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By-Ross, Sheila A.

A Study of the Effects of an Intensive Training Program on the Motor Skills of Young Educable Mentally Retarded Children. Final Report.

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In a study on improvement of basic motor skills by educable mentally retarded (EMR) children with special training in a sport and game situation, 21 EMR boys and 19 EMR girls (aged 4-1 to 10-1) were divided into an experimental and a control group, matched by chronological age, IQ, sex, and pretest scores on the Basic Skills Test (reliability .97) and the Brace Test Items (eight items were used on this test of general motor skills). An average group (nine boys and 11 girls, 4-10 to 9-7, IQ range 90 to 110) also served as a control. The experimental group received 20- to 25-minute training three times a week for 6 months on these skills; hitting, catching, throwing, running, jumping, bouncing, kicking, hopping, skipping, balancing, and target-throwing. The two control groups remained in the regular physical education programs for EMR and average children. On the two tests, the EMR groups did not differ significantly on pretest scores, but both differed significantly ($p=.001$) from the average control group. Upon posttesting, the two EMR groups did not differ on the Brace Test; the EMR experimental group differed significantly ($p<.001$) from the control group on the Basic Skills Tests; and the average group did not differ significantly from the experimental group. (Author/SN)

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U.S. DEPARTMENT OF

HEALTH, EDUCATION, AND WELFARE

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Sheila A. Ross

Palo Alto Medical Research Foundation
Palo Alto, California

November, 1967

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U.S. DEPARTMENT OF

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Summary

In developing educational programs for young mentally retarded children the tendency has been to develop curricula that replicate, at a lower level, the predominantly academic curricula for children of average intelligence. The assumption underlying the use of these curricula is that a considerable amount of non-academic learning has been acquired in the preschool years. Academic curricula are appropriate for the normal child, but they are inappropriate for the retarded child because he usually is unable to progress in the non-academic areas without formal training.

At the elementary school level, the non-academic areas of concern here are primarily social areas involving interaction in the form of play with other children. Informal play with other children offers the child opportunities to learn how to get along with other children, to experience the satisfaction of acceptance by the peer group, and to increase competence in a number of other areas.

The retarded child has limited experience in playing with other children. He does not acquire the social skills ordinarily acquired in preschool play and the rudimentary motor skills, which are important in play activities, develop at a slower rate. As the general and specific game skills of his chronological peers become increasingly advanced, he falls farther behind, and consequently, the trend is to a further reduction in the amount of interaction with peers. As a first step in reversing this trend, the retarded child should acquire some proficiency in the games and sports played by his peers.

The research described in this report was designed to increase the young, educable, mentally retarded child's motor skills by means of a training program in which skills basic to the games and sports commonly played by children in the elementary grades were taught in a game context.

The hypothesis tested was that retarded children in the training program would improve in these skills to a point above that of retarded children in the regular school physical education program.

Two groups of children, mentally retarded and average, participated in this experiment. The mentally retarded children were assigned to either the Experimental Group (n=20) or the Control Group (n=20), the groups not differing on CA, IQ, sex, or two pre-training measures of motor skill. The Average Group (n=20) provided

test data that were used as a basis for evaluating the progress of the Experimental Group following the latter's participation in the training program.

The results of the pre-testing showed that retarded children were far behind their chronological peers of average intelligence in the performance of both specific motor skills basic to playing games and sports commonly played by elementary school children and also general motor skills.

With training, the retarded children in the Experimental Group were able to improve markedly in both specific and general motor skills. The improvement in specific motor skills brought their mean score to a point which did not differ statistically from the mean score of the Average Group. The improvement in both categories of skill brought the mean total score of the Experimental Group to a point well above that of the mean total score for the Control Group. The Control Group failed to improve in the specific or general motor skills measured i this project, having participated in the regular school physical education program for retarded children.

The implications drawn from the data are that (1) the young, educable, mentally retarded child in a school setting would benefit from the inclusion in the curriculum of a formal training program designed to improve specific motor skills basic to games and sports played in the elementary grades, (2) the special class teacher should assess the motor skills of the child and include remedial training in his program (3) the content and methods currently in use for teaching physical education to retarded children in special classes should be evaluated to determine what positive effects do occur as a result of this training, (4) some thought should be given to earlier training in adult motor skills for social and vocational development, in view of the improvement shown in this study, and (5) data from the assessment of children of average intelligence are useful in providing goals for the training of retarded children, particularly in the area of non-academic skills.

Introduction

In developing educational programs for young mentally retarded children the tendency has been to develop curricula that attempt to replicate, at a lower level, the predominantly academic curricula for children of average intelligence (20).

The academically oriented curriculum is appropriate for the normal child because he is able to acquire many of the essential, but non-academic, skills without formal school training, informal play contacts with other children being the major source of opportunities for learning these skills. These play contacts provide the normal child with opportunities to learn social skills and to develop motor skills. Thus, the formal and informal training to which the normal child is exposed provides him with opportunities to develop in a number of areas.

For the retarded child, the situation is entirely different. This child benefits from the formal academic training offered by the curriculum, but is not able to acquire the essential non-academic skills in the way that normal children do. The retarded child usually has limited experience in playing with other children: he remains at each developmental stage for a longer period than his chronological peers, he spends more time than his peers under adult supervision, and learning to play is a more difficult process for him. Consequently, he does not acquire the social skills ordinarily learned in preschool play and he develops the rudimentary motor skills which are important in play activities at a slower rate, possibly due in part to a lack of practice in using these skills.

The retarded child generally is unable to progress in the non-academic areas without formal training, yet the curricula currently in use allocate very little time to such training, provide a minimum of guidance for the teacher, and fail to emphasize its importance to the child's development.

The non-academic areas are primarily social areas involving interaction in the form of play with other children. Play at the elementary school level is characterized by considerable physical activity for both boys and girls. As one prerequisite for play with other children, the retarded child should acquire some proficiency in the games and sports played by this age group. The skills involved fall into two categories. General game skills have a large component of social learning within a group context. They involve being in a group, knowing the role requirements and expectations of members of the group (the leader, the followers, the winner, the loser, etc.), following the rules of the group, and cooperating with members of the group in goal achievement. Specific game skills at the elementary school level are primarily motor skills which can be acquired by the child outside of the group context. That the

acquisition of specific game skills is an individual matter not requiring the presence of a group is of great importance to the retarded child. It means that the child can begin to learn skills in a situation set up to meet his needs (for example, much repetition, a minimum of distraction, a task broken down into small elements to be learned separately) and that he can be taught individually until he reaches a point at which forming a group would advance his training. In the course of having other retarded children join in the training, the child can acquire some rudimentary general game skills, such as taking turns, and these skills plus the specific game skills which he has learned should greatly facilitate his entry into informal neighborhood play groups. These groups offer the child opportunities to learn how to get along with other children, to experience the satisfaction of being accepted by the peer group, and to increase competence in non-acedemic areas. The effect of these opportunities on the child's self concept is a positive one. It is reasonable to expect that a retarded child who has achieved some competence in the non-academic areas of the type described here would be more likely as an adult to function satisfactorily in groups, than would a retarded adult who has been deprived of this type of training.

This individual and small group training is possibly the only way in which the retarded child would be able to learn general and specific game skills. Unlike the normal child, the retarded child cannot acquire motor skill proficiency through incidental learning from peer models, even when the models are present for long periods of time. Bandura (1,p.257) summarizes some of the conditions for imitation as follows:

> "In order for imitative responses to occur, the model's behavior must be within the perceptual and motor capacity of the observing organism. If the relevant cues are not observed or if the component responses required for reproducing the model's behavior are not available to the imitator, exposure to modeling behavior will have little or no influence on rate of learning."

The stimulus presentation in the typical motor games played by normal children occurs far too rapidly for the retarded child, at best, to do more than imitate in a limited and partial way. To a large extent, the crucial motor elements are unobservable and, in any case, the retarded child usually has some physical limitations. However, if the retarded child acquires some specific and general game skills prior to entry into informal play groups, the play situation becomes far less complex for him. He is able to ignore certain aspects of the situation with which he is already familiar. This gives him the opportunity to observe and imitate other aspects such as verbal and social responses.

The above discussion is based on the assumption that the young educable retarded child can be taught the specific game skills that are necessary in playing the games that are popular with children of elementary school age. There are no reports in the literature

of teaching the young retarded child these game skills. In fact, Kirk (11,p.94) concludes from a review of the literature that "the effects of training in physical education or motor proficiency have not yet been determined...This is an area of research that has been seriously neglected" and Lillie (13) points out that there have been very few investigations of the capacity of retarded children to learn simple and complex motor skills by means of specific motor training programs.

There is evidence from studies of other types of retarded subjects that supports the feasibility of this project:

(1) Mentally retarded children are consistently below normal children of the same chronological age (8,9,10,11,17) in motor skill.
(2) With training and practice retarded children can improve on fine motor skills (12).
(3) Retarded adolescents and adults can improve in physical fitness and on a variety of motor skills (6,9,16).
(4)Retarded adolescents and adults can reach the level of same-age normal subjects if the task is not too difficult (4,7,9).
(5) Even severely retarded adolescents and adults can learn relatively complex motor tasks (19,21).

The above studies provide support for Malpass' (14) opinion that, although educable retarded children are generally less proficient at motor tasks than are normal children, this does not establish that these children cannot learn to perform as well as normal children. Instead, the implication of the studies is that retarded children may be able to improve if more stimulation and better training methods are provided over a longer period of time.

In the present research, two general questions underlie the procedures: What is the level of motor proficiency of the retarded child and the normal child on specific game skills? What is the motor educability of the retarded child on these skills?

An intensive motor skill training program and a related Basic Skills Test were developed. The test and selected items from the Brace Scale of Motor Ability were administered to two categories of children: young, educable, mentally retarded children, who then formed the Experimental and Control Groups, and children of average intelligence whose test scores were used as a basis for evaluating the progress of the Experimental Group following the latter's participation in the six-month training program. The Control Group remained in the regular school program. The hypothesis tested was that the Experimental Group would show a significant improvement in motor skills over the Control Group.

Method

Subjects: Two groups of subjects (Ss), who differed in level of intelligence participated in this experiment. All Ss were free of gross motor, sensory, and emotional defects and were not on any medication that could influence their learning ability.

The 21 boys and 19 girls in the first group were mentally retarded. They ranged in chronological age (C.A.) from four years, one month, to 10 years, one month. The Ss were enrolled in eight preschool and primary classes for the educable mentally retarded in the Children's Health Council of Palo Alto, the Redwood City School District, the Mountain View Elementary School District, and the Palo Alto School District, all in California. These 40 Ss had been given the Stanford-Binet Intelligence Test, Form L-M, or other equivalent measure.

The Ss in the second group were of average intelligence. The nine boys and 11 girls in this group were enrolled in the Bing Nursery School at Stanford University, and the Redwood City School District. They ranged in C. A. from four years, 10 months, to nine years, seven months. The preschool Ss (n=2) in this group had scores between 90 and 110 on the Stanford-Binet Intelligence Test. The elementary school Ss (n=18) all scored between the 50th and 60th percentiles on standardized group test batteries of readiness and ability, given throughout the school system. This group will be referred to as the Average Group. Table 1 contains the descriptive statistics on the Experimental, Control, and Average Groups.

Measures: Two sets of measures, the Basic Skills Test and the Brace Test Items, were administered to all three groups. A copy of the Basic Skills Test and a description of the Brace Test Items are contained in Appendix A.

The Basic Skills Test: The Basic Skills Test consisted of 32 items, each measuring some aspect of a skill basic to participation in the following games and sports commonly played by elementary school children: baseball, hopscotch, four-square, jump-rope, dodge-ball, and ball-kicking games. The skills prerequisite to participating in these activities included hitting, throwing, catching, running, jumping, bouncing, kicking, hopping, skipping,

Table 1

Descriptive Statistics on the Three Groups

Group	n	CA in mos: M	SD	Range	Sex M	F	MA in Mos M	SD	IQ M	SD	Range
Experimental	20	92.50	19.56	53-121	9	11	61.75	10.87	68.40	9.39	48-79
Control	20	90.10	19.91	49-115	12	8	59.80	15.37	66.25	8.88	51-79
Average	20	92.65	15.78	58-115	9	11	(50th to 60th Percentile)				
F ratio (CA)	60	0.12 (n.s.)									
X^2(Sex)	60				1.20 (n.s)						

balancing, and accuracy at target throwing. Each skill was represented by more than one test item. Several groups of items formed clusters with the items within a cluster being ordered in terms of difficulty.

The Brace Test Items: Eight items (M-1, M-2, N-3, N-18, A-2, A-3, B-20, B-21) were selected from the test developed by Brace (2). This test measures general motor ability and is not directly related to a specific set of game skills. The items cover a wide range of difficulty and complexity. The eight items which were selected for this project were those which a retarded child could attempt without undue hazard to himself. The Brace Test Items were included in the project to provide some evidence of the effects of intensive training in specific skills on the performance of general motor skills. Therefore, no training or practice was given on the content of the Brace Test Items during the training program.

Administration of the Measures: The measures were administered to the Experimental, Control, and Average Groups prior to the beginning of the Training Program, and to the Experimental and Control Groups following the Experimental Group's completion of the Training Program. The measures were administered individually to each S in two sessions for the Average Group and in two or three sessions for the Experimental and Control Groups. Some Ss in the Experimental and Control Groups completed a large number of items at a slow rate and so required three sessions. The sessions were approximately 15 minutes in length.

The Experimenter (E) described and demonstrated the item, then watched while the S had a practice turn. The purpose of the practice turn was to ensure that the S understood the task. In the few instances when a S did not understand what was expected, the E demonstrated again followed by a second practice turn by the S. This repetition was seldom necessary: the combination of verbal description was most effective in ensuring that the S understood the task. The S then performed the task a second and third time. On all three turns, the E praised some aspect of the S's performance, regardless of the level of performance. If the turn was completed successfully, a general positive comment was made (for example, "My, you really are good at this."). If the S was unsuccessful on the turn, a positive comment was made about some aspect of the S's effort (for example, "You almost caught the ball, that was a pretty good try.").

A trained assistant helped E when demonstrating the item required two people and also recorded the S's performance on a test blank. The assistant recorded a "1" if the S completed the practice turn successfully and a "0" if he failed. The same recording procedure was followed for the S's second and third turns. When a cluster of items was arranged in order of difficulty, performance on the first item within the cluster (not including the practice turn) determined whether the remaining items in it would be administered. In cases where an item was not administered because the previous related item was failed, the assistant recorded a "_". There were no difficulties in recording the performance of the Ss.

Scoring the Measures: The scoring and recording of each item were done simultaneously and were identical. The reliability of the scoring was determined by having a second trained assistant score concurrently with the first assistant, but independently of her. The two assistants scored a total of 10 tests and were naive as to the experimental status of the Ss. Percent agreement between scorers was 98.8%. Omissions were not scored as agreement. Disagreements were discussed in terms of the scoring standards set up for each item. The scoring standards were explicit so that all disagreements were resolved and were consistent with the established scoring standards. Following the same procedure, the assistants scored the Brace Test Items for eight Ss and percent agreement between scorers was 100%.

The Basic Skills Test had 32 items with one practice turn and two scored turns per item for a total of 64 points. The Brace Test Items had eight items with one practice turn and one scored turn per item, for a total of eight points.

Reliability of the Measures: Following the pre-training administration of the measures, an estimate of the reliability of the Basic Skills Test was obtained by computing the Pearson product moment correlation coefficient for the two scored turns, i.e., the second turn for each item and the third turn for each item, for all Ss in the experiment. The obtained r was .97.

For the complete Brace Scale, Buros (3) reports high test reliability whether the first and second test administration occur on the same day (r = .9) or six months apart (r = .87). In the latter case, the children tested ranged in chronological age from five to nine years. In the present project, eight items were selected from the Brace Scale. The method of administering the items (one practice turn and one scored turn) did not permit the computation of a reliability coefficient comparable to that obtained for the Basic Skills Test and, in any case, the small number of items provided too limited a range to justify computing a Pearson product moment correlation coefficient.

The Training Program: Games and sports commonly played by boys and girls in the elementary grades were analyzed to determine what skills were basic to their play. The major games and sports were baseball, hopscotch, four-square, jump-rope, dodge-ball, and ball-kicking games. The skills selected included hitting, throwing, catching, running, jumping, bouncing, kicking, hopping, skipping, balancing, and accuracy at target-throwing.

General Characteristics of the Training Program which facilitated mastery of the skills were as follows:

(1) Simplicity of verbal instructions with frequent use of demonstration and teacher participation.

(2) The use of games rather than overt drill to provide practice in a skill.

(3) The use of simple games to teach aspects of a standard game: The Ss could not immediately learn a game in its standard form. It was necessary to teach parts of the game as games in themselves and to put the parts together as they were mastered. The simplified versions of the games always conformed to some aspect of the game as it should be played. For example, in the baseball games, first base was always in the correct direction even though it might be only six feet from the plate. Similarly, the vocabulary was correct, so that the S who was hitting was referred to as the batter even if the game only involved hitting a large ball with the hand.

(4) Changing rules of play from session to session: The Ss had to become accustomed to accepting changes in the rules of play because they could not immediately learn the game, or its rules, in its standard form. It was essential that the Ss follow rules in playing games and that the utility of knowing how to follow rules be apparent to them. Each small game was preceded by a brief discussion of the rules. In the early stages of the program, the E decided on one or two simple rules for a game. As the Ss became accustomed to the procedures, the E would have one S be the leader of the game and part of the leader's role would be to decide on the rules. The Ss became accustomed to adapting to changes in rules and were able to grasp the rules quickly and begin play promptly.

(5) The active participation of the S throughout the session: Efforts were made to have all Ss in a session active for almost the entire session. No S had a long turn while the others waited. If an S needed help, E would first set up a quick game for the others in the session, and then would work with the S. For those Ss who needed extensive individual help in a particular skill, such as jump-rope, the E would have two Ss in a session, both needing the same help, and would help one while the other practiced.

(6) The provision of short periods with frequent changes of activity: During a session, three or more different skills were worked on within a game context, in addition to activities to and from the class.

(7) Practice in leadership: When the Ss had learned some simple skills such as catching, hopping, and jumping, activities where one S was leader were introduced. The leader was encouraged to make decisions regarding play, to establish the rules for play, and to reprimand the players for any infractions of the rules. When the level of skill in a particular activity was adequate, all Ss had at least one turn as leader within any one session.

(8) The frequent presence in the group of an adult making the same mistakes as the Ss and providing opportunities for the E to draw attention to and correct the adult's mistakes without criticizing the Ss.

(9) The close relationship between what the retarded child was learning and the games that he saw other children playing: This relationship was an important source of motivation because retarded children obtain great satisfaction from the mastery of skills that normal children take for granted.

General Procedure: Each S had three sessions of from 20-25 minutes each, every week of school for six months. In the early stages of the program, E worked with one or two Ss at a time. This number was increased to a maximum of four within the first month. The sessions were held in either a room separate from the classroom or on the play area outside the classroom. In either case, the walk to and from the classroom was used to provide additional practice in specific game skills.

Sample of Procedure for One Session:

(1) Out to play area: Progressive hopping on right foot, progressive hopping on left foot, jumping on both feet, within the context of Follow the Leader.

(2) Catching and throwing a large ball (12" in diameter) accurately to another person, within the context of Hot Potato (A game in which the Ss stand in a circle, facing one another; each S tries to throw the ball as quickly as possible to any other S, and to hold it for as short a time as possible, because the ball is a "hot potato".)

(3) Jumping over objects and landing correctly on the balls of the feet, in the game context of an obstacle course in which small boxes and other objects are scattered four or five feet apart, the task being to follow the leader in jumping over the objects without touching them.

(4) Kicking a large ball accurately, in the game context of seeing who can get the most goals. Two chairs or other objects (the goal posts) are placed four feet apart, the distance depending on the skill of the group as a whole; the Ss stand in a line facing the goal and kick the ball between the goal posts. Each S keeps track of his own score and the first one to get a specified number of goals wins.

(5) Back to classroom: Each S thinks of a different kind of step (marching, tip-toeing, giant steps, little steps, etc.) and everyone takes turns doing them.

Appendix B contains a description of the general and specific skills for one game, baseball, and samples of the game activities for improving selected specific skills in the game.

Post-Training Testing: At the end of the six-month Training Program, the Basic Skills Test and the Brace Test Items were administered to the Experimental and Control Groups.

Results

The pre-training scores of the retarded children (Experimental Group Mean = 31.50, Control Group Mean = 35.65) were far below those of the Average Group (Mean = 57.50), a finding that is consistent with data from other studies of motor skills (8, 10, et al.). The Experimental and Control Groups did not differ on pre-training scores for the Basic Skills Test, the Brace Test Items, or for the two tests combined. Table 2 summarizes these data. The Experimental and Control Groups did not differ on C.A., IQ, and sex, and the Experimental, Control and Average Groups did not differ on C. A. and sex.

Although the retarded children were at a level of motor skill far below that of normal children, the results of this study indicate that the low level of performance need not be a permanent one. The hypothesis that with training the retarded child can improve in motor skills basic to games played by children of elementary school age was strongly supported. A comparison of the pre-and post-training scores shows that, as a result of participation in the Training Program, the Experimental Group made a marked improvement on the Basic Skills Test ($t = 10.74$, $p < .001$)*, the Brace Test Items ($t = 2.26$, $p < .018$)*, and on the combined scores ($t = 11.82$, $p < .001$)*. By contrast, the comparison of the pre- and post-training scores of the Control Group shows that this group did not improve either in the areas measured by the Basic Skills Test ($t = 1.55$, $p < .14$)** and the Brace Test Items ($t = 0.77$, $p < .45$)**, or in the combined scores ($t = 1.74$, $p < 0.10$)**, having participated in the regular school physical education program for retarded children. Table 3 contains these pre- and post-training comparisons.

When the post-training scores of the Experimental Group on the Basic Skills Test were compared with the scores of the Average Group, the means of the two groups did not differ statistically. Although the Experimental Group had improved significantly on the Brace Test Items, the Average Group remained well ahead of the Experimental Group on the Brace Test Item scores. When the combined scores of the two groups were compared, the Average Group maintained its superiority ($t = 2.08$), although to a lesser degree than had been the case prior to the Experimental Group's participation in the Training Program ($t = 5.88$).

When the mean post-training scores of the Experimental and Control Groups were compared, the two groups did not differ on the Brace Test Items, but the Experimental Group was far superior on the Basic Skills Test ($t = 4.00$, $p < .001$)* and on the combined Basic Skills and Brace Test Items ($t = 3.99$, $p < .001$)*. Table 4 contains the post-training comparisons.

* One-tail test
** Two-tail test

Table 2

Comparison of the Pre-training Scores of the Experimental, Control, and Average Groups

Measure	Group	n	M	SD	t	p
Basic Skills	Experimental	20	30.55	14.51	0.72	0.47
	Control	20	34.35	17.64		
	Experimental	20	30.55	14.51	5.27	.001*
	Average	20	52.80	12.10		
Brace Items	Experimental	20	0.95	1.23	0.66	0.51**
	Control	20	1.30	1.95		
	Experimental	20	0.95	1.23	7.21	.001*
	Average	20	4.70	2.00		
Total Basic Skills and Brace Items	Experimental	20	31.50	15.28	0.74	0.46**
	Control	20	35.65	19.06		
	Experimental	20	31.50	15.28	5.88	.001*
	Average	20	57.50	13.79		

* One-tail test
** Two-tail test

Table 3

Comparison of the Pre-and Post-training Scores for the Experimental Group and for the Control Group

Measure	Group	n	M	SD	t	p
Basic Skills	Exp. Pre-	20	30.55	14.51	10.74	.001*
	Exp. Post-	20	46.60	13.39		
	Con. Pre-	20	34.35	17.64	1.55	0.14**
	Con. Post-	20	36.50	19.41		
Brace Items	Exp. Pre-	20	0.95	1.23	2.26	0.018*
	Exp. Post-	20	1.55	1.70		
	Con. Pre-	20	1.30	1.95	0.77	0.45**
	Con. Post-	20	1.55	1.91		
Total Basic Skills and Brace Items	Exp. Pre-	20	31.50	15.28	11.82	.001*
	Exp. Post-	20	48.15	14.68		
	Con. Pre-	20	35.65	19.06	1.74	0.10**
	Con Post-	20	38.05	20.73		

* One-tail test

** Two-tail test

Table 4

Comparison of the Post-training Scores of the Experimental Group with those of the Control and Average Groups

Measure	Group	n	M	SD	t	p
Basic Skills	Experimental	20	46.60	13.39	4.00	.001*
	Control	20	36.50	19.41		
	Experimental	20	46.60	13.39	1.53	0.20**
	Average	20	52.80	12.10		
Brace Items	Experimental	20	1.55	1.70	0	—— *
	Control	20	1.55	1.91		
	Experimental	20	1.55	1.70	5.34	.001**
	Average	20	4.70	2.00		
Total Basic Skills and Brace Items	Experimental	20	48.15	14.68	3.99	.001*
	Control	20	38.05	20.73		
	Experimental	20	48.15	14.68	2.08	0.05**
	Average	20	57.50	13.79		

* One-tail test

** Two-tail test

Discussion

The Training Program resulted in significant increases in the post-training Basic Skills Test and Brace Test Item scores of the Experimental Group, indicating that the program was an effective one. The Control Group failed to progress on the skills measured in this study as a result of participation in the classroom program prescribed by the curriculum. The difference between the Control Group mean pre-test and post-test scores was a minimal one: one would expect a larger difference if only as a result of maturational change. These results support our contention that the curricula currently in use for retarded children make little allowance for the fact that these children usually are unable to progress in the non-academic areas without formal training that has been developed specifically for them. The results also raise some questions about the content and methods used in the teaching of physical education to the retarded children in special classes.

One weakness in current curricula for educable retarded children is a tendency to associate low difficulty level of a task with content and motivational approaches that are appropriate for very young normal children. For example, singing games involving nursery rhymes and simple motor movements are frequently suggested (15) for elementary school age retarded children. The same skills set in a framework appropriate to the chronological age and sex of the child would be of greater benefit, particularly in the area of the self concept.

The need for appropriate sex role behavior is important particularly for retarded boys, since inappropriate behavior is likely to make the boys a target for teasing. The types of activity frequently recommended for teaching motor skills (5,15) have low appeal to and are somewhat inappropriate for the boys in a class of young mentally retarded children. In the present study, the girls in the Experimental Group played all of the games in either the standard form of the games or close approximations of them. However, the boys had a different emphasis on the games that are regarded as girls' games, jump-rope and hopscotch. Jump-rope was presented as a form of training used by prize-fighters and track men; the hopscotch layout was used to improve target throwing and was not played in its standard form by the boys.

In a review of the literature on motor educability, Malpass (14, p.619) comments that, "Few investigators of motor skills in mental defectives have utilized tests of motor educability devised by physical educators (Brace, Johnson, Espenschade, et al.)... Such tests apparently are deemed not precise enough to evaluate changes in motor performance due to training." An alternative explanation for the failure to use the Brace Scale may be that there are very few items that a retarded child could attempt without undue hazard to himself. In the present study, eight

of the possible 50 items (four from the original Forms A and B, four from the revised forms M and N) were considered to be reasonably safe for the Ss to attempt. It is interesting to note that low hazard items are not necessarily the least difficult. Brace (2, p. 50) weighted the items in Forms M and N on a one to four point scale of increasing difficulty, according to the percentage of Ss (N=451) passing each item. Of the four items used from these two Forms, three received a weighting of one, but one item was weighted as three.

The Brace Test Items were included in order to provide some data on the effects of intensive training on specific skills on performance of general skills. The Brace Test Item post-training scores of the Experimental Group differed significantly from their pre-training scores ($p < .018$), whereas a similar comparison for the Control Group was not significant ($p < .45$). No practice or instruction was given during the Training Program on the tasks covered by the Brace Items. It is reasonable to conclude that participation in the Training Program for specific skills did have some positive effect on the performance of general motor skills. Although the above results are statistically highly significant, the problem of lowered test reliability as a function of the small number of items selected for administration prohibits the drawing of stronger conclusions concerning the effects of the Training Program on general motor skills.

The scoring system used in this project reduced all passed items to the value of "1", regardless of differences among the items. This system made for a more stringent test of the hypothesis that improvement would occur with training, because the effect was to underestimate change in performance by reducing the score value for mastery of the more difficult item tasks to that of mastery of the less difficult items.

A more refined evaluation of the item tasks was considered, since it was apparent that the item tasks differed greatly. The criterion selected for the item evaluation was physiological complexity. Although the choice appears to be an arbitrary one, it was in fact restricted by the limited availability of relevant data. For example, there are no age norm data on the difficulty level of tasks similar to those in the Basic Skills Test. This information would have been of great value in the present study, particularly with the range of chronological age within each group. A second problem concerned agreement among judges on the value to be assigned to the items. It was essential that a level of agreement at least at the .9 level be obtained. As a preliminary step, three judges, all of whom were experienced in the assessment of motor behavior, were asked to evaluate the item tasks and assign each item to one of three categories: high, medium, or low complexity. There was high agreement among the judges on the placement of approximately half of the items and low agreement on the remainder of the items. Disagreement at this preliminary stage precluded further attempts to develop a more refined evaluation of the item tasks.

In the first months of the Training Program, two aspects of the Ss' general game behavior contrasted markedly with the behavior of normal children in game situations. The rate of activity of almost all of the retarded Ss was at a low level: play responses were performed slowly, there were long pauses between turns, the Ss would sit if they could, or lean against the wall if there were no chairs, and by the end of the session most of the Ss appeared tired and made comments about playing so hard, although the demands of the sessions were reasonable ones, with activities planned so that the more strenuous ones were alternated with less strenuous ones. The ability to act as leader was a charactistic lacking in all of the Experimental Group. The Training Program session was highly conducive to encouraging leader behavior: the Ss were playing in a small group with peers, the activities were familiar, and the level of skill was adequate for the task. Yet, for the first month, no S wanted to be a leader, even though being the leader involved very simple tasks such as deciding how many turns everyone would have and what kind of moves (hopping, jumping walking, etc.) should be made. The Ss had clearly had little or no experience in making suggestions to a play group concerning possible activities for the group. The familiar, "Let's play ---" and "Let's do it this way", of normal children's play were absent from the retarded children's repertoire.

The above observations on rate of activity and leadership are subjective in that no standardized ratings were obtained of the Ss' behavior. However, empirical support is provided for these observations in a study by D. Ross (18) in which ratings were made of the playground free-play activity of young educable retarded children who were comparable in C.A. and IQ to the subjects in this study. Time Sample Observations on these children (n = 21) showed that, unless an adult initiated and supervised an activity, the children would spend 75 percent of their time standing still or sitting down. When they did engage in play activity, they moved more slowly than did the normal children in the situation. If an adult urged them to play faster, they complained of fatigue. Their preferred activity appeared to be sitting passively on the sidelines, watching other children play. All but one of these children were extremely reluctant to act as leader in games that were familiar to them. They had to be urged and helped by the adult in the situation. However, following a two-week period in which each of the children successfully served as the leader several times, all of the children became eager, and in some cases demanding, to assume the role of leader.

In the present project, it was encouraging that the Ss improved in both their rate of responding and their ability to direct the activities of the group. Deficits in these two areas were, at least in part, the result of inadequate learning rather than of innate characteristics of the children.

One general explanation for both deficits is that few demands are made of retarded children and expectations concerning their performance are low, not only for academic development but in all areas (11). The children are given much assistance, their activities are planned and supervised by adults, and they are not expected to be responsible for the consequences of many of their actions. This overprotection puts the retarded child at a tremendous disadvantage in interaction with other children. While it provides immediate assurance to the adult caretakers that the child is "safe", it sharply reduces the probability that the child will attain his potential for maximum self-direction and independence in adulthood.

Further observational data concerning the effectiveness of the program came from unsolicited comments from principals at two of the schools from which 12 of the Experimental Group were drawn. Each principal occasionally took the retarded class in his school out for a period of playground games. In these periods, the children showed great reluctance about playing new games or changing the rules or procedures for old games, and much of the time was spent in overcoming resistance to participating in the proposed activities. Towards the end of the Training Program, each principal reported a marked change in the children: the children were interested in new games and sports activities, suggested new rules themselves, began play briskly with little time spent on deciding how to play, and appeared confident in the game situation. The principals also commented on the fact that they had enjoyed the period themselves, a reaction that came as something of a surprise to them.

A similar reaction towards the change in the children was reported by most of the Experimental Group's parents. The Ss were allowed to take jumpropes, bats, and balls home to demonstrate their skill. As a result, 15 parents informed the class teacher or the E that they had been surprised at what their children could do, in some of the games the retarded children had taken the initiative for the first time over the normal siblings in the family, the parents had bought sports equipment for the retarded children, and they now played more often with the retarded children.

These observational data are consistent with Kirk's belief (11) that generally too few demands are made of the young retarded child.

Conclusions and Implications

The following conclusions are drawn from this study:

(1) The young, educable, mentally retarded children in this study were far behind their chronological peers of average intelligence in the performance of (a) specific motor skills basic to playing games and sports commonly played by elementary school children and (b) general motor skills emphasizing such aspects of motor ability as agility, balance, and flexibility.

(2) With training, the retarded children in the Experimental Group were able to improve significantly in both specific and general motor skills. The improvement in both categories of skill brought the total score of this group to a point well above that of the total score for the Control Group.

(3) The improvement in specific motor skills brought the Experimental Group's mean score to a point which did not differ statistically from the mean score of the Average Group.

(4) The Average Group remained well ahead of the Experimental Group on general motor skills. When the specific and general motor skills scores were combined, the Average Group maintained its superiority although to a lesser degree than had been the case prior to the Experimental Group's participation in the Training Program.

(5) The Control Group failed to improve, in either the specific or general motor skills measured in this project, having participated in the regular school physical education program for retarded children.

The following implications are drawn from the data:

(1) The young, educable, mentally retarded child in a school setting would benefit from the inclusion in the curriculum of a formal training program designed to improve specific motor skills.

(2) The special class teacher should assess the motor skill of the child at the beginning of the year and include remedial training in the program which she prepares for the child.

(3) Some thought should be given to earlier training in adult motor skills in the areas of social and vocational development. The fact that the Ss in this study were able to improve markedly has implications for their future social and vocational development.

(4) The content and methods currently in use for teaching physical education to retarded children in special classes should be evaluated to determine what positive effects do occur as a result of this training.

(5) Data from the assessment of children of average intelligence are useful in providing goals for the training of retarded children, particularly in the area of non-academic skills.

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Appendix A

Basic Skills Test and Test Blank

Brace Test Items and Test Blank

Basic Skills Test

#1. Jumping on one spot, both feet.

Preparation: 18" square drawn on ground.

Task: Standing on both feet in square, jumping up and down.

Adult says: "Look, I'm going to get in here (points to boundaries of square) and jump. Watch me jump (Jumps 3 times). Now you can get in here and it's your turn to jump (pause), jump a lot of times like I did."

Scoring: One point for each turn if all of following are done as specified:
(a) child jumps more than once within square
(b) feet are only part of body touching ground.

#2 Jumping over objects.

Preparation: One small box placed on ground, one larger box placed 4' away from it. (Small box 4" x 12" x 5" high; larger box 2" wide x 12" long x 12" high)

Equipment: Small box, larger box.

Task: Standing in front of smaller box, jumping over it, running and jumping over larger box.

Adult says: "Look, I'm going to jump over these boxes. Watch me jump over the boxes."

Scoring: One point for each turn if:
(a) child jumps over both boxes without touching them with feet
(b) child maintains balance, i.e., feet are only part of body touching ground.

#3. Progressive jumping, both feet.

Task: From standing position with feet together, i.e., touching, jumping forward still with feet together.

Adult says: "Watch me jump with my feet close together. First I'll get my feet together like this (shows child that feet are touching and then makes 3 jumps forward). Now you jump just like I did."

Scoring: One point for each turn if:
(a) child keeps feet together throughout
(b) jumps forward more than once without losing balance, i.e., only feet touch the ground.

#4. Throwing small ball as far as possible.

Preparation: One short line drawn on ground 22' from a wall.

Equipment: Tennis ball

Task: Standing behind line and throwing ball to the wall without bouncing using any method.

Adult says: "I'm going to throw this ball far far away. Right over to the wall. (Demonstrates). Now you can throw it far away, too."

Scoring: One point for each turn if:
(a) child maintains balance, i.e., only his feet touch the ground.
(b) ball travels to wall without bouncing first

#5. Throwing large ball at a target.

Preparation: Set Bobo doll 8' from a chalk line

Equipment: Large rubber ball, Bobo doll. (Ball 12" diam., Bobo-3' high)

Task: Standing behind line, throwing ball and hitting Bobo doll.

Adult says: "Now let's play with Bobo. He has to stand here, like this. Now I'm going to throw the ball at him. Now you throw the ball at him."

Scoring: One point for each turn if:
(a) child stays at least partly behind line.
(b) ball makes contact with any part of Bobo doll
(c) ball does not bounce before hitting Bobo doll.

#6. Dodging a ball.

Preparation: Draw two lines 10' apart.

Equipment: Large rubber ball. (12" in diam.)

Task: Standing behind one line and dodging ball thrown by adult.

Adult says: "Let's play with this ball (hands it to scorer). You see if you can throw it and make it touch me. I'll stand here (gets behind one line) and you stand there (points to other line) and throw it." In an aside to child, "Watch me get out of the way when she throws the ball." "Now I'll throw it and you get out of the way."

Scoring: One point per trial if:
(a) child avoids ball
(b) child maintains balance

#7. Throwing tennis ball to another person, overhand.

Preparation: Draw one straight line 10' away from a 3' diameter circle

Equipment: Tennis ball.

Task: Standing behind line and throwing tennis ball, overhand, to person standing in circle.

Adult says: "Watch me throw the ball to (scorer's name). See, I'll stand here and she can stand over there. I'm going to throw it like it's baseball we're playing. (throws) Now you have a turn and throw it just the way I did."

Scoring: One point per turn if:
(a) child remains at least partly behind line during throw.
(b) ball passes over circle without first touching ground
(c) child throws overhand (hand is at shoulder height or higher during throw).

#8. Throwing small object to a floor target.

Preparation: Draw an 18" square on ground and a straight line 6' from it.

Equipment: Small non-rolling object, bone (1/2"x1/2"x3") and a picture of dog for square.

Task: Standing behind line and throwing object within boundaries of square

Adult says: "Look, here's a bone. Let's see if I can get it to the dog in the box (point to dog and edge of square, running hand around edge of square)." Throws it. "Let's see if you can get it to the dog".

Scoring: One point per turn if:
(a) child stays at least partly behind line
(b) object comes to rest within square
(c) no part of object overlaps boundaries of square

#9. Skipping in rope turned by two others.

Equipment: Skipping rope.

Task: From standing position, jumping in turned rope, i.e., child does not enter rope already being turned. No demonstration.

Adult says: "Let's play jumprope with this big jumprope. You stand here and (scorer) and I will turn the rope. O.K. Ready? Here we go."

Scoring: One point for each turn if:
(a) child is able to skip more than once (one skip= rope turns once and child jumps over rope)
(b) maintains balance.

#10. Skipping in own rope on one spot.(Administer only if #9 was done at least once correctly)

Equipment: Skipping rope

Task: Skipping in own rope on one spot

Adult says: "Hey, here's a jumprope. That's fun to play with, watch me go jumping. Jump, Jump, Jump. Now it's your turn."

Scoring: One point per turn if:
(a) child can skip more than once
(b) maintains balance

#11. Skipping in own rope, progressing.
(Administer only if #10 was done at least once correctly.)

Equipment: Skipping rope.

Task: Skipping in own rope, and progressing from spot to spot.

Adult says: "That jumprope's fun to play with. Let's play jumpalong. Jumpalong. Jumpalong." (Skips forward 3 times). "Now it's your turn to play jumpalong".

Scoring: One point for each turn if:
(a) child moves from spot
(b) child can skip more than once (one skip= turns and jumps over rope).
(c) maintains balance

#12. Balancing on one foot.

Equipment: Stop watch.

Task: To stand on one foot in one place for 5 seconds.

Adult says: "You know what I'm going to do? I'm going to stand on one leg like this. See (demonstrates). Now you stand on one leg."

Scoring: One point for each turn if:
(a) no other part of body touches ground
(b) child's foot stays in one spot on ground.

#13. Walking along a 2" x 4" board.

Preparation: Place a 2" x 4" x 5' board on the broad side on the ground away from supports such as walls.

Equipment: 2" x 4" x 5' board

Task: Walking along the board without touching the ground.

Adult says: "Look at this piece of wood. Let's play walk along the wood. First, I'll do it (demonstrates). Now it's your turn."

Scoring: One point for each turn if:
(a) no part of body touches ground
(b) child walks along entire board

#14. Bouncing a large ball in one spot.

Preparation: 3' diameter circle drawn on ground

Equipment: Large rubber ball (12" in diameter).

Adult says: "Here's a great big ball, watch me bounce this. Bounce! (Bounces it three times) "Now you can bounce it, too."

Scoring: One point for each turn if:
(a) child's feet stay within circle
(b) child hits ball with one hand to make it bounce, and does not hold on to ball
(c) ball bounces more than once (once bounce=hand hits ball, ball touches ground)

#15. Bouncing a small ball on one spot.

Preparation: 3' diameter circle.

Equipment: Small ball (solid composition ball, size of tennis ball)

Task: Standing within circle and bouncing a small rubber ball with one hand

Adult says: "Watch me bounce the ball. Bounce. Bounce. (Bounces ball three times) You can have a turn, make it go bounce, bounce."

Scoring: One point for each turn if:
(a) child's feet stay within circle
(b) child hits ball with one hand to make it bounce, and does not hold on to ball
(c) ball bounces more than once

#16. Throw-bouncing a large ball to a ground spot.

Preparation: Draw a line 5' from a 3' diameter circle. Put clown's face in circle.

Equipment: Large ball (12" in diameter)

Task: Standing behind line and throwing ball so that it bounces within circle.

Adult says: "Let's play Hit-the-clown. Watch me hit that old clown." (demonstrates) "Pow! Now, you can have a turn".

Scoring: One point for each turn if:
(a) ball does not bounce before reaching circle
(b) ball hits any part of circle boundary
(c) child maintains balance

#17. Walking and bouncing a large ball.

Equipment: Large rubber ball (12" in diameter)

Task: Walking along and bouncing a large ball with one or both hands.

Adult says: "Say, look at this nice big ball. Let's see if it's a good bouncer." (bounces it) "Oh, it is. Let's see if you can walk along and bounce the ball like I do." (walks and bounces, than gives to child).

Scoring: One point for each turn if:
(a) child moves forward without stopping
(b) bounces ball by hitting or pushing it, but does not hold ball between bounces
(c) ball bounces more than once

#18. Running between two chalk lines.

Equipment: Flag and stop-watch

Preparation: Draw two parallel lines on ground, 12" apart and 12' long.
Close ends.

Task: Starting at one end, run along over line at other end, without crossing the 12' lines.

Adult says: "I'm a race car, watch me run fast" (scorer has flag and stands at far end) "Now you be a race car, start here (points to start line) and when I wave the flag, you start and run as fast as you can."

Scoring: One point per turn if:
(a) child stays within the lines
(b) child runs
(c) maintains balance

#19. Hopping on right foot on one spot.

Preparation: 18" square drawn on ground.

Task: Standing on right foot, in square, and hopping on right foot.

Adult says: "Let's play hopping, it's lots of fun. I stand here and hop a lot like a bunny. Hop! Hop! (hops three times) "Now it's your turn, you hop like a bunny, too."

Scoring: One point for each turn if:
(a) child hops within square, more than once
(b) foot is only part of body touching ground

#20. Hopping on left foot on one spot.

Preparation: 18" square drawn on ground.

Task: Standing on left foot, in square, and hopping on left foot.

Adult says: "Now hop like a bunny on that foot" and points to child's left foot.

Scoring: One point for each turn if:
(a) child hops within square, more than once
(b) foot is only part of body touching ground

#21. Progressive hopping on right or left foot.

Task: Progressive hopping on right or left foot (choice of foot depends on which foot child had been more proficient at in #20 and #19.)

Adult says: "Hopping's fun, I'm going to hop some more like this" (hops 3 times progressively) "Now you can hop like that, too."

Scoring: One point for turn if:
(a) child moves from spot with each hop
(b) uses same foot
(c) foot is only part of body touching ground
(d) hops more than once

#22. Hopping from both feet onto one foot, then back to two feet, etc.

Task: Standing on both feet, moving forward onto one foot, then forward to both feet.

Adult says: "Let's play jump-and-hop, it's lots of fun. See, I jump (jumps onto both feet, spread slightly) and hop (hops onto one foot) and jump (jumps onto both feet) and hop (hops onto one foot). Now you jump-and-hop just like me."

Scoring: One point for each turn if:
(a) feet are only part of body touching ground
(b) child is able to move forward with each move
(c) repeats sequence (two feet-one foot) more than once.

#23. Catching a bounced ball (large).

Preparation: Two chalk lines 7' apart

Equipment: Large rubber ball (12" in diameter)

Task: "Here's a nice big ball. I bet it's a good bouncer. We can play Bounce-a-ball. I'll stand here and (scorer) can stand there and catch the ball". (demonstrates) "Now you can play, too, and stand there and catch the ball".

Adult says: "Here's a nice big ball. I bet it's a good bouncer. We can play Bounce-a-ball. I'll stand here and (scorer) can stand there and catch the ball". (demonstrates) "Now you can play, too, and stand there and catch the ball".

Scoring: One point for each turn if:
(a) child catches ball and holds it
(b) child stays at least partly behind line until he has caught ball
(c) child maintains his balance

#24. Catching a large ball thrown by someone else.

Preparation: Circle 3' in diameter, line 3' from edge

Equipment: Large rubber ball (12" in diameter)

Task: Standing in circle and catching ball thrown underhand (and gently) by adult standing behind line.

Adult says: "Say, let's play catch. I'll stand here and (scorer) will throw the ball so I can catch it." (demonstrates) "I bet you are a good catcher, you stand here and I'll throw it to you."

Scoring: One point for each turn if:
(a) child stays at least partly within circle
(b) catches and holds ball

#25. Catching small ball thrown by someone else (NO. 1)

Preparation: Circle 3' in diameter drawn on ground, line 3' from edge

Equipment: Small rubber ball (size of tennis ball)

Task: Standing in circle and catching ball thrown underhand, gently, by adult standing behind line.

Adult says: "Watch me play Catch-the-ball. See, I stand here and (scorer) throws the ball to me." "Now, you can have some turns."

Scoring: One point for each turn if:
(a) Child stays at least partly within circle
(b) catches and holds ball

#26. Catching a small ball thrown by someone else (No. 2) (Administer only if child has earned at least one point on #25).

Preparation: Circle 3' in diameter drawn on ground, line 6' away from edge

Equipment: Small rubber ball (size of tennis ball)

Task: Standing in circle and catching ball thrown underhand, gently, by adult standing behind line 6' away.

Adult says: "You're a good catcher, let's play some more. I'll stand here and you stand in the circle and catch the ball."

Scoring: One point for each turn if:
(a) child stays at least partly within circle
(b) catches and holds ball

#27. Kicking a large ball.

Equipment: Large rubber ball (12" in diameter)

Task: Kicking a ball placed on the ground.

Adult says: "This is a good ball to kick. Watch me kick it." (demonstrates) "Now, you can have a turn kicking the ball like I did."

Scoring: One point for each turn if:
(a) child swings leg and foot strikes ball
(b) maintains balance

#28. Kicking a large ball to someone.

Preparation: Circle 3' in diameter drawn on ground, line 7' away from edge of circle.

Equipment: Large rubber ball (12" in diameter)

Task: Kicking ball placed on ground to another person standing in the circle

Adult says: "We could play kick-the-ball (scorer) can stand here (in the circle) and I'll stand here (at the line) and kick it to her." (demonstrates) "That's lots of fun, now you can have a turn, too." (If ball rolls before child kicks it, set it in spot where it will stay in place.)

Scoring: One point for each turn if:
(a) child swings leg and foot strikes ball
(b) child maintains his balance
(c) ball passes at least partly within the boundaries of the circle

#29. Hitting a ball with one hand

Preparation: Two short lines 5' apart.

Equipment: Medium rubber ball (5" in diameter, light weight, hollow).

Task: Standing behind line and hitting, with hand, ball thrown gently by adult standing behind opposite line.

Adult says: "Here's a good ball for playing a good game. (Scorer) can stand there and throw the ball and I'll hit it with my hand" (demonstrates) "That's fun, now you can have a few turns."

Scoring: One point for each turn if:
(a) child strikes ball with hand
(b) child moves ball away from himself, i.e., ball does not just fall to ground at his feet.
(c) child maintains his balance

#30. Hitting a thrown ball with a bat (No. 1)

Preparation: Two short lines 5' apart

Equipment: Medium rubber ball (5" in diameter, hollow, light) ping-pong paddle.

Task: Standing behind line and hitting, with paddle, ball thrown gently by adult standing behind opposite line.

Adult says: "Say, this ping-pong bat would make this game more fun. (scorer) can stand there and throw the ball and I'll hit it with the ping-pong bat." (demonstrates) "Now you have a turn."

Scoring: One point for each turn if:
(a) child strikes ball with paddle
(b) moves ball away from himself, i.e., ball does not just fall to ground at his feet
(c) maintains balance

#31. Hitting a thrown ball with a bat (No. 2)
(Administer only if child earned at least one point on #30)

Preparation: Two lines 5' apart.

Equipment: Medium rubber ball (5" in diameter, hollow, light), light plastic baseball bat.

Task: Standing sideways behind line, holding bat with both hands, and hitting ball thrown gently by adult.

Adult says: "I've got another bat that would be fun to play with. (Scorer) can stand and throw the ball and I'll hit with this bat." (demonstrates) "You hit those other ones nicely, you can have a turn with this bat."

Scoring: One point for each turn if:
(a) child strikes ball with bat
(b) moves ball away from himself, i.e., ball does not just fall to ground at his feet
(c) maintains balance

#32. Hitting a thrown ball with a bat (No. 3)
(Administer only if child earned at least one point on #31)

Preparation: Two lines 9' apart.

Equipment: Medium rubber ball (5" in diameter, light, hollow), light plastic baseball bat.

Task: Standing sideways behind line, holding bat with both hands, and hitting ball thrown gently by adult.

Adult says: "You're a good batter. Let's stand here (points to line) and here and I'll throw the ball and you hit it with the bat."

Scoring: One point for each turn if:
(a) child strikes ball with bat
(b) moves ball away from himself, i.e., ball does not just fall to ground at his feet
(c) maintains balance

Brace Test Items

#1. Walking in a straight line.

Starting with the left foot, walk in a straight line, placing the heel of one foot in front of and against the toe of the other foot. Take 10 steps in all, 5 with each foot.

One point if all of following are done as specified:
- child keeps balance and does not step out of line
- walks in a straight line
- places heel to toe with each step, i.e., feet touch each time.

#2. Stand jump, clapping feet together.

Standing with feet apart, jumping into the air and clapping both feet together once and landing with feet apart any distance.

One point if:
- child claps feet in air once
- lands with feet apart

#3. Hopping in a circle.

Holding the left foot in the right hand behind the right leg, hop around on one spot in a circle 3 times without losing balance.

One point if:
- child hops on one spot
- makes 3 complete turns, regardless of number of hops
- keeps balance (only hopping foot touches ground)

#4. Kneeling.

Clasping hands on the head, stepping forward with the left foot and kneeling onto the right knee, and returning to a stand, without moving the feet from the first position.

One point if:
- child maintains balance
- knee touches ground and feet do not move

#5. Kicking right foot up in air.

Standing, kicking the right foot up so that the toes come at least level with the shoulders.

One point if:

- child kicks as high as the shoulders
- maintains balance (does not fall down) and only the feet touch the floor

#6. Standing on left foot.

Hands on hips. Standing on left foot and holding bottom of the right foot against the inside of the left knee. Eyes shut and holding position for 10 seconds without shifting left foot about on the floor.

One point if:

- keeps eyes shut
- keeps hands on hips
- keeps right foot on left knee
- keeps balance (only left foot on floor)
- left foot stays in one spot

#7. Walking backward.

Walking backward in a straight line for 10 steps, placing the toe of one shoe against the heel of the other.

One point if:

- child keeps balance and does not step out of line
- walks in a straight line
- places toe to heel with each step, i.e., feet touch each time.

#8. Touching floor with fingers.

Feet together. Touching the tips of the fingers to the floor without bending the knees.

One point if:

- knees do not bend
- fingertips of both hands touch floor
- feet stay together

Project 70025 Basic Skills Test

Name _____ School _____ Date _____

Score _____ Test Administrator _____

Test Recorder _____ Date _____

Item	Pract. Turn	2nd Turn	3rd Turn	Comments
1. Jumping, both feet. -jumps more than once within square -only feet touch ground				
2. Jumping over objects -jumps both boxes, feet clear boxes -only feet touch ground				
3. Progressive jumping, both feet -keeps feet together throughout -jumps forward more than once -only feet touch ground				
4. Throwing small ball -throws distance without bouncing -only feet touch ground				
5. Throwing large ball at a target -stays partly behind line -ball touches Bobo, no bounces first				
6. Dodging a ball -child avoids ball -only feet touch ground				
7. Throwing ball overhand to other -remains partly behind line -ball passes over circle, no bounces -throws overhand				

8. Throwing small object to floor target -stays partly behind line -object stays within square not on line				
9. Skipping in rope turned by others -skips more than once -only feet touch ground				
10. Skipping in own rope, one spot -skips more than once -only feet touch ground				
11. Skipping in own rope, progressing -skips more than once, moves along -only feet touch ground				
12. Balancing on one foot -only foot touches ground -foot stays in one spot				
13. Walking along a board -walks along entire board -no part of body touches ground				
14. Bouncing large ball, one spot -feet stay within circle -one hand, no holding onto ball -ball bounces more than once				
15. Bouncing small ball, one spot -same as #14				
16. Throw-bouncing large ball, ground spot -ball hits any part of circle boundary -ball doesn't bounce. Balance kept.				

17. Walking, bouncing large ball -child moves forward, ball bounces more than once, no holding of ball				
18. Running between two lines -child runs within the lines -maintains balance				
19. Hopping on right foot, one spot -hops within square, more than once -only foot touches ground				
20. Hopping on left foot, one spot -hops within square, more than once -only foot touches ground				
21. Progressive hopping, either foot -moves from spot on each hop, uses same foot, hops more than once -only foot touches ground				
22. Hopping both feet, one foot etc. -moves forward with each hop repeats 2-ft.-1 ft. more than once, only feet touch ground				
23. Catching large bounced ball -catches and holds ball, keeps balance, stays partly behind line				
24. Catching large ball -stays partly within circle -catches and holds ball				
25. Catching small ball (No. 1) -stays partly within circle -catches and holds ball				
26. Catching small ball (No. 2) -stays partly within circle -catches and holds ball				

27. Kicking a large ball -swings leg, foot strikes ball -maintains balance				
28. Kicking a large ball to other -swings leg, foot strikes ball -ball partly within circle edges -maintains balance				
29. Hitting ball with one hand -strikes ball with hand, -moves ball away from self -keeps balance				
30. Hitting ball with bat (No. 1) -strikes ball with bat, moves ball away, keeps balance				
31. Hitting ball with bat (No. 2) -same as #30				
32. Hitting ball with bat (No. 3) -same as #30				

70025

Brace Test Items

Name _____ School _____ Date _____

Score _____ Test Administrator _____

Test Recorder _____

Brace Scale Form and Item No.		Pract. Turn	2nd Turn	Comments
M-1	1. Walking in straight line. (a) more than feet touch ground (b) does not stay right on line (c) heel and toe do not touch			
M-2	2. Jump, clapping feet together (a) feet do not touch in air once (b) lands with feet together			
A-2	3. Hopping in a circle. (a) does not hop on one spot (b) less than 3 complete turns (c) more than foot touch ground			
A-3	4. Kneeling. (a) more than feet, knee touches ground (b) feet move			
N-3	5. Kicking right foot up in air. (a) does not kick to shoulder (b) more than feet touch ground			
N-18	6. Standing on left foot. (a) less than 10 seconds (b) eyes open (c) hands do not stay on hips (d) right foot moves off left knee (e) more than left foot on ground (f) left foot moves from spot			
B-20	7. Walking backward. (a) more than feet touch ground (b) does not stay right on line (c) heel and toe do not touch			
B-21	8. Touching floor with fingertips. (a) knees bend (b) fingertips do not reach floor (c) feet do not touch throughout			

Appendix B

Description of the skills involved in one sport.

Samples of game activities for improving the skills.

Description of the Skills involved in one Sport: Baseball

(a) General game skills: Taking turns, keeping score, playing in a specified position (for example, the catcher must stand in a line with the batter and pitcher and out of range of the batter's bat), teamwork (for example, the ball must be thrown so that the receiver can catch it), losing.

(b) Specific game skills: Throwing, catching, batting, running directly from one point to another, combining activities into a series (for example, catching the ball, touching base with foot, tagging runner), knowing the position of the bases, knowing where to throw the ball (for example, catcher usually throws to pitcher).

(c) Vocabulary: Batter, catcher, fielder, pitcher, first base, second base, third base, out, strike one, strike two, strike three, ball one, ball two, ball three, ball four, walk, plate, home, home-run.

Samples of Game Activities for the Specific Game Skills of Ball Handling and Batting

(a) General ball handling skills:

1. Adult faces child about one foot apart. Adult hands ball (large light ball 12" in diameter) to child with both hands, child receives ball with both hands, and returns it to adult.

2. Children form pairs, same as above. When adult blows whistle whoever has ball is out, or whoever drops ball first is out.

3. Adult and child stand just far enough apart so adult can throw ball to child, i.e., there is a very short distance where neither is touching ball.

4. Children form pairs, same as #3. When adult blows whistle whoever has ball is out.

5. Children line up one behind the other, facing adult who is 3 feet away. Adult throws ball to first child, who catches it, throws it back and goes around on the right hand side to the end of the line.

Variations: Child must watch adult and do whatever adult does. For example, adult might bounce ball twice and then throw it to child. Child must then bounce ball twice and throw it back.

Anyone who does not do what the adult does is out, and last one left wins. Play is fast so that the children do not wait long for the winner to be decided.

When children become fairly competent, one child is leader.

6. Hot Potato - Children stand in circle, ball is "hot potato" so must be thrown to another child quickly and not held very long. At first, have clockwise order of throwing, later have any order of throwing. Throw must be accurate so other child can catch it.

7. Tricky Ball - Same as above except emphasis is not on speed but is on trying to fool other children, i.e., pretending to throw ball to one child but throwing to another instead. Throw must be accurate. Adult demonstrates various ways of fooling the other child, for example, looks at one child but throws to another.

8. All of the above activities, but with a small ball the size of a tennis ball.

9. The children face one another, in pairs. Using a small ball, one child throws the ball to the other. They each take one step backward so that the distance between them is increased. The second child in the pair then throws the ball back to the first child. They repeat the throwing and stepping backward sequence until they either can't catch or throw the distance to the other child. Variation: overhand throwing, underhand throwing.

10. Target throw with Bobo doll and large ball. Bobo doll is placedagainst wall, children line up and take turns throwing ball at Bobo doll. Variation: Children form circle with Bobo doll in center: Child with ball throws it at Bobo doll, next child (clockwise) retrieves it, has a turn, etc.

11. Children each have a different color small ball, stand side by side in a line, and each throws as far as he can. Children run and stand where ball comes to rest. Winner is one with longest throw.

Variation: Work on accuracy by narrowing width of area in which ball must land.

(b) Batting skills:

1. Child stands in batting position, using hand to bat ball (hollow, light, 5" in diameter) when adult throws ball gently at the correct height. Distance between batter and pitcher is small at the beginning, but is increased as child's proficiency increases. After turn, child goes to end of line.

2. When child is able to hit ball with hand, introduce idea of first base, and have child run to first base and back to home base whenever he hits the ball. After his turn, child goes to end of line. Have child keep score on blackboard, if inside, or on sheet of cardboard, if outside.

3. Have a wide bat like a ping-pong bat and follow same procedures as in #1 and #2 with one addition: when child hits ball with bat, he drops bat on ground before running to base and back.

4. Same as #3, but have a second child in line be catcher and return missed balls to adult pitcher.

5. When the children understand what the catcher does in this situation(catches ball and throws it to pitcher), have the other one or two children stand behind adult pitcher and help pitcher field the balls.

6. Begin practice with a plastic baseball bat and the same 5" ball. Make sure child is holding bat and standing in batting position correctly. Have contests to see who can hit the farthest, the most often, etc.

7. Note that it is essential that there be no confusion about what to do in any of the games played. If a game with three tasks for the player causes any confusion, backtrack to one or two tasks. When all the children have reasonable mastery of the above skills, introduce the following ideas slowly:

- strike one, two, and three: three turns and then child goes to end of line.
- first base player who must have one foot on the base after catching the ball and before throwing it to any other player.
- second base: Introduce only when first base and catcher procedures are understood by all the children.

- third base: Same as second base.

- team play: With the teacher as pitcher, one team could consist of one fielder, a catcher, and a player at first base. The other team would consist of three players. First base would be a shorter distance from home plate than is standard. Each player would try to get to first base and back after he hits the ball. Team play could gradually be extended until it is similar to play by the standard form of the game.

8. Older children in the school (Grade Five and Six) could be a great help in the baseball training. If possible, have two or three children who would like to help come regularly when the retarded children are playing. One older child could stand near first base and help the player there, the other children could be stationed around at various points to help play move smoothly. When the children are more proficient, the older children could play on both teams.

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TITLE

100 A STUDY OF THE EFFECTS OF AN INTENSIVE TRAINING PROGRAM ON THE MOTOR SKILLS
101 OF YOUNG EDUCABLE MENTALLY RETARDED CHILDREN.
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PERSONAL AUTHOR(S)

200 ROSS, Sheila A.

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ABSTRACT

800 Young educable mentally retarded children have limited experience in playing with
801 other children. As game skills of normal chronological peers become increasingly
802 advanced, the trend is to a further reduction in interaction with peers. As a first
803 step in reversing this trend, retarded children should acquire some proficiency in
804 games and sports played by peers. This research was designed to increase retarded
805 children's motor skills by means of a Training Program in which skills basic to
806 games and sports played by children in the elementary grades were taught in game
807 contexts.
808 Retarded children were assigned to either the Experimental or Control Groups.
809 Average children provided test data for evaluating the progress of the Experimental
810 Group following the latter's participation in the Training Program. The results
811 showed that:
812 (1) The retarded children were far below the average children in motor skills
813 basic to games and sports.
814 (2) With training, the Experimental Group improved significantly ($p < .001$).
815 (3) Their improvement in specific motor skills brought their score to a point
816 which did not differ statistically from the score of the Average Group.
817 (4) With participation in the physical education program for special classes,
818 the Control Group showed no improvement on the skills measured.
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