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The purpose of this study was to determine if educable mentally retarded (EMR) children's fitness test scores obtained from a group testing environment were significantly different from test scores obtained from an individualized testing environment.

Six separate groups with five randomly selected EMR children in each group provided thirty subjects for this study. The six groups were obtained from six different public schools in the Portland, Oregon metropolitan area. The subjects ranged in age from 8-12 years. There were 20 male and 10 female subjects. All subjects were free of major orthopedic and sensory impairments.

Three test items from the American Alliance for Health, Physical Education, and Recreation Special Fitness Test (AAHPER SFT, 1976) were utilized in the study. The

test items selected were the standing long jump, shuttle run of 40 yards, and sit-ups performed in 60 seconds. The subjects performed the shuttle run in pairs in the group testing environment and ran alone in the individual testing environment.

All 30 subjects were tested twice on the three fitness test items. One test session was conducted with only the child and the experimenter present. Another test session was conducted with four of the child's peers and one adult observer acting as passive spectators of the subject's performance. Subjects at three of the six schools were tested individually before they were tested in a group and at the other three schools subjects participated in group testing before individual testing.

The paired t statistic was utilized to determine if there was a significant difference between test scores obtained in the group versus individual test environment. No significant difference existed between group and individual performance on standing long jump scores ($t(29) = 1.82$, $p. > .05$). A significant difference, favoring group performance, existed between group and individual shuttle run performance ($t(29) = 8.09$, $p. < .001$) and between group and individual sit-up performance ($t(28) = 6.72$, $p. < .001$).

The influence of a passive audience or coactors on performance was dependent on the nature of the task. If the task required a simple motor response, as was the case for the sit-up or shuttle run, the presence of a group or

coactors served to motivate the EMR child to give a more maximal performance. The standing long jump, which required a complex motor response, was not influenced by the presence of a passive audience.

EFFECT OF PEER GROUP PRESENCE ON SELECTED PSYCHOMOTOR MEASUREMENTS WITH EDUCABLE MENTALLY RETARDED CHILDREN

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in charge of major

Redacted for Privacy

Dean of School of Education

Redacted for Privacy

Dean of Graduate School

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DEDICATION

To my grandfather, Walter W. Keeney,
a man who knew the value of hard work.

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TABLE OF CONTENTS

LIST OF TABLES

EFFECT OF PEER GROUP PRESENCE ON SELECTED PSYCHOMOTOR MEASUREMENTS WITH EDUCABLE MENTALLY RETARDED CHILDREN

CHAPTER I

INTRODUCTION

The Education for All Handicapped Children Act of 1975, Public Law 94-142, provides a clear mandate to educators representing all disciplines and at every instructional level to carefully examine the quantity and quality of services presently provided for the handicapped. Already many have recognized that immediate changes will be necessary to comply with the intent of this law. Through PL 94-142, physical education is by definition identified as an integral part of special education (Dunn, 1976). Recognizing the challenge created by legislation, intense efforts are being expended to provide adequate physical education programs for handicapped children.

Part of the process of compliance with PL 94-142 involves developing an individualized education program for each handicapped child. The law states:

> On October 1, 1977, and at the beginning of each school year thereafter, each public agency shall have in effect an individualized education program for every handicapped child who is receiving special education from that agency (Federal Register, August 23, 1977, section 121a. 342).

In addition, the individualized education program for each child must include "a statement of the child's present level of educational performance" (Federal Register, August 23, 1977, section 121a. 346).

Determining a child's present level of educational performance is a formidable task. There are a multitude of complex, inter-related variables which may be in operation to affect a child's performance at any given moment on any task. Improvement of reliability and validity in measurement of psychomotor tasks is continually being sought. Attainment of test scores which consistently reflect a child's true ability level produces reliable and valid measurements. Validity of student test performance is predicated on the assumption that the performance reflects maximal or near maximal efforts. Barrow and McGee (1973) stated, "A student has not been tested until he has given maximum effort" (p. 54). It is often difficult to obtain maximal performances from educable mentally retarded children.

The testing environment needs to be structured so that valid, reliable results can be obtained. After an extensive review of research literature, Stein and Pangle (1966) concluded that more research is needed to:

> develop standards, evaluate instruments and criteria for evaluating programs of a psychomotor nature for the retarded taking into consideration their special needs, interests, abilities, and limitations (p. 38).

The present study empirically investigated one specific facet of the process of evaluating educable mentally retarded (EMR) children's performance on psychomotor tasks.

The testing environment has a significant impact on test results. This finding has been verified for normal individuals (Martens & Landers, 1969; Zajonc, 1965; Hillery & Fugita, 1975) and for EMR individuals (Levy, 1974; Stoneman & Keilman, 1973; Daniels & Hansen, 1976).

The vast majority of research studies dealing with physical and motor fitness do not explicitly state whether the test used was given individually, with other subjects coacting, or with subjects performing before an audience (Dobbins & Rarick, 1976; Fait & Kupferer, 1956; Asmussen & Nielson, 1956; Stein, 1965; Londeree & Johnson, 1975; Rarick, Widdop, & Broadhead, 1970; Malpass, 1960; Chasey & Wyrick, 1971; Auxter, 1966). In these studies the reader must make assumptions concerning the testing environment.

There is good reason to believe that the presence of spectators or coactors will affect the test outcome. Hillery and Fugita (1975) tested 2,261 adults on simple manual and finger dexterity tasks. The subjects were tested in groups ranging in size from one to ten individuals. Subjects were found to perform at higher levels when they coacted in larger groups. The relationship between group size and performance appeared to be somewhat linear.

Zajonc's social facilitation theory states that an audience or coactors enhances the emission of dominant responses (Zajonc, 1965). (Dominant responses are those which have the highest response tendency and greatest probability of occurring.) In a hierarchy of possible responses, the dominant response will be the strongest. If the dominant responses are well learned, the presence of others will be of benefit to the individual. If the dominant responses are poorly learned, performance will be hindered. Simple motor responses are particularly sensitive to social facilitation (Zajonc, 1965).

The American Alliance for Health, Physical Education, and Recreation Youth Fitness Test (AAHPER YFT, 1976) is perhaps the most widely administered fitness test in the United States today. The test directions do not explicitly state whether the test should be administered individually or in a group situation. Only the items involving running recommend that the students coact with other students (AAHPER YFT, 1976).

National norms have been developed for EMR children on the AAHPER Special Fitness Test (AAHPER SFT, 1976; Rarick, Widdop, & Broadhead, 1970). The AAHPER Special Fitness Test is very similar to the AAHPER Youth Fitness Test. However, there is no mention as to whether the norms developed for either test were derived from group or individual testing.

The major focus of the present study was an investigation of the effects of the presence of a passive audience on fitness test performance. The study attempted to give clearer direction as to the most appropriate methods of evaluating EMR children. The study has a variety of important ramifications. The influence of the group on the EMR children's performance on a well learned task may be shown to be useful in obtaining more maximal performances. Obtaining the best performances from EMR children has long been a concern of special education personnel. The present study poses interesting considerations for the educator who attempts to deal effectively with EMR children. More specifically, the study offers valuable information for physical educators who are presently engaged in individualized education program development.

Purpose of the Study

The purpose of this study was to determine if passive peer group presence had a significant effect on the performance of three selected items from the AAHPER Special Fitness Test. The peer group was directed to form a passive audience of nonresponsive spectators who did not clap, cheer, or verbally interact with the performer. The passive audience silently observed the performers' behavior.

Significance of the Study

The Education for All Handicapped Children Act of 1975, PL 94-142, specifies that the child's present level of educational performance must be determined prior to the development of an individualized education program. If fitness testing done with an audience present is significantly different from testing done on an individualized basis, then the presence of an audience needs to be recognized as one variable which affects a child's test performance and thus influences the determination of the child's present level of educational performance. Standardized tests of physical and motor fitness should include a description of the number and type of individuals present at the time the test was administered so that results can be interpreted accordingly. The presence of spectators should be considered as a significant variable to control, and it becomes an important methodological consideration.

If the testing done in a group is not significantly different from the individualized testing, then it would appear that it is unnecessary to consider the presence of passive others as having a potentially significant impact on fitness test scores.

If testing done with passive spectators present yields significantly better results than testing done without spectators present, then the use of the group as a

means of enhancing the performance of EMR children becomes an important motivational factor to consider

Methodology

Thirty randomly selected children ages 8-12 who had been previously diagnosed as EMR served as subjects for the study. The subjects were tested on three items of the AAHPER Special Fitness Test (AAHPER SFT, 1976). These items included standing long jump, sit-up, and shuttle run. Three attempts were given for the standing long jump. Two attempts were given for the shuttle run. The child's sit-up score was the number of sit-ups they were able to perform in 60 seconds.

The three test items were administered to each subject twice; once with only the child and the experimenter present and once before a group of five individuals who acted as passive spectators. One of the spectators was an adult while four spectators were the child's peers. In addition to the five spectators, one adult experimenter was present. The shuttle run involved coaction for the group testing environment. During group testing two children ran together which resulted in an audience composed of four rather than five members.

Mean scores for trials on the shuttle run and standing long jump were computed. A paired t test was performed on the test data to determine if there was a significant

difference between scores obtained when spectators were present and scores obtained when only the experimenter and child were present.

Hypotheses

The following hypotheses were tested:

1. There is no significant difference in sit-up scores between group and individualized testing with EMR children.
2. There is no significant difference in shuttle run scores between group and individualized testing with EMR children.
3. There is no significant difference in standing long jump scores between group and individualized testing with EMR children.

Delimitations

This study was limited to investigating the effects of passive peer group presence on performance of selected physical fitness test items. The test items selected measure the following factors of physical fitness; speed and agility, efficiency of abdominal and hip flexor muscles, and explosive muscle power of leg extensors. The subjects used in the study were EMR elementary school children ages 8-12 who were enrolled in the Oregon State Public School System during the 1978-1979 school year. No special shoes

or clothing were provided for or required of the subjects.

Limitations

Subjects in the study had not all had the same past experiences in physical education and did not all have the same amount of previous exposure to the test items. However, it was assumed that the children would be familiar with and have previously learned the test items. It was also assumed that the EMR children would form a passive audience when so directed.

Definitions

For the purposes of this study, key terms are defined as follows:

Coaction: Coaction refers to two individuals simultaneously engaging in the same activity.

Dominant response: Dominant response refers to the response within an individual which has the highest response tendency and greatest probability of occurring. In a hierarchy of possible responses, the dominant response will be the strongest.

Educable mentally retarded (EMR): "Mentally retarded children exhibit significantly subaverage general intellectual functioning existing concurrent with deficits in adaptive behavior, and manifested during the developmental period" (American Association on Mental Deficiency, 1973, p. 11).

The Oregon State Department of Education recognizes the above definition and further describes EMR individuals as persons with mild retardation whose intelligence test scores range between two and three standard deviations below the norm on a standard individual test, administered in conformity with Oregon law.

Individualized Education Program: An individualized education program is a written statement developed by an educational team to identify the goals and objectives of education for a handicapped child in conformity with the Education for All Handicapped Children Act of 1975, PL 94-142.

Passive audience: Passive audience refers to a condition involving the presence of nonresponsive, silent spectators who do not clap, cheer, or verbally interact with the performer but who do observe the performer's behavior.

Physical fitness: Physical fitness refers to physical abilities and capacities which are relevant to health related parameters.

Social facilitation: Social facilitation refers to the effects of the presence of spectators or coactors on learning and performance.

Social stimulation: Social stimulation is a synonym for social facilitation.

CHAPTER II

REVIEW OF LITERATURE

The following review of literature will investigate the effects of the presence of others on human performance. The works of some of the major contributors to research in social facilitation will be reviewed. Various studies regarding motor performance and social facilitation will be discussed. Finally, characteristics of the mentally retarded which may make them sensitive to the influence of social facilitation will be examined.

Major Developments in the Study of Social Facilitation

Studies dating back to the late 1800's mark the beginning of empirical investigation into the effect of the presence of other individuals on human performance. These studies fall under the conceptual rubric of social facilitation. Social facilitation has two paradigms, namely audience effects and coaction effects. Audience effects focus on the effect of a passive audience on an individual's performance. Coaction effects focus on the effects of two or more individuals performing the same task simultaneously in view of each other.

The Puzzling Period

Results of social facilitation literature from the late 1800's through the early 1960's were somewhat puzzling. Many studies showed social facilitation to enhance performance. However, other studies showed social facilitation to be detrimental to performance. Wide individual differences in responding to the influence of social facilitation were noted within some studies.

Triplett (1897) noticed that the records for bicycle racing showed recurrent patterns. Times for simultaneous competition were always best. The next best times were for paced races. The slowest times were recorded for individuals who raced alone against the clock.

Triplett (1897) conducted a study with 40 children who worked alone and in pairs reeling in fishing line. When the children's performance in pairs was compared to their performance alone, 20 children worked faster, 10 children worked slower, and 10 children showed very slight changes in speed. Triplett concluded that the presence of a competitor liberates latent energy which is not ordinarily available to the performer. He felt that performing in pairs had a stimulating effect on most performers. Those who performed slower were overstimulated and lost muscular control. Those who performed faster were positively stimulated.

Allport (1924) conducted a number of studies which explored the effects of social facilitation on individual performance. Like Triplett, Allport was intrigued by the performance of bicycle racers. He stated:

> the most striking instances of social facilitation are to be found on the race track. It is a common maxim among bicyclists that, provided two riders are of equal ability, the one who starts out ahead and keeps ahead throughout most of the race will lose in the end (Allport, 1924, p. 261).

Allport attributed this phenomenon to the sight of the movements of the front rider providing a stimulus to the other rider which substantially increased the latter's energy and allowed him to win.

Allport's work on mental work and association led him to conclude that the facilitating influence of the group is greatest for the slower and poorer workers and least for the more rapid and efficient workers (Allport, 1924). He found that the correlation between speed of solitary work and gains made through working in a group, though low, was always inverse. Mayer (1903) studied the effects of social facilitation on 14 boys (mean age 12) in Germany on measures of reasoning, memory, and imagination. He found greater uniformity in scores from the "together" rather than the "alone" testing environment. He also found the facilitating influence to be greatest for the slower workers. Gates (1923) found that coaction tended to benefit

the work scores of the slower reactors more than the quicker reactors. Cottrell, Rittle, and Wack (1967) concluded that the influence of social facilitation brought about significant differences in performance for slow and medium speed learners but that differences for fast learners were not significant.

Allport (1924) studied the effects of coaction on graduate students on tests of vowel cancellation, multiplication and reversible perspective attention, and free flow of word response associations. He found that the presence of coworking groups tended to increase the quantity of work done by individual members while the quality remained practically unaffected. For mental work involving close attention, most individuals worked at a higher speed when stimulated by co-workers, and a few individuals' performances were retarded by social influence. Allport concluded:

> It is not difficult to understand why stimuli from the group should have a favorable effect upon the amount but not upon the quality of work. 'Amount' represents speed of movement; whereas 'quality' is determined, strictly speaking, not by movement at all but by that fixity of attention process which prevents any lapse or error. Our study of social facilitation has in all cases shown it to be a release of augmentation of some form of movement. The social stimuli reinforcing movement are more effective than those suggesting constancy of attention (p. 269).

Another study was conducted in which the subjects

were given short passages from the writings of two ancient philosophers and instructed to write as many arguments as possible to disprove the statements made in the passages (Allport, 1924). The responses were graded on a three point scale as to their relevancy and quality. The results showed that individuals working in a group produced a greater number of statements than those who worked in isolation. However, those who worked alone produced two-thirds of the highest rated statements while those who worked in a group produced two-thirds of the lowest rated statements. Allport concluded that overt responses, such as writing, were facilitated through the stimulus of co-workers but the intellectual or implicit responses of thought were hampered rather than facilitated.

Allport (1924) pointed out that there are individual differences in responses to social facilitation. He stated that children are more susceptible to social influence than adults. However, he also suggested a wide range of responses to social facilitation from adults. Allport listed "Habit, customary work environment, nervousness and distractibility, as well as reclusiveness, negative suggestibility, attitudes of superiority, defect of sociality, and other traits" (p. 278) as factors which help to account for individual differences.

Allport was the major contributor to social facilitation research during the puzzling period. Other researchers

conducted studies which yielded seemingly incongruous results. Dashiell (1930) tested college students on multiplication of two placed numbers, mixed analogies, and free serial word associations. He found that the presence of a passive audience resulted in an increase in speed at the expense of accuracy. Pessin (1933) had college students memorize a list of nonsense syllables. The results of the study showed that those who learned alone performed significantly better than those who learned in front of an audience. However, recall and retention was greater for those who learned in front of an audience than for those who learned alone.

Zajonc's Synthesis

In 1965 R. B. Zajonc presented a hypothesis which sought to unify some of the seemingly conflicting results which research in social facilitation was yielding. Zajonc examined both audience effects and coaction effects. He stated:

> The emission of well-learned responses is facilitated by the presence of spectators, while the acquisition of new responses is impaired. Audience enhances the emission of dominant responses. If the dominant responses are correct ones, as is the case upon achieving mastery, the presence of an audience will be of benefit to the individual. But, if they are mostly wrong, as is the case in the early stages of learning, then these wrong responses will be enhanced in the

> presence of an audience, and the emission of correct responses will be postponed or prevented (Zajonc, 1965, p. 270).

Coaction is defined as individuals simultaneously engaged in the same activity in full view of each other. Zajonc hypothesized that the effects of coaction are similar to audience effects. In discussing the effects of coaction he stated, "learning is impaired by the presence of others while performance of learned responses is enhanced" (Zajonc, 1965, p. 273).

Zajonc based his hypothesis on the Hull-Spence drive theory (Zajonc, 1965; Spence, 1956). The Hull-Spence drive theory suggests that increased arousal will result in emission of dominant responses. If the appropriate response is relatively strong in comparison with possible responses, the increased arousal level will lead to improved performance. If, however, the appropriate response is initially lower in habit strength than competing responses, then there will be a decrement in performance, especially in the early stages of learning (Spence, 1956). However, Zajonc admitted that evidence which suggests that the mere presence of others raises the arousal level is indirect and lacking (Zajonc, 1965).

Cottrell's Refinement

Cottrell (1972) agreed with Zajonc that social

facilitation enhances the performance of well-learned responses and inhibits the learning of new responses. However, Cottrell and other researchers have shown that when anticipations of praise and criticism were eliminated, the mere presence of others was not sufficient to increase the drive level.

Cottrell, Sekerak, Wack, and Rittle (1968) conducted a study with 45 male college students on a pseudorecognition task. The subjects were divided into three experimental groups. One group performed alone, another group performed before an audience of two spectators, and a third group performed before two people who were not spectators. The latter were blindfolded and the subject was told that the blindfolded individuals would be doing a color perception test and needed to adjust their eyes to the darkness. Results of the study showed that those who performed the task before an audience did significantly better than those who worked alone or in the mere presence of others. There was no significant difference between the alone and mere presence groups.

Paulus and Murdoch (1971) conducted a study similar to Cottrell, Sekerak, Wack, and Rittle's (1968). They tested college students on pseudorecognition tasks using responses based on habits of varying strength established in prior training. The subjects were divided into four experimental groups: alone with no evaluation, alone with

evaluation, audience with no evaluation, and audience with evaluation. The subjects wrote down their responses rather than saying them aloud so that the audience was not able to monitor the subjects' responses in the "audience no evaluation condition." Results of the study showed that anticipation of evaluation of performance produced an increase in the emission of dominant responses compared to no anticipated evaluation. Presence or absence of an audience did not significantly alter the emission of dominant responses.

The work of Klinger (1969) suggested that the mere presence of a coactor does not appear to increase drive level. He compared work done in two different coaction arrangements with work done alone. The subjects worked on a vigilance task and were to watch for repeated irregularities in repeated visual signs. The subjects were divided into four experimental groups. In one group two individuals worked simultaneously and individually with no opportunity to compare their detection accuracy. In another coaction group the errors were made public to both individuals. The third group worked alone with an error signal and the fourth group worked alone with no error signal. The detection accuracy of the individuals working in coaction was almost identical to the two groups who worked alone. The accuracy of the individuals in "coaction-errors public" was significantly better than those individuals working

alone.

Cottrell (1972) concluded:

> The drive increasing property of the presence of others is created through social experience and is not, as implied by the Zajonc hypothesis, a biological given. This formulation states that the presence of others is a learned source of drive (p. 227).

The presence of others is drive increasing only when it produces self-consciousness, evaluation, and apprehension about performance with an anticipation of later praise or criticism.

Allport, Zajonc, and Cottrell have made significant contributions to the literature regarding social facilitation. Allport (1924) stated that social facilitation increases speed but not necessarily accuracy or the quality of work. Zajonc (1965) proposed that social facilitation improves performance and hinders learning because of an innate increase in arousal level. Cottrell (1972) suggested that increases in arousal level are due to expected evaluation from the audience and are socially learned. Expectation of evaluation will cause increases in drive level which will cause increases in the emission of dominant responses.

Social Facilitation and Motor Responses

Allport (1924) and Zajonc (1965) concur that movements or motor responses are sensitive to social

facilitation. Allport (1924) stated, "Our study of social facilitation has in all cases shown it to be a release of augmentation of some form of movement" (p. 269). Zajonc (1965) stated that "Simple motor responses are particularly sensitive to social facilitation effects" (p. 269). The majority of studies regarding social facilitation and motor responses have been conducted utilizing adult subjects.

Travis (1925) studied audience effects on 22 college students involved in a standard pursuit rotary activity. Once the task was learned, 18 of the 22 subjects made better scores before an audience than when working alone.

Berridge (1935) tested college students on a weight lifting task using a dynamometer. He had three treatments. One group lifted alone without knowledge of results, another group lifted alone with knowledge of results, and a third group lifted in the company of other performers with the results announced so all could hear. The subjects in the third condition lifted the most weight while subjects in the "alone-without knowledge of results" lifted the least weight.

Martens (1969) tested college students on a coincident timing apparatus. He concluded that subjects acquiring the new response in the presence of a passive audience committed more error, had less within-subject consistency, and acquired significantly more trials to learn the coincident timing task than subjects learning

alone. Once the task was well learned, individuals in the presence of an audience performed better than individuals performing alone. Not only were performance scores better, but subjects performing in the presence of an audience were more consistent in their response.

Carment (1970) studied the effects of coaction and competition on a simple motor task which involved pulling out a lever. The subjects were 40 male and 40 female adults. Half of the subjects performed alone and the other half coacted with one other subject. Half of the coacting and alone subjects were given instructions to increase competitive motivation. The results of the study showed that the presence of coactors greatly increased the response rate of females but had little effect on males. For both males and females competition increased the rate of responding only when a coactor was present.

Springsteen (1975) tested 120 college males on the Minnesota Rate of Manipulation Turning Test. The subjects performed alone and before three different groups including: audience of four females, audience of four males, and audience of two females and two males. Springsteen concluded that all audience groups inhibited learning and facilitated performance. A passive female audience caused a significant increase in performance when compared to a passive male and mixed audience.

Hillery and Fugita (1975) had a large sample of

2,461 job applicants from two state employment agencies. The applicants were tested on a General Aptitude Battery which included a place and turn test which measured index manual dexterity and an assemble-disassemble test which measured index finger dexterity. On simple manual and finger dexterity tasks, the subjects performed at a higher level when they coacted in larger groups. Group size varied from one to ten. The relationship between group size and performance appeared to be somewhat linear.

Allport (1924) stated that children are more sensitive to the influence of social facilitation than adults. However, very few studies have been conducted which examine the impact of social facilitation on children. Two studies mentioned previously, Triplett (1897) and Mayer (1903), utilized children as subjects.

Cox (1968) conducted three experiments to investigate the effects of the presence or absence of fathers, male teachers, peers and strange male adults on the performance of third and fourth grade elementary school boys who differed in levels of test anxiety. The task employed was simple and repetitive and involved dropping marbles into holes. The low test anxious boys showed response increments when anyone entered and stayed in the experimental room. The presence of fathers or male teachers resulted in response decrements in high test anxious boys. When only the experimenter and the subjects were present, low test

anxious boys showed response decrements and high test anxious boys showed response increments.

Martens and Landers (1969) studied the effect of one and three coactors on individual performance of a muscular endurance task for 8, 13, and 18 year old males. The subjects were seated and asked to hold their dominant leg in a horizontal position as long as possible. Individuals who performed in quadrads performed significantly better than individuals performing in dyads or alone. There was no significant difference between individuals and dyads. Martens and Landers concluded that perhaps the presence of some minimum number of individuals is needed to produce sufficient arousal to significantly alter performance.

Some attempts have been made to examine the effects of the presence of an audience or coactors on educable mentally retarded (EMR) children's motor performance.

Abel (1938) executed a study to determine the relative influence of social facilitation on simple motor performance of two different subnormal intelligence levels. The subjects were 38 females with IQ scores of 50-59 and 36 females with IQ scores of 70-79. All subjects were either 15 or 16 years of age. The task was a paper and pencil maze without blind alleys. The subjects worked alone and in pairs. Both groups profited from the influence of working in pairs versus working alone. The

more intelligent subjects profited more from social facilitation than the less intelligent subjects.

Hansen (1972) enlisted 54 subjects with an IQ range of 50-75 to study the effects of coaction and selected grouping procedures on the learning and performance of a motor task by EMR pupils. The task employed was a tapping test. The subjects were to alternately tap two metal surfaces, and the number of taps were recorded with a digital counter. The subjects were given ten ten second trials to learn the task, then they had ten ten second trials to perform the task. The results of the study showed that coaction and selected grouping procedures did not have a significant effect on the learning effects of a simple motor task. However, a post hoc statistical analysis of all twenty trials revealed a significant difference in means up to trial seventeen. A significant difference in means is generally characteristic of a learning phase where scores will show relatively wide variations. Results of Hansen's study indicated that the learning phase (which consisted of ten trials) was too short and should have consisted of seventeen trials. Learning had continued to take place through the majority of the performance phase of testing.

Leitzke (1974) investigated the effects of the nature of the co-worker and type of audience reinforcement on EMR students ages 14-20. The IQ range of the 59 EMR subjects

was 50-75. Twenty-four normal high school subjects were also utilized in the study. The subjects performed a leg extension task which involved holding the dominant leg at a 90° angle while seated. EMR students coacting with regular students performed significantly longer on the endurance task than EMR students coacting with EMR students. "Audience verbal positive reinforcement" and "audience verbal non-reinforcement" did not have a significant effect on the performance of the endurance task by EMR subjects.

Stoneman and Keilman (1973) tested 40 EMR children ages 8 to 14 on a motor maze test and dots subtest of the Factored Aptitude Series. The mean IQ of the group was 63.7. The subjects were divided into competition, non competition, social stimulation, and non social stimulation treatment groups. The analysis of task efficiency showed only the effects of social stimulation to be significant. Although both competition and social stimulation effects were observed in the study, they were found to be somewhat task dependent.

Stoneman and Keilman (1973) suggested:

> More research is needed before the effects of manipulating competition and social stimulation in the EMR classroom can be understood. The children's reactions to failure in competitive situations, their distractibility in groups and their motivational systems should be studied in relation to competition and social stimulation (p. 100).

Thus, there is a need to examine the characteristics of the mentally retarded child which may be of significance in understanding the EMR child's response to social stimulation.

Characteristics of the Mentally Retarded Child

A number of studies have been conducted which examine the physical characteristics of the mentally retarded child. Comparative studies have shown mentally retarded children to be significantly lower than normal children of the same chronological age on measures of strength, endurance, agility, co-ordination, balance, running speed, power, flexibility, and reaction time (Howe, 1959; Stein, 1963, 1966; Auxter, 1966; Rarick, Widdop, & Broadhead, 1970; Dobbins & Rarick, 1976; Fait, 1978).

More complex movements which require pyramiding of body movements lead to increased frustration for the mentally retarded. Fait and Kupferer (1956) concluded, "success for the mentally retarded is related to the simplicity of motoric effort...pyramiding body movements diminishes the chances for successful performance" (p. 732). Many games and sports which children frequently engage in require pyramiding of body movements. The mentally retarded child's lowered physical and motor ability causes him to experience more failure and frustration than his normal chronological aged peers.

It is important to note that while Fait (1978) contends that the motor performance of EMR children may be two years behind normal children, there is considerable overlap. Dobbins and Rarick (1976) found the mean performance levels of EMR children lagged behind those of intellectually normal children of similar chronological age. However, 32% of the EMR children studied had motor performance characteristics no different from the majority of the subjects of the intellectually normal sample.

The repeated experiences of failure with which the mentally retarded are confronted results in their developing an outer-directed style of problem solving. Zigler (1966), in summarizing other studies (Green & Zigler, 1962; Turnure & Zigler, 1964), concluded that:

> The high incidence of failure experienced by retardates generates a style of problem solving characterized by outer-directedness. That is, the retarded child comes to distrust his own solutions to problems and seeks guides to action in the immediate environment (p. 99).

The retarded child comes to expect failure more readily than he expects success. Cromwell (1963) conducted research which presented evidence that:

> retardates (1) enter a novel situation with a performance level which is depressed below their level of constitutional ability, (2) have fewer tendencies to be 'moved' by failure experience than normals, and (3) have fewer tendencies than

> normals to increase effort following a mild failure experience (p. 87)

Other research indicated that the EMR child is less discriminating in his responses to success and failure than a normal child of the same chronological age (Bialer & Cromwell, 1960; Bialer, 1961; Miller, 1961).

Zigler and Green (1968) carried out a study to test the hypothesis that mentally retarded and normal children of the same mental age differ in their performance because they have differing expectancies of success. The subjects were 60 normal lower-class children, 60 normal middle-class children, and 60 noninstitutionalized retarded children. All subjects performed a partially reinforced three choice learning task which involved marble dropping under various reinforcement conditions. Both lower class and mentally retarded children had a much lower expectancy of success than did middle-class children. Lower class and mentally retarded children were more willing to give up the patterning response in favor of the maximization response. A patterning response involved trying different patterns of marble dropping in hopes of getting an increased number of reinforcers. The maximization response, which was reinforced more frequently than the patterning response, involved a more stereotyped response. There were no variations inherent in the maximization response. Middle-class children were more willing to try a variety of

responses to the problem.

The responses of EMR and normal children after a failure situation were compared by Gardner (1959). After experimentally induced failure, the EMR child was less likely to emit an increased effort in the next trial. The intellectually average subjects showed greater increases in effort after experiencing failure than was observed in the EMR children.

There are a variety of significant implications which arise from the mentally retarded child's outer-directed problem solving approach. A child who is outer-directed may appear to be highly distractible when compared with an inner-directed child. The motivational system of an outer-directed child differs markedly from the motivational system of an inner-directed child.

Fait (1978) lists a short attention span as one of the characteristics of the mentally retarded child. Zigler (1966) stated:

> The outer-directedness hypothesis suggests that distractibility, rather than being an inherent characteristic of the retarded, actually reflects a style of problem-solving emanating from the particular experiential histories of these children (p. 103).

Zigler (1966) presented a conceptualization of a reinforcement hierarchy. For each child there exists a reinforcement hierarchy and the positions of various

reinforcers on the hierarchy are determined by 1) the child's developmental level, 2) the frequency with which the reinforcers have been paired with other reinforcers, and 3) the degree to which the child has been deprived of these reinforcers.

After reviewing studies related to the socialization process of children, (Davis, 1941, 1943, 1944; Erickson, 1947; and Douvan, 1956), Zigler (1966) concluded:

> The differential effectiveness of particular reinforcers can be attributed to differences in experiential histories. Emphasis on being right is primarily a middle class phenomenon, being right is more frequently paired with other primary and secondary reinforcers in middle class than in lower class populations (p. 96)

Zigler also proposed:

> Being correct is probably more reinforcing for the performance of normal than for retarded children, who may value the interaction with, and attention of, the experimenter much more than the satisfaction derived from performing the task correctly (1966, p. 94).

Howe (1959) tested EMR and normal children on 11 motor tasks. He observed that the EMR children seemed to lack realism in estimating how well they were succeeding in the task. Howe commented relative to the EMR children, "Most expressed pride and pleasure at their performance regardless of how well they were doing (p. 354). Perhaps

the attention of the experimenter was a high level reinforcer to the EMR children while successful performance had a low position on their reinforcement hierarchy.

Telling a normal middle-class child to "do your best" generally connotes to the child that he is to give a maximal effort. The child may elicit a maximal effort because intrinsically he desires to "be number one" or to obtain a good score. The concept of "doing your best" does not appear to be equally meaningful to the mentally retarded child. Levy (1974) stated, "It appears that the EMR child requires a very high reward situation before he will elicit what is representative of his best performance" (p. 253).

Researchers point to the need for extrinsic motivation for the mentally retarded as being even greater than for normal individuals. Ellis and Distefano (1959) tested mentally retarded youngsters on a rotary pursuit task to study the effects of verbal urging and praise. They stated, "The normal subject's motivation is perhaps near optimal as a result of the experimental situational variables whereas the retarded individual requires additional prompting for optimal performance" (p. 490).

Studies by Wagner (1967) and Solomon (1968) have shown that the use of tangible reinforcers independently or jointly with social reinforcers have consistently brought about better motor learning and performance for EMR populations.

Solomon (1968) studied the effect of three different motivating conditions on the performance of five physical fitness test items. Subjects of the study were 27 normal junior high school boys, 27 EMR boys enrolled in special education classes, and 27 institutionalized EMR boys. Basic motivation, continuous verbal encouragement, and continuous verbal encouragement plus material reward were the three motivating conditions. The kind of motivating condition was important to both EMR and normal boys. "Continuous verbal encouragement" and "continuous verbal encouragement plus material reward" elicited superior performance from both EMR and normal boys when compared to performances under the basic motivation. The obtained values were consistently higher for the EMR boys than for the normal boys, which indicated a clearer differentiation of motivational response for the EMR boys. For the two EMR groups, performance under "continuous verbal encouragement plus material reward" was consistently superior to performance under "continuous verbal encouragement." This was not true of the normal boys, where there was no significant difference in performance between the second and third motivating conditions.

Wagner (1967) studied three types of motivating conditions on physical proficiency tests of EMR and normal girls. The sample consisted of nine EMR girls, twelve normal girls matched for mental age, and twelve normal girls

matched for chronological age. All three groups performed significantly better when active encouragement was added to the standard instruction. There was another significant increase in performance in all three groups when candy reward was added to active encouragement. The size of performance increments through motivation varied for the three groups with the most dramatic differences for EMR girls coming through the addition of candy reward. EMR girls' performance most nearly matched the level of their chronological age peers when candy reward was added. Wagner concluded:

> These findings emphasize the need for motivation in physical education programs for all children normal or retarded. They reveal also the fact that the need for motivation and practice is of even greater significance to retarded children than to their normal peers (p. 47).

Summary

The review of literature suggests that EMR children may be especially sensitive to social stimulation or social facilitation when performing a physical fitness test. However, this assumption has not been subjected to empirical evaluation. Furthermore, there are relatively few studies which discuss the effects of social facilitation on mentally retarded children in comparison with the number of studies done with adults.

The following generalizations present some of the major reasons why EMR children may be sensitive to the effects of social facilitation while performing a physical fitness test:

1. The performance of simple motor tasks is sensitive to the influence of social facilitation.
2. Children are more sensitive to social facilitation than adults.
3. Slower learners and poorer performers are more sensitive to the influence of social facilitation.
4. EMR children have an outer-directed approach to problem solving and rely more heavily than normal middle-class children on environmental cues.

Based on the preceding generalizations, the following questions pertinent to the current research are raised and will be discussed later:

1. Is the EMR child motivated to give a more maximal performance when observed by or coacting with his peers?
2. Can fitness testing done individually be realistically compared to fitness testing done in a group?
3. Should research dealing with physical and motor fitness testing of EMR subjects include a description of the number and type of individuals present during testing?

CHAPTER III

METHODS AND PROCEDURE

The purpose of this study was to compare fitness test scores obtained from an individualized testing environment with scores obtained when a passive audience was present during testing. The study was conducted during the 1978-1979 school year in six selected public schools in the Portland, Oregon metropolitan area. The testing was conducted during the months of October and November.

Subjects

Generally most public schools in Oregon which offer special services to educable mentally retarded (EMR) students have EMR populations which range in size from 4-15 students. Locating a population of EMR students in the public school system which was large enough to allow for a random selection of 30 subjects at one site was not feasible. Therefore, six separate groups with five randomly selected EMR children in each group provided 30 subjects for this study. The six groups were obtained from six different public schools in the Portland metropolitan area.

At each school a list of names of EMR children ages 8-12 was obtained. A table of random numbers was used to select five students for participation in the study. If any of the five children initially selected through this

procedure were unable to participate in the study, alternate subjects were selected from the list by use of a table of random numbers.

Participation in the study was voluntary. All subjects were required to return a signed parental permission slip (Appendix A) before they were allowed to participate in the study. The use of human subjects as well as the parental permission slips were approved by the Oregon State University Committee for the Protection of Human Subjects (Appendix B).

All subjects had been previously diagnosed as EMR according to Oregon State Department of Education guidelines and spent the majority of their day in special education classrooms. The subjects ranged in age from 8 years, 1 month to 12 years, 11 months. The mean chronological age was 10.42 years. There were 20 male and 10 female subjects. Table I presents a description of subjects by age and sex. All subjects were free of major orthopedic and sensory impairments.

TABLE I. AGE AND SEX OF SUBJECTS

AGE	NUMBER OF MALES	NUMBER OF FEMALES
8	2	4
9	3	3
10	5	1
11	6	1
12	4	1

Test Instrument

Three items from the American Alliance for Health, Physical Education, and Recreation Special Fitness Test (AAHPER SFT, 1976) were utilized in the study. Consideration was given to administrative feasibility and time constraints in the selection of the test items. Efforts were made to take as little time as possible from the children's regular schedule of instruction as the present study was conducted at public schools during the regular school day.

The test items selected were shuttle run, standing long jump, and sit-up. All three test items are described in the AAHPER Special Fitness Test Manual (AAHPER SFT, 1976) and the AAHPER Youth Fitness Test Manual (AAHPER YFT, 1976) as follows:

Shuttle run

Equipment - Blocks of wood (2 inches x 2 inches x 4 inches) and a stopwatch. Pupils should wear sneakers or run barefooted.

Description - Two parallel lines are marked on the floor 30 feet apart. Two blocks of wood are placed behind one of the lines. The pupil starts from behind the other line. On the signal "Ready? Go!" the pupil runs to the blocks, picks one up, runs back to the starting line, and places the block behind the line. He then runs back and picks up the second block, which he carries back across the starting line. It is preferable to have two pupils running at the same time, but a stop-watch is needed for each and there must be two blocks of wood for each runner.

Rules - 1. Allow two trials with some rest between.
2. The blocks must be placed behind the line, not dropped or thrown.

Standing long jump

Equipment - Mat, floor, or outdoor jumping pit and tape measure.

Description - Pupil stands with the feet several inches apart and the toes just behind the take-off line. Preparatory to jumping, the pupil swings the arms backward and bends the knees. The jump is accomplished by simultaneously extending the knees and swinging forward the arms.

Rules - 1. Allow three trials.
2. Using a tape, measure from the take-off line to the back of the heel nearest the take-off line.
3. When the test is given indoors, it is convenient to tape the tape measure to the floor at right angles to the take-off line and have the pupils jump along the tape. The scorer stands to the side and takes the measurement.

Sit-up*

Equipment - Clean floor, mat, or dry turf and stopwatch.

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*With the exception of the sit-up instructions, the instructions for fitness test items are identical in the AAHPER Youth Fitness Test Manual and the AAHPER Special Fitness Test Manual. The sit-up instructions are taken from the AAHPER Youth Fitness Test Manual (AAHPER YFT, 1976) rather than the AAHPER Special Fitness Test Manual (AAHPER SFT, 1976). The sit-ups described in the AAHPER Special Fitness Test are with legs extended rather than bent. Bent knee sit-ups are generally recommended because they provide a more accurate test of abdominal strength and also impose less strain on the muscles of the lower back (Flint, 1964; Soderberg, 1966).

Description - The pupil lies on his back with his knees bent, feet on the floor and heels not more than 12 inches from the buttocks. The angle at the knees should be less than 90 degrees. The pupil puts his hands on the back of his neck with fingers clasped and places his elbows squarely on the mat, floor, or turf. His feet are held by his partner to keep them in touch with the surface. The pupil tightens his abdominal muscles and brings his head and elbows forward as he curls up, finally touching elbows to knees. This action constitutes one sit-up. The pupil returns to the starting position with his elbows on the surface before he sits up again. The timer gives the signal "ready-go" and the sit-up performance is started on the word "go." Performance is stopped on the word "stop." The number of correctly executed sit-ups performed in 60 seconds shall be the score.

Rules - 1. Only one trial shall be allowed unless the teacher believes the pupil has not had a fair opportunity to perform.
2. No resting is permitted between sit-ups.
3. No sit-ups shall be counted in which the pupil does not (a) keep the fingers clasped behind the neck; (b) bring both elbows forward in starting to sit up without pushing off the floor with an elbow; or (c) return to starting position, with elbows flat on the surface, before sitting up again.

Experimental Design

As previously indicated, in order to obtain a sample size of 30 randomly selected subjects, it was necessary for the experimenter to test at six different public schools. Five subjects were randomly selected at each of the six schools. Subjects at three of the six schools were tested

in a group before they were tested individually and at the other three schools, subjects participated in the individual testing before group testing. It was randomly decided prior to testing which of the three schools would receive individual testing first and which three schools would receive group testing first.

There are six possible orderings of the three test items. The six orderings were randomly assigned to the six schools. This process of randomization was conducted in order to minimize any influence that might have accrued due to the order of presentation of test items. Table II describes the order of presentation of various test items.

TABLE II. ORDER OF PRESENTATION OF TEST ITEMS BY SCHOOL

School 1	School 2	School 3	School 4	School 5	School 6
G-I[a]	I-G[b]	G-I	I-G	G-I	I-G
SR[c]	SR	SU	SU	SLJ	SLJ
SU	SLJ	SLJ	SR	SU	SR
SLJ	SU	SR	SLJ	SR	SU

[a]G-I indicates that group testing occurred before individual testing.

[b]I-G indicates that individual testing occurred before group testing.

[c]abbreviations - SR - shuttle run
SU - sit-up
SLJ - standing long jump

At least one day was allotted between group and individual test sessions. This time between testing sessions allowed the subjects ample time to recover from any fatigue which they may have experienced as a result of participation in the study.

Efforts were made to keep the test environment as constant as possible (except for the presence or absence of an audience) during both group and individual test sessions. At each of the six schools both test sessions were conducted in the same area. The experimenter was dressed in the same warm-up suit during all test sessions. One set of equipment was used for the entire study. The equipment was set up in the same place in the testing area for both group and individual test sessions.

Procedures

The experimenter was introduced to the children prior to the actual testing and briefly discussed the study with them. The importance of returning the parent permission slips was stressed with the children. The experimenter left permission slips with the home room teachers, who sent the slips home with the children at the end of the school day.

When conducting individualized testing, the experimenter went to the child's classroom, accompanied the child to the test site, tested the child, and then escorted the child back to his or her classroom. This procedure was

repeated until all subjects were tested. Before each test item was administered, the experimenter gave a verbal description of the test item and a demonstration.

When conducting group testing, the experimenter first introduced the group of five children to the adult observer. The experimenter reminded the children that they were to be very quiet and not clap or cheer during the testing session. The children were told that they were to model the adult observer and act just like she did. The experimenter and the adult observer accompanied the group of children to the test area. A bench or chairs for the audience were placed to the side of the performer and experimenter at a distance of 8-10 feet. The experimenter verbally reinforced the audience throughout the test session for sitting quietly and watching the performer. The group was given a verbal description and demonstration of the test items by the experimenter.

Prior to group testing the order in which the children were called upon to perform test items was randomly decided for each test item. When a child's name was called by the adult observer he or she left the audience, went to the test area, (mat, running space, or jumping area) and performed the test item before the audience. After being tested the child went back and rejoined the audience. The shuttle run activity differed from the sit-up and standing long jump in that the children ran in pairs, which resulted in an audience composed of four rather than five individuals, who each

child would be paired with was randomly decided prior to testing. After the test session the experimenter and adult observer accompanied the children back to their classroom.

A female adult observer was utilized at all six schools. Her duties were outlined and discussed with the experimenter prior to meeting the children. The main duty of the adult observer was to help keep the children quiet. She sat in the middle of the audience. When a child began to whisper or talk she would pat them on the back or leg and signal to be quiet. The adult observer was instructed to avoid smiling or interacting with the subjects as much as possible. She was to look interested, but be reserved as she observed the subjects perform. The adult observer wrote down the scores for the standing long jump and shuttle run after the experimenter announced them. The experimenter recorded the sit-up scores.

The adult observer's behavior was extremely consistent throughout all six group testing sessions. The children responded well to the group session and did an excellent job of working as a passive audience. Group testing was conducted without major incident or disruption.

The experimenter gave specific starting cues in both group and individual test sessions for each of the three test items. The cue for the sit-up was "I am going to time you. When I start the watch I will say, 'Ready?, Go!' Do as many sit-ups as you can as fast as you can.

You will have one minute. 'Ready,? Go!'" The starting cue for the shuttle run was, "I am going to time you. When I say, 'Ready, Go!,' run as fast as you can. 'Ready, Go!'" The starting cue for the standing long jump was "Jump out here, jump way out here," (experimenter patted measuring tape at the 4 or 5 foot mark).

The experimenter announced the scores that the performers attained immediately after their performance in both group and individual test sessions. The standing long jump scores were announced in inches and quarter inches. The shuttle run scores were announced in seconds and tenths of seconds. During the sit-up performance the experimenter counted aloud as the children performed. The experimenter held the feet of each subject during the sit-ups in order to keep the soles of the feet in contact with the mat.

The experimenter attempted to verbally, mildly encourage all subjects in both the group and individualized settings. Two comments were given to each child for each effort. Typical comments were, "good job," "thank you for working so hard," "nice jumping," and "good trying." Efforts were made by the experimenter to keep the voice inflection and enthusiasm with which the comments were given consistent throughout the experiment. The experimenter attempted to sound sincere but not excited. It was important to verbally encourage the EMR students because they are used to being praised for their efforts at school.

Giving no comments at all would very likely have been viewed by the children as a negative response from the experimenter.

All necessary equipment was brought to each testing session including: tape measure, stop watches, sit-up mat, chalk erasers (2x2x4 inches) for the shuttle run, and a bench for the spectators. The same equipment was used throughout the study.

Analysis of Data

Since the two sets of data (test scores from group and individualized testing) were gathered from the same sample population, a paired t test was utilized for analyzing the data (Pfaffenberger, Patterson, 1977). The following null hypotheses were tested:

1. There is no significant difference in sit-up scores between group and individualized testing with EMR children.
2. There is no significant difference in shuttle run scores between group and individualized testing with EMR children.
3. There is no significant difference in standing long jump scores between group and individualized testing with EMR children.

The paired t statistic requires that only two sets of data be compared at one time. Therefore, in comparing

group with individual trials, it was necessary to have only one set of data to represent group trials and one set of data to represent individual trials.

Mean scores for group and individual performances on the shuttle run and standing long jump were computed. Taking the mean rather than the best score on multiple-trial items will give a more precise representation of the child's true score (Baumgartner, 1974; Kroll, 1967).

To determine the statistical significance of the three hypotheses the null hypothesis was utilized. The level of significance at which the hypotheses were to be rejected was selected at the .05 level and was evaluated by a two-tailed test. The .05 level of significance was selected due to the nature of the study.

CHAPTER IV

RESULT AND DISCUSSION

The purpose of this study was to determine the effect of a passive audience on fitness test scores of educable mentally retarded (EMR) children. A statistical analysis of the results of the study and an interpretation of these results are presented in this chapter.

Results

Description of Subjects' Performance

The study compares two separate conditions for the performance of three fitness test items. Therefore, six separate sets of scores and six separate performances were generated from the study. The mean, standard deviation, maximum value, minimum value, and range for each of the six performances are listed in Table III.

Comparisons were made between the performance of subjects in this investigation and performance data of similar populations. National norms for EMR children ages 8-12 years on standing long jump and shuttle run performances are reported in the American Alliance for Health, Physical Education, and Recreation Special Fitness Test Manual for Mildly Retarded Persons (AAHPER SFT, 1976). The norms developed by AAHPER for both standing long jump and shuttle

TABLE III. DESCRIPTIVE STATISTICS

	MEAN	SD	MAXIMUM VALUE	MINIMUM VALUE	RANGE
Standing Long Jump					
Group	43.39	10.25	66.67	18.17	48.50
Individual	42.11	10.82	68.33	18.33	50.00
Shuttle Run					
Group	13.76	1.48	18.75	11.00	7.75
Individual	15.01	1.69	19.15	11.70	7.45
Sit-up					
Group	27.90	8.49	48.00	5.00	43.00
Individual	23.66	8.41	41.00	0.00	41.00

run performances were generated by taking the best score of the three trials allowed for the standing long jump and the best score of the two trials allowed for the shuttle run. Therefore, in this study the subjects' best scores on multi-trial items were used in comparing performances with the national norms. The comparisons are presented in Appendices C and D.

Subjects' performances ranged from 0-96th percentile on group standing long jump. There were 15 subjects at or above the 50th percentile and 15 subjects below the 50th percentile. Subjects' performances ranged from the 0-97th percentile on individual standing long jump, with 14 subjects at or above the 50th percentile and 16 subjects below the 50th percentile.

The group shuttle run performances ranged from the

2-85th percentile. There were 16 subjects at or above the 50th percentile and 14 subjects below the 50th percentile. Subjects' performances on individual shuttle run ranged from the 1-57th percentile. Percentile scores were much lower for the individual shuttle run, with only 4 subjects having scores at or above the 50th percentile and 26 subjects having scores below the 50th percentile.

The AAHPER Special Fitness Test includes a description of extended rather than flexed leg sit-ups. Subjects in the present study performed flexed leg sit-ups. Therefore, a comparison of subjects' scores on flexed leg sit-ups with national norms developed for extended leg sit-ups would not constitute a realistic comparison. The AAHPER Youth Fitness Test (AAHPER YFT, 1976) includes flexed leg sit-ups as one of its fitness test items. National norms have been developed for normal children ages 9-17 years for flexed leg sit-ups. While there may be some problems in comparing an EMR population with a normal population, the AAHPER Youth Fitness Test norms are the most appropriate standard for comparison available at the present time. Mentally retarded children have been found to perform significantly lower on tests of physical and motor fitness (Fait, 1978). Nevertheless, a comparison of sit-up performance of the subjects was made to the AAHPER Youth Fitness Test national norms and is presented in Appendix E.

Group sit-up performance yielded 11 subjects who

were at or above the 50th percentile and 13 subjects who were below the 50th percentile. The group sit-up performance scores ranged from the 4-96th percentile. The subjects' performance percentiles were much lower when they were tested individually. Only 5 subjects were above the 50th percentile while 19 subjects were below the 50th percentile. No age-norms were given in the AAHPER Youth Fitness Test for 8 year olds, and separate norms for boys and girls were not presented.

Large differences were observed between the number of subjects scoring at or above the 50th percentile in group versus individual testing on sit-ups and the shuttle run. These same differences did not appear in the group and individual percentiles for the standing long jump.

Hypothesis Testing

The Statistical Interactive Programming System at the Oregon State University Computer Center was used in analyzing the data. The paired t statistic was used to test the three hypotheses of the study. A paired t test requires that only two sets of data be compared at one time. Therefore, in comparing group with individual trials, it was necessary to have only one set of data to represent group trials and one set of data to represent individual trials. Mean scores for group and individual performances on multi-trial items were computed. Results of the hypothesis

testing are presented in Table IV.

TABLE IV. MEAN AND t SCORES OF GROUP AND INDIVIDUAL PERFORMANCE

	df	GROUP MEAN	INDIVIDUAL MEAN	COMPUTED t	TABULAR t $\alpha = .05$
Standing Long Jump	29	43.39	42.11	1.82	2.045
Shuttle Run	29	13.76	15.01	8.09	2.045
Sit-up	28	27.90	23.66	6.72	2.048

The group standing long jump mean was superior to the individual standing long jump mean. However, no significant difference existed between group and individual performance on standing long jump scores at the .05 level, as indicated by the t values presented in Table IV.

A significant difference existed between group and individual shuttle run performance. The mean time for group performance was significantly lower than the mean time for individual performance.

A significant difference existed between group and individual test scores on sit-up performance. The difference favored group performance at the .05 level of significance.

Thirty children were originally tested on sit-ups. One subject complained of abdominal pain to her teacher

after one of the test sessions and was absent the following day due to illness. Therefore, her sit-up scores were deleted from the data, which gave a total n of 29. There are fewer degrees of freedom for sit-ups than for the other two test items.

Discussion

The 30 subjects in the present study demonstrated a wide range of ability levels. Fitness test scores obtained in the group testing environment resembled a normal distribution. Approximately half of the subjects scored above the 50th percentile and approximately half of the subjects scored below the 50th percentile for all three test items.

When tested in a group situation, the subjects' test results were within the limits of what might be expected from the normal population. When tested individually, subjects' scores were below what might be expected of the normal population for the sit-up and shuttle run. The individual standing long jump percentile scores were nearly identical to the group standing long jump percentile scores. For individual standing long jump performance, 47% of the subjects were at or above the 50th percentile and for the group standing long jump performance 50% of the subjects were at or above the 50th percentile. For group shuttle run performances 53% of the subjects were at or above the 50th percentile. However, for individual shuttle run

performances only 13% of the subjects were at or above the 50th percentile. For group sit-up performances 46% of the subjects who were compared to the national norms given by the AAHPER Youth Fitness Test were at or above the 50th percentile. Only 21% of the same group of subjects were at or above the 50th percentile when their individual performances were compared to national norms.

Standing Long Jump

Results of this study indicated that standing long jump performance was not significantly influenced by the presence of a group ($t(29) = 1.82$, $p > .05$). The standing long jump is intended to measure the explosive muscle power of leg extensors (AAHPER SFT, 1976). However, timing, coordination, and a high degree of jump skill have been reported to be key factors to successful standing long jump performance (Dunn, 1978; Glencross, 1966). Thus in addition to explosive muscle power of leg extensors, a number of complex movements must be pyramided in rapid succession in order to achieve success. The standing long jump could therefore be classified as a complex motor activity and, in accordance with Zajonc's (1965) hypothesis, it would not logically be expected to be sensitive to the influence of a group.

There was a great deal of variability observed in standing long jump performance and a high degree of

inconsistency noted within subjects. The variability noted within subjects could be due to the reliability of standing long jump performance. Dunn (1978) found the reliability of standing long jump performance over a four day period to be very low (R=.49) and stated that the use of the standing long jump as a measure of physical fitness of mentally retarded men is questionable. Because of the nature of the task, perhaps the standing long jump should not be included in a physical fitness test battery but used instead as a measure of complex motor skill.

Subjects in the present investigation appeared to exhibit a greater degree of muscular tension, nervousness, fidgeting, and hesitancy when performing the standing long jump than in either the sit-up or shuttle run performances. Also, jumping style and form varied considerably among the 30 subjects.

Shuttle Run

The shuttle run is reported to assess speed and agility (AAHPER SFT, 1976). The shuttle run was the only fitness test item which involved coaction in the group testing environment. Subjects were able to visually assess their progress in relation to another child during performance. Subjects in the present study had little difficulty in performing the task. Running is a task which EMR children ages 8-12 years have had ample opportunities to

practice and is a well learned response. The change of direction involved in the shuttle run presented no observable confusion to the performers.

Consistently faster times were recorded when subjects performed the shuttle run with a partner before a passive audience. Results of this study indicated that a significant difference ($t(29) = 8.09$, $p < .05$) between group and individual performances. The shuttle run t value was the largest t value obtained in the study and also significant at the .001 level. The mean of the two trials given in the group testing environment was faster than the mean of the two trials given in the individual testing environment for all 30 subjects.

Sit-up

The sit-up test was designed to measure the efficiency of abdominal and hip flexor muscles (AAHPER YFT, 1976). A significant difference existed between group and individual performance on sit-ups ($t(28) = 6.72$, $p < .05$), which was also significant at the .001 level. The mean of group performance was superior to the mean of individual performance. The sit-ups were the most fatiguing task which the subjects were asked to perform, as was evidenced in increased respiration and redness of the face. Signs of stress were evident through facial expressions of the performers.

The presence of a group appeared to motivate the subjects to withstand the stress associated with higher performances. Of the 29 subjects tested, 90% had higher scores when performing before a passive audience. If it is assumed that Zigler's (1966) hypothesis (that the EMR child is outer-directed) is correct, then it seems logical to conclude that the EMR child is more likely to endure the stresses associated with intense physical exertion when performing in the presence of an audience. The lower scores on sit-up performance from individualized testing may be due to the mentally retarded child's lack of intrinsic interest in high scores and lack of motivation to continue a maximum effort while in a state of physical stress.

Group Dynamics

Observations made by students' behavior in the present study concur with findings and conclusions reported by other researchers. Subjects in the group testing environment were observed making frequent glances at the audience by both the experimenter and adult observer. This behavior may lend support to Cottrell's (1972) contention that the presence of others is drive increasing only when it produces self-consciousness, evaluation, and apprehension about performance with an anticipation of later praise or criticism. The subjects in the present study looked to the passive audience for some type of feedback even though they

had been told that there would be no verbal interaction.

Zigler's (1966) hypothesis states that the EMR child is outer-directed and looks to the environment for cues to action. Theoretically, the group testing environment presented a greater number of cues for action than the individualized testing environment. There was a greater amount of sensory stimulus present in the environment with the addition of a passive audience than was present in the individualized testing environment.

Summary

In the present study, the presence of a passive audience resulted in more optimal performances for EMR subjects on sit-up and shuttle run tests. The presence of a passive, attentive audience did not result in an increase in standing long jump performances. Results of this study lend empirical support to Zajonc's (1965) hypothesis that "Simple motor responses are particularly sensitive to social facilitation effects" (p. 269). Reasonably simple motor responses were necessary to execute the sit-up and shuttle run tasks while performance of the standing long jump required a high degree of motor skill and coordination.

In conclusion, a response to the three questions which concluded Chapter III based on the results of the present study will be presented.

1. Is the EMR child motivated to give a more maximal performance when observed by or coacting with his peers?

The influence of an audience or coactors on performance is dependent on the nature of the task. If the task requires a simple motor response, as was the case for sit-up and shuttle run performance, the presence of a group or coactors served to motivate the EMR child to give a more maximal performance. The standing long jump performance, which required a complex motor response, was not influenced by the presence of a passive audience.

2. Can fitness testing done individually be realistically compared to fitness testing done in a group?

Significantly different results were obtained from the same group of children when the variables of group versus individualized testing were manipulated on performance of the sit-up and shuttle run. All subjects scored higher on shuttle run when performing in the group and 90% of the subjects increased their sit-up performances when performing before a passive audience. Therefore, fitness testing done on an individualized basis on items which require simple motor responses cannot be realistically compared to fitness testing done in a group testing environment. From the results of this study, test items which require a complex motor response may not be influenced by the presence of a passive audience and thus realistic

comparisons may be possible.

3. Should research dealing with physical and motor fitness testing of EMR subjects include a description of the number and type of individuals present during testing?

Research articles dealing with the physical and motor fitness testing of EMR subjects on test items which require a simple motor response should include a description of who was present in the testing environment. Results of this study indicated that individualized testing of EMR children on sit-up and shuttle run did not provide an accurate assessment of the children's ability level. In a testing situation, it is assumed that the subject tested is giving a response that is representative of his true ability level. Research indicates that EMR children often need some additional prompting in order to elicit maximal or near maximal performances. The presence of a passive audience has been demonstrated to aid in eliciting more maximal performances from EMR children on fitness test tasks which require simple motor responses. Therefore, it would be helpful for researchers who investigate physical fitness parameters of EMR children to give some thought to the method of obtaining test scores which reflect the children's ability level. This is a very complex question and necessitates a great deal of additional research.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary

The Education for All Handicapped Children Act of 1975, PL 94-142, has caused physical educators to critically examine the quality of physical education programs developed to meet the unique needs of handicapped children. One of the basic foundations of quality program development is careful assessment of student capabilities. Accurately evaluating or testing mentally retarded children is a challenging task. Numerous variables interact within the total testing process to affect test results.

Little research is available as to the effect of an audience on test performance of educable mentally retarded (EMR) children. The purpose of this study was to determine if passive peer group presence had a significant effect on the performance of three selected fitness test items with EMR children.

Thirty EMR children were randomly selected from six elementary schools in the Portland metropolitan area to serve as subjects in the study. The subjects ranged in age from 8-12 years. Twenty subjects were male and ten subjects were female. All subjects were free of major orthopedic and sensory impairments.

Subjects were tested on three fitness test items from the American Alliance for Health, Physical Education, and Recreation Special Fitness Test (AAHPER SFT, 1976). The test items were sit-up, shuttle run, and standing long jump. Sit-up performance was recorded as the number of sit-ups performed in 60 seconds. Shuttle run performance was recorded in seconds and tenth of seconds and was the mean score of the two trials given. The total running distance for each trial was 40 yards. Three trials were given for the standing long jump, and the mean of the three efforts represented the child's score. The standing long jump performances were measured to the nearest quarter inch.

Subjects were tested twice on the three fitness test items. In one test session the experimenter and the child were the only individuals present in the testing environment. In another test session the experimenter and the child worked before a passive audience composed of four of the child's peers and one adult observer. Six different schools were involved in the study. Five children were randomly selected at each of the six schools to participate in the study. Each group of five children were utilized as subjects and as a passive audience for group testing. Therefore, during group testing the children took turns being the performer and being a part of the passive audience.

The passive audience, which was utilized only during group testing, did not verbally interact with the performers.

The audience was seated on a bench or on chairs 8-10 feet from the performer. An adult observer sat with the children and modeled appropriate behavior. One test item, the shuttle run, involved coaction in the group testing environment as two children ran together. Therefore, for the shuttle run, there were four rather than five individuals in the passive audience.

Three of the schools (representing 15 subjects) were first tested individually and then tested in a group, while the other three schools received group testing before individual testing. There were six possible orderings of the three fitness test items. Each school was randomly assigned one of the six orderings.

One set of scores was obtained from the subjects' individualized testing and another set of scores was obtained from the subjects' group testing. Since the two sets of scores came from the same individuals, the paired t statistic was utilized in analyzing the data and testing the three hypotheses of the study. Significance at the .05 level was required to reject the null hypotheses. A summary of the hypotheses tested is presented in Table V.

Significantly different results were obtained from the same group of children when the variables of group versus individualized testing were manipulated on the performance of the sit-up and shuttle run. Test scores from the group testing environment were superior to test

TABLE V. SUMMARY OF THE RESULTS AND CONCLUSIONS

HYPOTHESIS	RESULTS	CONCLUSION
1. There is no significant difference in sit-up scores between group and individualized testing with EMR children	A significant difference existed between test scores obtained from group testing and test scores obtained from individual testing on sit-ups.	The hypothesis was rejected
2. There is no significant difference in shuttle run scores between group and individualized testing with EMR children.	A significant difference existed between test scores obtained from group testing and test scores obtained from individual testing on the shuttle run.	The hypothesis was rejected.
3. There is no significant difference in standing long jump scores between group and individualized testing with EMR children.	No significant difference existed between test scores obtained from group testing and test scores obtained from individual testing on the standing long jump.	The hypothesis was tenable.

scores from the individualized testing environment. No significant difference was observed between group standing long jump test scores and individual standing long jump test scores.

The influence of an audience or coactors on performance was dependent on the nature of the task. If the task required a simple motor response, as was the case for sit-up and shuttle run performance, the presence of a group or coactors served to motivate the subjects to give more maximal performances. The standing long jump, which required a complex motor response, was not influenced by the presence of a passive audience.

When conducting fitness testing with EMR children, the physical educator needs to consider two major variables: (1) whether the test necessitates a simple or complex motor response, and (2) whether the students could be motivated to give more maximal performances if a group were present. The physical education teacher involved in Individualized Education Program development needs to take into consideration sociological as well as physiological variables when attempting to plan effective instruction for students.

Recommendations

The following are recommendations for further study:

1. A study similar to the present study should be conducted utilizing an active, verbally supportive

audience.

2. The use of a variety of tangible reinforcers as motivators for eliciting more maximal performances from EMR children should be studied.

3. A study similar to the present study which compares the responses of EMR children and normal children to the influences of social facilitation should be conducted.

4. A study similar to the present study should be conducted utilizing fitness test items other than those used in the present study.

5. A study similar to the present study which compares the effect of social facilitation on high versus low performers should be conducted.

6. A study similar to the present study which compares the effect of social facilitation on boys versus girls should be conducted.

7. The interactions and behaviors of the experimenter in an individualized versus group testing environment should be studied.

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APPENDIX

APPENDIX A

SAMPLE LETTER TO PARENTS

Dear Parents:

I am a graduate student at Oregon State University working on a master's degree in education. At present I am conducting a study to see if physical fitness test scores obtained in a group situation are different from fitness test scores obtained in a one-to-one situation. The children who participate in the study will be tested on three fitness items which include sit-ups, standing long jump, and shuttle run. The children will be tested once in a group of five and once individually. A description of the test is included.

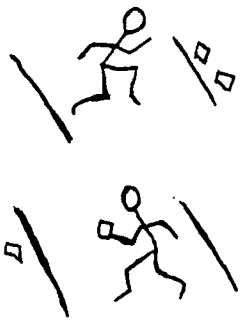
These fitness test items are ones that your child may be familiar with because they are often used in elementary schools. The test items are from the American Alliance for Health, Physical Education, and Recreation Special Fitness Test. The AAHPER SFT has been given to thousands of school age children across the United States.

I would like to ask permission for your child to participate in the study. The name of your child will not be recorded with test results and confidentiality will be strictly enforced. Also, your child may withdraw from participation at any time he or she chooses.

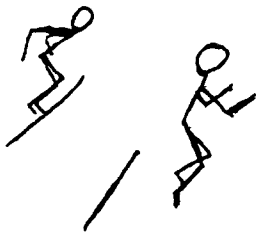
My past experiences in working with children include three years of teaching in an elementary school. I have also worked as a volunteer teacher's aid in a program for developmentally disabled preschoolers. I enjoy working with children and am looking forward to this project.

I will be happy to answer any questions regarding the study that you may have. If you request, I will also be happy to send you a summary of the results of the study.

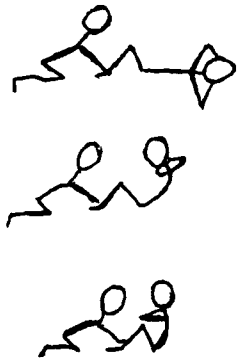
Selected Items from AAHPER SFT



Shuttle Run. Two parallel lines are placed 30 feet apart. Behind one line are placed two blocks of wood. Behind the other line stand the student. On the signal "Ready? Go!" the student runs to the blocks, picks up one, runs back to the starting line, and places the block behind the line. Student then runs back and picks up the second block, which is carried back across the starting line. The score is the elapsed time between the starting signal and the moment the student crosses the finish line. Two trials are allowed.



Standing Long Jump. Student stands with toes just behind a takeoff line. Before jumping, the student swings the arms backward and bends the knees. The jump is performed by straightening the knees and swinging the arms forward. The distance is measured from the takeoff line to the back of the heel nearest the takeoff line. Three trials are allowed.



Sit-up (flexed leg). The student lies on his back with his knees bent, feet on the floor. The student puts his hands on the back of his neck with fingers clasped and places his elbows squarely on the mat. His feet are held by a partner to keep them in touch with the mat. The student tightens his stomach muscles and brings his head and elbows forward as he curls up, finally touching elbows to knees. This action constitutes one sit-up. The student returns to the starting position with his elbows on the mat before he sits up again. The number of correctly performed sit-ups in sixty seconds shall be the score.

I give permission for my child to participate in the AAHPER Special Fitness Test Study.

Signed: _____

I do not give permission for my child to participate in the AAHPER Special Fitness Test Study.

Signed: _____

I would like more information. Please call. Phone _____

Signed: _____

Date: _____

After you have read and understand this letter of informed consent, please indicate your decision, sign, and date.

Thank you.

Sincerely,

Ruth Bowman
Graduate Assistant
Department of Physical Education
Oregon State University
Phone 754-3222

Dr. John M. Dunn
Associate Professor
Department of Physical Education
Oregon State University
Phone 754-2631

APPENDIX B

OREGON STATE UNIVERSITY

Committee for Protection of Human Subjects

Summary of Review

Title: Effect of Peer Group Presence on Selected Psychomotor Measurements with Educable Mentally Retarded Children.

Program Director: John M. Dunn (Ruth A. Bowman)

Recommendation:

_x_ Approval

___ Provisional Approval

___ Disapproval

___ No action

Remarks:

Date: July 6, 1978 Signature

J. Ralph Shay
Assistant Dean of Research
Phone: 754-3437

cc: Don MacDonald

mep

APPENDIX C

COMPARISON OF SUBJECTS' SHUTTLE RUN PERFORMANCES TO NATIONAL NORMS

Percentile from AAHPER SFT/Test Scores in Seconds and Tenths

SUBJECT	AGE	SEX	GROUP SCORE	PERCEN-TILE	INDIVIDUAL SCORE	PERCEN-TILE	50th PER-CENTILE
1	8	F	13.9	73rd	16.6	22nd	15.0
2	8	F	15.0	50th	15.7	36th	15.0
3	8	F	14.2	67th	17.5	6th	15.0
4	8	M	12.4	85th	14.1	47th	14.0
5	8	M	13.8	52nd	15.0	30th	14.0
6	8	F	14.4	62nd	16.5	23rd	15.0
7	9	M	12.9	55th	14.5	31st	13.1
8	9	F	13.5	53rd	14.6	43rd	14.2
9	9	M	13.0	53rd	15.7	14th	13.1
10	9	M	12.5	63rd	14.4	29th	13.1
11	9	F	15.2	33rd	16.0	17th	14.2
12	9	F	12.8	78th	14.2	50th	14.2
13	10	M	13.8	26th	14.4	15th	12.6
14	10	M	13.3	33rd	13.9	25th	12.6
15	10	M	13.6	27th	14.5	12th	12.6
16	10	M	13.3	33rd	14.0	22nd	12.6
17	10	M	12.6	50th	14.6	9th	12.6
18	10	F	12.0	80th	12.8	57th	13.3
19	11	M	13.0	23rd	14.5	7th	11.9
20	11	M	11.5	63rd	11.8	55th	11.9
21	11	M	12.8	25th	14.5	7th	11.9
22	11	M	14.6	6th	16.0	2nd	11.9
23	11	M	12.4	35th	12.8	25th	11.9
24	11	F	12.6	57th	14.2	17th	12.9
25	11	M	13.2	20th	13.2	20th	12.9
26	12	M	15.0	4th	15.8	4th	11.6
27	12	F	18.5	2nd	19.0	1st	12.2
28	12	M	13.5	13th	14.5	6th	11.6
29	12	M	13.0	17th	13.3	14th	11.6
30	12	M	11.0	70th	11.5	53rd	11.6

APPENDIX D

COMPARISON OF SUBJECTS' STANDING LONG JUMP PERFORMANCES TO NATIONAL NORMS

Percentiles from AAHPER SFT/Test
Scores in Feet and Inches

SUBJECT	AGE	SEX	GROUP SCORE	PERCEN-TILE	INDIVIDUAL SCORE	PERCEN-TILE	50th PER-CENTILE
1	8	F	2'8"	35th	2'6"	30th	3'1"
2	8	F	3'7"	73rd	3'6"	70th	3'1"
3	8	F	3'4"	63rd	2'9"	40th	3'1"
4	8	M	3'11"	80th	3'8"	70th	3'4"
5	8	M	4'2"	87th	4'2"	87th	3'4"
6	8	F	3'	48th	3'1"	50th	3'1"
7	9	M	2'9"	18th	2'10"	20th	3'10"
8	9	F	3'4"	50th	3'11"	77th	3'4"
9	9	M	3'9"	45th	4'	60th	3'10"
10	9	M	3'4"	32nd	3'5"	34th	3'10"
11	9	F	3'4"	50th	3'3"	45th	3'4"
12	9	F	4'4"	95th	4'4"	95th	3'4"
13	10	M	3'1"	17th	3'	15th	3'11"
14	10	M	4'5"	65th	3'9"	40th	3'11"
15	10	M	3'10"	45th	3'8"	37th	3'11"
16	10	M	4'3"	60th	4'1"	55th	3'11"
17	10	M	4'	53rd	3'10"	45th	3'11"
18	10	F	5'4"	96th	5'6"	97th	3'10"
19	11	M	3'8"	20th	3'10"	25th	4'6"
20	11	M	5'4"	85th	5'9"	95th	4'6"
21	11	M	3'1"	8th	3'1"	8th	4'6"
22	11	M	3'11"	27th	3'1"	8th	4'6"
23	11	M	4'7"	55th	4'9"	60th	4'6"
24	11	F	4'5"	67th	4'1"	55th	4'0"
25	11	M	4'	30th	3'7"	18th	4'6"
26	12	M	3'6"	9th	4'1"	23rd	4'10"
27	12	F	1'10"	0	1'10"	0	4'3"
28	12	M	4'5"	33rd	4'4"	30th	4'10"
29	12	M	4'9"	45th	5'1"	65th	4'10"
30	12	M	5'6"	85th	4'11"	55th	4'10"

APPENDIX E

COMPARISONS OF SUBJECTS' SIT-UP PERFORMANCES TO NATIONAL NORMS

Percentiles from AAHPER YFT/Test Score in Number of Sit-Ups*

SUBJECT	AGE	SEX	GROUP SCORE	PERCEN-TILE	INDIVIDUAL SCORE	PERCEN-TILE	50th PER-CENTILE
7	9	M	30	53rd	29	50th	29
8	9	F	24	30th	20	17th	29
9	9	M	27	40th	21	20th	29
10	9	M	31	55th	27	40th	29
11	9	F	24	30th	23	27th	29
12	9	F	26	37th	19	15th	29
13	10	M	26	37th	23	27th	29
14	10	M	37	78th	32	60th	29
15	10	M	30	53rd	26	37th	29
16	10	M	27	40th	27	40th	29
17	10	M	33	65th	25	35th	29
18	10	F	39	83rd	37	77th	29
19	11	M	31	50th	30	45th	31
20	11	M	48	96th	41	85th	31
21	11	M	18	11th	13	6th	31
22	11	M	18	11th	15	8th	31
23	11	M	30	45th	24	25th	31
24	11	F	37	73rd	27	35th	31
25	11	M	27	35th	16	9th	31
26	12	M	22	20th	20	15th	31
27	12	F	5	4th	0	0	31
28	12	M	20	15th	16	21st	31
29	12	M	39	80th	40	83rd	31
30	12	M	37	73rd	29	40th	31

*Norms were not available for 8 year olds.