THE EFFECTS OF TWO POSTURAL TRAINING PROGRAMS ON THE STANDING POSTURE OF TRAINABLE RETARDED CHILDREN

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ABSTRACT

THE EFFECTS OF TWO POSTURAL TRAINING PROGRAMS ON THE STANDING POSTURE OF TRAINABLE RETARDED CHILDREN

By

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The purpose of this study was to discover whether two postural training programs were effective in improving the standing posture of trainable retarded children. Of particular interest was whether the music activity training program was more effective than the nonmusic activity training program in improving standing posture.

Twenty-two trainable retarded students from Forest Grove School in Fenwick, Michigan were involved in the study. The students were randomly divided into two groups. Eleven subjects were randomly assigned to the experimental group and eleven to the control group. All subjects were trained in correct standing posture according to the ideas of Fenton and Drury. The training program lasted for four weeks, with training on three successive days each week. Measurements were taken on the amount of improvement

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in posture as measured on all subjects- pre- and posttest scores and the results compared by computer statistical analyses.

Certain conclusions were drawn based on the findings of this study:

1. The two postural training programs employed in this study, nonmusic exercises/activities and music exercises/activities, did not significantly improve standing posture in selected trainable retarded students.
2. The use of music exercises/activities in postural training was not found to be more effective than the use of nonmusic exercises/activities in postural training.

Statistically, music activities were not found to be more effective than nonmusic activities in the improvement of the students' standing posture. However, there was a distinct difference in the "feeling state" of the two groups during the training sessions. The music activities seemed to make exercising more enjoyable for the music group and this group responded much more positively to the training sessions. Future researchers would be well advised to study standing

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posture over a longer period, design an indepth postural rating program for training the adjudicators, use still photographs instead of video-tapes for postural rating and to use a larger sample in the study. Areas of similar research would include examining such postures as sitting, walking and working, and developing postural norms for the population of trainable mentally retarded students.

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By

Julianne Hyland O'Shea

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CHAPTER I

PURPOSE OF THE STUDY

Introduction

According to Morgan (1964, 6), "some people have a highly individual and clearly recognizable manner of moving and standing." This seems to be especially true of retarded persons. After working as a music therapist with severely retarded children, this researcher has determined that poise is a deficit area for most of the children. Poise, as defined by Webster (1963, 654) is a "self-possessed composure, assurance, and dignity; a particular way of carrying oneself." One of the most important aspects of poise is posture (the relative arrangement of the parts of the body). Posture, being so important to poise, has been determined to be a good starting point for developing poise. It is the purpose of this study (1) to determine whether the children of Forest Grove School can improve their posture by participating in a series of specially designed postural training activities and (2) to determine if the use of music

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is effective as an aid in teaching posture.

A child's posture is determined by his physiology, his self-image, and his training. A child's physiology, or body make-up, determines how efficiently his body functions. Structural problems cause a loss of body efficiency and often result in poor posture. Structural problems, however, cannot be remediated by untrained persons. Beter and Cragin (1972, 29) state:

> Structural conditions exist when the boney structure has been changed or affected. Correction for structural conditions is the province of the physician, who may resort to surgery or casting, or, both, in an effort to secure desired improvement.

The improvement of structural conditions, then, will not be undertaken in this postural training program.

A child's posture is also influenced by his image of himself. How a child sees himself often shows in how he carries his body. Beter and Cragin (1972, 23) state that "at rest or in motion, a person often reveals the image he has of himself and expresses the attitude with which he faces certain situations of living." As Kelley (1949, 5) explains:

> The way a person carries himself makes an important impression. From his carriage or

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> posture, people draw certain conclusions about his health, his vitality and his personality. Experience teaches us to expect enthusiasm for living, initiative, self-confidence and self-respect from a person with an easily erect posture. Most poor postures suggest just the opposite--dejection, apathy, lack of confidence and fatigue.

With correct postural training a child can learn to present himself more positively to society, with increased self-confidence and self-respect.

Another important factor determining a child's posture is his past training in posture and body mechanics. Posture is largely a matter of habit. Beter and Cragin (1972, 23) explain that "good or bad, if a given posture is assumed often enough, a neuromuscular response is established which becomes typical of that person." Most children, these days, have not had an organized training program in posture and body mechanics. Although many of them have grown up with the command to "stand up straight" or "throw your shoulders back," they have not been involved in a specific program of postural training. As a result many children have developed poor postural habits.

Poor posture is detrimental to both physical appearance and body functioning. Retarded children

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are often characterized by their "awkward gait" and "slouched" appearance. The appearance of a child is very important to his acceptance by society, and to his acceptance of himself. Improvement of appearance is, then, an area which requires emphasis in the retarded child's overall educational program. As Weber states (1963, 104), "the way any child looks and acts conditions how he is accepted by people in general." Good posture enhances appearance and makes it easier for a retarded person to fit into society. Good posture is also important to good health. A body in good posture functions better because it is maintained in correct alignment (Kasch, 19).

A postural training program would benefit retarded children by helping them to improve their physical appearance and body efficiency thus leading to benefits of increased social acceptance, self-confidence and improved health. Posture training is the responsibility of both the parents and the trained staff working with the child. In the school setting, posture training is the responsibility of the classroom teacher and all other staff with whom he comes in contact. As a staff member, then, it is the responsibility of the

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music therapist to work on postural improvement. The use of music activities could be effective in teaching correct posture. Music used in such a way is referred to as "functional" music. As Cardinell (1948, 352) explains, "music which accomplishes specific predetermined ends other than entertainment or pleasure is functional music."

In this study music therapy activities are used, within a school setting, in a program designed to improve the standing posture of some mentally retarded children.

Statement of the Problem

The problem of this study can be expressed in the form of two questions:

1. Will the standing posture of selected retarded students be significantly improved with participation in a postural training program?
2. Will the program of music activities be more effective than the program of nonmusic activities in improving the standing posture of selected retarded students?

Hypotheses

There is presently no scientifically based research that gives concrete evidence that the use of music aids in postural training. It is the objective of this study to provide such evidence.

More specifically, this study will test the following hypotheses:

1. There is improvement in the standing posture of selected trainable retarded students with the use of nonmusic activities in a short-term program.
2. There is improvement in the standing posture of selected trainable retarded students with the use of music activities in a short-term program.
3. There is a significant difference between the use of music and nonmusic activities in the improvement of standing posture in selected trainable retarded students.

Need For the Study

It was agreed by both the staff at Forest Grove School and this experimenter, that the students at the school needed training in posture and body mechanics in addition to the self-help skills being taught in the classrooms. A postural training program would benefit the students in two ways:

1. Improvement of physical appearance

   With improved posture the children would appear more poised, would seem less awkward, and would be physically more acceptable to society.

2. Improvement of health

   Poor posture leads to aches and fatigue and results in an uneconomic use of the body. With better posture the children would feel better and have more energy.

No postural training program has been offered at Forest Grove School in the fourteen years of its existence. It is the responsibility of all of the staff, including the music therapist, to work with the children in problem areas in their total life experience. Music has been a very positive experience for the children of Forest Grove School. It, therefore, could be a feasible means of helping to teach good posture habits to the children. If music is found to

be of benefit in posture training in this setting, other programs could be developed by music therapists to teach posture to exceptional children and adults.

Definition of Terms

Forest Grove School.--A public school in Fenwick, Michigan which serves the needs of sixty-five trainable retarded youth from Montcalm and Iona counties.

Level of Functioning (Adaptive Behavior).--A subjective measure determined by the faculty of Forest Grove School to describe a child's performance level in the classroom. Children described as functioning at a high level can be considered to be borderline educable, have academic skills up to a third grade level, and can function independently in the classroom. Children described as functioning at a medium level can be considered to be trainable retarded, can learn letters and do some printing and can function semi-independently in the classroom. Children described as functioning at a low level can be considered to be severely mentally impaired, can be taught self-care skills and some language and are able to function

somewhat independently in the classroom.

Postural Defects.--Five postural defect areas have been found to be of almost universal occurrence (Richardson, 90). They are as follows:

1. Flat feet
2. Tight posterior muscles
3. Weak abdominal muscles
4. Exaggerated lumbar curve
5. Winged scapulae

These five defect areas have served as the basis for the development of exercises used in the Postural Training Program.

Postural Rating.--An instrument developed by the experimenter from research in the area of the "ideal" standing posture. It is used to evaluate the standing posture of the twenty-two subjects in the study. This examination was carried out both pre- and posttest by five adjudicators for each of the subjects. The examination is comprised of a postural rating form and score sheet (see Appendix B).

Postural Training Program.--A series of exercises/activities developed by the experimenter to help retarded children improve their posture. The program was developed through research in the areas of "ideal" standing posture, postural defects and corrective exercises. The program was set up to include both exercises/activities for remediating problem areas and exercises/activities for developing an awareness of good posture and overall correct body positioning (see Appendix C).

Social Maturity.--A subjective measure used by the faculty of Forest Grove School to determine the placement of students into specific classrooms. The subjects in this study were placed in the classroom of Mr. Henkes, teacher of the most socially mature group, because of their level of social maturity. That is, these students are:

1. capable and ready to learn work skills
2. capable of working somewhat independently in small groups
3. capable of fitting into a classroom where very little behavior management is needed

4. socially appropriate for the class; their friends are in this classroom now or soon will be.

Standing Posture.--In this study "posture" refers to the relative arrangement of the different parts of the body in the standing position. The "correct" standing position for this study has been determined to be the following:

1. Head:

   The head is evenly balanced on the shoulders at a 90 degree angle. No tilting is observed either to the side or to the front or back.

2. Shoulders:

   The shoulders should be relaxed and of a comparable height and elevation.

3. Chin:

   The chin should be relaxed and at a 90 degree angle to the neck. No tilting is observed.

4. Chest:

   The sternum (breast bone) should be held high but not high enough to look inflated.

5. Arms:

   The arms should be relaxed and hang freely at his sides. The areas from the shoulder to the elbow should be in line with an imaginary gravity line from the ear, through the middle of the hip, in back of the kneecap, and in front of the ankle bone.

6. Abdomen:

   The abdomen should not be absolutely flat, however, the abdominal muscles should not protrude.

7. Spine:

   The spine should be upright without being stiff.

8. Pelvis:

   The anterior superior spine of the iluim (the bones in front of the hip) are more or less horizontal. These bones should not be pointing downward.

9. Hips:

   The contour and elevation of the hips should be equal.

10. Knees:

    The knees should be relaxed not locked so that they are not hyperextended (pushed backward so that the calf of the leg is bowed backward instead of being more or less horizontal).

11. Legs:

    The legs should have no visual problem with genu valgum (knock-knees) or genu varum (bow-legs).

12. Ankles:

    The ankles should bend neither inward or outward.

13. Feet:

    The body weight should be balanced evenly over both feet with the feet pointing

directly ahead, about six inches apart. Body weight should be placed in the middle of the foot, just in front of the ankle bone.

Trainable Mentally Retarded.--Children are placed in Forest Grove School for the Trainable Mentally Retarded who fit the following qualifications:

1. Reside in Montcalm or Ionia counties
2. Have been tested by a school psychologist from Ionia/Montcalm Intermediate School District with such tests as the Wide Range Achievement Test, the Stanford-Binet, the Wechsler Intelligence Scale for Children and the Peabody Picture Vocabulary Test
3. Have been determined through testing and interviews to have an intelligence quotient of between 30 and 50.

Scope and Limitations of the Study

The subjects in this study are limited to twenty-two trainable retarded students attending Forest Grove School, Spring Term, 1974. The subjects were randomly divided into two groups. Group I was the control group and participated in postural training sessions using nonmusic activities. Group II was the experimental group and participated in postural training sessions using music activities. Due to the time limitations of the study and the intellectual

limitations of the subjects, only the specific posture of standing was evaluated in this study. The variable of standing posture as compared to an "ideal" was measured during pre- and posttraining for all subjects. The training program lasted four weeks with training on three successive days of each week. The order of the sessions was randomly determined. Each youth was compared on his own pre- and posttests, so variations in postures within the group was discounted as an experimental variable. Due to the variance of intellectual limitations of the subjects, different rates and levels of postural improvement were to be expected. Due to the length of time involved in adjudicating the video-tapes, a fatigue factor may have entered into the evaluation. Because of the lack of experience by the adjudicators in judging correct standing posture, some errors may have entered into the evaluation. Due to the uncharacteristic backgrounds of some of the subjects (three were formerly institutionalized at large state institutions for the mentally retarded) a different result may have been obtained from a different sample. Care was taken

at both the pre- and posttests to familiarize all the subjects with the requirements of the evaluation procedure for posture.

CHAPTER II

REVIEW OF RELATED LITERATURE

The purpose of this study was to determine the effect of a series of specially designed music therapy activities on the improvement of posture of selected retarded students. No experimental work has been found which specifically deals with the use of music in postural training. For this reason, a survey of literature which concerns the value and components of posture training, a description of an ideal standing posture, and the use of music as an aid in learning new skills should serve as sources from which to draw inferences on the importance of postural training and the use of music activities in such training.

Value of Postural Training

Psychological Well-Being

There has been much discussion, both in postural literature and literature on mental retardation,

concerning the value of good posture. The reasons for postural training have generally fallen into two main areas: improvement of health and improvement of appearance. Helping a retarded child to improve his physical appearance is especially important in helping him to seem more "normal" and thus more acceptable to society. Faber (1968, 151) states that most retardates are "conscious of being different and are aware of being set apart from society." Isaacson (1974, 158) notes that "all retardates want to be accepted as normal people and to avoid the stigma of 'mental retardation'. The overwhelming desire of the individual is to be recognized as a competent individual, fit to live in society, a person of worth." He suggests that "ways must be found to guarantee an adequate level of self-esteem. The stigma of mental retardation must be minimized. The range of successful experiences must be maximized." Hutt and Gibby (1958, 33) explain that many of the problems of retarded children are not the result of their retardation but of the way in which society thinks about them and reacts to them. These authors stress that "there are no differences between the fundamental

personality structure of the retarded child and that of the child of normal intelligence. Both are human beings." Mentally retarded children have the same emotional, psychological and physical needs as all other children. Therefore:

> Social adjustment is the ultimate goal for trainable retarded children as well as for the educable retarded, and work in all other areas should have the aim of making the child more "socially acceptable." Better speech, better postural habits, respect for property--these things are part of a specific training to enhance the social acceptance of the child. The objective is to help the child become more acceptable to others (Willey, 158).

Weber (1963, 104) states that the way a child is accepted by people is conditioned by how that child looks and acts. He notes that:

> This is especially true of the child with limited ability. It is wise, then, for parents to make certain that this child is attractively clothed, neat and clean, and has learned the fundamentals of courtesy, politeness and good manner in general.

Because people are influenced by the physical appearance of the child it is the duty of the people working with that child to help him to make his appearance as pleasing and as normal as possible. The more normal he appears the more easily he will be accepted by others.

Physical Well-Being

Good posture is important to good health as well as enhancing physical appearance. Throughout the postural literature one finds references to posture being vital to one's effectiveness, well-being and enjoyment of life. Fenton (1973, 10) states that poor posture "contributes to functional disorders like flat feet, headaches, digestive upsets, asthma and stammering." Rathbone (1949, 17-32) refers to a weak position of the foot giving such symptoms as pain in the arch, calf or lower back, general fatigue and weak and painful knee joints. He also relates fatigue to poor positioning of neck muscles. Goldthwait (1941, 1) states:

> An individual is in the best health only when the body is so used that there is no strain on the joints, bones, ligaments, muscles, or any other structures. There should be adequate room for all the viscera, so that their function can be performed normally, unless there be some congenital defect.

With good posture, then, one's body efficiency is increased in addition to the improvement in physical appearance.

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Ideal Standing Posture

In this study standing posture was chosen as the specific posture to be evaluated. Standing posture was chosen because, as Wessel (1961, 19) explains:

> Standing posture is the reflection of the way you use your body second by second, minute by minute, hour by hour, day by day, week by week, and year by year. This posture, your standing alignment, is the point of departure for every other position and movement that you take during your life. This means that without balanced alignment it would be impossible to achieve grace and beauty of your body lines in motion.

The "ideal" standing posture has been described over three decades by several authors (Metheny, 1952; Colson, 1956; Lowman and Young, 1960; Beter and Cragin, 1972). Material by Fenton (1973, 76-77) and Drury (1970, 2-5) appears to be the most helpful to this study. These writers state that when standing correctly a child's head will be balanced evenly on his shoulders with no observable tilting (either to the side or to the front or back); his neck muscles will be in a neutral position (not contracted or stretched); his shoulders will be of a comparable height and elevation; his breathing will be gentle with abdominal movement accompanying chest movement; his spine will

be upright without being stiff; his stomach will be relaxed but not protruding; the contour and elevation of his hips even; his legs will be straight but not locked; his ankles neither bending inward or outward; and his feet will be pointing straight ahead, a few inches apart. As Rathbone (1949, 76) states:

> It is probably incorrect to hold up a common standard of posture for all individuals . . . What is ideal for one individual would not be ideal for another. . . . Assuredly some postures are better than others, but we must be careful not to fall into the error of talking as though one particular posture were superior to all others.

Within the preceding definition of correct standing posture, then, it can be seen that posture could have a wide range of "normal." As Metheny (1952, 193) states:

> There is no single best posture for all individuals. Each person must take the body he has and make the best of it. For each person the best posture is that in which the body segments are balanced in the position of least strain and maximum support. This is an individual matter.

In this study the consideration is the search for each subject's best posture not one "correct" posture to fit all.

Components of Classroom Posture Training

Classroom posture training is usually accomplished through evaluation and exercise. Phelps (1956), Kelly (1949) and Richardson (1930) purport the use of pictures or films as a very effective way of evaluating posture. In addition, Kelly (1949, 61) suggests the use of photographs in motivating children to improve their posture. She states:

> No single factor is more effective in motivating pupils toward real effort than the personal posture picture. Most pupils have been told to "stand up straight" as long as they can remember. Most pupils know verbally and visually what good posture is. Few pupils, however, have any real knowledge of their own posture, either good or poor. Pupils who are quite indifferent to "talk" about posture improvement are quickly motivated when they evaluate their own pictures in terms of acceptable standards. Frequent comments are "I didn't know I looked like that," and "My mother says I have poor posture. Now I know what she's talking about." Comparison of first pictures with subsequent pictures is also a most gratifying evidence of progress.

Drury (1970, 29-102), Truslow (1943, 138-238), Phelps (147-167), and Lowman (1960, 256-318) among others, have developed specific exercises for strengthening and stretching weak muscle areas.

According to Richardson (1930, 90), the main postural defects, which have been found to be of almost

universal occurrence, are flat feet, tight posterior muscles, weak abdominal muscles, exaggerated lumbar curve and winged scapulae. In looking at the subjects of this study the above areas were found to be the most obvious defect areas. Exercises to alleviate them were determined and comprise a portion of the Postural Training Program. In the following paragraphs an explanation of the five defect areas and a list of activities used to remediate them will be presented.

Flat Feet

According to Truslow (1943, 138):

> Although faulty shoes, disease and deforming injury play important parts in causing foot disability, the strains and stresses due to man's standing position must remain the principal factor in causing weak feet, flat feet and metatarsal derangement.

Weak feet are not only locally disabling but are often responsible for strain and disability above the feet in such places as the calves, knees, hips and the back (Truslow, 155). As Phelps states (1956, 130):

> The greatest source of discomfort leading to a postural disturbance is that of flat feet, "fallen arches" or "weak ankle positions." Actually these conditions are all due in large part

> to pronation. . . . If marked, the inner border of the foot may make full contact with the ground and the heels "cant" outwardly at an angle of 60 to 70 degrees. Usually the heel cord is long or slack and the individual may seem to toe out. The opposite stance may be observed, wherein the foot is inwardly rotated and the heel shows a tilting away from the center of gravity.

Exercises to strengthen feet are composed mainly of exercises to strengthen the arch. These include exercises to strengthen toe flexors and exercises to stretch the achilles tendon. Exercises included in the Postural Training Program are:

1. Exercises to strengthen toe flexors
   --"Toe Exercises"
   --"Picking Up Pencils"

2. Exercises to stretch the achilles tendon
   --"Heel Bounce"
   --"Elephant Walk"

3. Exercises to develop consciousness of correct positioning of the foot
   --"Walking Exercise"

Tight Posterior Muscles

The posterior muscles of the lower limb extend all the way from the pelvic girdle to the heel. They include the tendon of achilles and the group of hamstring muscles on the posterior aspect of the thigh. According to Richardson (1930, 106), an abnormal

tightness in this group of muscles is often accompanied by a "flat-footed" gait. This occurs because the feet are turned out to put less pull on the posterior muscles. Such everted feet give way easily and become flattened. People who suffer from tight posterior muscles often have considerable pain in their calves and the posterior part of their thighs. Exercises included in the Postural Training Program to stretch posterior muscles are:

1. "Row, Row, Row Your Boat"; numbers 1 and 2
2. "Elephant Walk"

Weak Abdominal Muscles

According to Drury (1970, 54):

> The common problem in the abdominal region is relaxed or protruding abdomen. It is generally a true statement that the tone or strength of the abdominal muscles gives an indication as to the overall tone or fitness of the individual.

Richardson (1930, 119) states that many authorities believe that the abdominal muscles "constitute the keystone of good posture." A protruding abdomen can be the result of defects of the thorax and low back which weaken or elongate the abdominal wall. Visceroptosis, or drooping of the abdominal viscera, is

caused by weakness of the abdominal muscles (Drury, 1970, 54). According to Drury, "it leads to laxness of the mesenteric and peritoneal attachments to the stomach, liver, spleen, kidneys, with adverse effect on digestion." Weak abdominal muscles also lead to lordosis. Exercises to strengthen abdominal muscles which are included in the Postural Training Program are:

1. "If You're Happy"
2. "Snake Walk"

Exaggerated Lumbar Curve

According to Richardson (1930, 129), there is a normal forward curve of the spinal column in the region known as the "small of the back" (lumbar portion of the spine). He explains that when this curve loses its "continuity and becomes more or less angular, an abnormal condition of the spine results." This condition, lordosis, has several causes. One cause is tight posterior muscles due to the increased pull on the posterior muscles of the legs and the back. As Richardson explains (1930, 133):

> These muscles tend to approximate (draw closer together) their points of attachment to the bones of the legs and hips. The pull of these posterior muscles when they are too strong, may be so great, that the balance of power between the opposing muscle groups is lost. This upsets the correct relations of the bones of the skeleton. Any deviation from the normal curve in the lumbar region of the spine forces the abdominal organs into an abnormal position. Poor posture is the inevitable result.

Another cause of lordosis is weak abdominal muscles. When the abdominal muscles are too weak the balance of power between the abdominal muscles and the back muscles is upset. The pull they both exert is not equal, so they fail to keep the pelvic girdle in correct relation to other parts of the skeleton. As Richardson explains, "as the tension on the anterior surface of the skeleton is relaxed, the muscles on the posterior aspect will contract, as their contraction is no longer opposed. This produces a greater angle in the lumbar region.

Another cause of lordosis is habitual standing with hyperextended knees. According to Richardson (134), "the thrusting back of the knees forces forward the crest of the pelvic girdle, and the normal lumbar curve changes into an abnormal angle. This

hyperextension of the knees is often the result of maintaining a stiff and tense standing position." The effects of lordosis include abnormal functioning of abdominal organs (because of displacement) and pain in the lumbar region due to increased angle. Lowman (1960, 115) states that "lordosis is usually accompanied by such compensatory deviations as forward head, cervical lordosis, round shoulders, flat chest, back knees, or flat feet." Exercises to correct exaggerated lumbar curve which are included in the Postural Training Program are "Row, Row, Row Your Boat" Numbers 1 and 2, "Elephants," "If You're Happy," and "Snake Walk."

Winged Scapulae

Children with winged scapulae have prominent shoulder blades which are sometimes described as "angel wings." Richardson states (1930, 139):

> When a child has prominent shoulder blades, he presents to the examiner other undesirable features as well. The shoulder girdle drops forward, with a resultant decrease in the size of the thoracic cavity. This in turn impairs the action of both heart and lungs; for the space in which these organs function has been appreciably lessened. Hence the lungs cannot

> efficiently supply the blood with oxygen; and the heart has a greater amount of work to perform, to compensate for this incapacity of the lungs to function satisfactorily.

With decreased efficiency of the heart and lungs waste products remain in the body longer than is normal and thus the body develops lowered resistance to disease. Winged scapulae develop from the shoulders being forward which "leads to increased dorsal kyphosis and a flat chest, allowing the scapulae to slide around the convexity of the thorax" (Phelps, 68). The deformity is further associated with either an elevation or depression of the shoulders. Exercises included in the Postural Training Program are "Kangaroo Hop" and "Circles in the Air."

The Use of Music as an Aid in Learning New Skills

Although a review of literature has revealed no studies on the use of music in postural training, a number of studies have been found which show music to be effective as an aid in learning new skills. Dillon (1952, 1-8) conducted a study with 240 college females over a period of three years. The purpose of the study was to determine the value of music as an aid in teaching swimming. In the music group specific

music was chosen with regard to its tempo when specific skills were practiced and general background music was used when the students were swimming. She found that swimmers who were taught with music improved more in swimming speed and in form than did swimmers who were taught without music. Beisman (1967, 172), in a study involving 607 children in grades one through six, found that the use of rhythmic accompaniment (provided through the media of records, piano, tape recorder, drum, clapping and singing) provided more improvement of fundamental motor skills than did teaching and practice without rhythmic accompaniment. The motor skills tested included throwing, catching, climbing, balancing, jumping, leaping, dodging, bouncing and striking. Isern (1958, 162-165) found that the use of music positively influenced the memory of retarded children. Using a story and a song equated according to length, similarity of content, difficulty of text, appeal of the context and the number of items to be remembered in each, she found that "a more significant number of items were recalled from the song as compared to the number of

items recalled from the story for the immediate, recent and remote recall." She feels that the feeling state of music "apparently helped to reinforce, organize and focus the attention of the subjects upon the learning experience." Seybold (1971, 102-110), in working with speech delayed children, found that the addition of music activities in speech therapy provided the necessary stimulation for the child to use spontaneous speech at the .10 level of significance.

CHAPTER III

DESIGN OF THE STUDY

Method

This study was directed toward the determination of the effects of music therapy sessions on the improvement of standing posture in selected retarded students. There were twenty-two subjects in the study. All subjects were Caucasian; no other racial or ethnic groups were represented at Forest Grove School. Eleven subjects were randomly assigned to the experimental group and eleven to the control group. All subjects were trained in correct standing posture according to the ideas of Fenton (1973, 76-77) and Drury (1970, 2-5). The training program lasted for four weeks, with training on three successive days each week. Measurements were taken on the amount of improvement in posture as measured on all subjects' pre- and posttest scores and the results compared.

Subjects

The subjects involved in this study were twenty-two students in the class of Mr. Robert Henkes, at Forest Grove School in Fenwick, Michigan. One student in this class was not included as a subject in the study because of severe physical limitations. The faculty of Forest Grove School, a school for the trainable mentally retarded, divided the sixty-seven students into three classrooms each having a certified special education teacher and two teacher's aides. The students were assigned to their particular classrooms according to age and social maturity; assignment did not include I.Q. The students in Mr. Henkes' class were chosen as subjects for the experiment because, of the three classes, they were the oldest and most socially mature. It has been found that adult postural defects usually have their origin in adolescence (Phelps, 51). Adolescence, then, is the time when good posture habits should be taught. Phelps states that posture training is "not only most important at that age, but it is most satisfactorily carried out" (1956, 51). There was no known history of previous postural training programs for any of the

subjects. It is important to note that many of these students came to Forest Grove School from long-term, full-time placements in large state supported institutions for the mentally retarded and thus generally lacked the stimulation of a home environment or a small school setting. For many of these children, Forest Grove School was their first experience in a school setting and for this reason they cannot be compared to the general population of thirteen to twenty-six year old, trainable, mentally retarded students attending a public school for the trainable mentally retarded. There is, however, no reason to believe that these students were unique when compared to past students at the school.

Setting

The sequence of sessions in the daily schedule was randomly determined each day by picking a number out of a hat. If Roman numeral I was selected, Group I (control group/nonmusic) was scheduled from 10:00 to 10:20 A.M. and Group II (experimental group/music) was scheduled from 10:40 to 11:00 A.M. If Roman numeral II was selected, Group II was scheduled from

10:00 to 10:20 A.M. and Group I was scheduled from 10:40 to 11:00 A.M. Both groups were taught by the experimenter in the same room. The room was chosen because it was large enough to provide adequate working and moving space for eleven children. The floor was carpeted which enabled the children to go barefoot, lie down, and roll around on the floor. The room was well lighted and ventilated, attractively decorated and had full length drapes which could be pulled to block out any distractions. The room was familiar to all of the children and provided no distractions for them. The experimental and control groups were both given the same skills practice with identical number of repetitions. Every effort was made to have the use of music the only difference between the two groups.

Data Gathering Procedures

For this study the data were obtained from two sources: the staff and records from Forest Grove School and postural ratings administered by the researcher.

The principal of Forest Grove School, Mrs. Clarice Cummings, maintains a file for each of the students in the school. Each file contains information about the child's sex, age, I.Q. and the length of time the child has been enrolled in the school. From consultation with Mr. Henkes, the subjects' teacher, a general level of functioning in the classroom was obtained for each student. The data from the students' files were collected during April, 1974 and are to be considered valid through the completion of the study. The information about each student was recorded according to a code number randomly assigned by the researcher. This procedure insured the anonymity of the subjects. The data collected regarding the subjects' sex, age, level of functioning and length of time in attendance at Forest Grove School can be seen in Table 1.

The second category of data came from postural ratings given both before and after the experimental condition. The postural ratings consisted of video-taped presentations of each subject. Each subject was positioned in front of the video-tape recorder with his heels touching a line stationary on the

Table 1.--Sex, Age, General Level of Functioning and Length of Time in Forest Grove School

Subject	Sex	Age	Level of Functioning	Years in Forest Grove School
1	M	18	H	2
2	M	17	L	7
3	M	17	L	11
4	M	16	M	7
5	F	16	M	10
6	F	15	H	2
7	F	16	M	9
8	F	17	L	12
9	F	16	H	11
10	F	18	M	7
11	M	21	L	13
12	M	16	H	7
13	M	18	H	7
14	M	19	L	13
15	M	17	M	3
16	F	24	L	13
17	M	17	H	11
18	M	15	H	2
19	M	16	H	3
20	M	16	L	11
21	M	18	H	13
22	M	15	H	1

H = High level of functioning
M = Medium level of functioning

floor and the center of his body corresponding to a line on the wall drawn by the experimenter. Two teachers (one of which was the classroom teacher) acted as aides and helped to position each subject. Because of the small size of the school (sixty-seven students), both teachers were very familiar to all of the subjects. Three students from another classroom were video-taped first to serve as practice examples for the adjudicators. Each subject was positioned and video-taped twice. The first taping was to familiarize the students with the procedure and to check for any problems with the equipment. The second video-taping was used for the postural rating. The rating consisted of each subject assuming four positions for a given number of seconds. Position one, posterior view, was held for 45 seconds. Position two, the bent view, was held for 15 seconds; position three, leg view, for 15 seconds; and position four, anterior-posterior view, for 45 seconds. After each position was assumed the video-taping was begun. At the end of the specified time it was stopped and the next position assumed. The procedure was repeated until all four positions were taped for each of the twenty-two

subjects. The subjects were video-taped on two consecutive days in a random order as determined by the teacher aides. The male subjects were clad only in shorts and were barefooted. The female subjects wore shorts, blouses and were barefooted.

After each of the video-taped postural ratings, a panel of adjudicators met and viewed the video-tapes. The adjudicators included two professors and three graduate students in the music department. Each adjudicator viewed each of the four positions of each of the twenty-two subjects and recorded his postural rating according to the directions on the score sheet. The same procedure was followed for both the pre- and posttest.

Independent Variables

Five independent variables were established in this study. These were age, sex, level of functioning, length of time attending Forest Grove School and participation in a postural training program.

Age

The age of each subject was found by checking the date of birth in his official school file. The

range of ages for the subjects was from fifteen to twenty-four years old. Three subjects were 15 years old, seven were 16, five were 17, four were 18, one was 19, one was 21, and one was 24 years old. Group I (control/nonmusic) was found to contain two 15 year olds, three 16 year olds, four 17 year olds, one 18 year old, and one 19 year old. Group II (experimental/music) was found to contain one 15 year old, four 16 year olds, one 17 year old, three 18 year olds, one 21 year old and one 24 year old.

Table 2.--Number of Subjects in Each Age Group for Control and Experimental Groups

	Age: 15	16	17	18	19	20	21	22	23	24
Group I (Control/ nonmusic)	2	3	4	1	1					
Group II (Experimental/ music)	1	4	1	3			1			1

Sex

The subject population contained fifteen male and seven female subjects. Group I (control/nonmusic) contained nine males and two females. Group II

(experimental/music) contained six male and five female subjects.

Table 3.--Composition of Control and Experimental Groups According to Sex

	Male	Female
Group I (control/nonmusic)	9	2
Group II (experimental/music)	6	5

Level of Functioning

The level of functioning for each subject was determined by the classroom teacher (see definition). Ten subjects were determined to be functioning in the classroom at a high level; five at a medium level and seven at a low level. Group I (control/nonmusic) was composed of three high functioning, three medium functioning and five low functioning subjects. Group II (experimental/music) was composed of seven high functioning, two medium functioning and two low functioning subjects.

Length of Time in Forest Grove School

The length of time in attendance at Forest Grove School was determined by checking each subject's official school record. The range of time in attendance extended from one to thirteen years. All of the subjects had attended the school for at least one year.

Table 4.--Number of Subjects in Each Level of Functioning for Control and Experimental Groups

	High	Medium	Low
Group I (control/nonmusic)	3	3	5
Group II (experimental/music)	7	2	2

Table 5.--Number of Years Enrolled in Forest Grove School Per Subject Per Group

	Years:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Group I (control/nonmusic)													
2							x						
3											x		
4							x						
7									x				
8												x	
14													x
15			x										
18		x											
20											x		
21													x
22	x												
Group II (experimental/music)													
1		x											
5										x			
6		x											
9											x		
10							x						
11													x
12							x						
13							x						
16													x
17											x		
19			x										

Postural Training Program

The Postural Training Program is a series of exercises/activities developed by the researcher to help retarded children improve their standing posture. For a complete definition and an explanation of the exercises and activities included in this program see Appendix C. The Postural Training Program consisted of twelve, twenty minute sessions. The daily sequence of sessions was determined randomly and the experimental and control groups were both given the same skills practice with an identical number of repetitions. Every effort was made to have the music as the only difference between the activities of the two groups.

Table 6.--Composition of Control and Experimental Groups in the Postural Training Program

	Subject:																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Group I (control/ nonmusic)		x	x	x			x	x						x	x			x		x	x	x
Group II (experimental/ music)	x				x	x			x	x	x	x	x			x	x		x			

Dependent Variable

The dependent variable in this study is the improvement of the standing posture of twenty-two trainable mentally retarded students from Forest Grove School. Improvement in standing posture was determined by pre- and posttests given by the researcher. These tests consisted of a rating by five adjudicators of the video-taped posture of each subject. The adjudicators saw the children only during the video-taped tests and did not know which subjects participated in which group. The tapes were evaluated according to a postural rating designed by the researcher. Each component of standing posture was evaluated and given a score from 1 (most deviation from "ideal" posture) to 4 (no deviation from "ideal" posture). A total postural score was tallied for the test and a comparison of the posttest with the pretest score resulted in a change score for each individual.

Materials

The materials used in this study included:

1. Video-tape equipment
2. Stopwatch
3. Forms

4. Postural Training Program
5. Musical songs and recordings

Video-tape Equipment

The video-tape equipment used for the experiment consisted of a Panasonic Tape-a-Vision Portable Video-tape Recorder, model NV-8100, a Panasonic Transistor Television, model TR-413V, and a Panasonic Television Camera, model WV-350P with tripod.

Stopwatch

A Hanhart #381/300 stopwatch was used to control the time interval of the subject's performance.

Forms

The forms used for recording data included a Postural Rating Form and Score Sheet (see Appendix B). The Postural Rating Form included definitions and suggestions of what to look for in determining good posture for the upper, middle and lower body in posterior, bent, leg and anterior-posterior views. The Score Sheet was comprised of individual sections for recording the scores for each postural view. Each view (posterior, bent, leg and anterior-posterior) received a sub-total score. These sub-totals, then, were added

together for a grand total postural score. A perfect score was computed to be 104 points. The Postural Rating Form and Score Sheet were adopted and modified from ideas and forms of Drury (1970, 2-13), Phelps (1956, 56-138), Colson (1956, 3-20), Truslow (1943, 12-124), Lowman (1960, 136-165) and Baumgartner (1943, 1-31).

Postural Training Program

The activities used to work on improving posture were a combination of activities designed to strengthen and stretch certain muscle groups and to draw attention to and make the children aware of good posture. All of the activities were repeated at least two times so that a child missing one day of class would not completely miss one exercise and thus miss out on all of the benefits of that exercise. The strengthening and stretching exercises were adopted and modified from ideas of Drury (1970), Phelps (1956), Beter and Cragin (1972), Kelly (1949), and Richardson (1930). The music activities were developed from the researcher's background and experiences in music therapy. For a complete explanation of the activities see Appendix C.

Musical Recordings and Songs

The songs and albums used in this study are as follows:

Songs

1. "If You're Happy" This Is Music, Grade Three. Allyn and Bacon, Chicago, Illinois, 1961. p. 156.

2. "Row, Row, Row Your Boat" Exploring Music 2. Holt, Rinehart and Winston, Inc., New York, 1971. p. 129.

3. "Mary Had a Little Lamb" familiar nursery rhyme.

4. "Ten Little Indians" familiar nursery rhyme.

5. "She'll Be Comin' 'Round the Mountain" This Is Music, Grade Four. Allyn and Bacon, Chicago, Illinois, 1961. p. 154.

6. "The Wheels of the Bus" Exploring Music, Kindergarten. Holt, Rinehart and Winston, Inc., New York, 1971. p. 15.

Albums

1. "Chicken Fat" Alley Cat and Chicken Fat. Wonderland Golden Records. LP 281.

2. "Elephants" Saint-Saens Carnival of Animals. RCA LP LSC-2596.

3. "Hokey Pokey" Alley Cat and Chicken Fat. Wonderland Golden Records. LP 281.

4. "Kangaroos" Saint-Saens Carnival of Animals. RCA LP LSC-2596.

5. "Sammy the Snake" Muppet Alphabet Album Starring Jim Henson's Muppets from Sesame St. LP CC25503 XSM 155263.

6. "Skybird" Jonathan Livingston Seagull. Columbia Records. LP KS32550.

7. "Theme from 'Shaft'" Motion Picture Themes. United Artists Records, Inc. UXS-89.

Handling of Missing Data

Due to the limited number of sessions in the study (two pretest, twelve experimental, and one posttest) the researcher made the determination at the beginning of the study that the score of any subject missing one-fifth or more of the total sessions would be dropped from the data. Four subjects (8, 9, 16, 17) missed three or more of the sessions and, although they continued to participate in the study, their scores were dropped from the accumulated data. Table 7 shows the attendance of each subject. For the compilation of data for the experiment only the scores of 18 subjects were used.

Statistical Procedures

The reliability of the testing method was determined by the Hoyt Reliability Scale which computed the reliability of sets of ratings by the five adjudicators.

Table 7.--Absences for Each Subject During the Study

Subject	Pretest 1	Pretest 2	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7	Session 8	Session 9	Session 10	Session 11	Session 12	Post-test	Total Absences
1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
3	x	x	x	x	x	x	x	x	x	x	x	-	x	x	x	1
4	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
5	x	x	x	x	-	x	x	x	x	x	x	x	x	x	x	1
6	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
7	x	x	-	x	x	x	x	x	x	x	x	x	x	x	x	1
8	x	x	x	x	x	-	x	-	x	x	x	x	x	x	-	3
9	x	x	x	x	x	x	x	x	-	-	x	x	x	x	-	3
10	x	x	x	x	x	x	x	x	-	x	x	x	x	-	x	2
11	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
12	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
13	x	x	-	x	x	x	x	x	x	x	x	x	x	x	x	1
14	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
15	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
16	x	x	-	x	x	x	-	x	-	x	x	x	x	x	-	4
17	x	x	x	x	-	x	x	x	-	-	x	x	x	x	x	3
18	x	x	x	x	x	x	x	x	x	x	x	x	x	-	x	1
19	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
20	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0
21	x	x	x	x	x	-	x	x	x	x	x	x	x	x	x	1
22	x	x	x	x	x	-	x	x	x	x	x	x	-	x	x	2

x = present at session
- = absent from session

A t-test was used to determine if differences existed between the groups at the pretest.

A t-test was used to determine the effects of training on each group's posttest scores.

An analysis of variance of the posttest by group was used to determine whether or not posttest differences were due to the training effect or to chance.

CHAPTER IV

PRESENTATION OF RESULTS

The purpose of this study was to determine the effects of two postural training programs on the improvement of standing posture in selected trainable retarded students.

Three hypotheses were established for investigation:

1. There is improvement in the standing posture of selected trainable retarded students with the use of nonmusic activities in a short-term program.
2. There is improvement in the standing posture of selected trainable retarded students with the use of music activities in a short-term program.
3. There is a significant difference between the use of music and nonmusic activities in the improvement of standing posture in selected trainable retarded students in a short-term program.

There were twenty-two subjects at the pretest and eighteen at the posttest. The data of four subjects were dropped from the study before the posttest due to excessive absences. Subjects were randomly assigned to the following groups:

Group I - Control (nonmusic) N = 11

Group II - Experimental (music) N = 11

Table 8 indicates that at the pretest Group I had more variance than Group II. However, the training period tended to eliminate some of the extreme scores and by the posttest the groups were more alike. The study involved determining pre- and posttest postural values on 9 control and 9 experimental subjects. At the pretest all of the subjects were video-taped by the experimenter in their interpretation of the "ideal" standing posture. This video-tape was shown to five adjudicators later the same day and each subject's posture was rated according to a predetermined rating guide (see Appendix B, Postural Rating). The total score for each subject from each adjudicator was compiled from 26 individual scores and 4 sub-total scores. The combined total scores for each subject by all five adjudicators is referred to as the Grand Total Score.

Table 8.--Mean and Standard Deviation Scores on Pretest, Posttest and Change Scores for Control and Experimental Groups

GROUP I (control/nonmusic)						GROUP II (experimental/music)					
Pretest		Posttest		Change Score		Pretest		Posttest		Change Score	
Mean	S D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
423.66	31.46	436.22	23.44	12.56	10.6	431.8	17.53	448.5	20.43	16.7	15.54

It was possible to earn 104 points on the rating.

Five days after the pretest, the postural training program was begun. Group I was taught correct standing posture through the use of nonmusic activities. Group II was taught correct standing posture with the use of music activities. The activities used with both groups were identical as possible with the exception of the music used with Group II. The order of the training sessions was randomly determined with each session lasting twenty minutes. Training took place on three successive days each week for four weeks.

On the day of the cessation of training, a post-test video-tape was recorded of each subject's "ideal" standing posture. This video-tape was evaluated the same day in the same way as the pretest by the five adjudicators who had scored the pretests.

Data Analysis

Three analyses were used in this study:

1. Analysis to determine the reliability of the testing method.
2. Analysis to determine the pretest differences between the control and experimental groups.

3. Analyses to determine the training effect on the experimental and control groups.

All computations for analyzing the data in this study were carried out at the Michigan State University Computer Center using the Control Data Computer No. 6500 and appropriate SSPS programs.

Raw data summarizing all pre- and posttest training measurements are contained in Appendix A.

Results

Reliability of the Testing Method

A reliability analysis of the testing method was computed by the Hoyt SPSS computer program. This program, based on the analysis of variance, is used for estimating the reliability of sets of ratings and for establishing the reliability of the "average rating as a criterion for validating a selection test" (Mehrens, 116). The reliability coefficient of the test (The Postural Rating) was found to be 0.743 showing an acceptably high reliability (see Table 9).

Comparison of Groups at the Pretest

A t-test was used to determine if significant differences existed between the groups at the pretest.

Table 9.--Hoyt Reliability Analysis of Variance

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Reliability Coefficient
Between People	1005.55556	17	59.15033		
Within People	2026.00000	72	28.13889		
Between Measures	953.44444	4	238.36111	15.11209	
Residual	1072.55556	68	15.77288		
Total	3031.55556	89	34.06242		alpha = .73334

No significant statistical difference was found between the control and experimental groups on the pretest ($t = .68$, $df = 16$, $p = .503$) (see Table 10).

Table 10.--t-Test Analysis of Differences Between Control and Experimental Groups at the Pretest

Group	No. of Cases	Mean	S.D.	df	t
Group I (experimental/music)	9	423.66	31.46	16	.68
Group II (control/nonmusic)	9	431.88	17.53		

Not significant at the .05 level of confidence (critical t value = 2.120, df = 16)

Comparison of the Groups Over the Training Period

An analysis of variance of the posttest by group with the pretest as covariate was used to determine whether or not posttest differences were due to the training effect or to chance. The F value of .776 was not significant at the .05 level of confidence and indicates that the difference in scores between the pre- and posttests in the groups was due either to chance or to the level of standing posture ability as measured by the pretest.

Table 11.--An Analysis of Variance of the Posttest by Group With the Pretest as Covariate

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F
Covariates				
Pretest	5344.442	1	5344.442	21.058
Main Effects				
Group	196.833	1	196.833	.776
Residual	3807.003	15	254.800	
Total	9348.278	17	549.899	

Pre- to posttest differences in the dependent variable were also analyzed. A t-test between the pretest and posttest scores for each group revealed no significant difference in postural improvement for either group (t=.75, t = 1.20).

Review of Hypotheses

Hypotheses 1 and 2

1. There is no significant improvement in the standing posture of selected trainable retarded students with the use of a nonmusic activity program.
2. There is no significant improvement in the standing posture of selected trainable

retarded students with the use of music activities in a short-term program.

The t-test results stated above reveal that there is no significant difference in the pretest and posttest score for either group and thus, hypotheses 1 and 2 were accepted.

Hypothesis 3

3. There is no significant difference between the use of music and nonmusic activities in the improvement of standing posture in selected trainable retarded students in a short-term program.

The F value in Table 11 indicates that there was no significant difference in scores between the posttests and thus music activities were not more effective than nonmusic activities in postural training. Hypothesis 3, then, was accepted.

Discussion

The statistical results demonstrate that music activities were no more effective than nonmusic activities in improving standing posture and that the

Postural Training Program was not effective in significantly improving the standing posture of selected trainable retarded students.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to determine the effect of two training programs on the improvement of standing posture in retarded children. Twenty-two subjects were used in the study. The study was conducted over a five-week period during the spring term of 1974. There were 11 experimental subjects, and 11 control subjects. Subjects were assigned to either the nonmusic (control) posture training group or the music (experimental) posture training group. The data of four of the subjects were dropped from the study because of excessive absences. Thus, the data used in the study are from 9 experimental and 9 control subjects.

The subjects trained for four weeks, on three successive days each week. Group I used nonmusic activities and Group II used music activities in a Postural Training Program designed by the researcher.

All subjects were tested in their interpretation of "ideal" standing posture at a pre- and posttest.

Reliability of the testing method was evaluated by the Hoyt Reliability Analysis. A t-test was conducted on pretest data to determine any significance between groups. A t-test was also conducted to determine the effects of training on each group's posttest scores. An analysis of variance was used to determine if the difference in posttest scores between the two groups was due to the training effect or to chance. The complete analysis was directed towards determining whether:

1. There was a significant improvement in the standing posture of selected trainable retarded students with the use of a nonmusic activity program.
2. There was a significant improvement in the standing posture of trainable retarded students with the use of a music activity program.
3. There was a significant difference between the use of music and nonmusic activities in the

improvement of standing posture in selected trainable retarded students.

Conclusions

The conclusions drawn from this study apply only to the sample from which the data were obtained. Based on the results of this investigation, the following conclusions seem pertinent:

1. The two postural training programs employed in this study, nonmusic exercises/activities and music exercises/activities, did not significantly improve standing posture in selected trainable retarded students.
2. The use of music exercises/activities in postural training was not found to be more effective than the use of nonmusic exercises/activities in postural training.

Discussion

This study came about because of a need at Forest Grove School. It was agreed by both the staff at the school and this experimenter, that the students needed training in posture and body mechanics to improve their physical appearance. Since no postural

training had been offered at the school in the fourteen years of its existence, no postural training program had been developed for use with the students. The idea of developing a program designed to improve the overall posture of the children was discarded early in the planning of this project. Such a program would have involved much more time than was available to the researcher and would have been too great a task for intellectually limited students to absorb at one time. A four-week program was eventually designed with the objective being to introduce correct standing posture to the students.

The following problem areas were encountered in the study:

1. The training period was found to be too short for postural improvement.
2. The sample size was very small.
3. A more complete training program in postural rating was needed for the adjudicators (see Appendix D for the training program used in this study).

Training Period

The postural training program consisted of twelve, twenty-minute sessions which ran three

successive days a week for four weeks. By the end of the training period it was clear to the experimenter that the four-week period was not a long enough time to make substantial gains in postural improvement. Posture is a habit, and as Metheny (1952, 93) states: "for good or ill, it is a habit which is acquired through long hours of conscious or unconscious practice." Thus, it is not surprising that the twenty-minute sessions spent on posture exercises produced very little in the way of postural improvement. It is recommended that future postural training programs, with this type of subject, be designed to include daily sessions over an entire academic year. With such a long-term program significant gains could be expected.

Sample Size

The study was designed to include 22 of the 23 students in one of the three classes at Forest Grove School. One student was eliminated from the study because of severe physical limitations. Due to absences from the postural training sessions, the data of four subjects were later eliminated from the

study. This brought the total sample size down to eighteen subjects with nine in each group. It is recommended that future postural training programs include a larger sample size.

Training Program for the Adjudicators

The adjudicators were given clear instructions on how to rate standing posture and had the videotapings of three sample subjects on which to practice. However, due to the complexity of postural rating and the inexperience of the adjudicators in rating posture, some errors may have entered into the evaluations. In future studies it is recommended that an indepth postural rating program be designed for training the adjudicators.

Statistically, music activities were not found to be more effective than nonmusic activities in the improvement of the students' standing posture. However, there was a distinct difference in the "feeling state" of the two groups during the training sessions. The participants of the nonmusic group often complained about coming to the sessions and needed encouragement to participate in some of the activities.

In the music group, however, the subjects were usually eager to participate. Some subjects even mentioned that they enjoyed coming to the sessions. At one point in a session of the nonmusic group, two subjects began singing "Row, Row, Row Your Boat" as accompaniment to an exercise. When their singing was stopped by the researcher they expressed dismay at having to continue the exercise without the musical accompaniment. Although music activities were not found to be more effective than nonmusic activities in teaching standing posture in this study, they did seem to make exercising more enjoyable for the music group.

The general attitude of the adjudicators, after rating the posttests, was that the subjects' posture had greatly improved since the pretest. One adjudicator was very surprised at the results of the study stating that he had had very positive feelings about what had happened between the pre- and posttests. He felt that he had seen significant gains in standing posture at the posttest. This researcher suspects that the statistical outcome of the study was due to problems of technique in running the study. With changes made in techniques (see recommendations)

significant gains might be seen in the postural scores of the music group.

Suggestions for Further Research

From the findings of this study, it is recommended that:

1. The study be replicated with the following changes:
    a. Standing posture be examined over a nine-month period
    b. A larger sample be used in the study (possibly two classes from a school, or the entire school population)
    c. Indepth postural rating program be designed for training the adjudicators
    d. Still photographs used instead of videotapes. Photographs could be studied carefully by each adjudicator and precise measurements could be made
2. Further research be designed to examine such postures as sitting, walking and working.
3. The development of postural norms for the population of trainable mentally retarded students be undertaken.

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APPENDIX A

RAW DATA

DESCRIPTIVE DATA OF EACH SUBJECT

Subject	Group	Sex	Age	Level of Functioning	Pre	Post	Change
1	II	M	18	1	437	471	34
2	I	M	17	3	373	379	6
3	I	M	17	3	418	432	14
4	I	M	16	2	396	421	25
5	II	F	16	1	444	471	27
6	II	F	15	1	424	458	34
7	I	F	16	2	416	448	32
10	II	F	18	2	423	427	4
11	II	M	21	3	399	414	15
12	II	M	16	1	421	461	40
13	II	M	18	1	451	431	-20
14	I	M	19	3	404	426	22
15	I	M	17	2	457	461	4
18	I	M	15	1	474	453	-21
19	I	M	16	1	431	446	15
20	II	M	16	3	456	459	3
21	II	M	18	1	432	445	13
22	I	M	15	1	444	460	16

Group I = Control group (nonmusic)
Group II= Experimental group (music)
Level of Functioning: 1 = high 2 = medium 3 = low

SUBJECT SCORES ON PRE- AND POSTTEST BY RATER

Subject No.	Pretest	Posttest	Change Score	Rater No.
1	73	87	14	1
	88	89	1	2
	91	98	7	3
	94	95	1	4
	91	102	11	5
2	62	70	8	1
	76	72	-4	2
	80	75	-5	3
	77	76	-1	4
	78	86	8	5
3	73	79	6	1
	89	83	-6	2
	81	83	2	3
	89	92	3	4
	86	95	9	5
4	73	81	8	1
	77	80	3	2
	83	82	-1	3
	88	85	-3	4
	75	93	18	5
5	85	92	7	1
	94	97	3	2
	87	94	7	3
	89	90	1	4
	89	98	9	5
6	79	86	7	1
	84	87	3	2
	85	90	5	3
	87	93	6	4
	88	102	14	5

Subject No.	Pretest	Posttest	Change Score	Rater No.
7	76	87	11	1
	83	88	5	2
	80	85	5	3
	84	90	6	4
	93	98	5	5
10	74	82	8	1
	84	80	4	2
	85	83	-2	3
	88	86	-2	4
	92	96	4	5
11	76	77	1	1
	79	82	3	2
	79	75	-4	3
	82	85	3	4
	83	95	13	5
12	76	85	9	1
	85	96	9	2
	87	90	3	3
	88	90	2	4
	85	100	15	5
13	86	84	-2	1
	88	84	-4	2
	92	79	-13	3
	92	86	-6	4
	93	98	5	5
14	79	82	3	1
	75	81	6	2
	77	84	7	3
	85	86	1	4
	88	93	5	5
15	92	88	-4	1
	96	92	-4	2
	89	89	0	3
	93	91	-2	4
	87	101	14	5

Subject No.	Pretest	Posttest	Change Score	Rater No.
18	88	81	-7	1
	98	91	-7	2
	94	90	-4	3
	100	92	-8	4
	96	99	3	5
19	80	87	7	1
	90	82	-8	2
	87	91	4	3
	88	87	-1	4
	86	99	13	5
20	81	86	5	1
	91	86	-5	2
	92	95	3	3
	97	90	-7	4
	95	102	7	5
21	81	85	4	1
	82	78	-4	2
	84	92	8	3
	90	93	3	4
	94	97	3	5
22	85	86	1	1
	87	88	1	2
	90	93	3	3
	92	92	0	4
	90	101	11	5

APPENDIX B

POSTURAL EVALUATION

Definition and Forms

POSTURAL RATING

The Postural Rating is an instrument developed by the experimenter from research in the area of the "ideal" standing posture. It is used to evaluate the standing posture of the twenty-two subjects in the study. This examination was carried out both pre- and posttest by five adjudicators for each of the subjects. The examination is comprised of a postural rating form and score sheet. The forms were adopted and modified from ideas and forms of Drury (1970, 2-13), Phelps (1956, 56-138), Colson (1956, 3-20), Truslow (1943, 12-124), Lowman (1960, 136-165) and Baumgartner (1943, 1-31).

POSTURAL RATING

Posterior View

Upper Body

Head tilt: In good posture the head should be evenly balanced on the shoulders at a 90^{o} angle. Such posture should be given a rating of 4. Any deviation in this angle will result in a lowered rating. If the deviation is slight (1^{o} to 22^{o} of tilt) a rating of 3 should be given. A moderate tilt (23^{o} to 45^{o} of tilt) will result in a rating of 2. Severe tilting (46^{o} to 68^{o} of tilt) should be assigned a rating of 1.

	Rating
a. Head evenly balanced on the shoulders (0^{o} tilt)	4
b. Slight tilting to either side (1^{o} to 22^{o} of tilt)	3
c. Moderate tilting to either side (23^{o} to 45^{o} of tilt)	2
d. Severe tilting to either side (46^{o} to 68^{o} of tilt)	1

Shoulders:

1. Level: In good posture the right and left shoulders should be of comparable height. The differences in height should be noted. Shoulders at a comparable level should receive a rating of 4. A slight difference should be assigned a 3 rating, a moderate difference should receive a 2 rating and a severe difference should be given a 1 rating.

a. Shoulders of comparative height	4
b. Slight difference in shoulder height	3
c. Moderate difference in shoulder height	2
d. Severe difference in shoulder height	1

2. Depression: In good posture the shoulders should be relaxed and at an average elevation. A depression or lowering of the shoulders gives the impression of an extremely long neck. A subjective evaluation of the degree of deviation should be formulated and recorded.

		Rating
a.	Shoulders do not appear low	4
b.	Shoulders appear slightly low	3
c.	Shoulders appear moderately low	2
d.	Shoulders appear severely low	1

3. Elevation: An elevation or raising of the shoulders gives the appearance of an extremely short neck or a "shrugged shoulder" effect. A subjective evaluation of the degree of deviation should be formulated and recorded.

a.	Shoulders do not appear high	4
b.	Shoulders appear slightly high	3
c.	Shoulders appear moderately high	2
d.	Shoulders appear severely high	1

Middle Body

Hips

1. Prominence: The contour of the hips should be even. Sometimes it is easy to judge contour by the amount of light seen between the arms and the sides of the body. Any deviations in the contour or size of the hips should be noted and recorded.

a.	Contour of the hips is even	4
b.	Contour of the hips is slightly uneven	3
c.	Contour of the hips is moderately uneven	2
d.	Contour of the hips is severely uneven	1

2. Elevation: Inevaluating hip elevation it is necessary to note the balance of the hips. Determine whether or not the hips are at the

same level and then evaluate the deviation. Hips at a comparable level should receive a rating of 4. A slight difference should be assigned a 3 rating, a moderate difference a 2 rating and a severe difference should be given a 1 rating.

		Rating
a.	Elevation of the hips is even	4
b.	Elevation of the hips is slightly uneven	3
c.	Elevation of the hips is moderately uneven	2
d.	Elevation of the hips is severely uneven	1

Lower Body

Ankles

1. Pronation: Pronation is a rolling inward of the ankle, causing lowering of the longitudinal arch. A subjective evaluation of the degree of pronation should be formulated and recorded.

a.	No visible pronation	4
b.	Slight pronation	3
c.	Moderate pronation	2
d.	Severe pronation	1

2. Toeing in: When standing with good posture the feet should be pointing directly ahead. Any deviation of the angle of the toes should be noted. When the feet are pointing directly ahead (90^{o} angle) a rating of 4 should be given. If the deviation is slight (1^{o} to 12^{o}) a rating of 3 should be given. If the deviation is moderate (12^{o} to 23^{o}) a rating of 2 should be given and severe toeing in (23^{o} to 45^{o}) should be assigned a rating of 1.

a.	No toeing in	4
b.	Slight toeing in	3
c.	Moderate toeing in	2
d.	Severe toeing in	1

3. Toeing out: When the feet are pointing directly ahead a rating of 4 should be given. If the deviation is slight (1^{o} to 12^{o}) a rating of 3 should be given. A moderate toeing out (12^{o} to 23^{o}) should result in a rating of 2 and severe toeing out (23^{o} to 45^{o}) should be assigned a rating of 1.

		Rating
a.	No toeing out	4
b.	Slight toeing out	3
c.	Moderate toeing out	2
d.	Severe toeing out	1

BENT VIEW

Middle Body

Spine

1. Dorsal Scoliosis: Dorsal Scoliosis is a curvature of the spine to the side in the area of the rib cage. In the bent position any unevenness of the sides of the spine can be noted by a bulging of the muscles on that side. A subjective evaluation of the degree of deviation should be formulated and recorded.

a.	No visible dorsal scoliosis	4
b.	Slight dorsal scoliosis	3
c.	Moderate dorsal scoliosis	2
d.	Severe dorsal scoliosis	1

2. Lumbar Scoliosis: Lumbar Scoliosis is a curvature of the spine to the side in the area of the low back. Again in the bent position any unevenness of the sides of the spine can be noted by a bulging of the muscles on that side. A subjective evaluation of the degree of deviation should be formulated and recorded.

	Rating
a. No visible lumbar scoliosis	4
b. Slight lumbar scoliosis	3
c. Moderate lumbar scoliosis	2
d. Severe lumbar scoliosis	1

LEG VIEW

Lower Body

Legs

1. Genu valgum (Knock-knees): The condition is present when the standing subject is able to bring his knees together, but is unable to make the inner ankle bones come together. A subjective evaluation of the degree of deviation should be formulated and recorded.

a. No visible problem	4
b. Slight problem	3
c. Moderate problem	2
d. Severe problem	1

2. Genu varum (Bowlegs): The condition is present when the standing subject is able to bring his ankles together, but unable to make the knees come together. A subjective evaluation of the degree of deviation should be formulated and recorded.

a. No visible problem	4
b. Slight problem	3
c. Moderate problem	2
d. Severe problem	1

ANTERIOR-POSTERIOR VIEW

Upper Body

To judge posture from the anterior-posterior view (side view) consider an imaginary gravity line

from the ear, through the middle of the hips, in back of the kneecap and in front of the ankle bone. Deviations forward and back are judged in relationship to this gravity line.

Head: To judge the position of the head imagine a line from the ear to the middle of the shoulder. If the line is slanted to the left the head is too far forward, if slanted to the right the head is too far back. A subjective evaluation of the degree of deviation should be formulated and recorded.

	Rating
1. Forward	
a. No visible problem	4
b. Slight problem	3
c. Moderate problem	2
d. Severe problem	1
2. Back	
a. No visible problem	4
b. Slight problem	3
c. Moderate problem	2
d. Severe problem	1

Another indication of incorrect positioning of the head is the degree of tilt of the chin. When the head is in good position the chin will be relaxed and at a 90^{o} angle to the neck. Incorrect positioning will result in the chin tilting up or down. The chin tilt should be subjectively evaluated and the degree of deviation from the ideal should be formulated and recorded.

3. Chin/tilt up	
a. No visible tilt	4
b. Slight tilt	3
c. Moderate tilt	2
d. Severe tilt	1

Rating

4. Chin/tilt down

a.	No visible tilt	4
b.	Slight tilt	3
c.	Moderate tilt	2
d.	Severe tilt	1

Chest: In good posture the breast bone (sternum) should be held high. A low chest has a sunken-in look with a rounding of the shoulders. A chest that is too high has an inflated look with the shoulders too high and/or too far back. A subjective evaluation of the degree of deviation from good posture should be formulated and recorded.

1. Low

a.	Chest does not appear low	4
b.	Chest appears slightly low	3
c.	Chest appears moderately low	2
d.	Chest appears severely low	1

2. High

a.	Chest does not appear high	4
b.	Chest appears slightly high	3
c.	Chest appears moderately high	2
d.	Chest appears severely high	1

Arms: In good posture the arms should be relaxed and hang freely at the subject's sides. The area from the shoulder to the elbow should be in line with the imaginary gravity line from the ear, through the middle of the hip, in back of the kneecap, and in front of the ankle bone. A subjective evaluation of the degree of deviation from good posture should be formulated and recorded.

	Rating
3. Arms/forward	
a. Arms do not appear forward	4
b. Arms appear slightly forward	3
c. Arms appear moderately forward	2
d. Arms appear severely forward	1
4. Arms/back	
a. Arms do not appear back	4
b. Arms appear slightly back	3
c. Arms appear moderately back	2
d. Arms appear severely back	1

Middle Body

Abdomen: In good posture the abdomen should not be absolutely flat, however, a rounding of the abdomen with protrusion of the abdominal muscles should be noted. A subjective evaluation of the degree of deviation from good posture should be formulated and recorded.

a. Abdomen does not appear relaxed	4
b. Abdomen appears slightly relaxed	3
c. Abdomen appears moderately relaxed	2
d. Abdomen appears severely relaxed	1

Pelvic tilt: In good posture the anterior superior spine of the iluim (the bones in front of the hip) are more or less horizontal. If these bones are pointing downward a subjective evaluation of the downward tilt should be formulated and recorded.

a. Pelvis does not appear tilted	4
b. Pelvis appears slightly tilted	3
c. Pelvis appears moderately tilted	2
d. Pelvis appears severely tilted	1

Rating

Lower Body

Knees/hyperextension: Hyperextension of the knees occurs when the knees are pushed backward so that the calf of the leg is bowed backward instead of being more or less horizontal. A subjective evaluation of the degree of deviation from good posture should be formulated and recorded.

a.	No visible hyperextension	4
b.	Slight hyperextension	3
c.	Moderate hyperextension	2
d.	Severe hyperextension	1

Feet/balance: To judge the balance of a subject, refer to the imaginary gravity line and note whether the body is forward or back from this line. If the body is forward, too much weight is placed on the forepart of the foot; if it is backward, the weight is on the heels. The weight should be placed in the middle of the foot, just in front of the ankle bone.

1. Balance/forward

a.	No visible problem	4
b.	Slight problem	3
c.	Moderate problem	2
d.	Severe problem	1

2. Balance/back

a.	No visible problem	4
b.	Slight problem	3
c.	Moderate problem	2
d.	Severe problem	1

SCORE SHEET

NAME_____ SUBJECT #_____

AGE_____ SEX_____ LEVEL OF FUNCTIONING_____

OBSERVATION #_____

RATING SCALE:
4 = No Deviation, 3 = Slight Deviation, 2 = Moderate Deviation, 1 = Severe Deviation

POSTERIOR VIEW

Upper Body	Rating			
Head Tilt	4	3	2	1
Shoulders				
1. Level	4	3	2	1
2. Depression	4	3	2	1
3. Elevation	4	3	2	1
Middle Body				
Hips				
1. Prominence	4	3	2	1
2. Elevation	4	3	2	1
Lower Body				
Ankles				
1. Pronation	4	3	2	1
2. Toeing in	4	3	2	1
3. Toeing out	4	3	2	1

BENT VIEW

Middle Body				
Spine				
1. Dorsal Scoliosis	4	3	2	1
2. Lumbar Scoliosis	4	3	2	1

LEG VIEW

Lower Body

Legs	Rating			
1. Knock-knees	4	3	2	1
2. Bowlegs	4	3	2	1

ANTERIOR-POSTERIOR VIEW

Upper Body	Rating			
Head				
1. Forward	4	3	2	1
2. Back	4	3	2	1
3. Chin/tilt up	4	3	2	1
4. Chin/tilt down	4	3	2	1
Chest				
1. Low	4	3	2	1
2. High	4	3	2	1
3. Arms/forward	4	3	2	1
4. Arms/back	4	3	2	1
Middle Body				
Abdomen/relaxed	4	3	2	1
Pelvic Tilt	4	3	2	1
Lower Body				
Knees/hyperextension	4	3	2	1
Feet				
1. Balance/forward	4	3	2	1
2. Balance/back	4	3	2	1

POSTERIOR VIEW	BENT VIEW	ANTERIOR-POSTERIOR
Upper Body _____	Middle Body _____	Upper Body _____
Middle Body_____	Total _____	Middle Body _____
Lower Body _____		Lower Body _____
	LEG VIEW	Total _____
Total _____	Lower Body _____	
	Total _____	GRAND TOTAL _____

APPENDIX C

POSTURAL TRAINING PROGRAM

Definition, Order of Activities, Activities

POSTURAL TRAINING PROGRAM

The Postural Training Program is a series of exercises/activities developed by the experimenter to help retarded children improve their posture. The program was developed through research in the areas of "ideal" standing posture, postural defects and corrective exercises. The program was set up to include both exercises/activities for remediating problem areas and exercises/activities for developing an awareness of good posture and overall correct body positioning. The program was identical for both the control and the experimental group, with the exception of the music used with the experimental group. Great care was taken to insure that the activities were identically presented to the two groups.

The following pages contain the descriptions of the activities used in the Postural Training Program and the order in which they were presented.

POSTURAL TRAINING SESSIONS

SESSION 1 Tuesday, April 23

1. Posture Talk
2. Walking Exercise
3. If You're Happy
4. Row, Row, Row Your Boat #1
5. Row, Row, Row Your Boat #2

SESSION 2 Wednesday, April 24

1. Toe Exercises
2. Picking Up Pencils
3. Posture Check
4. If You're Happy

SESSION 3 Thursday, April 25

1. Posture Check
2. Kangaroo Hop
3. Snake Walk
4. Heel Bounce
5. Circles in the Air

SESSION 4 Tuesday, April 30

1. Row, Row, Row Your Boat #2
2. I Used To
3. Posture Hokey Pokey
4. Circles in the Air
5. Kangaroo Hop

SESSION 5 Wednesday, May 1

1. Toe Exercises
2. Picking Up Pencils
3. Posture Check
4. Snake Walk
5. Elephant Walk

SESSION 6 Thursday, May 2

1. Heel Bounce
2. Walking Exercise
3. If You're Happy
4. Posture Check

SESSION 7 Tuesday, May 7

1. Row, Row, Row Your Boat #1
2. Picking Up Pencils
3. Posture Check with Photographs (same as posture check but photographs are taken of each subject in his best standing posture)
4. Elephant Walk

SESSION 8 Wednesday, May 8

1. I Used To
2. Kangaroo Hop
3. Heel Bounces
4. Posture Hokey Pokey
5. Walking Exercise

SESSION 9 Thursday, May 9

1. Toe Exercises
2. Snake Walk
3. If You're Happy
4. Posture Check
5. Circles in the Air

SESSION 10 Tuesday, May 14

1. Subjects given posture photographs
2. Posture Check
3. If You're Happy
4. Elephant Walk

SESSION 11 Wednesday, May 15

1. Posture Check
2. Posture Hokey Pokey
3. Row, Row, Row Your Boat #2
4. Picking Up Pencils
5. Circles in the Air

SESSION 12 Thursday, May 16

1. Posture Check
2. Snake Walk
3. Walking Exercise
4. I Used To

POSTURE TALK

PURPOSE: To introduce the subjects to the concept of posture

DIRECTIONS: WITHOUT MUSIC

1. Subjects sit on the floor in a circle.

2. Experimenter stands in the middle of the circle and gives a short talk on posture.

3. While giving the talk the experimenter demonstrates correct posture.

4. The text to the posture talk is as follows:

   Posture is a word that tells about how our bodies look to ourselves and others. For the next four weeks we will be learning about good posture. Good posture helps our bodies look good and helps us to feel good. Right now I am standing in good posture: my feet are pointing straight ahead and are a few inches apart; my legs are straight; my stomach is in; my chest is high (but not too high); my shoulders are back and my head is straight, not tilted. You will soon learn how to stand in good posture, too.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. As the subjects come into the room the song "Chicken Fat" is playing at a very low volume.

2. Subjects sit on the floor in a circle.

3. Experimenter stands in the middle of the circle and gives a short talk on posture.

4. While giving the talk the experimenter demonstrates correct posture.

5. The text of the posture talk is the same as above.

EQUIPMENT: Phonograph

Song: "Chicken Fat" from Alley Cat and Chicken Fat. Wonderland Golden Records. LP-281.

WALKING EXERCISE

PURPOSE: To develop the consciousness of the correct position of the foot.

ADAPTED FROM: Geiger, Jacob D and Christaldi, Josephine. Postural Improvement Activities for all Ages, Album 25. Educational Activities, Inc., Freeport, New York, 1964.

DIRECTIONS: WITHOUT MUSIC

1. Subjects are barefoot, standing in a circle.
2. Feet are parallel, a few inches apart.
3. At a signal subjects rise on their toes as high as possible.
4. At the next signal the subjects begin walking counter-clockwise around the circle on their toes.
5. After three times around the circle the subjects are instructed to stop, curl their toes and roll their weight to the outer borders of their feet.
6. At a signal the subjects begin walking around the circle on the outer borders of their feet, with their toes curled under.
7. After three times around the circle a signal is given for the subjects to stop, place one heel forward in readiness to walk forward on their heels.
8. At the signal the subjects begin walking around the circle on their heels.

9. After three times around the circle a signal is given for the subjects to stop, stand with their feet parallel, a few inches apart.

10. At the signal the subjects are instructed to walk normally around the circles concentrating on holding their bodies erect.

11. After three times around the circle a signal is given for all the subjects to stop.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Subjects are barefoot, standing in a circle.

2. Feet are parallel, a few inches apart.

3. At a signal subjects rise on their toes as high as possible.

4. At the next signal the subjects begin walking counterclockwise around the circle on their toes.

5. After three times around the circle the subjects are instructed to stop, curl their toes and roll their weight to the outer borders of their feet.

6. At a signal the subjects begin walking around the circle on the outer borders of their feet, with their toes curled under.

7. After three times around the circle a signal is given for the subjects to stop, place one heel forward in readiness to walk forward on their heels.

8. At the signal the subjects begin walking around the circle on their heels.

9. After three times around the circle a signal is given for the subjects to stop, stand with their feet parallel, a few inches apart.

10. At the signal the subjects are instructed to walk normally around the circle concentrating on holding their bodies erect.

11. After three times around the circle a signal is given for all the subjects to stop.

12. The exercise is done to the music of "Chicken Fat."

EQUIPMENT: Phonograph

Song: "Chicken Fat" from Alley Cat and Chicken Fat. Wonderland Golden Records. LP 281.

IF YOU'RE HAPPY

PURPOSE: To strengthen abdominal muscles

ADAPTED FROM: Drury, Blanche J. Posture and Figure Control Through Physical Education. National Press, Palo Alto, California, 1970. p. 56.

DIRECTIONS: WITHOUT MUSIC

1. Subjects are barefoot, lying on their backs, knees pointed toward the ceiling, legs extended, arms extended at a 45° angle with the body.

2. In response to the words, "If you're happy and you know it, raise your legs," the subjects raise their legs until they are extended at a 90° angle to the body.

3. In response to the words, "If you're happy and you know it, spread your legs," the subjects extend their legs sideward as far as possible.

4. In response to the words, "If you're happy and you know it, then your face will surely show it," subjects continue to hold the spread leg position.

5. In response to words, "If you're happy and you know it, lower your legs," subjects bring legs together and slowly lower them to the floor.

6. This exercise is repeated three times.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Subjects are barefoot, lying on their backs, knees pointed toward the ceiling, legs extended, arms extended at a 45° angle with the body.

2. In response to the words, "If you're happy and you know it, raise your legs," the subjects raise their legs until they are extended at a 90° angle to the body.

3. In response to the words, "If you're happy and you know it, spread your legs," the subjects extend their legs sideward as far as possible.

4. In response to the words, "If you're happy and you know it, then your face will surely show it," subjects continue to hold the spread leg position.

5. In response to the words, "If you're happy and you know it, lower your legs," subjects bring legs together and slowly lower them to the floor.

6. This exercise is repeated three times and sung to the tune of "If You're Happy."

EQUIPMENT: Music: "If You're Happy," This Is Music, Grade 3. Allyn and Bacon, Chicago, Illinois, 1961. p. 156.

ROW, ROW, ROW YOUR BOAT #1

PURPOSE: To stretch posterior muscles

ADAPTED FROM: Drury, Blanche J. Posture and Figure Control Through Physical Education. National Press, Palo Alto, California, 1970. p. 46.

DIRECTIONS: WITHOUT MUSIC

1. Partners of approximately the same height and weight sit on floor facing each other.
2. Legs are straight and spread with feet touching the soles of their partner's feet.
3. Partners grasp hands, partner A leaning backward pulls partner B forward as far as possible.
4. Partners then reverse, partner B leans backwards pulling partner A forward as far as possible.
5. Exercise is repeated 24 times; each repetition is composed of each partner leaning back once and being pulled forward once.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Partners of approximately the same height and weight sit on floor facing each other.

2. Legs are straight and spread with feet touching the soles of their partner's feet.

3. Partners grasp hands, partner A leaning backward pulls partner B forward as far as possible.

4. Partners then reverse, partner B leans backwards pulling partner A forward as far as possible.

5. Exercise is repeated 24 times; each repetition is composed of each partner leaning back once and being pulled forward once.

6. Exercise is performed in time to the song "Row, Row, Row Your Boat"

EQUIPMENT: Song: "Row, Row, Row, Your Boat" Exploring Music 2. Holt, Rinehart and Winston, Inc., New York, 1971, p. 129.

ROW, ROW, ROW YOUR BOAT #2

PURPOSE: To stretch posterior muscles

ADAPTED FROM: Drury, Blanche J. Posture and Figure Control Through Physical Education. National Press, Palo Alto, California, 1970. p. 46.

DIRECTIONS: WITHOUT MUSIC

1. Partners of approximately the same height and weight sit on floor facing each other.

2. Legs are straight and spread with feet touching the soles of their partner's feet.

3. Partners grasp hands, keeping knees straight, bend to the side, to the back, to the other side, and forward. Partner moves in opposition so that both describe circles with their trunks.

4. Pattern is repeated 16 times.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Partners of approximately the same height and weight sit on floor facing each other.

2. Legs are straight and spread with feet touching the soles of their partner's feet.

3. Partners grasp hands, keeping knees straight, bend to the side, to the back, to the other side, and forward. Partner moves in opposition so that both describe circles with their trunks.

4. Pattern is repeated 16 times to the song, "Row, Row, Row Your Boat."

EQUIPMENT: Song: "Row, Row, Row, Your Boat," Exploring Music 2. Holt, Rinehart, and Winston, Inc., New York, 1971. p. 129.

TOE EXERCISES

PURPOSE: To strengthen toe flexors

DIRECTIONS: WITHOUT MUSIC

1. Sit on chair, legs crossed at the knees.
2. Curl toes of top leg, hold, then release.
3. Exercise is performed to the following count:

1	2	3	4
curl	hold	release	----

4. Entire sequence is repeated eight times.
5. Repeat with other leg

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Sit on chair, legs crossed at the knees.
2. Curl toes of top leg, hold, then release.
3. Exercise is performed to the tune of "Mary Had a Little Lamb" as follows:

1	2	3	4	1	2	3	4
Ma	- ry	had	a	lit	- tle	lamb	
curl	hold	release		curl	hold	release	----

```
  1     2    3     4    1     2
 Lit - tle   lamb ---- lit - tle
curl  hold  release    curl  hold

  3    4
lamb   ----
release

  1     2    3     4    1     2
 Ma  - ry   had    a   lit - tle
curl  hold  release    curl  hold

  3    4
lamb   it's
release

  1     2    3     4  1      2    3     4
fleece was white  as  snow  -------------
curl  hold release    curl  hold  release
```

4. Repeat with other leg.

EQUIPMENT: Song: "Mary Had a Little Lamb"

PICKING UP PENCILS

PURPOSE: To strengthen toe flexors

DIRECTIONS: WITHOUT MUSIC

1. Sit on chair.
2. Using toes of right foot, pick up pencil.
3. Lift pencil to opposite hand.
4. Repeat 7 times.
5. Repeat entire exercise with other foot.

EQUIPMENT: One pencil per student

DIRECTIONS: WITH MUSIC

1. Sit on chair.
2. Using toes of right foot, pick up pencil (*).
3. Lift pencil to opposite hand (-).
4. Exercise is done to the tune of "Ten Little Indians" as follows:

One little Two little
 * -

Three little Indians
 * -

Four little Five little
 * -

Six little Indians
 * -

Seven little Eight little
 * -

Nine little Indians
 * -

Ten little Indian Boys
 * *

5. Repeat entire exercise with other foot.

EQUIPMENT: One pencil per student

Song: "Ten Little Indians"

POSTURE CHECK

PURPOSE: To help subjects become more aware of good standing posture

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DIRECTIONS: WITHOUT MUSIC

1. Subjects' are divided into two groups.
2. Group I is instructed to walk around the room.
3. At the signal the subjects' stop, assume correct standing posture and are checked by the researcher and the subjects in Group II.
4. The exercise is repeated so that each group has its posture checked 3 times.
5. For correct standing posture see the definition on page 11 of this study.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Subjects' are divided into two groups.
2. Group I is instructed to walk around the room in time to the music.
3. At the signal the subjects' stop, assume correct standing posture and are checked by the researcher and the subjects in Group II.
4. The exercise is repeated so that each group has its posture checked 3 times.

5. For correct standing posture see the definition on page 11 of this study.

6. This exercise is performed to the music "Skybird."

EQUIPMENT: Phonograph

Song: "Skybird," Jonathan Livingston Seagull. Columbia Records. LP KS32550.

KANGAROO HOP

PURPOSE: To stretch pectoral muscles which are tight in children with winged scapulae

ADAPTED FROM: Richardson, Frank H. and Hearn, Winifred J. The Pre-School Child and His Posture. G. P. Putnam's Sons, New York, 1970. p. 145.

DIRECTIONS: WITHOUT MUSIC

1. Subject holds up one leg behind his back by grasping the ankle with both hands.
2. Subject is instructed to pretend he is a kangaroo and to hop around the room.
3. The activity should last about 3 minutes.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Subject holds up one leg behind his back by grasping the ankle with both hands.
2. Subject is instructed to pretend he is a kangaroo and to hop around the room.
3. The activity should be performed in time to the music "Kangaroos."

EQUIPMENT: Phonograph

Song: "Kangaroos," Saint-Saens Carnival of Animals. RCA LP LSC-2596.

SNAKE WALK

PURPOSE: To strengthen abdominal muscles

ADAPTED FROM: Richardson, Frank H. The Pre-School Child and His Posture. G. P. Putnam's Sons, New York, 1930. p. 128.

DIRECTIONS: WITHOUT MUSIC

1. Subject lies face down on the floor with hands clasped behind his back and his head up.
2. Through wriggling and hissing the subject tries to imitate a snake progressing across the room.
3. Activity should continue for about 3 minutes.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Subject lies face down on the floor with hands clasped behind his back and his head up.
2. Through wriggling and hissing the subject tries to imitate a snake progressing across the room.
3. Activity is performed to the song "Sammy the Snake."

EQUIPMENT: Phonograph

Song: "Sammy the Snake," Muppet Alphabet Album Starring Jim Henson's Muppets from Sesame St. LP CC25503 XSM 155263.

HEEL BOUNCE

PURPOSE: To stretch achilles tendon

ADAPTED FROM: Drury, Blanche J. Posture and Figure Control Through Physical Education. National Press, Palo Alto, California, 1970. p. 44.

DIRECTIONS: WITHOUT MUSIC

1. Stand, hands on hips, trunk erect, feet parallel about 4 inches apart.
2. Keeping knees straight, lift heels from floor and replace.
3. Be sure that the heels touch the floor each time and that the movement is done rather quickly.
4. Exercise is done to the following pattern: 1 2 3 pause.
5. Repeat pattern 16 times, then rest for 60 beats, repeat entire sequence three times.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Stand, hands on hips, trunk erect, feet parallel about 4 inches apart.
2. Keeping knees straight, lift heels from floor and replace.
3. Be sure that the heels touch the floor each time and that the movement is done rather quickly.

4. Exercise is done to the following pattern: 1 2 3 pause.

5. Repeat pattern 16 times in time to the music "Theme from Shaft," then rest for 60 beats, repeat entire sequence three times.

EQUIPMENT: Phonograph

Song: "Theme from 'Shaft'," Motion Picture Themes. United Artists Records, Inc. UXS-89.

CIRCLES IN THE AIR

PURPOSE: To strengthen shoulder and scapulae muscles

ADAPTED FROM: Drury, Blanche J. Posture and Figure Control Through Physical Education. National Press, Palo Alto, California, 1970. p. 63.

DIRECTIONS: WITHOUT MUSIC

1. Subject sits cross-legged on the floor, head in good position, arms horizontal at sides.

2. Describe small circles with arms moving forward, upward, backward and downward.

3. Describe large circles with arms moving forward, upward, backward and downward.

4. Vary between fast small circles and slow large circles.

5. Describe circles while reciting the verse "Circles in the Air" as follows:

   "Circles in the Air"

   Let's make circles in the air in the air.
   Let's make circles in the air in the air.
   Let's make circles in the air, let's make them everywhere.
   Let's make circles in the air, in the air.

6. Repeat the verse three times.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Subject sits cross-legged on floor, head in good position, arms horizontal at sides.

2. Describe small circles with arms moving forward, upward, backward and downward.

3. Describe large circles with arms moving forward, upward, backward and downward.

4. Vary between fast small circles and slow large circles.

5. Describe circles while reciting the above verse to the tune of "She'll Be Comin' 'Round the Mountain"

6. Repeat the song three times.

EQUIPMENT: Song: "She'll Be Comin' 'Round the Mountain," This Is Music, Grade 4. Allyn and Bacon, Chicago, Illinois, 1961. p. 154.

I USED TO

PURPOSE: To help subjects become more aware of good posture and to learn to assume good standing posture quickly

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DIRECTIONS — WITHOUT MUSIC

1. One of the subjects is selected to be "it."
2. He decides by himself, or with coaching from the group or the therapist, which body part he wants to use to demonstrate good posture.
3. At a signal the group recites the poem, "I Used To." At the blank the subject inserts his choice of body parts and stands in his worst possible posture.
4. At the last line the subject assumes his best posture demonstrating the correct positioning of the body part he has chosen.
5. The poem is repeated until all subjects have had a chance to be "it."
6. The poem is as follows:

"I Used To"

"I used to stand with

my _____ like this

my _____ like this

my _____ like this

I used to stand with

my _____ like this

But look how I'm standing now."

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. One of the subjects is selected to be "it."

2. He decides by himself, or with coaching from the group or the therapist, which body part he wants to use to demonstrate good posture.

3. At a signal the group sings the poem, "I Used To" to the tune of "The Wheels of the Bus." At the blank the subject inserts his choice of body parts and stands in his worst possible posture.

4. At the last line the subject assumes his best posture demonstrating the correct positioning of the body part he has chosen.

5. The song is repeated until all subjects have had a chance to be "it."

EQUIPMENT: Song: "The Wheels of the Bus," Exploring Music, Kindergarten. Holt, Rinehart and Winston, Inc., New York, 1971. p. 15.

POSTURE HOKEY POKEY

PURPOSE: To develop an awareness of good posture and overall correct body positioning

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DIRECTIONS: WITHOUT MUSIC

1. Subjects stand barefoot in a circle directing their attention toward the center.

2. Subjects follow directions explicit in the text. For example:

   You set your feet right (Subjects position their feet in the "correct" postural stance; feet parallel, about 6 inches apart, toes pointing straight ahead)

   You set your feet right (Subjects remain in correct position)

3. This activity is progressive. At the beginning of verse two subject assumes correct position for verse 1. At beginning of verse 3 subject assumes correct positions for verses 1 and 2. Etc.

4. The text for the activity is as follows:

verse 1

"You set your feet right"
(Subject assumes correct standing position)

"You set your feet right"
(Subject remains in correct standing position)

"You set your feet right and stand up tall"
(Subject remains in correct standing

position and reaches upward with the crown of his head)

"You do the hokey pokey and turn yourself around"
(Subject slowly turns around in place snapping his fingers)

"That's what it's all about"
(Subject stands in correct standing position)

verse 2 "You set your knees right"
(Subject assumes correct standing posture; feet parallel, 6 inches apart, toes pointing straight ahead; knees straight, released not locked)

"You set your knees right"
(Directions the same as in verse 1)

"You set your knees right and stand up tall"

"You do the hokey pokey and turn yourself around"

"That's what it's all about"

verse 3 "You set your hips straight"
(Subject assumes correct standing position; feet parallel, 6 inches apart, toes pointing straight ahead; knees straight, released not locked; contour and elevation of hips even)

"You set your hips straight"
(Directions the same as in verse 1)

"You set your hips straight and you stand up tall"

"You do the hokey pokey and you turn yourself around"

"That's what it's all about"

verse 4

"You hold your stomach in"
(Subject assumes correct standing position; feet parallel, 6 inches apart, toes pointing straight ahead; knees straight, released not locked; contour and elevation of hips even; stomach not protruding)

"You hold your stomach in"

"You hold your stomach in and stand up tall"

"You do the hokey pokey and turn yourself around"

"That's what it's all about"

verse 5

"You put your chest up"
(Subject assumes correct standing position; feet parallel, 6 inches apart, toes pointing straight ahead; knees straight, released not locked; contour and elevation of the hips even; stomach not protruding; chest held high, but not too high)

"You put your chest up"

"You put your chest up and stand up tall"

"You do the hokey pokey and turn yourself around"

"That's what it's all about"

verse 6

"You keep your shoulders even"
(Subject assumes correct standing position; feet parallel, 6 inches apart, toes pointing straight ahead; knees straight, released not locked; contour and elevation of the hips even; stomach

not protruding; chest held high; shoulders relaxed and of a comparable height and elevation)

"You keep your shoulders even"

"You keep your shoulders even and stand up tall"

"You do the hokey pokey and turn yourself around"

"That's what it's all about"

verse 7 "You keep your head on straight" (Subject assumes correct standing position; feet parallel, 6 inches apart, toes pointing straight ahead; knees straight, released not locked; contour and elevation of the hips even; stomach not protruding; chest held high; shoulders relaxed and of a comparable height and elevation; head evenly balanced on the shoulders at a 90 degree angle. No tilting observed either to the side or to the front or back)

"You keep your head on straight"

"You keep your head on straight and stand up tall"

"You do the hokey pokey and turn yourself around"

"That's what it's all about"

EQUIPMENT: None

DIRECTIONS: <u>WITH MUSIC</u>

1. Subjects stand barefoot in a circle directing their attention toward the center.

2. Subjects follow directions explicit in the text (see above directions)

3. This activity is progressive. At the beginning of verse two subjects assume correct position for verse 1. At beginning of verse 3 subjects assume correct position for verses 1 and 2. Etc.

4. The text for the activity is the same as above.

5. The activity is done to the tune of "The Hokey Pokey"

EQUIPMENT: Song: "The Hokey Pokey," Alley Cat and Chicken Fat. Wonderland Records. LP 281.

ELEPHANT WALK

PURPOSE: To stretch achilles tendon and other posterior muscles

ADAPTED FROM: Richardson, Frank H. The Pre-School Child and His Posture. G. P. Putnam's Sons, New York, 1930. p. 117.

DIRECTIONS: WITHOUT MUSIC

1. Stand, trunk erect.
2. At signal bend over placing hands on floor.
3. Move in a "swaying" gait, first one side then the other.
4. Be careful to keep heels down.
5. Move around the room for about 2 1/2 to 3 minutes.

EQUIPMENT: None

DIRECTIONS: WITH MUSIC

1. Stand, trunk erect.
2. At signal bend over placing hands on floor.
3. Move in a "swaying" gait, first one side then the other.
4. Be careful to keep heels down.
5. Move around the room in time to "Elephants."

EQUIPMENT: Phonograph

Song: "Elephants" Saint-Saens Carnival of Animals. RCA LP LSC-2596.

APPENDIX D

ADJUDICATOR TRAINING PROGRAM

ADJUDICATOR TRAINING PROGRAM

As the adjudicators met to rate the postural video-tapes of each subject they were given a copy of the Postural Rating and twenty-five score sheets. Each adjudicator was asked to read through the rating form and to formulate a definition of how he would rate good standing posture. After each adjudicator had read the Postural Rating all questions were answered and the video-tapes of three practice subjects were shown. These video-tapes were stopped anytime any one of the adjudicators had a question. When the questions had been adequately answered the video-tape was begun again. After the video-tapes of the three practice subjects were shown and rated, and all questions were answered, the video-tape of Subject 1 was begun. After that time there was no discussion between the adjudicators or the researcher about the video-taped subjects or the postural ratings.