DAVIS, Ruth Meredith, 1923-
THE RELATIONS BETWEEN BODY IMAGE BOUNDARY AND PHYSICAL FITNESS IN CHILDREN FROM A TRAINABLE PROGRAM FOR MENTAL RETARDATES.

The Ohio State University, Ph.D., 1970
Education, physical

University Microfilms, A XEROX Company, Ann Arbor, Michigan
THE RELATIONS BETWEEN BODY IMAGE BOUNDARY AND PHYSICAL FITNESS IN CHILDREN FROM A TRAINABLE PROGRAM FOR MENTAL RETARDATES

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

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1970

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ACKNOWLEDGMENTS

It is with sincere gratitude that acknowledgment is given to Professor Charles Mand, adviser, for his support and helpful suggestions. In addition, the writer acknowledges the assistance of Professor Lewis Hess and Associate Professor Joseph Hewlett of the School of Health, Physical Education and Recreation, and Professor Charles Huelsman of the Faculty of Exceptional Children who served as the examining committee for this study.

This study profited greatly from the help of Dr. Seymour Fisher, Professor of Psychology of the State University of New York Upstate Medical Center in Syracuse.

It is not possible to express adequately how grateful the writer is to Dr. Wilhelmina D. McFee of the School of Health, Physical Education and Recreation who provided wisdom, encouragement and patience.

The writer extends a special thanks to Mr. Dominic DiGiovanni, Principal of the Kennedy Center for Trainable Children, Kalamazoo, Michigan, for making this study possible, and to the teachers and students for their willingness and cooperation during the testing periods.
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PUBLICATIONS

FIELDS OF STUDY

Major Field: Physical Education

Minor Field: Recreation
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CHAPTER I

RATIONALE

For centuries mental retardates were looked upon as freaks of nature. In some cultures they were disposed of while other societies relegated retardates to custodial care in institutions. Still today, our mental institutions are filled with thousands of retardates. However, there is a growing trend for society to exhibit a concern for the welfare and development of the mentally retarded. The focus of this concern centers about the importance of providing an educative environment. The terminology used to categorize mentally retarded children illustrates this focus (i.e., educable retarded and trainable retarded).

Attempts are now being made to train and educate retarded children in order that they may be better adjusted and make better progress toward social interaction in family and community environments. Toward this goal various habilitation programs have been developed and utilized.

A basic approach in improving the social adjustment of retardates rests on the premise that a better adjustment will occur with an improved self-image. One of the aspects of self-image is the attitude the individual has of his body. This attitude has variously been called the body concept or body image. In the course of the
socialization process the individual experiences his body in different situations and is influenced by the varied responses of others to himself.

Depending on the theoretical perspective, the image that is formed from one's experiences may include: visual, tactual and kinesthetic sensory associations, awareness of postural configurations, the dynamic spatiality of the body, and the mediation of tangible physical aspects with the abstract concept of self. Whatever the perspective, the assumption is made that the body image has to do with the personality traits and ego structure of the person's self. (1)

Various developmental theorists support the idea that the development of the individual progresses from indistinct self–world differentiation to definite demarcation of self and others. According to Piaget the initially hazy perceptions of self–environment gradually become distinct and the child is gradually freed from an egocentric mode of thought. (2) Wapner and Werner theorize that the body concept differs and undergoes change in development. They claim the change may depend at times on maturation, at times on learning, and is in part an interaction of both maturation and learning. (3) Redl and Wattenberg indicate that "by adulthood the individual has not only established the fact that he is a distinct person, but also he has established the boundaries of his influence upon the world around him and which parts of the world are psychologically speaking a part of him." (4, p. 102-103)

An aspect of body concept that seems particularly relevant, in considering the development of self–world differentiation, is the
body boundary construct of Fisher and Cleveland. They have found that certain inkblot responses are concerned with boundary type percepts. They have categorized these responses into a body boundary index called the barrier score. Reports of their research indicate that individuals who have high barrier scores are apt to be "more active, independent, autonomous, communicative, and more likely to channel excitation to the exterior layers of the body." (5, p. 52) Fisher and Cleveland stated their impression that . . . "unless the individual develops body image boundaries of a certain minimum degree of definiteness, his relationships with people are somewhat restricted . . ." (5, p. 363)

Since retarded children are unable to meet expectations normally achieved by children of the same chronological age, the retardates repeatedly experience failure. (6) In due time a syndrome develops whereby the retarded child ceases to try to learn and progress is limited to maturational change. (7) Fortunately, through efforts to change the status of the retardate, programs have been developed to improve the physical fitness level of the mentally retarded child. (8)

Though a satisfactory physical fitness level is important for all human beings, it has special relevance for the retarded. (9) First, since success and achievement can be shown, a physical fitness program should help to reverse the failure syndrome. (8) This could serve as a potential motivation for the child to learn. Second, the improvement of the physical fitness level may enhance the self-image of the child. This could contribute toward more self-confidence in
his social interaction. (6) Third, since the retardate's potential vocational success is largely dependent on jobs that utilize physical rather than mental skills, his ability to satisfactorily do a job may depend on his physical fitness. (10)

Schilder suggests that the control one has in moving apparently plays a special role in establishing body image and he takes the position that it is likely that sensory motor development parallels the development of body image. (11) Bowers states that a child's self-image and his social interaction with others depends to a large extent on how he sees himself, his body, and what he can do with it. Through increasing the individual's range of movement, his control over his body in performance, and his confidence and interest in attempting new activities, he perhaps will see himself and others in his environment in a different light. (12)

Very little appears in the literature pertaining to the body image percepts of retarded children; and there has been no attempt to study how these percepts relate to human gross movement behavior. Concerned with the lack of research investigating the relation of these variables in retardates, the writer has explored the relationships between the physical fitness status of retarded children and a predictive measure of social adjustment known as the body image boundary concept.

The importance of exploring the relations of body image boundary and physical fitness in retardates is logically apparent. The rationale for the study points out the relevance of the body image boundary as a predictor of social adjustment. Support for the importance
of physical fitness has been given. Evidence of the relations between body image boundary and physical fitness would yield support for the emphasis of physical fitness programs for mentally retarded children in terms of enhancing their successful socialization. To date there has been no attempt to study the relations of body image boundary and physical fitness in retardates.

Statement of the Problem

The purpose of this study was to explore whether or not relationships existed between the extent that retarded children perceive their own body boundaries as being differentiated from the environment, and their performance on physical fitness test items. The study took the position, that if the claim that physical fitness status contributes to the social adjustment of retardates was valid, then retardates of higher fitness levels would have higher body image boundary scores. As a sub-problem the study compared certain test items that were used in other studies to note whether the developmental patterns of the subjects appeared to be similar to the mental age or to the chronological age of retardates.

The study thus sought answers to the following questions:

1. What would be the relations between the body image boundary aspects and physical fitness status?

2. Would any sex differences occur in the relations of the variables to be studied?

3. Would any difference occur in the relation of variables in terms of mental age as compared to chronological age of subjects?

4. What developmental pattern for mentally retarded children would be suggested by the relation of the variables of this study?
Assumptions of the study

1. The degree of body boundary definiteness can be determined by an analysis of responses made by the Holtzman Inkblot Test.

2. The body image boundary scores are good predictors of social adjustment.

3. The AAHPER Kennedy Foundation Special Fitness test for the Mentally Retarded can discriminate the physical fitness status of mental retardates.

4. The research by Woods and McFee suggest the cross-sectional developmental trends for the relationships of body image boundary and gross motor skill in normal subjects.

5. The particular items used by Woods and McFee that are the same as certain items in the AAHPER test may be used to compare the developmental status of the retardates with normals of the same C.A.

Definition of Terms

1. **Barrier Score:** an index of the degree to which the body boundaries are perceived by oneself as being an effective barrier separating body from the environment. (5)

2. **Body:** a "total organized being or individual which has existence in space." (13, p.70)

3. **Body Image:** is "a picture or mental representation one has of his body at rest or in motion." (13, p. 70) It is derived from internal sensations, postural changes, contact with outside objects and people, emotional experiences, and fantasies. (13)

4. **Body Image Boundary:** a construct "based on the idea that in experiencing our world we develop an attitudinal framework of our body. In so doing, we ascribe a certain quality to the external aspects of the body that are located at the skin and musculature. This image one has of himself has a boundary surface that helps the person to differentiate himself from his environment." (14, pp. 1-2) "This process of learning to separate the self from the non-self is a fundamental one, and as such provides critical information regarding an individual's adjustment strategies." (15, p. 48)
5. Chronological Age: (CA) the actual number of years a person has lived.

6. Holtzman Inkblot Test: a series of 45 inkblot replications designed under the direction of Wayne Holtzman. The test requires the subjects to make a single response to each inkblot thus the number of responses is constant among subjects. For the purposes of obtaining an index of body boundary definiteness only the first 25 inkblots are utilized. There is no time limit essential--though differing time limits have been recommended for subjects of varying ages.

7. Mental Age: (MA) the age that is equivalent to the capabilities of an individual that is chronologically that number of years. Equals C.A. (chronological age) times I.Q. divided by 100.

8. Mentally Retarded: a person who is academically, vocationally and socially incapacitated by his mental limitations. (13)

9. Penetration Score: an index of the degree to which the body boundaries are perceived by oneself as being fragile, disintegrating, and/or penetrable.

10. Physical Fitness: the capacity of an individual to perform a given task. (17)

Design of Study

Specifically the proposed research was an exploration of the relations of body image boundary and physical fitness in mentally retarded children. To determine what relationships existed between barrier score and the level of performance on physical fitness items, tests were administered to assess the following:

1. Determination of body image boundaries as reflected by the barrier score and penetration score on the Holtzman Inkblot Test.
2. Determination of the performance level of each item of the AAHPER Kennedy Foundation Special Fitness Test for the Mentally Retarded.

In addition, the collection of data included chronological age and I.Q. from the school records.

Limitations of the study

1. The findings may be applied only to the population sampled.

2. The degree of relationship compared responses and is not to be interpreted as a cause-effect function.

3. Only longitudinal data yields developmental trends or stages. Since this study utilized cross-sectional data, the developmental aspects may be suggested, but must be confirmed by means of a longitudinal design.

4. The study utilized only non-institutionalized retardates. It is possible that data on institutionalized retardates would yield quite different results, since the nature of their experiences would add a complex dimension to the aspects being considered in this study.

5. Neither the socio-economic background or the etiology of the children were included as part of the design of this study, since the available records were incomplete and no differential diagnosis was noted for each child.
CHAPTER II

REVIEW OF LITERATURE

The rationale chapter dealt with the importance of studying the relations between the physical fitness status and the body image boundary aspects of mentally retarded children. The need for the study thus has been presented. The present chapter concerns a review of the literature that is deemed to be relevant to the variables of this study.

A concern for body image dates back to at least the sixteenth century, but the earliest theory of body image was that of Head. He theorized that a person had a "postural model" that served as a frame of reference for making judgments of life's experiences--especially experiences of bodily movements. (18)

Paul Schilder is a more recent body image theorist. He has emphasized the importance of social influence as a major determinant of one's body image. (11) The impact of social influence in terms of physical characteristics has long been generally assumed and is obvious to anyone who has been criticized or complimented for his or her appearance.

Much of Schilder's descriptions are couched in classical Freudian language, and it is to Freud that we must credit most of the theoretical rationale on body image. Freud's ideas are based on the
assumption that a person's personality develops from the process of internalizing and structuring the attitudes and characteristics of key people in a person's social environment. Further, Freud points to the significance of the body image as a directive system, and that the ego is first of all a body-ego. (19) While Freud's ideas have been highly criticized for their dependence on primitive biological conditions, his general theoretical position has stimulated more psychological research and controversy than all other theories combined, and it is considered to be a valid contribution to the study of human behavior. (20, p. 571)

The literature is rich with references on the body image that in general tends to agree with the previous theoretical positions. As such, body image is of value in supporting the idea that one's attitudes and feelings about the body are important. However, it is necessary to delineate the broad, general concept of body image in order to formulate testable ideas for experimental research. One such delineation of body image is the construct of body image boundary. This construct is the thread that gives meaning to the dimensions of this study.

The construct of body image boundary is based on the assumption that in the course of development the individual gradually learns to differentiate what is self from what is not self. The individual learns where he leaves off and where the outer world begins. In this process of differentiating, the person develops a realization of his boundary surface—a surface that literally separates himself from the other.
Fisher and Cleveland have developed a theory about the body image boundary. They have proposed that as part of a person's lifestyle the person may view his body boundary as being either definite and firm or hazy and weak. As a measure of this continuum they have devised a scoring system of inkblot responses called the barrier score. Responses that have boundary-like properties are barrier score responses. This method of scoring inkblots is based on the idea that a person who views his body framework as being differentiated from his environment and contained within firm barriers, will perceive inkblots as shapes which are containers or which have protective, containing characteristics. (5, p. 58) The research findings of Fisher and Cleveland show a basic difference between subjects who score high and subjects who score low in terms of barrier score. According to Fisher and Cleveland:

The most important results . . . have to do with the high level of activity and aspiration manifested by those with high Barrier scores as contrasted to those with low Barrier scores. The high Barrier scores are significantly higher in degree of participation in athletics and also higher in the number of TAT themes they produced involving hard work and pursuit of high goals. . . . Those who stress the . . . value of the body exterior are more likely . . . to take an active "muscular" attitude toward life. The high Barrier group seems more likely to seek muscular expression in athletic activity . . . [Apparently], emphasis on the body-image boundary is a reflection of a style of life based on an unusually strong definition of self-identity and on active self-expression aimed at setting up a stable, controlling relationship with the environment. (5, pp. 90-91)

A second measure of body image boundary deals with responses that indicate an individual's concern with fragile, disintegrating, penetrating qualities. These types of inkblot responses are a measure of the penetration of boundary referred to as the "penetration score."
Fisher and Cleveland indicate that the penetration score apparently does not have significant predictive value for normal subjects, and the scores have a skewed distribution. The use of this measure has been limited primarily to groups that are mentally or emotionally abnormal where a greater range of scores has occurred and where the results have had fruitful predictiveness. (5, p. 232)

There has been a considerable amount of research by Fisher, Cleveland and others that utilize the body image boundary construct. For the purpose of this study the relevant research are those that have studied the relationship of body image boundary measures to measures of physical status, those which are concerned with factors of socialization and those that have used mentally retarded subjects.

Though the body image is assumed to be based on bodily experiences, the evidence does not support a resemblance to real body characteristics. In other words the body image has been found to be associated with affective rather than physical behavioral characteristics. Nevertheless, Fisher and Cleveland state that,

one could argue along the lines that an individual who possesses unusually well developed body musculature, as compared to the individual with poor musculature, would have body experiences that would make it particularly easy for him to think of his body as having firm, strong boundaries. The very strength of his musculature would stimulate fantasies of boundary toughness and definiteness. (5, p. 110)

A study by Cheatum attempted to test this argument by comparing the somatotype score to the barrier score in a group of college students. Since there was no significant relationship, it was concluded that barrier score is not a function of actual body structure. (21) Fisher and Cleveland comment as follows, . . . "to the degree
that Sheldon's somatotypes do represent important dimensions of body structure, one may say that the Barrier Score is not determined by actual body characteristics." (5, p. 110) It should be pointed out, however, that the dimensions of body structure utilized by somatotyping do not necessarily represent the muscular or strength performance of the individual. The question remains whether or not a person's concepts and feelings about his body have any predictiveness of his performance on tests of motor fitness, or vice versa. A meaningful relation between body image boundary measures and physical fitness tests would clarify this question.

Appropos to the idea that subjects with more definite body boundaries tend to use a more muscular approach to life, Armstrong tested the relationship of barrier score to physical fitness in normal adolescent boys and girls. This study has special relevance, because it is the only study that has attempted to investigate directly the relations of body image boundary and physical fitness.

A significant relation was found for girls but no significant relation was found for boys. Armstrong explains the sex difference by stating, "young women are free to pursue muscle building types of activities or not according to their genuine interests than are young men." He further states, "perhaps quite different results would be obtained with adult male subjects or with pre-adolescents, both of these groups being somewhat less driven to prove their masculinity than adolescent boys." (15, p. 50)

While no doubt there are differences in the cultural expectations for appropriate sex role development of girls and boys, it could
be argued that in terms of physical fitness activities girls are no more free to choose by genuine interest than are boys. It may be more valid to say that cultural expectations more frequently discourage physical activity for girls while at the same time pressuring participation for boys.

Armstrong does not mention whether or not there was any sex difference in the levels of physical fitness, but one would expect that the boys would have scored higher than the girls in a normal group of adolescents. One could speculate that meaningful relations of barrier score and fitness occur only at lower or minimum fitness levels.

It is also possible that different patterns of relations may have resulted had the individual items of the fitness test battery been treated as separate variables rather than as a total standard score. There is evidence that girls and boys differ in their abilities to perform the specific test items utilized in the Armstrong study. (22)

There have been two studies on the relation of body image boundary and motor ability in normal subjects. While motor ability and physical fitness tests do not measure the same aspect of movement performance, there are certain interrelations that may be said to hold true. Also, it may be assumed that at least a minimal fitness level is important in performing motor ability test items. Further, certain of the test items used in these two studies are similar to some of the fitness items of this study and may be used as a basis of comparison.
The first of the two studies, by Woods, explored the relations of barrier score and motor ability in children aged 8, 10, and 12 years. Woods' findings indicated an increased capacity for both body boundary definiteness and movement performance as a function of age, and, suggested a mutual reciprocity function of body image boundary and motor skill. (23)

The second study, by McFee, on the relations of body image boundary and motor ability on adolescents, supported similar developmental trends suggested by the Woods' study. Of interest was a finding similar to that of Armstrong that motor skill was significantly related to barrier score for the female subjects only. However, in McFee's study this relation was in an inverse direction rather than positive as in the Armstrong study. (24) The meaning of the differing direction of relation is perplexing and will need further study for clarification.

Socialization is a by-word in education. One of the seven cardinal principles of education that is still in good repute is that an objective of education is . . . "the development of social competence which enables a person to participate cooperatively and constructively in group endeavors. (25) This goal of education is considered to be even more vital for the mentally retarded. Competent social adjustment is stated as a goal for educating mental retardates in all educational sources perused by this writer.

The relevance of the body image boundary construct to social adjustment is supported by the research by Fisher and Cleveland. The research and its implications are reported in Body Image and
Personality. They have interpreted the results of their studies to mean that . . . "emphasis on the body image boundary is a reflection of a style of life based on an unusually strong definition of self identity and an active self-expression aimed at setting up a stable, controlling relationship with the environment." (5, p. 91)

Fisher and Cleveland stress that the body image boundary reflects the unconscious attitudinal feelings of the individual that are an outgrowth of past social roles and experiences. For example, if an individual has a negative body attitude, perceiving it as ugly and depreciated, these negative body feelings may be assumed to indicate that the early experiences of the individual consisted of behavior that was interpreted by others as ugly and depreciated. From this sort of reasoning Fisher and Cleveland predict that the "body image should be a sensitive indicator which registers many of the individual's basic social relationships." (5, p. 111)

Further, studies of Fisher and Cleveland involving social interaction show high barrier subjects to be more concerned with success, high aspiration and achievement than low barrier subjects. (5) Sailor and Ponder speculated that, since high barrier subjects were oriented toward successful achievement, the degree of boundary definiteness would serve as an indicator of ability to make an adjustment to social conditions. They were concerned with "finding a useful measure of adjustment for subsequent use in habilitation programs for adolescent mental retardation." (6, p. 149) A study by Sailor and Ponder shows the index of body image boundary to be a good predictor of social adjustment of adolescent mentally retarded subjects. The
discussion concludes that, . . . "this appraisal of the body boundary concept argues for the interaction of bodily development, social development, and intellectual development." (6, p. 152) In correspondence this writer has had with Dr. Fisher he corroborates the ideas of Sailor and Ponder by saying that their data indicates that "the barrier score may very well prove to be a good predictor of various aspects of the adjustment of retarded children." (26)

For some authorities the factor of social competence is the ultimate determinant of the diagnosis of mentally retardation. While this emphasis on the level of social competency to the exclusion of other criteria is questionable, the importance of development of social competency in the mentally retarded is well established. (27, 28, 29)

Newland stresses the importance of using projective tests with all kinds of exceptional children in order to gain an understanding of their social adjustment. (30, p. 98) Johnson is more specific when he states that . . . "the general feeling among psychologists is that projective tests . . . have primary value in determining the existence and nature of problems related to personal adjustment that may be facing the mentally retarded person." (31, p. 467) It is apparent from the research of Abel, Gothberg, and Sarason that mental retardates are similar to normal people in respect to their psychological needs and personality stresses. (32, 33, 34) Thus there is reason to believe that a psychological test that is meaningful for normal subjects would be expected to be meaningful when used on mentally retarded subjects.
Mentally retarded subjects have been frequently tested by means of inkblots, especially the Rorschach inkblots, but there has been a limited amount of use of the Holtzman inkblots. Further, a search of the literature did not produce any studies that have tested subjects from a public day school completely dedicated to a trainable program for mentally retarded children. However, Holtzman et al. have collected inkblot protocols of 100 mental retardates from two state institutions. (35) It would seem, that in lieu of any data on the same type of subjects as this study, the norms developed by Holtzman et al. from the 100 subjects may be considered somewhat related and used as a basis of comparison.

An area which has had a considerable amount of study with mentally retarded subjects is that of physical fitness. This has been a popular area of study especially in the last decade. It seems likely that the recent increase is to a major degree due to the support that the Kennedy Foundation has given to studies that utilize mentally retarded children. Whatever the reason, according to Bowers more than one-half of all research on movement performance of mental retardates has been completed since 1960. (36)

One of the most important findings that has come out of much of this research is that mentally retarded children are in general also physically retarded. That is, their scores on motor ability and physical fitness tests were consistently lower than test results of normal children of comparable chronological age. (37, 38)

An extensive perusal of the literature has clarified that there is very little research on the physical fitness status of
trainable retarded children. Most of the studies were limited to educable retarded groups. In addition, in many instances the tests that were utilized were designed for children of normal mentality. It is understandable that the educable level dominates the literature, since these children are much easier to communicate with than trainable children. As for the use of tests designed for normal children, the results are confounded by the consistent finding that the fitness test scores have a high degree of relationship to I.Q. It is not clear whether the relation is due to the complexity of the test directions or the performance demands of test items, but it is clear that physical fitness tests for normal children are not valid for mental retardates. Since this study utilized subjects from a trainable program, only physical fitness research that either used trainable retarded children or used test items similar to this study were reviewed in this chapter.

Brown reports a study on the physical fitness of trainable retardates. He used the Kraus-Weber test as a measure of minimal muscular fitness. As is generally known, this test has been highly criticized as a measure of muscular fitness, because of the high dependency of failure solely on the basis of failing the flexibility item. Of interest in Brown's study is the fact that the trainable retarded children failed primarily because of the item measuring lower back strength. Brown concluded that for the trainable mentally retarded subjects it was "quite apparent that they lack muscular fitness." (10, p. 353)
Two studies on the educable are worth mentioning in that they utilized the AAHPER Youth Fitness Test. This was the test that was used as a basis for the development of the fitness battery used in this study.

A study by Sengstock is interesting in that the findings show educable retardates on the AAHPER Youth Fitness Test were about halfway between normals of equal CA and normals of equal MA. (9) Similar results were reported by Carter in that educable retarded boys tested on the AAHPER Youth Fitness Test were lower than non-retarded boys. In addition, Carter's study showed that with a training program the educable retarded could attain nearly normal average scores. (40) From these studies it is clear that the consensus of research results of physical fitness tests show retarded children to compare more favorably to normals of the same MA and not to normals of the same CA. However, Fait and Kupferer indicate that when test items are simplified the physical fitness tests of retardates are more comparable to normals of the same CA. (41) Fait and Kupferer's research thus indicated the need to modify tests or test conditions for mentally retarded children.

An extensive study on the physical fitness of educable retarded children was reported by Rarick, Widdop, and Broadhead. Using a modification of the AAHPER Youth Fitness Test they tested 4,235 boys and girls from 241 schools in 21 states. Their report indicates that educable retardates at all age levels were 2 to 4 years behind children of comparable chronological age. (42) As a result of this research it was apparent that the same performance standards were not
appropriate for normals and retardates. From the data of Rarick et al., norms were developed for retardates based on their own potential abilities. A special fitness test manual for mentally retarded children was developed in 1967 and is jointly sponsored by the Joseph P. Kennedy Foundation and the AAHPER. (43)

The educational development of mentally retarded children in respect to motor function have been left largely to chance. According to Bowers . . . "the physical capabilities of the mentally retarded were automatically relegated to a place of small importance." (36, p. 1)

The trend in programs for the retarded are activities designed to bring about appropriate behavioral change. One of the most important behavioral changes that is an objective in education of the mentally retarded child is that of improved social competency, as has been stated elsewhere in this study. The role of motor function in contributing to this goal is implied by Benton when he states,

motor skills can play a decisively important role as a determining factor in the behavioral and social efficiency of the intellectually subnormal person . . . . The latter's psychomotor ability may well determine whether he will attain a reasonable degree of social competence. For this reason, assessment of motor capacity is an aspect of . . . evaluation which has significant implications for predicting guidance, and training. (44, p. 37)

Even with normal children psychologists have recognized the importance of the physical fitness status for appropriate social development. (45) In general, the affects of success in motor training have been found to relate to social adjustment. (46) Or conversely,
a lack of strength tends to relate to social introversion and feelings of inferior status. (47)

One exception to the above finding was a study by Corder which showed that improved physical fitness "did not significantly affect the social status of educable retarded boys." (48) This apparent exception to general research findings may be explained by the fact that the study was only 4 weeks in duration. A behavioral change in terms of social status would be expected to require a considerably longer duration of time. Also, Corder's report does not specify whether he means social status in terms of peer acceptance or self-acceptance— an important difference. Nevertheless, the seeming inconsistency introduced by Corder's study suggests the need for further study of the relation of physical fitness and social status.

Stein comments on the pattern of the findings that have been shown in retarded children who have progressed by participating in programs of physical education. Stein says,

undoubtedly the progress that has been shown by mentally retarded subjects who have participated in planned programs of physical education has accrued through the interplay of a complex of factors, achievement and success, improved confidence, better adjustment, a feeling of importance because of the interest and attention centered on the increased competitive spirit, increased pride, improved physical condition, more perseverance, and increased desire to perform well. With retarded children, these factors have even greater significance than with the normal population. (49, p. 27)

Surely all of the aforementioned characteristics are practically synonymous with social competency and progress in socialization.

This study was an initial attempt to explore the possibility of a mutual dependency between an individual's physical fitness status
and a measure that is a predictor of the social adjustment of mental retardates. The remaining chapters deal with the procedures of the study, the analysis of the results, and the summary and conclusions.
CHAPTER III

PROCEDURE

The intent of this study has been to explore the relation between the performance of physical fitness items and the body image boundary in mentally retarded children.

The rationale chapter supported the need for the study. The second chapter reviewed the literature deemed pertinent to this research. The procedure herein described has intended to show how the study was implemented.

Selection of Subjects

The subjects for the study were 51 boys and girls who were enrolled at the Kennedy School—a public day school with a program for trainable mentally retarded children. The school is located in Kalamazoo, Michigan.

Kalamazoo is a city of population circa 100,000, in the southwestern part of Michigan. The Kennedy School provides a public school education with a special trainable program for retardates. The school, in addition to serving the needs of mental retardates from the city proper, accepts children from Kalamazoo County and nearby towns. The metropolitan area has both light and heavy industry. The surrounding townships consist of small farms and housing developments. There are three degree-granting colleges in the area served by the Kennedy School.
These factors formed the basis of the socio-economic background of the children at the Kennedy School.

In general, the socio-economic status and housing conditions of the children used in this study ranged from deprived to advantaged, but this information was not available for all of the subjects. The children were heterogeneous in terms of types of etiology, since the criteria for the school admission was both social incompetence and intellectual subnormality. The following special categories were recorded concerning the children used in this study: mongoloid, epileptic, mild cerebral paley, brain damaged, poor articulation, speech impairment, neurological impairment, and culturally deprived. The available records did not show a complete differential diagnosis for each child.

At the time of this study the school facilities were in the fifth year of operation. The maintenance of the facilities was clean and neat. The atmosphere of the school was friendly and organized.

The school building included: an all-purpose space primarily used as a cafeteria and gymnasium, a playroom for nursery-kindergarten activities, a home economics area used for teaching home skills, a room for crafts, audio-visual equipment room, a library, staff lounge, rest room areas, rest areas, office space, and ten classrooms. Outside the school was a large playground on which there was standard-type playground equipment such as swings and jungle-gym structures. Also outside there was a roofed-in play area, open on one side, that was used for kindergarten-type play in inclement weather.
There was a total of 111 children in the school of ages 5 to 20 years. The size of the ten classes varied from 8 to 14 with one special education teacher and one full-time teacher's aid per class. The classes were said to be "ungraded" as the children were grouped primarily according to their development of social-emotional adjustment. Table 1 shows the school's classroom structure that includes: class category, class maximum and actual size, number of males and females, age range, and I.Q. range. It can be seen from Table 1 that the potential maximum number of children for which the school is designed was 139. The actual total was 111 children of which 59 were boys and 52 were girls. The total age range was 5 to 20 years and the total I.Q. range was 30 to 78.

The following groups were available for the purpose of this study: III—Orientation and Diagnostic Group, VI—Early Group, VII—Intermediate Group, VIII—Later Group, IX—Junior Group, X—Senior Group. Of the total 69 from these groups, 60 were in attendance at school during the time of testing. An attempt was made to test all of the 60 who were available. Of the 60 attempted, 9 were eliminated as subjects. Four were eliminated because they were either unable or unwilling to communicate in the inkblot test, and one was eliminated because her physical handicap was too great to participate in the physical fitness testing. Four boys were eliminated as they did not fall in the age range selected for this study.

Table 2 shows the demographical breakdown of the subjects used in this study. As is indicated in Table 2, there were: 30 male subjects with a mean I.Q. of 48.4 and a mean M.A. of 7.37 years, and
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Mean CA 15.8  Total Subj. 51  Mean 50.3  Mean 50.3  Mean 7.71  Mean 7.37
F-21 I.Q. F-21 I.Q. MA MA F-8.05

21 female subjects with a mean I.Q. of 52.2 and a mean M.A. of 8.05 years. For the total 51 subjects the mean I.Q. was 50.3 and the mean M.A. was 7.71.

It should be noted, that two female subjects had I.Q. scores of 76 and 78. Undoubtedly these two scores somewhat raised the mean I.Q. of female subjects. It was reasoned that these two subjects should be included because the two subjects were sufficiently retarded.
to need a trainable program. In addition, the elimination of these two subjects would have accentuated the male-female ratio to an even greater extent.

All of the children that were subjects for this study have a daily program of physical education taught by a physical education specialist. There was a man specialist to teach the boys and a woman specialist to teach the girls.

**Measurements recorded per subject**

1. Chronological age, mental age, and I.Q. from school records.

2. Body image boundary assessment:
   b. Scored for Barrier and Penetration.

3. AAHPER Kennedy Foundation Special Fitness Test for the Mentally Retarded. Items are:
   a. Flexed arm hang
   b. Sit-up
   c. Shuttle run
   d. Standing broad jump
   e. 50-yard dash
   f. Softball throw for distance
   g. 300-yard run-walk

**Assessment of body image boundary**

Body image boundary was assessed according to the general procedures in the Holtzman Inkblot Technique directions. However, the directions were modified as deemed necessary for mentally retarded
subjects. There were seven testing sessions of an hour to an hour and one-half in length per session. There were 8 to 14 subjects tested at each session. The following materials were used in the administration of the test:

1. Protocol forms for responses
2. Slides of Holtzman Inkblots
3. Slide projector
4. Projection screen
5. Tables and chairs
6. Box sharpened #2 pencils (2 each subject)

The following directions were carried out:

1. All subjects were greeted and seated so that they had a clear view of the projection screen.
2. The protocol forms and pencils were distributed.
3. Each subject was instructed to print his name, age, and sex at top of protocol. Some received help with this.
4. The subjects were instructed to listen to directions very carefully and to ask questions if they did not understand.
5. Test administrators were stationed between each two subjects to assist with writing or spelling.
6. The subject was asked not to say anything out loud, but if he wanted help to whisper to his helper what to write for him.

The following were the directions for the test:

Today we are going to look at some pictures on the screen. Some are in black and white and some are in color. The outline of each picture is drawn on the sheet in front of you. The pictures on the screen were made from inkblots. We would like to know what you think the pictures look like. There is no right or wrong answer. As you look at each picture, you will be asked to make whatever answer you see first, though you may see many things. On the paper, in the space beside the picture, write as much detail about your answer as you see—or, we will write
it for you. When you finish with each picture, circle the place on the drawing on your sheet where you saw your answer. Remember, there are no right or wrong answers. Any answer is correct if it is what you see in the picture on the screen. Now let's look at a slide of a picture.

Slide number 42A was projected on the screen in order to explain types of responses. This slide was selected because it was not part of the series needed for scoring body image boundary, and it is a slide that depicts a variety of types of responses—all of which are simple objects and are easy to perceive. Since as far as could be determined, this was the first time the Holtzman Inkblot Test had been group administered by slides to mentally retarded subjects, an effort was made to be absolutely sure that all subjects understood the nature of the test. In the opinion of the writer the effort was worthwhile, because no difficulties were noted in the test administration. During the projection of slide 42A, various types of responses accompanied by appropriate detail were pointed out to all subjects. At the end of this orientation to the test, the subjects were asked if they had any questions. The occasional question which occurred was dealt with as needed.

Trial X and Y blots were projected in succession. Subjects were directed to respond to these blots in the same manner as test slides. After each trial blot, examples of common responses were given and again opportunity for questioning was provided. The remainder of the test proceeded according to standard directions. This included periodic reinforcement and motivational comments designed to encourage a response to every inkblot, as much detail about a response as possible, and a careful circling of the proper area on the protocol form.
An exception to normal test administration was made with those groups that took more time than an hour to complete the test. After the first 15 blots, a break was taken during which a brief stretch and exercise period was given to relieve fatigue.

No time limit was given the subjects. When it appeared that all had finished responding to a slide, they were asked if they wanted more time. The administrative assistants helped to indicate when more time was needed.

A good rapport was established with the children. They seemed to enjoy the test and were cooperative throughout.

When all data was completed, the protocol forms were masked and sent to Dr. Seymour Fisher,* who blind scored each response for barrier and penetration scores. The individuals barrier and penetration score was the total number of responses so scored.

**Testing for physical fitness**

The second type of assessment completed for each subject was that of the AAHPER-Kennedy Foundation Special Physical Fitness Test for Mentally Retarded. This test was selected for the reasons that:

1. It was assumed to measure the items of motor fitness that contribute to movement performance.

2. It has separate items that could be used to identify specific strengths and weaknesses.

3. It was acceptable and desirable to the school personnel in that there are norms and awards available for retarded children.

*Acknowledgment is given to Dr. Seymour Fisher for the scoring of the Holtzman Inkblot protocol forms. Dr. Fisher is a Professor of Psychology at the State University of New York Upstate Medical Center in Syracuse.*
4. It's appropriateness was valued since it was designed for use with mentally retarded children.

The particular components of fitness that the test was assumed to measure include: dynamic strength or muscular endurance as measured by the flexed arm hang and sit-up; explosive power or strength as measured by the shuttle run, 50-yard dash, throw for distance, and broad jump; and, cardiorespiratory endurance measured by the 300-yard run-walk. Thus the test items were:

1. Flexed arm hang
2. Sit-up
3. Shuttle run
4. Standing broad jump
5. 50-yard dash
6. Softball throw for distance
7. 300-yard run-walk

The administration of all items was according to the published test directions. The details of test administration may be found in the Special Fitness Test Manual for the Mentally Retarded. (43)

Each of the separate items were treated as separate variables rather than combining them into a single criterion score. Each item was thought to utilize fitness elements in a different way and it was of interest to explore how the variables of body image would relate to each item.
**Test administrators**

1. Holtzman Inkblot Test.

There were two full-time administrators for the inkblot test. Both of these administrators had previously administered the inkblot test to normal subjects and had previous experience working with trainable retardates. In addition, there were ten assistants who helped the children write responses. All of these assistants were teachers who worked regularly with these children and were experienced special educators. It is assumed that these factors contributed to the good rapport that existed during the testing.

2. Special Fitness Test for the Mentally Retarded.

Two physical education specialists collected the physical fitness data. Rapport with all of the children was established prior to the testing. Apparently the test scores represented the children's best efforts.
CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

This study has explored the relations between aspects of body image boundary and selected physical fitness tests in mentally retarded children. The aspects of body image boundary were barrier and penetration scores. Physical fitness was measured by the seven items of the AAHPER-Kennedy Foundation Special Fitness Test.

All collected data were coded and recorded on sheets furnished by the statistics laboratory. The data were programmed and processed by The Ohio State University Data Processing Center.*

Interpretation of data consisted of linear correlations. The significance of the degree of relationships tested the statistical hypothesis that $r = 0$. The .10 level of confidence was accepted as significant in any relations, since the variables were not manipulated and there were many uncontrolled and unknown variables that may have contributed to these relations.

In order to examine the tendency for developmental patterns the data of the subjects were divided into two age categories such that one group is of early adolescents and another group is late

*Acknowledgment is given for the advice on the statistical aspects of this study made by Madhukar Golhar, member of the Computer Center staff.
adolescents. In addition, since sex differences were expected to occur the two adolescent groups were sorted by sex.

Table 3 shows the mean and standard deviations for all variables for all subjects by age and sex groups. It can be seen that the mean and standard deviation of chronological ages of male and female subjects were reasonably similar. The mean I.Q. of male subjects was lower than the I.Q. of female subjects as was the standard deviation for I.Q. Among the male subjects, the I.Q. was higher for the lower age group but the standard deviation of the lower age group was smaller. Thus the lower age male group had a distinctly lesser amount of variability in I.Q. The age groups of the female subjects had almost the same mean I.Q. and very similar standard deviations. The influence of the C.A. and I.Q. on the M.A. is apparent as might be expected, since the M.A. is derived from the C.A. and I.Q. ratio.

With all the remaining variables there are sex differences in means. The means of the physical fitness items when compared to the test norms clarify the extent of these differences, since some sex difference in scores is to be expected. The norms are in percentiles, so the 50th percentile will be used as average since this is the point above which and below which lie an equal number of scores.

For the flexed arm hang the mean male score of 11.56 is comparable to the 30th percentile, and the mean female score of 3.68 is comparable to the 37th percentile score. Thus it is clear that the subjects of this study were below that of "average" retardates
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Legend:  
C.A. = Chronological Age  
I.Q. = Intelligence Quotient  
M.A. = Mental Age  
F.A. = Flexed Arm Hang  
S.U. = Sit-ups  
S.R. = Shuttle Run  
B.J. = Standing Broad Jump  
300 = 300-yard Run-Walk  
50 = 50-yard Dash  
S.T. = Softball Throw  
BAR = Barrier Score  
PEN = Penetration Score

In this test item, and the males performed relatively poorer than females in terms of the norms.

In the sit-up test item the male mean score of 29.08 and the female mean score of 21.18 were both equal to the 55th percentile for
their respective sexes. The performance on this item was therefore just slightly above average for both sexes.

On the shuttle run the boys with a mean of 12.52 performed at the level of the 20th percentile and the girls with a mean of 14.53 performed at the 10th percentile level. This test item, as other timed items, showed the subjects to be very much below average in speed of movement.

In performance of the broad jump the males were at the 20th percentile with a mean of 4.84, and the females were at the 15th percentile with a mean of 3.56. These scores are well below the performance level of average retardates.

The results of the 300-yard run-walk and the 50-yard dash showed marked sex differences in terms of percentiles. In the 300-yard run-walk test female subjects were only slightly below average at the 42 percentile with a mean of 1.20. The mean of males was 1.51 which was so slow that the time was below the zero percentile level. Of note is the fact that this physical fitness test was the only one that female subjects had mean scores that were better than male subjects. There is no empirical evidence to explain this fact. One can only conjecture that possibly something about the nature of the test item did not appeal to the boys.

The percentile scores of the 50-yard dash were 53 for males with a mean of 7.26 and 19 for females with a mean of 10.24. This indicates that the males jumped slightly better than average whereas the females jumped very poorly in comparison to the norms.
The greatest sex difference occurred with the softball throw test. Table 3 shows that male subjects had a mean of 173.26 which was equivalent to the 71st percentile. Female subjects had a mean of 39.82 which was at the 17th percentile. Thus while the performance of males was superior, the female performance was exceedingly poor. A marked mean difference is to be expected in this skill since girls do not throw well. However, the percentile norms make allowance for the lower skill of girls. If this task may be taken to represent a basic skill for sports, then one would surmise that the girls of this study would be poorly skilled in sport activities, whereas the boys would probably be similar to boys of the same chronological age. Of course, one must make this sort of inference with reservations, since throwing is only one of many skills that are important in playing sports.

Table 3 indicates that the mean male barrier score was 5.90 and the mean female barrier score was 7.10. These means are higher than the reported means of other studies that utilized retarded children. Both means compare favorably to normal subjects of the same chronological age. The pattern of female scores being higher than males is also similar to the pattern of normal adolescent subjects. Since this variable was to be used as a predictor of socialization, it would appear that the subjects of this study may be predicted to have a favorable social adjustment. An examination of the barrier scores of somewhat related samples indicates that lower barrier scores are more typical of retarded subjects. Holtzman reported that the mean barrier score for retarded adults was 2.92 as compared to a
normal seventh grade mean score of 6.12. (35) Sailor and Ponder's study reveals that the mean barrier score for mentally retarded teenagers was 3.69. (6)

The results in Table 3 show that the mean Penetration score was 2.87 for male subjects and 1.10 for female subjects. In comparison, the study by Sailor and Ponder reported for the institutionalized subjects a male mean of 1.90 and a female mean of 2.33, and for the non-institutionalized group a male mean of 2.12 and a female mean of .67. The ranges for institutionalized were: males 0-8, and females 0-6. The ranges for non-institutionalized were: males 0-6 and females 0-2. Their study reported 18 zero penetration scores out of a total of 52 subjects. (6) By contrast, in the research conducted by this writer the ranges of penetration scores were males 0-13 and females 0-4 with a total of 23 zero scores out of 51 subjects. It would appear that in terms of the penetration score the subjects of this study were more similar to those of the institutionalized group in the Sailor and Ponder study. This was the group that had higher body image boundary scores than retarded adults and lower than normal adolescents.

The correlation of variables falls into the following categories: (1) relations of vital statistics such as CA, MA, and I.Q.; (2) relations of physical fitness test items; (3) relations of body image boundary aspects; and the interrelations of categories (1) and (2), (1) and (3), (2) and (3).
Table 4 shows the correlation coefficients for all variables for male subjects twelve to sixteen years old. There were a total of 25 significant correlations for this group of subjects.

In the vital statistics category I.Q. was significantly related to MA (.721) at the .001 level of confidence. This would be expected, since the MA is a function of the I.Q.

The physical fitness test items were significantly related as follows:

1. The flexed arm hang was correlated to sit-ups (.465) at the .10 level, to the broad jump (.595) at the .01 level, and to the 300-yard run-walk (.583) at the .02 level.

2. The sit-up test was related to the shuttle run (.681) at the .005 level, to the broad jump (.593) at the .01 level, and to the 300-yard run-walk (.446) at the .10 level.

3. The shuttle run was related to the broad jump (.829) at the .001 level.

4. The standing broad jump was related to the 300-yard run-walk (.423) at the .10 level.

5. The 50-yard dash was related to the softball throw (.939) at the .001 level.

From the above it can be seen that for this group of subjects each fitness task related to one or more other tasks. Since various aspects of physical fitness necessarily overlap on the test items, it is not surprising to find frequent intracorrelations of items.
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<tr>
<th></th>
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<th>SU</th>
<th>SR</th>
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<th>St</th>
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<td>.098</td>
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<td>-.155</td>
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<td><strong>Softball Throw</strong></td>
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<td>.149</td>
<td>-.277</td>
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<td>.080</td>
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</tbody>
</table>

Significance:  
- a = .001,  
- b = .005,  
- c = .01,  
- d = .02,  
- e = .05,  
- f = .10.
In the third category of relations no significant correlations between penetration and barrier scores occurred.

In examining the inter-correlations between the categories of variables Table 4 shows that at the .01 level I.Q. was related to the flexed arm hang (.600) and to the 300-yard dash (-.539) at the .05 level of confidence.

For this group all of the remaining correlations concern the penetration score which was significantly related to all variables except the barrier score. The penetration score related as follows: to I.Q. (.466) at the .10 level, to M.A. (.749) at the .001 level, to flexed arm hang (.603) at the .01 level, to sit-ups (.474) at the .05 level, to shuttle run (-.441) at the .10 level, to broad jump (.661) at the .005 level, to 300-yard run-walk (-.469) at the .05 level, to 50-yard dash (-.497) at the .05 level, and to softball throw (.470) at the .05 level.

The picture of the inter relations of the penetration warrants special mention. Since the penetration score is assumed to represent the more immediate attitude of the individual toward his body image framework, it may be that the unusually high and frequent penetration correlations were an indication of the individual's attitude toward the tests, his body action in performing the tests, or his general body attitude. Possibly he was evidencing a certain bodily threat through the nature of testing.

Table 5 shows the correlation coefficients for all variables for males seventeen to twenty years old. There are a total of twenty significant correlations in the table.
<table>
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<td>Shuttle Run</td>
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<td>Standing Broad Jump</td>
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<td>50-yard Dash</td>
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<td>Softball Throw</td>
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<td>Penetration Score</td>
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<td>.179</td>
<td>-.137</td>
<td>-.469</td>
<td>-.188</td>
<td>-.165</td>
<td></td>
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</table>

Significance:  a = .001, b = .005, c = .01, d = .02, e = .05, f = .10.
As with the other male group, I.Q. was related to M.A. (.971) at the .001 level. This was explained for the previous table.

The intra-relationships of the physical fitness test items were:

1. Flexed arm hang was related to the shuttle run (-.875) at the .001 level, to the broad jump (.822) at the .001 level, to the 300-yard run-walk (-.653) at the .01 level, and to the 50-yard dash (-.457) at the .10 level. Flexed arm hang was not significantly related to any other variables.

2. In addition to the above, the shuttle run was related to the broad jump (-.891) at the .001 level, to the 300-yard run-walk (.835) at the .001 level, and to the 40-yard dash (.500) at the .05 level.

3. The standing broad jump was related to the 300-yard run-walk (-.898) at the .001 level, and to the 40-yard dash (-.527) at the .05 level.

4. The sit-up test and softball throw were not significantly related to any physical fitness item.

As with the other male group, there were no significant intra-relations between the body image boundary aspects.

There were intra-relationships present for all categories of variables. I.Q. and M.A. were both related to physical fitness tasks, as follows:

1. Sit-ups to I.Q. (.430) at the .10 level; sit-ups to M.A. (.475) at the .10 level.

2. Broad jump to I.Q. (.430) at the .10 level; broad jump to M.A. (.502) at the .05 level.
3. Softball throw to I.Q. (-.635) at the .01 level; softball throw to M.A. (-.467) at the .10 level.

It should be pointed out that the relations of softball throw with I.Q. and M.A. are inverse relations. All other negative signs on the correlations are relations for timed variables for which the relation is direct in terms of comparing best with best and/or poorest with poorest. The reader is reminded that with the other male group M.A. and softball throw were directly related. A reference to Table 3 shows that this older male group had the lowest mean I.Q. and the highest mean scores in the softball throw. The only two test items in which this group scored especially high in comparison to the other groups of the study were in the softball throw and flexed arm hang tests. Both of these items are dependent on arm and shoulder strength. The results seem to show that strength can be developed in spite of intellectual capacity. Or, it is possible that the repeated relation of I.Q. and physical fitness tests may indicate that the fitness tests were not as discriminating for these subjects as had been assumed. Perhaps the tests are not equally appropriate for trainable and educable retardates.

Body image boundary was significantly related to three other variables with this group of older males. The barrier score was related to the sit-up test (.597) at the .02 level. The penetration score was related to the 50-yard dash (-.469) at the .10 level, and to I.Q. (.457) at the .10 level. Table 3 showed that in comparison to other groups of this study the older males had the lowest barrier score and the highest penetration score. While the meaning of this
information is not explicit from the data of this group, it may imply that any mutually reciprocal function between physical fitness and body image boundary is at a minimal level. Possibly in the process of development an individual has certain expectations of his ability to perform motor tasks. In the earlier stages of his learning, movement performance and body image boundary may be mutually dependent. Gradually the individual, in the development of body concept, is less dependent on movement experiences. As the organism develops in complexity, the reciprocity function is overshadowed by ego functions of greater importance. Thus, the relation of one variable to another may occur only at a minimum or mediocre skill development. Perhaps studies on the relations of movement concept, movement performance, and body image concept would clarify the relations that have occurred.

Table 6 presents the correlation coefficients for all variables for females twelve to sixteen years old. There were eighteen significant correlations between the variables with these subjects.

As with the other groups, M.A. and I.Q. were related. The degree of relationship (.840) was at the .001 level of confidence.

With the exception of the 300-yard run-walk, which had no significant relationship to any variable, all other physical fitness items were intra-related to at least one other item of the test battery.

1. The flexed arm hang was related to the sit-up test (.558) at the .05 level.

2. The sit-up test was related to the shuttle run (.767) at the .001 level, to the broad jump (.475) at the .10 level, to the 50-yard
### TABLE 6. THE CORRELATION COEFFICIENTS FOR ALL VARIABLES FOR FEMALES, 12 TO 16 YEARS OLD

<table>
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<tr>
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</table>

Significance: \(a = .001\), \(b = .005\), \(c = .01\), \(d = .02\), \(e = .05\), \(f = .10\).
dash (-.595) at the .02 level, and to the softball throw (.488) at the .10 level.

3. The shuttle run was related to the broad jump (-.702) at the .005 level, to the 50-yard dash (.851) at the .001 level, and to the softball throw (-.474) at the .10 level.

4. The standing broad jump was related to the 50-yard dash (-.757) at the .001 level, and to the softball throw (.552) at the .05 level.

5. The 50-yard dash and the softball throw were related (-.559) at the .05 level.

This was the only group of the study in which penetration and barrier score were significantly related. The degree of relationship (.703) was significant at the .005 level of confidence. In general, research findings have not found these two variables to be related, but Fisher and Cleveland in their theoretical formulations imply that a person who is high in both barrier and penetration score has both the security of definite boundaries and the fluidity of boundary typical of those with empathetic ability. (5) Insecure and undeveloped boundaries may be implied for those individuals who were exceedingly low in both barrier and penetration aspects of body image boundary.

In the relationships between categories of variables, I.Q. was related to the flexed arm hang (.593) at the .02 level, and both I.Q. and M.A. were related to sit-ups (.461) (.474) respectively at the .10 level. These relations are similar to the findings of relations of the same variable for the younger adolescent male subjects.
The barrier score, in addition to the aforementioned relation with penetration score, was related to M.A. (.559) at the .05 level, and to the shuttle run (-.535) at the .05 level. A state of mutual interdependency may be implied by these relations.

The correlation coefficients for all variables for females seventeen to twenty years old are presented in Table 7. There were a total of thirteen significant correlations for these older adolescent subjects.

Two variables, the 300-yard run-walk and the barrier score, were not significantly related to any variable.

As might be expected from other groups, the I.Q. and M.A. were related (.984) at the .001 level. The M.A. was not related to any other variable.

Similar to the groups previously discussed, there was some intra-relation of physical fitness items with the exception noted above.

1. Flexed arm hang was related to shuttle run (-.722) at the .05 level, to the broad jump (.852) at the .005 level, to the 50-yard dash (-.744) at the .05 level, and to the softball throw (.981) at the .001 level.

2. Sit-ups related only to the broad jump (.714) at the .05 level.

3. Shuttle run was related to the broad jump (-.899) at the .001 level, to the 50-yard dash (.897) at the .001 level, and to the softball throw (-.816) at the .01 level.
<table>
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<tr>
<th></th>
<th>IQ</th>
<th>MA</th>
<th>FA</th>
<th>SU</th>
<th>ST</th>
<th>RJ</th>
<th>300</th>
<th>SO</th>
<th>ST</th>
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<td>-.110</td>
<td>.422</td>
<td>-.285</td>
<td>.205</td>
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<td>-.327</td>
<td>.600&lt;sup&gt;f&lt;/sup&gt;</td>
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<tr>
<td>Mental Age</td>
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<td>-.098</td>
<td>.002</td>
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<td>-.096</td>
<td>.503</td>
<td>-.722&lt;sup&gt;e&lt;/sup&gt;</td>
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<td>-.262</td>
<td>-.722&lt;sup&gt;e&lt;/sup&gt;</td>
<td>-.456</td>
<td>-.899&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>.897&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.816&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.405</td>
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<tr>
<td>Standing Broad Jump</td>
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<td>.219</td>
<td>.852&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.714&lt;sup&gt;e&lt;/sup&gt;</td>
<td>-.899&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>-.871&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.886&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>-.276</td>
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<td>-.098</td>
<td>-.744&lt;sup&gt;e&lt;/sup&gt;</td>
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<td>.897&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.871&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-.169</td>
<td>-.763&lt;sup&gt;d&lt;/sup&gt;</td>
<td>.482</td>
<td>.299</td>
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</tr>
<tr>
<td>Softball Throw</td>
<td>.004</td>
<td>.002</td>
<td>.981&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.536</td>
<td>-.816&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.886&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>.424</td>
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<td>-.513</td>
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<td>-.176</td>
<td>.463</td>
<td>.299</td>
<td>-.184</td>
<td>-.083</td>
<td></td>
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</tbody>
</table>

Significance:  
- a = .001, b = .005, c = .01, d = .02, e = .05, f = .10.
4. The broad jump was related to the 50-yard dash (-.871) and the softball throw (.886) both at the .005 level of confidence.

5. The 50-yard dash was related to the softball throw (-.763) at the .02 level.

As with the two male groups, penetration score was related to I.Q. (.600) at the .10 level. The barrier score had no significant relation with any variable.

However, this group had the highest mean barrier score and the highest mean score on the 300-yard run-walk. The 300-yard run-walk was the only fitness task in which a female group surpassed both male groups in performance. For this group the highest barrier correlation was with the 300-yard run-walk (-.513). Although this correlation is not at the level of significance accepted for this study, it is at the .20 level and has a degree that would be acceptable at better than the .05 level for any other size group of this study. This information seems to support the idea of a mutual reciprocity function between certain fitness aspects and barrier score of at least minimal importance.

Table 8 shows the correlation coefficients for all variables for all subjects. In this table there are a total of thirty-six significant relationships between the variables. The elimination of age groups resulted in the addition of chronological age to the list of variables. With a few notable exceptions all of the significant relations found in Table 8 were previously discussed in the other correlation tables.
TABLE 8. THE CORRELATION COEFFICIENTS FOR ALL VARIABLES FOR ALL SUBJECTS

<table>
<thead>
<tr>
<th></th>
<th>Chronological Age</th>
<th>Intelligence Quotient</th>
<th>Mental Age</th>
<th>Flexed Arm Hang</th>
<th>Sit-ups</th>
<th>Shuttle Run</th>
<th>Standing Broad Jump</th>
<th>300-yard Run-Walk</th>
<th>50-yard Dash</th>
<th>Softball Throw</th>
<th>Barrier Score</th>
<th>Penetration Score</th>
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<tbody>
<tr>
<td>Chronological Age</td>
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<td>.488^a</td>
<td>.182</td>
<td>.204</td>
<td>-.248^f</td>
<td>.209</td>
<td>-.188</td>
<td>-.319^d</td>
<td>.384^b</td>
<td>.208</td>
<td>.168</td>
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<tr>
<td>Intelligence Quotient</td>
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<td>.140</td>
<td>.141</td>
<td>.002</td>
<td>-.039</td>
<td>-.269^f</td>
<td>.252^f</td>
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<td>.222</td>
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<tr>
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<td>.701^a</td>
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<td>-.782^e</td>
<td>.086</td>
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<tr>
<td>Standing Broad Jump</td>
<td>.209</td>
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<td>.115</td>
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<td>.545^a</td>
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<td>-.181</td>
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<td>.028</td>
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<td>-.601^a</td>
<td>.759^a</td>
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<tr>
<td>Softball Throw</td>
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<td>-.156</td>
<td>.465^a</td>
<td>.470^a</td>
<td>-.526^a</td>
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<td>-.777^a</td>
<td>-.061</td>
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<td>Barrier Score</td>
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<td>.172</td>
<td>.286^e</td>
<td>-.005</td>
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<td>-.266^f</td>
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<td>-.085</td>
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<td>Penetration Score</td>
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<td>.404^b</td>
<td>.291^e</td>
<td>-.314^e</td>
<td>.412^b</td>
<td>-.054</td>
<td>-.342^d</td>
<td>.361^c</td>
<td>.014</td>
<td></td>
</tr>
</tbody>
</table>

Significance: a = .001, b = .005, c = .01, d = .02, e = .05, f = .10.
The relation of C.A. and M.A. (.488) at the .001 level and the relation of M.A. and I.Q. (.751) at the .001 level could be predicted. The M.A. is a function of the ratio of C.A. and I.Q.

The physical fitness test items were all intra-correlated with the exception of the 300-yard run-walk.

1. The flexed arm hang related to sit-ups (.428) at the .005 level, to shuttle run (-.547) at the .001 level, to broad jump (.701) at the .001 level, to 50-yard dash (-.445) at the .001 level, and to the softball throw (.465) at the .001 level.

2. The sit-up test was the only physical fitness test that related to all other items of the battery. The relations were as follows: to shuttle run (-.742) at the .001 level, to broad jump (.545) at the .001 level, to the 300-yard run-walk (-.251) at the .10 level, to the 50-yard dash (-.601) at the .001 level, and to softball throw (.470) at the .001 level. The .10 level is perhaps questionable in testing the significance of inter-relatedness of physical fitness items. Items of physical fitness batteries frequently are inter-related since the strength factor being tested cannot be isolated completely from other strength factors of the total body.

Three new relations concern that of chronological age and three physical fitness items. The C.A. related to the shuttle run (-.248) at the .10 level, to the 50-yard dash (-.319) at the .02 level, and to the softball throw (.384) at the .005 level.

I.Q. showed a different type of relationship with physical fitness tasks. I.Q. related to the 300-yard run-walk (-.269) at the .10 level. As with the C.A. variable, I.Q. also was related to the
50-yard dash (.252) at the .10 level, and to the softball throw
(-.444) at the .001 level. In the case of I.Q., however, the re-
lations are in an inverse direction such that as I.Q. increased the
performance level on the tests decreased or vice versa. The two
fitness tasks tended to be negatively correlated to each other, so no
interpretation would appear to be appropriate for the similar I.Q.
relations to both tests. Perhaps there are age or sex factors that
are confounding the picture of these relations. The meaning is
puzzling and no interpretation seems to account for all of the facts.

The mental age was related to the shuttle run (.247) at the
.10 level, and to the 300-yard run-walk (-.362) at the .01 level.
The relation of M.A. to flexed arm hang was previously noted for the
younger male adolescent subjects. No significant relation between
M.A. and the 300-yard run-walk was found for any sub-group of subjects.
Thus, as with the I.Q. variable, this relation also may have been
spurious.

The pattern of interrelations between the body image boundary
and other variables seem clearer in Table 8. The same three barrier
score relationship that were noted in respect to other tables were
found for all subjects. These relations were with M.A. (.286) at the
.05 level, with sit-ups (.311) at the .05 level, and with the shuttle
run (-.266) at the .10 level. The penetration score also related to
M.A. (.309) at the .05 level, and to all physical fitness items except
the 300-yard run-walk. The following fitness items were related to
penetration score: flexed arm hang (.404) at the .005 level, sit-ups
(.291) at the .05 level, shuttle run (-.314) at the .05 level, 50-yard
dash (-.342) at the .02 level, and softball throw (.361) at the .01 level.

Some explanation for the relations with the body image boundary variables has been given previously. In general the data may be said to support the idea that a well developed body image boundary has a reciprocity function with the ability to perform physical fitness tasks in at least a minimal manner.

The following is a summary of interpretations of Barrier score relations:

1. In comparison to the median of retarded children of comparable C.A., the mean scores of retardates of this study were below average in most physical fitness tests.

2. The sit-up test was significantly related to Barrier score for older males, and the shuttle run was significantly related to Barrier score with younger females. The mean scores of both groups was below "average" retardates in the physical fitness tests. The Barrier scores of both groups were comparable to adolescents with normal intelligence but were lower than the two other groups of the study.

3. The shuttle run test is of particular interest in that this test was significantly related to Barrier in three other studies. Such repeated findings would seem to be of special importance. For each of the findings of shuttle run and Barrier score a different picture of relation was evident.

a. In the study by Woods, the relation was inverse and was with male 10-year old subjects.
b. In the study by McFee on older adolescents, the relation was inverse and was with female subjects.
c. In the study by McFee on younger adolescents, the relation was direct and was with all subjects.
d. In the present study, the relation was direct and was with younger females, and with all subjects.

It can be seen that with the four above results each result has a factor in common with one or more other studies but each also had one factor that was different from any other study. It would appear that one must look elsewhere at the data to find a meaning of the findings.

A look at the movement performance of each of the four above mentioned groups shows the following:

1. The shuttle run performance of the 10-year old males of the Woods study showed that 10-year old males scored better than the 10-year old females, but were mediocre in comparison to most normal male groups.

2. The shuttle run performance of the older adolescent females in McFee's first study was below average for normal adolescent females and was poorer than the performance of male subjects.

3. The shuttle run performance of the younger adolescents in McFee's second study showed the mean score of all subjects to be below average when compared to the norms of normal adolescents.

4. The shuttle run performance of younger females of the present study were the poorest of the four groups of the study such that the mean of this group was about at the 3rd percentile of norms for retarded children.
When the results of the four studies are examined, it can be seen that they all have in common the factor of mediocre or poorer performance of the shuttle run task.

An explanation of the results found in the four studies should account for the nature of all the findings. The following explanation attempts to explain all of the different conditions.

Since the relations of Barrier score and shuttle run have only been significantly correlated with subjects of lower performance levels, it may be that the two variables are mutually reciprocal only in the case of subjects who perform the movement task at relatively minimum levels. It is possible a poorer performing subject who has accepted his or her ability and is thus not dissatisfied by the performance, can still have a well-articulated body image concept. Perhaps this type of person has found some other means of enhancing his or her concept of body/self. Since the actual degree of correlation found to be significant ranged from .205 to .535, at best there is only about a 28 percent predictability of one variable from the other. This means that the performance of the shuttle run task may be important in body image boundary for some individuals but not for many others, or that the existing relation is due to some unknown factor that is in common to both variables. Considerable more study is indicated, if the meaning is to be clarified.

There have been no other studies that have dealt with the relation of barrier score and the sit-up task. Therefore no further interpretation can be given for the significant correlation found for these two variables in this study. Only future studies can determine
whether or not the relation of sit-up and Barrier score will follow
the reasoning used to interpret the relation of shuttle run and
Barrier score.

One of the intents of this study was to determine if the
Barrier score, as a predictor of social adjustment, would be related
to physical fitness in any significant manner. The nature of the
significant relations seems to indicate that the subjects of only
mediocre physical fitness evidenced the greatest potential for social
adjustment as measured by the Barrier score. The number and extent
of relations were not sufficient to be conclusive, but this study
does not support the supposition that a higher level of physical
fitness necessarily contributes to the social adjustment of retardates.
CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this study was to explore the relationship between the body image boundary and performance of certain physical fitness tests in mentally retarded subjects.

Support was given for the use of the body image boundary as a predictor of socialization via a review of literature. Justification for the study was made by establishing the importance that physical fitness is assumed to have in developing the social competency of mental retardates.

The design of the study included three types of variables: The first type was certain vital statistics, the second type was two indices of body image boundary, and the third type was a battery of physical fitness tests.

Subjects for the study were 51 mentally retarded children. These children were all students at a school that emphasized a trainable program for retardates. The number of subjects for the discrete age and sex groups were:

- males 12-16 years old = 16
- males 17-20 years old = 14
- females 12-16 years old = 14
- females 17-20 years old = 7
There was a total of thirteen variables of the study. The specific measures used were as follows:

1. Chronological age
2. Intelligence quotient
3. Mental age
4. AAHPER-Kennedy Foundation Special Fitness Test including:
   a. Flexed arm hang
   b. Sit-ups
   c. Shuttle run
   d. Broad jump
   e. 300-yard run-walk
   f. 50-yard dash
   g. Softball throw
5. Barrier score
6. Penetration score

The barrier and penetration scores were assumed to measure the degree of body boundary definiteness and articulation. The projective technique of the Holtzman Inkblot Test, modified for group administration to retardates, was used to assess body image boundary. All protocols were blind scored for barrier and penetration by Dr. Seymour Fisher. The two scores were determined by tallying the number of barrier and penetration responses.

The vital statistics of chronological age, intelligence quotient, and mental age were procurred from the school records.
The physical fitness test scores were obtained according to the test directions given in the test manual. The norms of the test manual served to assess the relative physical fitness status of the subjects.

The main purpose for the study intended the use of a linear rule for predicting relations in the existent population. Within the limits of the special type of population, a bivariate distribution was assumed and a two-tailed test of significance was applied to the correlations. The linear correlation was used to analyze the results, since the interest was in actually predicting one individual's status on another in a type of population where the independent variables represented natural or previously acquired characteristics of the individual.

The following questions posed in Chapter I may be answered as follows:

1. What would be the relations between the body image boundary aspects and physical fitness status?

   Significant relationships between the barrier score and fitness were found with both male and female groups for which shuttle run and sit-ups were the significantly related tests. The penetration score was significantly related to all fitness tests for male subjects.

2. Would any sex differences occur in the relations of the variables to be studied?

   a. For male subjects:

   The only significant barrier relations for male subjects was
with the sit-ups test. The penetration was significantly related to all variables except barrier score.

The mental age of males was significantly related to flexed arm hang, broad jump, 50-yard dash, and softball throw.

The 300-yard run-walk was significantly related to other physical fitness items for male subjects only. These items were: the flexed arm hang, the sit-ups, the shuttle run, and the standing broad jump.

b. For female subjects:

Barrier score was significantly correlated to the shuttle run, to the mental age, and to the penetration score of female subjects. For the female groups the only other penetration relationships were with chronological age and intelligence quotient.

Intelligence quotient was significantly related to the sit-ups for female subjects only.

All physical fitness tests had some interrelations except the 300-yard run-walk which for female subjects was not significantly related to any variable. The particular physical fitness items that were intra-related for female subjects concerned relations with the softball throw. These were: flexed arm hang, sit-ups, shuttle run, and standing broad jump.

3. Would any difference occur in the relation of variables in terms of mental age as compared to chronological age of subjects?

Chronological age was significantly correlated to mental age which was also correlated to intellectual quotient.
With the exception of being related to each other, none of the same relations occurred for both C.A. and M.A. The C.A. related to shuttle run, 50-yard dash, and softball throw. The M.A. related to sit-ups, 300-yard run-walk, barrier score and penetration score.

4. What developmental pattern for mentally retarded children would be suggested by the relation of the variables of this study?

It was not possible to study the developmental pattern of the correlations, since the age breakdown of these subjects was insufficient across all ages of the study. An examination of the two age groupings does not show any developmental patterns. One relation of two variables was found in previous studies and it was thought that these studies could be used for comparison. A significant relation of the shuttle run and the barrier score was found in the Woods and the two McFee studies. In the Woods study these two variables for 10-year old males were correlated .373 significant at the .10 level of confidence. In the first McFee study the relation of these variables for females of late adolescence was significant (.457) at the .05 level. In the second McFee study the relation was significant for all subjects (.205) at the .10 level of confidence. The present study showed a relation between these variables for females 12 to 16 years old of -.535 significant at the .05 level of confidence.

There are important differences in the relations found for the four studies. In the Woods study the relation was negative for males; in the first McFee study the relation was negative for females; in the second McFee study the relation was positive for all subjects, and, in the present study the relation was positive for females. No develop-
mental pattern seems reasonable to infer by a comparison of the correlation of the two variables from the four studies.

In addition to the sex differences that were apparent in the correlation of variables, there were certain sex differences that could be noted by examining the mean of all variables in Table 8. These were as follows:

1. The I.Q. and M.A. were lower for male subjects.
2. The performance level of males was better in all physical fitness items except the 300-yard run-walk.
3. The barrier score was higher for females and the penetration score was lower.

From the results of this study one can say that the subjects were not typical mental retardates. In terms of body image boundary their mean scores were similar to normal subjects of a similar chronological age. Using the body image boundary scores for prediction of socialization, the subjects would appear to be capable of fairly normal social adjustment.

The physical fitness scores were in general below that of average retardates. Yet there were meaningful relations of body image boundary and physical fitness. Possibly the attitude toward performance is more important than the actual level of performance in the socialization of mentally retarded subjects.

The value and meaning of the results of this study lie in future research endeavors. The following are suggested:

1. Longitudinal studies on the relations of the variables of this study.
2. Study of the relation of developmental movement tasks and body image boundary.

3. Study of the effect of a physical fitness training program in relation to the assessment of body image.

4. Study of the effect of physical education skills especially emphasizing the boundary aspects of the body.

5. A scoring of the inkblot protocols to study other personality factors in relation to the variables of this study.
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