECTED FROM TESTING

To facilitate ease in reporting data the experimental group will be group A, the independent group will be group B, and the control group will be group C for the remainder of the study.

The Range, Mean and Standard Deviation were determined to see if there was a difference between the "Adjustment Score" of groups A and B, groups A and C, and groups B and C. The Range, Mean and Standard Deviation were used to see if there was a difference between the Posture Score" of groups A and B, groups A and C, and groups B and C.

In addition the Fisher "t" for the significance of a difference in the means was to test the hypothesis that there was no significant difference in the "Adjustment Scores" and "Posture Scores" of groups A and B, groups A and C, and groups B and C in both the pre-test and post-test.

In order to determine if a relationship existed between the "Adjustment Score" and "Posture Score,"

Pearson's product moment "r" was applied to all subjects in groups A, B and C.

These statistics were analyzed on the pre-test and post-test scores and the differences were computed between them.

CHAPTER IV

ANALYSIS OF DATA

HYPOTHESES TESTED

The specific hypotheses tested were:

(1) That the subjects of groups A, the experimental group, B, the independent group, and C, the control group were from the same population.

(2) That there will be no significant differences between groups A, B and C on the New York State Posture Rating Chart or the Revised Adapted Q-set at the beginning of the study.

(3) There will be no significant difference between the pre-test and post-test of group A as measured by the Revised Adapted Q-set.

(4) There will be no significant difference between the pre-test and post-test of group B as measured by the Revised Adapted Q-set.

(5) There will be no significant difference between the pre-test and post-test of group C as measured by the Revised Adapted Q-set.

(6) There will be no significant difference in self-concept between groups A, B and C as measured by the Revised Adapted Q-set.

(7) There will be no significant difference between the pre-test and post-test of group A as measured by the New York State Posture Rating Chart.

(8) There will be no significant difference between the pre-test and post-test of group B as measured by the New York State Posture Rating Chart.

(9) There will be no significant difference between the pre-test and post-test of group C as measured by the New York State Posture Rating Chart.

(10) There will be no significant difference in postural improvement between groups A, B and C as measured by the New York State Posture Rating Chart.

The .05 level of significance was set as the level beyond which differences would be accepted as having statistical significance throughout this experiment.

Range, Mean and Standard Deviation. To provide statistical evidence that the three groups were from the same population at the beginning of the study, the range, mean and standard deviation were computed for self-concept and posture. The following formulas were used:

$$R = H - L \quad M = \frac{\Sigma X}{N} \quad \sigma = \frac{1}{N}\sqrt{N \Sigma X^2 - (\Sigma X)^2}$$

As recorded in Table I, no differences were found among groups A, B or C for self-concept or posture. In addition, Fisher "t" tests were computed to determine if any

significant differences existed in self-concept at the beginning of the experimental period. Table V shows the results found: the "t" between groups A and B was 1.11, the "t" between groups A and C was .32, and the "t" between groups B and C was 1.28. None of these were significant, therefore it was assumed that the groups were not different.

The range, mean and standard deviation were computed at the end of the study to determine if any changes had been made as compared to the total population. As recorded in Table I, it was found that a difference existed in self-concept of group B as compared to the total population. No differences existed in self-concept in groups A and C as compared to the total population. When the "t's" were computed at the end of the experimental period the following results, as recorded in Table V, were obtained: the "t" between groups A and B was 2.94, the "t" between groups A and C was .09, and the "t" between groups B and C was 2.74. It was found that a significant difference existed between groups A and B, and groups B and C, therefore it could be assumed that the groups were different at the end of the study.

Pearson's Product Moment Correlation Coefficient. To determine if a relationship existed between self-concept and posture, Pearson's product moment "r" was

TABLE I

COMPARISON OF RANGE, MEAN AND STANDARD DEVIATION BETWEEN GROUPS A, B, C AND TOTAL POPULATION ON THE PRE-TESTS AND POST-TESTS OF SELF-CONCEPT AND POSTURE

Group	Self-Concept Range	Posture Range	Self-Concept Mean	Posture Mean	Self-Concept St. Dev.	Posture St. Dev.
A						
Pre-test	24	24	37.04	46.05	5.79	5.00
Post-test	18	16	39.56	50.56	4.93	4.08
B						
Pre-test	26	24	34.53	45.74	8.22	6.62
Post-test	22	22	34.53	49.42	6.00	5.57
C						
Pre-test	28	22	37.63	47.96	7.45	5.60
Post-test	22	18	39.70	47.52	6.45	4.60
Total Population						
Pre-test	30	28	36.61	46.67	7.14	5.74
Post-test	26	22	38.30	49.14	6.19	4.85

applied. The formula used was:

$$r_{xy} = \frac{N.\Sigma XY - (\Sigma X)\ (\Sigma Y)}{\sqrt{\left[N.\ \Sigma X^2 - (\Sigma X)^2\right]\left[N.\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

Pre-test scores made on the New York State Posture Rating chart and the Revised Adapted Q-set were correlated for groups A, B and C to find whether self-concept and posture were related at the beginning of the study. Post-test scores made on the New York State Posture Rating Chart and the Revised Adapted Q-set were correlated for groups A, B and C to see if a relation existed between self-concept and posture at the end of the study.

As recorded in Table II, groups A and C showed that no significant relationship between self-concept and posture existed on either the pre-test or post-test scores. Group B showed little relationship between self-concept and posture on the pre-test scores; however, group B showed a significant relationship of .85 between self-concept and posture on post-test scores. Table II shows the "r" relationship of all three groups.

As shown in Table III, groups A, the experimental group, and B, the independent group, showed that a low relationship existed between the pre-test and post-test for posture, which indicated that changes had been made in posture during the study. The data for groups A and B showed moderate relationship between the pre-test and

TABLE II

PEARSON'S PRODUCT MOMENT "r" OF PRE-TEST AND POST-TEST SCORES OF SELF-CONCEPT AND POSTURE

Group	Test	"r"
A	Pre-test	.086
A	Post-test	.09
B	Pre-test	.17
B	Post-test	.85
C	Pre-test	-.11
C	Post-test	.02

TABLE III

PEARSON'S PRODUCT MOMENT "r" OF PRE-TEST AND POST-TEST SCORES OF SELF-CONCEPT, AND PRE-TEST POST-TEST SCORES OF POSTURE

Group	Test	"r"
A		
Pre- and Post-	Self-concept	.54
Pre- and Post-	Posture	.29
B		
Pre- and Post-	Self-concept	.71
Pre- and Post-	Posture	.09
C		
Pre- and Post-	Self-concept	.82
Pre- and Post-	Posture	.70

post-test in self-concept, which indicated that individuals within the group had made some changes in self-concept during the study. Data for group C, the control group, showed that moderate relationship existed between pre-testing and post-testing in posture which indicated some change had occurred in posture during the study. Group C showed a higher relationship between pre-testing and post-testing of self-concept, which indicated that only a few changes had occurred in self-concept during the study.

The Fisher "t" test for the Significance of a Difference in the Means of Small Samples. The "t" test was used to determine if significant differences existed within groups A, B and C on the pre-test and post-test in self-concept. The following formulas were used:

$$M = \frac{\Sigma X}{N} \qquad = \frac{1}{N} \quad N.\Sigma X^2 - (\Sigma X)^2 \qquad \sigma m = \frac{\sigma}{\sqrt{N - 1}}$$

$$\sigma \text{ diff} = \sqrt{\sigma m_1^2 + \sigma m_2^2} \qquad t = \frac{\text{Diff } m_1, m_2}{\sigma \text{ diff}}$$

The "t" test was used also to determine if differences existed within groups A, B and C on the pre-test and post-test in posture.

As recorded in Table IV, group B showed a significant change in self-concept. Groups A and B showed a

TABLE IV

COMPARISONS OF THE FISHER "t" TEST ON THE PRE-TEST AND POST-TEST IN SELF-CONCEPT AND THE PRE-TEST AND POST-TEST OF POSTURE WITHIN GROUPS A, B, AND C

Group	Test	"t"	Significant
A			
Pre- and Post-	Self-concept	1.68	*
Pre- and Post-	Posture	3.57	.01
B			
Pre- and Post-	Self-concept	2.40	.05
Pre- and Post-	Posture	1.80	.05
C			
Pre- and Post-	Self-concept	1.07	*
Pre- and Post-	Posture	.42	*

* Not significant at .05 level of confidence

significant change in posture. Group C did not show a significant change in either self-concept or posture.

The "t" test was used to determine if differences existed between groups A, B and C on the pre-test and post-test in self-concept. The "t" test was used to determine if gains existed between groups A, B and C on the pre-test and post-test in posture.

As recorded in Table V, group A showed a significant difference in self-concept between group B on the post-test. Group A showed a significant gain in posture on the post-test as compared to group C. Group B showed a significant difference on the post-test in self-concept between group C.

THE QUESTIONNAIRE

The writer was interested in determining what the subjects felt they had gained in personal benefits from the posture training and posture improvement program. A check list type of questionnaire was given to subjects in groups A and B. A copy of the questionnaire can be found in Appendix E, pages 83-85.

Any statement that was checked by twenty per cent or more of the subjects seemed important enough to be considered in analyzing the results of this study. Statements checked by less than twenty per cent were not

TABLE V

COMPARISONS OF THE FISHER "t" ON THE PRE-TEST AND POST-TEST IN SELF-CONCEPT AND THE PRE-TEST AND POST-TEST OF POSTURE BETWEEN GROUPS A, B & C

Group	Test	"t"	Significant
A vs. B			
Pre-test	Self-concept	1.11	*
Pre-test	Posture	.15	*
Post-test	Self-concept	2.94	.01
Post-test	Posture	.74	*
A vs. C			
Pre-test	Self-concept	.32	*
Pre-test	Posture	1.41	*
Post-test	Self-concept	.09	*
Post-test	Posture	2.11	.05
B vs. C			
Pre-test	Self-concept	1.28	*
Pre-test	Posture	1.24	*
Post-test	Self-concept	2.74	.01
Post-test	Posture	1.20	*

* Not significant at .05 level of confidence

reported in this analysis of the data.

All of the subjects in groups A and B felt that the posture training and posture improvement program had been helpful to them.

Table VI shows by means of percentage what part of the exercise program the subjects reported as most helpful.

The following shows per cent of subjects who spent time outside of class doing some of the exercises:

Time spent	Group A	Group B
Once a day		32%
Occasionally	59%	42%
None		21%

The following shows by percentage which series of exercises the subjects worked on outside of class:

Exercises for:	Group A	Group B
Standing posture	30%	
Abdominal muscles	30%	42%
Upper back, shoulders and neck	45%	

The reported personal benefits gained from the posture training and posture improvement program are shown in Table VII.

The subjects were asked if they were stiff and sore after doing the exercises. Seventy-eight per cent of each group reported that they had been stiff and sore at some time during the study. The following shows how often:

TABLE VI

EXERCISES MOST HELPFUL TO SUBJECTS

Exercise for:	Group A	Group B
Standing posture	67%	68%
Abdominal muscles	52%	79%
Upper back, shoulders and neck	70%	37%
Flexibility and Strengthening	22%	32%
Lower back and hamstrings	27%	32%
Chest, shoulders and upper back	41%	21%

TABLE VII

PERSONAL BENEFITS GAINED

Personal Benefits:	Group A	Group B
Lost weight	12%	37%
Gained posture awareness	81%	74%
Improved self-confidence	41%	32%
Improved figure		26%
Improved physical fitness	27%	47%
Improved muscle toneness	22%	58%
Improved physical appearance	26%	26%

How often?	Group A	Group B
After first class		21%
Occasionally	30%	32%
Only at the first of the study	22%	32%

The subjects were asked to make comments on how they felt the posture training and posture improvement program could have been improved. The following are suggestions that were most often mentioned:

Group A

a. Wanted to spend more time on their own defects.
b. Felt a posture check halfway through the study would have shown what progress they were making.
c. More time should have been spent on walking posture.
d. More time spent doing the exercises.
e. Felt the instructor was too lenient and the subjects should have been forced to do the exercises.
f. Felt the program was good in the way it was conducted.

Group B

a. Liked the program as it was presented.
b. Needed more motivation to do the exercises.

c. The subjects felt the instructor should have been more strict about insisting that everyone do the exercises.

CHAPTER V

SUMMARY

The experiment consisted of administering self-concept and posture tests at the beginning and end of a fourteen week period to three groups of girls enrolled in a sophomore physical education at Wenatchee High School. Group A, the experimental group, and group B, the independent group, underwent a posture training and posture improvement program. Group C, the control group, had no exercise program and participated only in physical activities.

The purpose of the study was to determine whether or not improvement in posture would in turn cause an improvement in self-concept.

The statistical tools employed were the range, mean, standard deviation, Pearson's product moment "r" and a Fisher "t" test of the significance of the difference between means. In addition, a questionnaire was used for the purpose of determining what personal benefits had been gained from the study.

The following findings are the result of the statistical analysis of the data:

(1) The range, mean and standard deviation indicated

that the three groups could be considered as samples from the same population.

(2) Pearson's product moment "r" indicated that self-concept and posture were not related.

(3) The differences in the mean as measured by the Fisher "t" test, indicated that a significant improvement in posture can be made through well-designed posture exercises.

(4) The differences in the mean as measured by the Fisher "t" test, indicated that self-concept was not changed in groups A and C, but did show a significant change in group B.

RESULTS OF HYPOTHESIS

(1) The hypothesis was accepted as it was found that groups A, B and C were from the same population.

(2) The hypothesis was accepted as it was found that there was no significant differences between groups A, B and C on the New York State Posture Rating Chart or the Revised Adapted Q-set at the beginning of the study.

(3) The hypothesis was accepted as it was found that there was no significant difference between the pre-test and post-test of group A as measured by the Revised Adapted Q-set.

(4) The hypothesis was rejected as there was found to be a significant difference between the pre-test and post-test of group B as measured by the Revised Adapted Q-set.

(5) The hypothesis was accepted as it was found that there was no significant difference between the pre-test and post-test of group C as measured by the Revised Adapted Q-set.

(6) The hypothesis was rejected as there was found to be a significant difference in self-concept between groups A and B and groups B and C.

(7) The hypothesis was rejected as there was found to be a significant difference between the pre-test and post-test of group A as measured by the New York State Posture Rating Chart.

(8) The hypothesis was rejected as there was found to be a significant difference between the pre-test and post-test of group B as measured by the New York State Posture Rating Chart.

(9) The hypothesis was accepted as it was found that there was no significant difference between the pre-test and post-test of group C as measured by the New York State Posture Rating Chart.

(10) The hypothesis was rejected as there was found to be a significant difference in postural improvement

between groups A, B and C as measured by the New York State Posture Rating Chart.

CONCLUSIONS

From the findings in this study the following conclusions were drawn: (1) It was found that there was a significant gain in posture for the two groups that had had the posture training and posture improvement program, (2) it was found that there were no significant changes in the self-concept of groups A and B as related to posture gains, and (3) it was found that there was a significant change in the self-concept of group B as related to posture gain.

It is thought that the change of group B may have been caused by factors which could not be controlled in the study. The four special education students that were in this group may have caused negative effects upon attitudes and self-concept for a few of the regular students within the class. Some of the students in this class had confided with the instructor stating that there was a social stigma attached to being in this class with "mental retards" and pressures and facetious remarks from peer groups outside of class had caused them to dislike coming to physical education class. The association within the

class was not satisfactory because the special education students could not understand rules of games or how to play them correctly and consequently it was very discouraging and disheartening for others within the class. These factors may have caused adverse effects for some.

RECOMMENDATIONS

At the conclusion of this study the writer believed that there could have been some improvements in the study which would have given a more accurate evaluation of posture and self-concept.

The New York State Posture Rating Chart was not a precise enough instrument to evaluate minor changes in posture. The posture chart, however is an excellent teaching device as the student has a visual picture of her posture as well as two other figures with which to compare (see posture chart in Appendix B, page 64).

It is recommended to use an objective posture measure, such as the comformateur, in conjunction with the New York State Posture Rating Chart to measure minor changes.

It is recommended that a posture evaluation should be made about half-way through the study to evaluate the students progress and to discover if other defects are

resulting from not properly doing the exercises as they are described in the instructions.

In the selection of a measuring instrument for self-concept it is recommended that a measure be found that has statements which will relate more closely with the body and thoughts associating with body structure.

A final recommendation is to have the research study last for a longer period of time, preferably two or three years. This would enable the investigator to establish what permanent changes could be made in self-concept and posture.

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APPENDIX A

REVISED ADAPTED Q-SET

Directions for obtaining an adjustment score: Twenty five of the items are "positive" adjustment statements, i.e., for the optimally adjusted person they belong on the right half (values 5 . . .9) of the scale. Correspondingly, the other twenty five items are statement of "negative" adjustment, belonging to the left half of the scale (values 0 . . .4).

Any item belonging on the positive side of the scale which had been "misplaced" under any of the scaling values 0 through 4 counts a "maladjustment" item and one point for it is subtracted from the Total Adjustment Score of 50 (highest score possible). Correspondingly, any item belonging on the negative side of the scale (value 0 . . .4) which has been "misplaced" under any of the scaling values 5 through 9 also counts as a "maladjustment" point which is subtracted from 50. Thus a person's "Adjustment Score" can be any even number from 0 through 50.

NEGATIVE STATEMENTS

4. I am uncomfortable with uncertainty and confusion.

5. I find outlet for anxiety and tension in bodily symptoms (sickness).

6. I tend to be self-defensive.

7. I am sensitive to anything that can be meant as criticism.

10. I feel a lack of personal meaning in life.

11. I am revengeful and tend to transfer or project the blame to others.

12. I tend to over-control my needs and impulses and delay enjoyment uncecessarily. (N.B. Even when most people would consider it alright to do something, I generally would not.

14. I tend to indicate to others that I do not really think they are as good as I am.

19. I frequently do not agree with others and tend to do things which will result in their plans failing.

20. I am deceptive and dishonest, manipulative and will take advantage of a situation.

21. I really don't like other people very much.

22. I am defenseless to real or imaginary threats and am generally fearful.

38. I am basically worried and an anxious person.

23. I am reluctant to commit myself to any definite course of action and tend to delay or avoid action.

25. I have little confidence in myself and would be disorganized and not able to control myself when under pressures.

26. I have a readiness to feel guilty (N.B. regardless of whether it is spoken verbally or not.)

27. I keep people at a distance and avoid close personal relationships.

28. I am basically distrustful of people in general, and I question their motives.

30. I am self-defeating.

35. I want to make others dependent upon me (regardless of technique used).

40. I tend to see in others the same kinds of feelings and motives I have myself.

42. I feel cheated and victimized by life and feel sorry for myself.

43. I tend to daydream and have persistent, preoccupying thoughts.

47. I handle anxiety and disagreements by, in effect, refusing to recognize their presence.

50. I am unexciting (i.e., not stimulating) and have a colorless, dull personality.

POSITIVE STATEMENTS

1. I am genuinely dependable and a responsible person.

2. I have a wide variety of interests (N.B. The amount of the interest is not important.

3. I behave in a generous way towards others (N.B. Regardless of the reason or motive involved).

8. I am skilled in social games of imaginative play, pretending, and humor.

13. I am productive and get things done.

15. I tend to arouse liking and acceptance in people (N.B. Most people seem to like me).

16. I am aware of the impression I make on others.

17. I am calm and relaxed in manner.

18. I have warmth and a capacity for close relationships, and feelings for others.

24. I tend to search for the reasons why others do what they do. (N.B. The accuracy of the reasoning is not assumed here).

29. I appreciate and value those things which are primarily intellectual (N.B. Those things that require reasoning, judging, understanding and comprehending.

49. I value my own independence (freedom) and the ability to make my own decisions.

31. I respond to humor (positively).

32. I am an interesting, stimulating person.

33. I enjoy experiences which involve touching, tasting and smelling. (sensual pleasures)

34. I have an insight into my own motives and behavior.

36. I am socially aware of the many relationships that exist between others.

37. I am responsive and alive to things that are impressive.

39. I have high personal and moral standards and am consistent about using them. (no morality intended)

41. I am straightforward, forthright and honest in dealing with others.

9. I behave in a sympathetic and considerate manner.

44. I am (normally) interested in members of the opposite sex.

45. I am able to see the heart (center) of important problems.

46. I am cheerful.

48. I have social poise and presence, and appear socially at ease.

RECORDING SHEET FOR ADJUSTMENT SCORES AND POSTURE SCORES

Q-sort of _____

Card No.	Sort I N	Sort I P	Score	Card No.	Sort II N	Sort II P	Score
1				1			
2				2			
3				3			
4				4			
5				5			
6				6			
7				7			
8				8			
9				9			
10				10			
11				11			
12				12			
13				13			
14				14			
15				15			
16				16			
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32				32			
33				33			
34				34			
35				35			
36				36			
37				37			
38				38			
39				39			
40				40			
41				41			
42				42			
43				43			
44				44			
45				45			
46				46			
47				47			
48				48			
49				49			
50				50			

ADJUSTMENT SCORE

Total possible AS = 50

Formula: AS = 50

AS=_____Sort I

AS=_____Sort II

POSTURE SCORE

Total possible PS = 65

PS=_____Test 1

PS=_____Test II

APPENDIX B

NEW YORK STATE POSTURE RATING CHART

Directions for obtaining a Posture Rating Score. Posture is measured by reference to the rating guides for the 13 different segments identified on the Posture Rating Chart. Each pupil is rated individually by a qualified examiner.

Equipment. (1) A heavy, clearly visible plumb line, and (2) Masking tape (approximately 1-inch wide).

Suspend a plumb line from a stationary support so that the bob almost touches the floor. Directly under the bob, construct a straight line using the masking tape. This line should begin at a point on the floor three feet from the bob and extend 10 feet on the examiner's side of the bob.

Testing procedure and scoring. The subject being examined first assumes good standing posture and the plumb line will be between the subject being tested and the examiner. The examiner takes a position on the floor line about 10 feet from the subject with the plumb line between herself and the subject.

After the subject's lateral posture and feet have been rated, the subject then makes a one-quarter left turn so that her left side is next to the plumb line.

Her left ankle bone must be in line with the plumb bob.

As the examiner scores each segment as shown on the Posture Rating Chart, she should first observe the subject; then review the illustrations and descriptions on the rating chart and, finally, evaluate the subject and record her score in the box on the right hand side of the rating chart. The subject's score on each segment must be 5, 3, or 1. Each segment should be scored separately and the scoring of the previous segments should not influence the score of the segment under consideration at the moment. After ratings have been made for each of the 13 segments, record the total score in the space provided at the bottom of each page. The sum of the 13 scores will be an odd number.

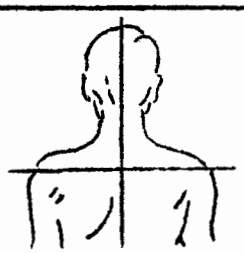
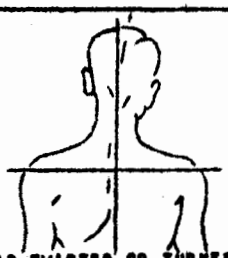
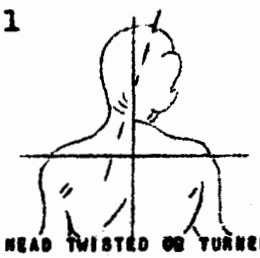
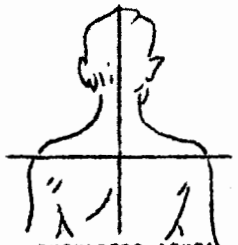
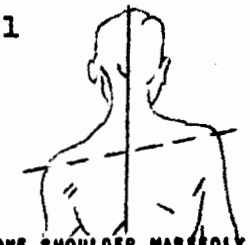
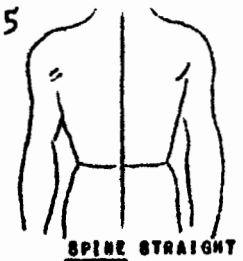
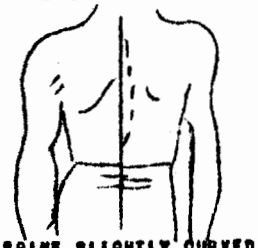
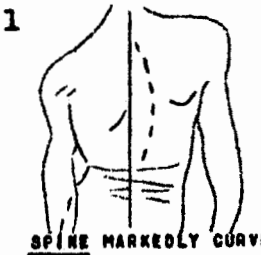
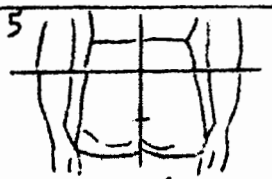
THE NEW YORK STATE

POSTURE RATING CHART

Grade _____

Rater's Initials

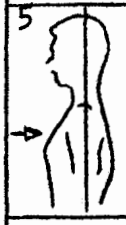
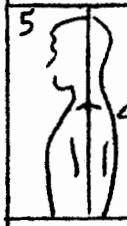
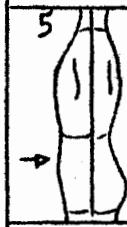
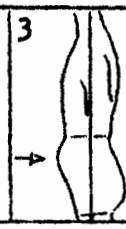
Date of Test (1) _____ (2) _____

5  **HEAD** ERECT GRAVITY LINE PASSES DIRECTLY THROUGH CENTER	3  **HEAD** TWISTED OR TURNED TO ONE SIDE SLIGHTLY	1  HEAD TWISTED OR TURNED TO ONE SIDE MARKEDLY		1 2
5  **SHOULDERS** LEVEL (HORIZONTALLY)	3  **ONE SHOULDER** SLIGHTLY HIGHER THAN OTHER	1  **ONE SHOULDER** MARKEDLY HIGHER THAN OTHER		1 2
5  **SPINE** STRAIGHT	3  **SPINE** SLIGHTLY CURVED LATERALLY	1  **SPINE** MARKEDLY CURVED LATERALLY		1 2
5  **HIPS** LEVEL (HORIZONTALLY)	3  **ONE HIP** SLIGHTLY HIGHER	1  ONE HIP MARKEDLY HIGHER		1 2
5  **FEET** POINTED STRAIGHT AHEAD	3  **FEET** POINTED OUT	1  **FEET** POINTED OUT MARKEDLY ANKLES SAG IN (PRONATION)		1 2
5  **ARCHES** HIGH	3  **ARCHES** LOWER, FEET SLIGHTLY FLAT	1  **ARCHES** LOW, FEET MARKEDLY FLAT		1 2

Total Page One _____ _____

Grade _____

Total Page One (1) ____ (2) ____

5  **NECK** ERECT. CHIN IN. HEAD DIRECTLY ABOVE SHOULDERS	3  **NECK** SLIGHTLY FORWARD. CHIN SLIGHTLY OUT	1  **NECK** MARKEDLY FORWARD. CHIN MARKEDLY OUT	1	2
5  **CHEST** ELEVATED BREASTBONE FURTHEST FORWARD PART OF BODY	3  **CHEST** SLIGHTLY DEPRESSED	1  **CHEST** MARKEDLY DEPRESSED (FLAT)	1	2
5  **SHOULDERS** CENTERED	3  **SHOULDERS** SLIGHTLY FORWARD	1  **SHOULDERS** MARKEDLY FORWARD (SHOULDER BLADES PROTRUDING IN REAR)	1	2
5  **UPPER BACK** NORMALLY ROUNDED	3  **UPPER BACK** SLIGHTLY MORE ROUNDED	1  **UPPER BACK** MARKEDLY ROUNDED	1	2
5  **TRUNK** ERECT	3  **TRUNK** INCLINED TO REAR SLIGHTLY	1  **TRUNK** INCLINED TO REAR MARKEDLY	1	2
5  **ABDOMEN** FLAT	3  **ABDOMEN** PROTRUDING	1  **ABDOMEN** PROTRUDING AND SAGGING	1	2
5  **LOWER BACK** NORMALLY CURVED	3  **LOWER BACK** SLIGHTLY HOLLOW	1  **LOWER BACK** MARKEDLY HOLLOW	1	2
			TOTAL RAW SCORE	1 ____ 2 ____

TO OBTAIN TOTAL RAW SCORE:

1. DETERMINE THE SCORE FOR EACH OF THE ABOVE 13 ITEMS AS FOLLOWS:
   - 5 POINTS IF DESCRIPTION IN LEFT HAND COLUMN APPLIES
   - 3 POINTS IF DESCRIPTION IN MIDDLE COLUMN APPLIES
   - 1 POINT IF DESCRIPTION IN RIGHT HAND COLUMN APPLIES
2. ENTER SCORE FOR EACH ITEM UNDER PROPER GRADE IN THE SCORING COLUMN
3. ADD ALL 13 SCORES AND PLACE TOTAL IN APPROPRIATE SPACE

APPENDIX C

SET I

EXERCISES

Series A: Exercises to Correct Faulty Standing Posture.

A. Use a mirror. See good and bad first, then feel it.

B. Stretch body as tall as possible.

C. Practice flattening lower abdomen, being sure that chest is not forcibly raised at same time. There should be a definite feeling of tension, of tightening in the lower abdominal muscles as this is done. One should be able to hold this to a moderate degree regardless of breathing, talking, walking, etc., if it is correctly done.

D. Assume both good and poor positions as follows in order to recognize when each is present:

1. Raise both shoulders into a hunched position, and lower; repeat. Now draw shoulders forward, then forcibly backward and downward. Finally assume the best position with shoulders low and easily back, as if weights at lower tips of shoulder blades were pulling them down and back, but with no strain.

2. Let the chest sink down. Notice how the head and shoulders move forward, and how the back rounds. Keeping shoulders relaxed, slowly straighten with a final easy lift of the chest. This should not be strained nor be produced by taking and holding a deep breath. Note that the head

and neck and shoulders naturally fall into an easy, good position.

3. Thrust head straight forward, localizing movement above shoulders, then draw straight backward toward imaginary collar button, keeping the chin at same level throughout, e.g., do not tilt it up in air, nor pull it down toward chest. An habitual forward head and neck may also be helped by a feeling of being lifted toward the ceiling by the bones just behind the ears.

4. Hollow lower back, thrusting buttocks backward and abdomen forward. Then contract buttock and abdominal muscles to bring the lower back into a position of only moderate hollow. It is especially important to remember in this connection that the lower back should not be flat. Many individuals who normally have a good standing posture overhollow the lower back under some conditions as, for instance, when they wear high heels, after they have been standing for a long time, when they raise their arms for any purpose, and in other situations which tend to produce that effect. Excessive hollowing, as well as overflattening, places a strain on the joints and muscles of the lower back and is a frequent cause of fatigue and pain in that region.

If a person habitually overhollows the lower back, and finds difficulty in learning to correct it, it may be practiced as follows: Stand with the back to the wall,

heels out about three to four inches, shoulders and head against wall; push the lower back against the wall and tuck the hips under. It may be necessary actually to bend the knees at first in order to produce the result. Flattening should normally occur to within less than an inch of the wall (about the thickness of the hand), with the knees straight but not stiff and with no movement of the shoulders and upper trunk.

Series B: Exercises For Strengthening Abdominal Muscles.

1. Abdominal retraction

Lie on floor with knees bent, feet on floor, tense the abdominal wall, especially the lower part, to flatten it as much as possible: hold then relax. The chest should move only slightly if at all. If this seems difficult, it sometimes helps to try to draw the two hip bones together in front, though they cannot actually be moved. (15-20 times)

This should also be done in other positions, as sitting and standing. When correctly done, it should be possible to maintain a position of moderate retraction of the lower abdomen indefinitely with no discomfort. The final aim, of course, is that it should become a habit.

2. "Curling" exercise

Lie on back, knees bent, feet on floor, arms resting at sides. Raise head and shoulders from the floor, with chin tucked in, trying to look at heels. Back should be fully rounded with lower back against the floor. Reach toward feet with hands. Hold very briefly and relax. Repeat exercise a few times working up to 10-15 times daily.

3. "Nutcracker" exercise

Lie on back, legs straight, arms straight out at shoulder level, palms down: 1. raise right leg to vertical, knee straight; 2. swing leg over to left, touching toe lightly to floor as near left hand as is possible with both knees straight; 3. return leg to vertical; 4. lower leg, heel touching floor lightly. Shoulders do not leave floor throughout. This is also a good hip exercise. Work up to 10-12 times to each side.

4. Lie on back with knees bent, feet flat on floor, hands under neck: 1. bend both knees to chest; 2. straighten knees to bring legs to a vertical position; 3. lower straight legs to about 45^{o} angle or more; 4. bend knees to put feet on floor. It is very important that the lower back not be excessively hollowed at the beginning or end of this exercise. Work up to 10-15 times.

Series C: Exercises For Strengthening Muscles of Upper Back, Shoulders and Neck.

1. Sitting (or standing) with head relaxed forward, chin on chest; slowly raise head to natural level, then slowly but forcibly draw head and shoulders straight backwards, as if against imaginary collar button. Do not tilt chin up, nor pull chin in toward chest, 8-10 times.

2. Lie on face, hands clasped low behind back, elbows straight: slowly pull head and shoulders off floor, pinching shoulder blades together and pulling down with hands; hold for 5-6 seconds, then relax. Feet remain on floor. Avoid tilting chin up in the air by keeping eyes directed toward the floor. Do not see how far you can bend backwards as this merely produces extreme hollowing of the back. Work up to 8-12 times.

3. "Breaking chains"

Sit on floor with legs crossed, "tailor" fashion, and bend arms to bring clenched fists in front of chest, palms down, elbows at shoulder level: slowly pinch shoulder blades together as if attempting to break a chain held in the two hands. Keep elbows at shoulder level, shoulders low, and avoid thrusting the head forward. 10 times.

4. Sit on floor with legs crossed, fingers touching top of head, elbows well back: stretch throughout trunk, pushing up against hands; then relax. Avoid "hunching" shoulders.

Series D: Exercises For Flexibility and General Strengthening.

1. Stand with feet slightly apart, abdomen well controlled: keeping knees straight, let trunk fall forward, arms relaxed, touching floor with hands: bob a few times, going down farther each time; then straighten trunk all the way up and repeat.

2. Stand with feet slightly apart and with hands clasped high overhead; bend slowly from one side to the other, keeping head back and abdomen and lower back in a good position. Hips move only slightly from side to side, most of movement coming throughout spine.

3. "Airplane" exercise

Stand with feet apart and arms out at shoulder level, elbows straight and palms down: 1. Twist trunk to the left; 2. keeping knees straight, bend to touch the left toe with the right hand, the left hand pointing toward the ceiling; 3. straighten to twist position, arms at shoulder level; 4. return to position with trunk facing forward. Repeat to right side. Knees straight, heels on floor throughout. Work up to 10 times each side.

4. Stretch walking

With hands clasped overhead and slightly forward, walk on tiptoes, whole body in as straight a line as possible. Avoid thrusting head forward, hunching shoulders, hollowing back, or stiffening knees. Try to carry over this "lift" into ordinary walking.

Series E: Exercises For Strengthening Muscles of Feet and Ankles.

1. Stand with feet parallel and about 2 inches apart: keeping toes and heels on floor, lift arches, throwing ankles apart and weight onto outer border of feet.

2. Walk with weight exaggerated on outer border of feet, letting heel come down first in natural manner and carrying weight through to ball and all toes. Then do the same to a moderate degree in a way that can be carried over into walking habits.

3. Rise as high on toes as possible; lower weight slightly toward outer borders of feet, keeping toes on floor. Avoid throwing ankles either in or out on rising.

4. Walk as high on toes as possible, ankles straight.

5. Pick up small objects under toes, and lift them to at least knee height to place them in the opposite hand.

IN DOING ALL EXERCISES, REGARDLESS OF POSITION IN WHICH THEY ARE DONE, THE FAULTS MENTIONED ABOVE, SUCH AS HOLLOWING THE LOWER BACK, THRUSTING THE HEAD OR SHOULDERS FORWARD, SHOULD BE AVOIDED WHEN NOT A NECESSARY POSITION IN ANY PART OF THE EXERCISE.

SET II

EXERCISES

Series A: Exercises for Chest, Shoulder, and Upper Back Flexibility.

If a person has habitually assumed a round-shouldered and stooped posture, the chest muscles and the ligaments on the front of the shoulders are likely to have become tight, and the upper spine may have lost the ability to straighten.

In doing exercises to stretch a muscle caution must be taken not to apply the stretch suddenly or with a jerky motion as this will shorten rather than stretch the muscle.

Rib Spreading Series

Exercise 1. Back lying: Rib spreading

Directions: Lie on the back with the legs straight and the arms extended over head on the mat. Slowly stretch the right arm back as though trying to touch something just out of reach. Repeat slowly, left and right, working for a lateral spread of the ribs.

Purpose: To increase the expansion and flexibility of the rib cage.

Exercise 2. Cross leg sitting: Rib spreading

Directions: Sit cross-legged on the floor with the back against the wall. The arms are raised sideward with

the elbows bent and the fingers placed lightly on the top of the head. With the elbows against the wall, slowly stretch first one, then the other, as high as possible, attempting to spread the ribs apart. Do not bend the body sideward; keep the head motionless against the wall.

Purpose: To increase the expansion and flexibility of the rib cage and to extend the spine.

Exercise 3. Wall standing: Rib spreading

Directions: Stand with the back to the wall, heels about six inches from the wall and the fingers resting lightly on the top of the head. With the elbows against the wall, slowly stretch first one, then the other, as high as possible, attempting to spread the ribs apart. Do not bend the body sideward; keep the head motionless against the wall.

Purpose: To increase the expansion and flexibility of the rib cage and to extend the spine.

Pectoral Stretching Series

Exercise 1. Hyperextended lying

Directions: Lie on the back with the hands clasped beneath the head, the elbows on the mat, and with a small narrow pillow (about 12" X 4" X 2") placed across beneath the shoulder blades. Lie quietly for three to five minutes or longer.

Purpose: To put the pectoral (chest) muscles on a mild stretch, to expand the thorax (rib cage), and to decrease the roundness of the upper spine.

Comments: This is a good exercise to use at the beginning of the lesson. It may also be used at any time when rest and relaxation are indicated. A folded bath towel may be substituted for a pillow. If the pull on the lower back causes discomfort a folded bed pillow or a rolled blanket should be placed under the knees.

Exercise 2. Bent arm passive chest lifting.

Directions: Sit on a bench and place the fingers against the back of the neck but do not interlock them. Keep the head erect with the chin level, point the elbows straight sideward, and contract the abdominal muscles enough to keep the back from having an exaggerated hollow. Your partner, or instructor, stands behind you with one foot on the bench and his knee against your back between your shoulder blades. He grasps your elbows and gradually but firmly pulls them backward and slightly upward. He holds them in this position for a moment, then, still supporting their weight, lets them return to the starting position. As he pulls them back you should draw your shoulder blades together.

Purpose: To stretch the pectoral muscles.

Comments: This exercise can be as mild or as forceful as needed. It is particularly good for round-shouldered, tight-shouldered, and flat-chested persons. Many persons tend to poke their heads forward and to hollow their backs during this exercise. If you can sit with your sides toward a full length mirror your partner can easily check on your performance. You may be hollowing your back because his knee is too low. If he cannot hold it higher he should place a book under his foot.

Variations: (A) If no bench is available you can sit cross-legged on the floor. (B) For persons who have a lordosis the exercise should be done from a straight leg sitting position on the floor with the feet braced against the wall. A pillow or blanket-roll may be placed under the knees to relieve the pull on the lower back.

Exercise 3. Straight arm passive chest lifting.

Directions: Sit on a bench with the arms extended overhead, shoulder width apart. Keep the head erect and the chin level and avoid arching the back. This takes strong contraction of the abdominal muscles. Your partner or instructor stands behind you with one foot on the bench and his knee against your back at upper shoulder-blade level. He grasps your arms at the elbows and pulls them back gradually but firmly, holds them a moment, then gradually lets them return to the starting position.

Purpose: To stretch the pectoral muscles and to extend the thoracic spine.

Comments: This is a forceful exercise and should only be used after Exercise 6 has been used for several lessons. For additional comments refer to Exercise 6.

Series B: Exercises For Lower Back and Hamstring Flexibility.

This group of exercises is for the students that have trouble bending over and touching their toes. These exercises are also designed for the student with a tilted pelvis and/or an exaggerated hollow in the lower back (lordosis).

Exercise 1. Single knee pull.

Directions: Lie on the back with one leg straight and the other bent. Clasp both hands around the bent knee and pull it toward the chest in a rhythmic springing motion. Keep the other leg straight. Repeat with the other knee.

Purpose: To give a mild stretch to the muscles and ligaments of the lower back. This is an elementary exercise for persons with lordosis.

Comments: If you can perform this exercise easily you do not need it. For perfect form in doing the exercise the straight leg should remain flat on the mat the the chin should not be tilted.

Exercise 2. Double knee pull.

Directions: Lie on back with both knees bent and feet off the mat. Grasp each knee with the corresponding hand and pull them simultaneously toward the armpits in a rhythmic springing motion.

Purpose: To increase the forward flexibility of the lumbar spine and to encourage a "tucked-under" position of the pelvis.

Trunk Bouncing Series

Exercise 1. Wide leg long sitting bounces.

Directions: Sit on the mat with the legs straight and wide apart. Relax forward with the hands resting on the floor between the legs. From this position bounce forward, sliding the hands along the floor. After every fourth bounce rest momentarily with the hands on the floor behind the body.

Purpose: To stretch the hamstring tendons and to increase the flexibility of the lower back.

Comments: Be sure to keep the legs straight and knees down on the mat. Attempt to bring the chest, not the face, close to the mat when bouncing forward.

Exercise 2. One-sided bounce.

Directions: Sit on the mat with the legs straight and wide apart. (1) Relax forward over the left leg and place both hands on top of it just below the knee. Bounce forward

four times, sliding the hands down the leg. (2) With the trunk inclined slightly to the left, straighten up with the arms stretched overhead. (3) Swing the arms and trunk toward the right and then bend forward over the right leg. Bounce forward four times as in 1. (4) Repeat alternately left and right, taking four counts to make the shift from one side to the other in order to keep the rhythm uniform.

Purpose: To stretch the hamstring tendons and to increase the flexibility of the lower back.

Exercise 3. Close leg long sitting bounce.

Directions: Sit on the mat with the legs straight and close together. Relax forward and place the hands on top of the legs. From this position bounce forward, sliding the hands down the legs as far as the ankles. After every fourth bounce sit erect and lean back on the hands for a few moments.

Variation: Grasp the ankles and pull yourself forward four times in a bouncing movement by bending the elbows sideward. Keep the knees straight and attempt to bring the chest, not the head, close to the legs.

Purpose: To stretch the hamstring tendons and increase the flexibility of the lower back.

Exercise 4. Standing bounce.

Directions: Stand with the feet wide apart, relax forward, and from this position bounce downward to touch

the floor without bending the knees. After every fourth bounce rest momentarily with the hands on the knees or stand erect.

Purpose: To stretch the hamstring tendons and increase the flexibility of the lower back.

Variation: As this becomes easier the feet may be placed closer together.

APPENDIX D

LETTER TO PARENTS

Dear Parents:

I am planning to do a study as part of a requirement for a Master's Degree.

The study deals with posture training and self-concept. This will mean that each student participating in the study will be given a posture examination and a self-concept test at the beginning and at the end of the experiment.

I would like your permission for your child to participate in this study. Please sign and return this slip as soon as possible.

Yours truly,

Polly Brown
Girl's P. E. Instructor

_____ My child has permission to take part in this study.

_____ My child does not have permission to take part in this study.

Signed_____

If you wish further information about this study please feel free to call me at my home after 5:00 PM.

Phone 4-4452

APPENDIX E

NAME_____

QUESTIONNAIRE FOR SUBJECTS

1. Did you feel that the posture training and exercise program has been helpful to you?

   _____Yes _____No

2. If answer is yes to question 1: what part of the exercise program did you feel was most helpful? (you may check more than one)

   Exercises to:

   ____Correct faulty standing posture

   ____Strengthen abdominal muscles

   ____Strengthen muscles of upper back, shoulders and neck

   ____Flexibility and general strengthening

   ____Strengthen muscles of feet and ankles

   ____Lower back and hamstring flexibility

   ____Chest, shoulder and upper back flexibility

3. How much time, other than class, did you spend doing some or all of the above exercises?

   ____once a day ____twice a week ____once a week

   ____occasionally ____none

   Which set of exercises did you spend the most time on? (List one or two)_____

---

4. Were you stiff and sore after class?

   ____Yes ____No

If yes, how often?

____after first class ____only at first of the study

____frequently ____rarely

____occasionally ____never

5. What personal benefits did you gain from the posture training and exercise program? (check the ones that apply to you)

_____lost weight

_____better health

_____gained posture awareness

_____improved physical fitness

_____improved self confidence

_____improved muscle toneness

_____improved my figure

_____improved my physical appearance

_____felt that nothing was gained

6. List any benefits gained that are not listed above.

_____

_____

7. How could this class have been improved so that you could have gained more? Please make comments:

_____

_____

_____

_____

APPENDIX F

THE UNIVERSITY OF THE STATE OF NEW YORK
THE STATE EDUCATION DEPARTMENT
ALBANY, NEW YORK 12224

WARREN W. KNOX
ASSISTANT COMMISSIONER FOR
INSTRUCTIONAL SERVICES
(GENERAL EDUCATION)

DIVISION OF HEALTH, PHYSICAL EDUCATION
AND RECREATION
GEORGE H. GROVER, DIRECTOR

BUREAU OF PHYSICAL EDUCATION
CASWELL M. MILES, CHIEF

SUPERVISORS OF PHYSICAL EDUCATION AND
RECREATION
HENRIETTA L. BARTLESON
ROBERT L. CARR
GERALD J. HASE
ARTHUR J. MULLER
IRWIN ROSENSTEIN
FRANCES R. STUART

May 14, 1965

Mrs. Polly Brown
1245 Utah Street
Wenatchee, Washington

Dear Mrs. Brown:

Your letter pertaining to the New York State Posture Rating Chart has been referred to me for reply.

We are presently establishing the reliability for both the New York State Physical Fitness Screening Test and the New York State Physical Fitness Test. However, the information is not available for public use at this time. If you are interested in the validity of the various test items, may I refer you to the basic for the New York State Physical Fitness Test which was a study done by Saul Ostrow, "An Experimental Study to Determine Standards of Organic Development, For Use in the Boys' Physical Education Program in New York State Public Secondary Schools".

Under separate cover I am sending copies of both of our New York State Physical Fitness Tests along with norms for scoring each one.

Sincerely yours,

Please note:
The signature has been redacted due to security reasons

Gerald J. Hase

gjh/sim