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The Effect of Planned Physical Activities on Deficient Motor Skills in Head Start Preschool Children

Darlene L. Robinson

Abstract

THE EFFECT OF PLANNED PHYSICAL ACTIVITIES ON DEFICIENT MOTOR SKILLS IN HEAD START PRESCHOOL CHILDREN

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During the past few years many physicians, nurses, psychologists, teachers, and physical educators have begun to place more emphasis upon the developmental problems of children. As an outgrowth of this, more attention has been given the child showing mild to moderate motor problems. As a result of these more subtle difficulties going unrecognized and untreated, children may suffer from learning disorders, lack of acceptance by teachers and peers, maladaptive behavior, and feelings of low self-esteem (Cratty, 1970; Kiphard, 1970; and Ferinden, 1972).

The purpose of this study was to ascertain whether planned physical activities would aid in remediation and/or modification of identified motor deficiencies in Head Start preschool children.

The role of the public health nurse was to screen out children with motor problems and develop a program of planned physical activities specific to their needs. The hypothesis formulated was: deficient motor skills in Head Start preschool children will be enhanced by planned physical activities.

The "before-after" experimental method of study was chosen. The children's ability to perform selected motor skills normal for age was evaluated at the beginning of the study period and again five months

later at the close to determine the status of these skills in the sample population.

The tool used was a battery of motor skills tests developed and researched by Dr. Bryant J. Cratty of U.C.L.A. The tests include skills in various categories such as: body perception, gross agility, balance, locomotor agility, and tracking.

The planned physical activities were simple exercises to develop coordination such as ball throwing, walking a balance beam, and jumping activities.

The San Salvador School in South Colton with seven Head Start classes and three Head Start classes in Rialto, Fontana, and Riverside, California, were chosen for collection of data.

There were 169 children in the convenience sample. They made up the entire population of the ten Head Start classes, including the drop-outs, during the study period. The sample consisted of four groups: Groups I and IV were children with low test scores who were not given any remedial planned physical activities. Group II were children with low scores who were given remedial planned physical activities on a daily basis. Group III were children with low test scores who were from a single classroom. They were given remedial planned activities, under the direction of the teacher, on a group basis with children who had passing scores.

The findings were treated as ordinal data and both the pre and post test scores were ranked. The median and range were found on the differences between the pre and post test scores for all groups. A Chi Square statistics was chosen with the level of significance being $\alpha = .05$. The statistical data was significant ($p < .01$) and supported the hypothesis.

The two experimental groups were then compared to each other. In both instances the finding was that individual remediation was superior. The public health nurse, with her knowledge of growth and development, is able to identify and plan motor activity remedial programs for Head Start children.

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THE EFFECT OF PLANNED PHYSICAL ACTIVITIES ON DEFICIENT MOTOR SKILLS IN HEAD START PRESCHOOL CHILDREN

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Darlene L. Robinson

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Each person whose signature appears below certifies that this thesis in his opinion is adequate, in scope and quality, as a thesis for the degree Master of Science in Nursing.

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INTRODUCTION

During the past few years, many physicians, nurses, psychologists, teachers, and physical educators have begun to place more emphasis upon the developmental problems of children. As an outgrowth of this, more attention has been given the child showing mild to moderate motor problems. The phrase "clumsy child syndrome" has come into use among members of the medical profession to describe children who could not move well and who at times evidenced other problems such as distractability and lack of attention to school subjects (Cratty, et al., 1974, p. 1). These less obvious difficulties often include developmental lags observable in the delayed emergence of motor abilities. If these problems go unrecognized and untreated, more major concerns such as learning difficulties, maladaptive behavior, and lack of acceptance by teachers and peers can be the result. Further, research has shown that children yield most readily to remediation in the early childhood years (Cratty, 1975, p. 7; Ferinden, 1972, p. 86).

Need for Study

From the newborn infant's first efforts to lift its head to the jubilant leap of a child at play, movement is the very embodiment of life. Many present-day professionals who deal with young children have become increasingly concerned with movement or motor activities and their

effect on total development. Movement is seen as vital in the formation of self-awareness and exploration of the environment. Historically, psychologists have long noted the importance of emerging motor skills in the development of the young child. Further, the interrelatedness of all aspects of development is a recognized principle. Therefore we can readily observe the psychological feelings of self worth that are engendered as the child gains in physical abilities. Beginning self confidence has its roots in motor behavior (Omwake, 1971, p. 13; Halverson, 1971, p. 29).

The ability to move with grace and agility can bring pleasure to the child, enhance his self confidence, and positively influence his social acceptability in today's society. Conversely the awkward, clumsy child usually is the last to be chosen for team play by his peers, often is rejected by adults, and early in life may set up a pattern of failure and self-defeating behavior. Kiphard states that children with impaired motor coordination also suffer emotional disturbances. Often they react with inhibition and assume an attitude of passivity and regression or they may overcompensate with unrestrained aggressive behavior. Between these two extremes is the apparently indifferent type who does not participate, remains seemingly unimpressed, and smiles at each new failure as if he didn't care (Kiphard, 1970, pp. 46-47).

The public health nurse in her role as coordinator of health services in the Head Start preschool setting is in an ideal position to observe and screen out preschool age children with motor difficulties. Further, she can assist in the development of remediation programs in the home as well as in the school.

Although numerous studies have been done regarding the effect of remediation programs on handicapped and normal school age children, no studies have been done on the Head Start population.

Purpose of Study

The purpose of this study is to ascertain whether a planned regime of physical activities will aid in remediation and/or modification of identified motor deficiencies in Head Start preschool children.

Problem

A certain proportion of so-called normal children have mild to moderate motor deficiencies. These often go unrecognized and treated until later school years when they may contribute to more severe problems such as learning difficulties and rejection by teachers and peers. The problem is to compare a group of Head Start children who have had daily planned individual exercise with a group who were given planned group exercise by the teacher, and these two groups with a random group who had no systematic daily program of exercise.

Hypothesis

Deficient motor skills in Head Start preschool children will be enhanced by planned physical activities.

Definitions

Deficient motor skills. Developmental lags in normal-for-age motor functions according to an inventory of motor skills test for ages 4-10 years developed and researched by Dr. Bryant J. Cratty of U.C.L.A., Department of Kinesiology (Cratty, 1974, pp. 65-82).

Planned physical activities. Simple exercises to develop coordination such as ball throwing, walking a balance beam, and jumping activities.

Enhanced. Achievement of gains in motor skills as evidenced by test scores.

Head Start. The Head Start program is a government-funded project developed to serve preschool children from economically and/or culturally deprived homes, the aim being to better equip them to participate and achieve in the regular school setting. Activities carried on through a nine-month school year are those of the traditional preschool or nursery school setting. The children must be four years of age to quality for the program and they must be from families considered to be "low-income" according to guidelines developed by the Federal Government.

Assumptions

For purposes of this study, the following assumptions were made:

1. A certain portion of so-called normal children have unrecognized mild to moderate motor deficiencies.

2. Motor deficiencies in preschool children may predispose to learning and socialization problems in later years.

3. Inadequate motor skill engenders a lack of self worth within the child.

Limitations

1. Study children were from a background with varying degrees of cultural deprivation.

2. Attainment of motor skills was limited to those defined by the motor skills test.

LITERATURE REVIEW

Current literature in the field of movement and the development of motor skills in children contains many varied theories. A majority of these are aimed at the child with learning disabilities, the retarded child, and/or the child with recognized brain damage. Well known advocates of programs to assist these types of children are Kephart and Delacato. Other investigators such as Cratty and Humphrey have looked into ways that games, exercises, and established physical education activities might assist in the learning of such things as language skills and arithmetic (Martin, 1971, p. 2). Maria Montessori, in her particular method of education for young children, frequently recommends sensorial and manipulative activities as channels for learning (Wolf, 1968, p. 1).

Delacato employs a theory which has a neurologic emphasis and is described as "cortical integration." His thinking is that neurologic growth can be accelerated and extended. Structural activities such as "patterning" are seen to improve central nervous system functioning and other sensory processes such as speech, vision, and hearing (Wunderlich, 1970, p. 468). Many authorities do not accept the premise on which he works and there is debate on his basic assumptions. However, he was one of the first to bring to the attention of the pediatric field that motor activity must be considered when dealing with children who have learning problems and possible brain damage.

Theorists such as Kephart and Chaney view development in the

child, not so much as a sequence of specific skills and performances, but as the evolution of certain basic "generalizations." They list balance, posture, locomotion, and laterality as "motor generalizations" that are very crucial to learning. Direct transference is seen to take place between a given motor activity, such as walking a balance beam, and increased intellectual proficiency (Kephart, 1968, p. 3). Present research has failed to completely support various theories such as those most often put forward under the general title of perceptual-motor programs especially in regard to the more extravagant claims (Martin, 1971, p. 3). However, it has been well documented by Edgars, Kephart, Bobath and others that stimulation of the retarded or brain damaged child can produce positive results.

A more general approach is seen by Harrow in that movement is the key to life and essential in all areas. Her appeal to educators of young children is to view the total child as a thinking, feeling, moving being and thus has evolved what she refers to as a taxonomy of the psychomotor domain. Since research indicates background experiences or early learning make a difference in later learning she feels efficient utilization of the body and development of perceptual skills is paramount to the education of children (Harrow, 1972, pp. 6-8). Piaget also sees movement and life inextricably bound together. He refers to a developmental continuum consisting of five phases. The first of these, from birth to two years is the sensorimotor phase. The most important developmental tasks of this period are the coordination of the child's actions or motor activities, and his resultant perception or sensory perception into a tenuous whole. Thus the first self that is known is the "sensorimotor self" (Maier, 1965, p. 103).

The relationship between self-esteem and ability to perform motor skills well is noted by many authors. Mahler feels that the child's ability to move and thus promote autonomous functioning is the first prerequisite for the development of self-esteem (Mahler, 1974, p. 98). Movement for the young child is seen as ego-enhancing when he can call attention to newly mastered skills and acts of physical prowess. A recent study of 32 children four years of age showed that their motor ability in performing simple tasks increased when they were exposed to adult praise and presence (Meddock, 1973, p. 470).

Whitehurst sees movement education as one of the many avenues to self-actualization and lists the major meanings it can have for children:

1. life
2. self-discovery
3. environmental discovery
4. freedom, both spatial and self-expressive
5. safety
6. communication
7. enjoyment and sensuous pleasure
8. acceptance (Whitehurst, 1971, p. 55).

The fact that motor skills can be positively influenced by remediation and training has been well documented (Cratty, 1975; Edgar, 1969; and Herkowitz, 1970). Werner tested 36 nursery school children, exposed them to an eight-week learning program, and then retested them. He found this activity led to significant improvement in their motor patterns (Werner, 1974, pp. 795-798).

Cratty has conducted much reliable research on motor activities normal for age, activities to enhance motor skills, and the influence of motor activities on academic abilities. Of special interest to this study are his findings regarding motor abilities and their relationship

to feelings of self worth. He states the body is seen by the developing child as a vehicle of physical performance and thus part of his perception about himself and his body is related to that performance (Cratty, 1970, p. 104). Boys are especially seen as a population at risk for displaying more coordination difficulties. The social maladjustments that can be the end result of these motor problems may produce effects that persist into adult life. Since other children tend to make fun of their clumsy efforts, they withdraw or may choose to play with girls who are generally more accepting. This situation in turn may foster problems in gender identification. General acceptance by peers, especially among boys, is often based on physical prowess (Cratty, 1970, p. 224; Kiphard, 1970, p. 46). One has only to look at the acclaim given athletes to realize the impact of this on today's society.

> . . . for the sociologist, educator, psychologist to ignore the marked influence game success has on the social acceptance of children and adolescents is to ignore an important dimension of the value system with which youngsters are surrounded (Cratty, 1970, p. 228).

THEORETICAL FRAMEWORK

This study attempts to observe the child in a holistic frame. He is seen as an intricate and complex organism who is more than the sum total of his parts. There is constant interaction within himself and with his environment. Factors such as inheritance, environment (including socio-cultural) experience, and maturation work both from within and without to influence the developing child. It is impossible to state which of any of these factors has the most telling influence or if they all are of equal importance. A model has been constructed to illustrate

the unitary yet interacting factors contributing to development of motor skills. (See Figure 1, Appendix A.)

One of the important endpoints of successful development of motor skills is seen to be increased feelings of self-confidence and self-worth. This enables the child to explore and/or master his immediate environment. It also brings the child rewards that stimulate further development. The rewards may be internal such as the pleasure an infant receives when he finds his hands for the first time or is able to reach out to the bright colored object over his crib. External rewards are also present in the obvious responses of excitement and praise given the infant by his parents as he takes his first faltering steps or learns to play pat-a-cake. Both the internal and external rewards associated with the emergence of motor skills continue to influence the child all through his developing years and play an important part in the way he ultimately sees himself. If one accepts this assumption, then, conversely, a failure to develop adequate motor skills would tend to engender a lack of self-worth and confidence within the child.

Careful observation of the school-age child reveals a small population of children who are, in fact, physically inept. These children have not been able to perform motor skills as well as their peers. They tend to have less confidence in themselves which in turn negatively influences any attempts made to develop these skills. Often they are exposed to ridicule by their peers and lack of understanding on the part of teachers and parents. This general milieu increases feelings of failure and decreases desires to attempt further mastery of motor skills thus setting in motion a cycle of defeat. (See Figure 2, Appendix A.)

Development of adequate motor skills is a necessary part of a child's integrated view of himself. His general feelings of self-worth can be greatly influenced by lack of ability in this area. The public health nurse who functions in the Head Start or school setting is in an ideal position to assess and plan for children with deficient motor skills. She can work with teachers and parents in developing general and individual programs for planned physical activities to enable children to adequately develop normal-for-age motor skills. Further, she can evaluate and upgrade these activities throughout the school year.

METHODOLOGY

There are many variables that affect the course of emerging motor skills. The child's prenatal, birth, and disease history may be significant. Cultural patterns, inheritance traits, and environmental factors all can lend their influence, too. Furthermore, a very precise evaluation of motor skills is difficult to obtain as a child may perform differently from day to day depending on his state of physical and/or mental well being. Taking these variables into account, the "before-after" experimental method of study was chosen. The children's ability to perform selected motor skills normal for age was evaluated at the beginning of the study period and again five months later at the close to determine the status of these skills in the sample population.

Variables

The independent variable in this study was planned physical activities and the dependent variable was scores on the motor skills test.

Setting

The San Salvador School in South Colton with seven Head Start classes and three Head Start classes in Rialto, Fontana, and Riverside were chosen for collection of data.

Sample

The sample consisted of the entire population of the ten Head Start classes, including the dropouts, during the study period. A convenience sample of 169 children was selected who met the following criteria:

1. age 4 years,
2. enrolled in Head Start classes.

The majority of the children came from homes recognized by the United States government guidelines as low-income families. The children in South Colton and Riverside were predominantly from a Mexican-American barrio type culture. The children from Rialto and Fontana were a mixture of Black, Anglo, and Mexican-American cultural blackgrounds.

The experimental children were all chosen from the San Salvador setting as were some of the controls. The other three Head Start populations were used entirely as controls.

The sample contained four groups:

Group I--these children were the control group within the San Salvador setting. They had low test scores but were not given any remedial planned physical activities. There were 16 children in this group.

Group II--these children were in an experimental group in the

San Salvador setting. They had low test scores and were given remedial planned physical activities. There were 22 children in this group.

Group III--these children were in an experimental group also within the San Salvador setting. They had low test scores but were all from a single classroom. This entire classroom received remedial planned physical activities on a group basis under the direction of the teacher. Both the passing and the low scoring children were included in the activities. The teacher did not know the results of the test scores and she used the same activities as those used for the children worked with individually. There were seven low scoring children in this group.

Group IV--these children were used as controls and came from the other three Head Start settings in Riverside, Fontana, and Rialto. They had low test scores but were not given any planned remedial activities. There were 15 children in this group. The remainder of the sample population were children with passing test scores and children with either passing or low test scores who dropped out of the Head Start classes during the study period. There were 109 in this group.

Tool

A battery of motor skills tests, developed and researched by Dr. Bryant J. Cratty of U.C.L.A. was used to evaluate the children. The tests included skills in various categories such as: body perception, gross agility (movement in a vertical plane), balance (static posturing), locomotor agility (precision of movement in a horizontal plane), tracking (catching, intercepting balls in motion), fine motor ability, and trunk fitness and flexibility. (See Appendix A.) The battery consisted of

eight individual sections with a possible score of 5 points for each section and a total possible score of 40 points. Receiving 2-1/2 points or less on each section was considered to be a low score, or a total of 20 points or less for the entire battery. Although the test is not available in commercially published form, it does appear in several appendices of the author's books.

> Averages, not norms, are available, extending from age 4 to 10 for each sex, and additionally, stanines have also been computed. All subtests have been found to be reliable (Cratty, 1975, p. 75).

Procedure

The procedure consisted of four parts:

1. All the children were given the motor skills test at the beginning of the school year in September and October of 1974. Each child was tested individually and all testing was done by the public health nurse and the community health aide working as a team. Both the nurse and the aide had seen Dr. Cratty administer the test and evaluate several children. Further, they had been able to discuss the test with him and their plans for evaluation.

A pilot study was carried out six months prior to this using only the children at San Salvador. Testing was carried out on approximately 40 children. Half of the children were given remedial activities and half were not. Test scores were simply compared and no statistical analysis was done. However, this did provide a good opportunity to become familiar with the test and observe how the children would respond.

2. Children with low scores (in experimental Group II) were given remedial planned physical activities on an individual basis such

as ball throwing, walking a balance beam, and jumping over a rope. (See Appendix B.) These activities were carried out for a 10-15 minute period daily throughout the school week by the community health aide under the supervision of the public health nurse. The aide had an Early Childhood Development credential and was specifically trained in dealing with motor skill activities for children. The aide and the public health nurse collaborated on the specific activities needed for each child according to the test results. Weekly conferences were held between the aide and the nurse to discuss the status of each child and update the physical activities needed as they progressed. The remedial program was carried out for a period of five months from November 1974 to April 1975.

3. Children with low scores (in experimental Group III) were exposed to the same planned remedial physical activities but they were presented to the whole class by the teacher. The children with passing scores also participated in the group activity for a 10-15 minute period daily. The teacher did not know the children's scores and was not instructed to work with them on an individual basis.

4. At the end of the study period in April and May of 1975, all the children in the sample population were again given the Cratty motor skills test. The public health nurse and the community health aide again worked as a team to do individual testing of the children.

Data Analysis

The findings were treated as ordinal data and both the pre and post test scores were ranked. The median score and the range were found on both the pre and post test scores for all groups. The median score

and the range were found on the differences between the pre and post test scores for all the groups. These scores were then subjected to a median test to determine whether the children in the experimental groups had significantly higher scores than the children in the control groups.

FINDINGS AND ANALYSIS

Demographic data pertinent to the sample population is presented in Table 1. There was an approximately equal number of boys and girls. The ethnic background was predominantly Mexican-American, comprising 68 per cent of the children. Another 29 per cent were Anglo and the remaining 3 per cent were Black. During the course of the study period 38 children who had been given the pretest dropped out of the Head Start program. A characteristic often found in lower socioeconomic groups is that of mobility and frequent changes of address. The majority of these children left the program because their families moved out of the area.

Observation of sex differences in the test scores indicated the girls did not do quite as well as the boys. The usual finding is just the reverse of this. Generally a greater number of boys than girls suffer from problems of physical ineptitude (Cratty, 1973, p. 9). However, when one looks at the very low scores of 10 points or below, five of these children were boys and only two were girls. Further, since the majority of the children were from a Mexican-American background, some of their prevailing cultural attitudes may have influenced the children's performances. This possibility could be revealed in the definite ideas in regard to male and female roles such as the strong actively masculine or "macho" identity for boys and the more passive, quiet role expected of girls.

Table 1

Demographic Data for Total Sample Population

N=160

	Number	Boys	Girls	Ethnic Groups		
				Black	Angio	Mexican-American
Children with low scores	60	28	32	1	20	39
Children with passing scores	71	41	30	3	13	55
Drop-outs with low scores	13	8	5	1	6	6
Drop-outs with passing scores	25	12	13	0	10	15
Totals	169	89	80	5	49	115

The demographic data for the portion of the study population used as experimental and control groups is presented in Table 2. All of these children were in the low score category. The sex ratio was approximately 1:1 with slightly more girls than boys. The ethnic mixture was also similar to that of the entire pretested population.

The findings were treated as ordinal data and both the pre and post test scores were ranked. The median score and the range were then found on both the pre and post test scores. This is presented in Table 3. Attention should be brought to the fact that in both the control groups the median scores on the pre tests were higher than those of the experimental groups. Thus, if any favorable bias was present it was toward the control groups. The differences were found between the pre and post test scores and again the median and range were calculated for these values. This is also shown in Table 3. It should be noted that in spite of the possible bias in favor of the control groups, the differences were greater for the experimental groups.

The differences between pre and post test scores for all the groups were then ranked and the median and range calculated for the study groups as a whole. The median score for all differences was 12 and the range was 28. The differences between the scores of all the individual groups as they related to the median score of differences for all the groups combined is shown in Table 4. This data was then subjected to a median test, which is a Chi Square statistic, in order to determine whether the scores in the experimental group were significantly higher than those of the controls. The level of significance chosen for all tests was $\alpha = .05$. The difference was found to be significant ($p<.01$).

Table 2

Demographic Data for Experimental and Control Groups

N=60

				Ethnic Groups		
	Number	Boys	Girls	Black	Angio	Mexican-American
Group I Control	16	6	10	0	3	13
Group IV Control	15	5	10	1	7	7
Group II Experimental	22	12	10	0	7	15
Group III Experimental	7	5	2	0	3	4
Totals	60	28	32	1	20	39

Table 3

Median and Range of Pre and Post Motor Skills Test Scores and Differences

N=60

	Number of Children	Pre Test Scores		Post Test Scores		Differences Between Pre and Post Test Scores	
		Median	Range	Median	Range	Median	Range
Group I Control	16	18	9	25	16	8	15
Group IV Control	15	16	10	27	20	10	14
Group II Experimental	22	13	9	35.5	12	23	14
Group III Experimental	7	12	12	28	15	16	11

Table 4

Relationship of Individual Group Differences to Median Score for All Differences Combined
(Expected cell counts in parenthesis)

N=60

	Group I Control	Group IV Control	Group II Experimental	Group III Experimental	Totals
Less than or equal to the median*	15 (8.3)	13 (7.7)	0 (11.4)	3 (3.6)	31
Greater than the median*	1 (7.7)	2 (7.2)	22 (10.6)	4 (3.4)	29
Number of children	16	15	22	7	60

* Median score for all differences combined = 12, Range - 28

$\chi^2 = 42.4$
($p < .01$)

The children who were worked with daily on an individual basis appeared to derive the greatest benefit, as the scores for this entire group were greater than the median score for all differences of the group combined. This finding is substantiated in research by Dr. Cratty who notes that specific remediation activities promote the most positive results (Cratty, 1974, p. 59). The children who were given daily planned activities by the classroom teacher in a group with their peers made gains also. However, the gains were not as great, for they were approximately evenly divided above and below the median score for all differences. The children in the two control groups made very little gain, as compared to the experimental groups. The majority of their scores were below the median score for all differences. This is consistent with current research showing the children receiving planned physical activities have improved sometimes at twice the pace expected through maturation alone (Cratty, 1975, p. 7).

A further comparison was made between the two experimental groups. The differences between the pre and post test scores for these two groups alone were found. They were ranked and again the median and range was calculated. The median score for the differences of the two groups combined was 22 and the range was 19. The differences between the scores of these two experimental groups as they related to the median score of differences for both groups combined is illustrated in Table 5. This data was subjected to a median test in order to determine whether the scores in experimental Group II (children worked with individually on a daily basis) were significantly higher than the scores in experimental Group III (children worked with daily by the teacher in a group). The

Table 5

Relationship of Two Individual Experimental Group Differences to Median Score of the Two Groups' Differences Combined (Expected cell counts in parenthesis)

N=29

	Group II	Group III	Totals
Less than or equal to the median*	8 (11.4)	7 (3.6)	15
Greater than the median*	14 (10.6)	0 (3.4)	14
Number of children	22	7	29

* Median score for two groups combined = 22, range = 19

$\chi^2 = 8.6$ ($p < .01$)

differences were found to be significant ($p<.01$). In the group worked with by the teacher all the children fell below the median score. In the group worked with on an individual basis approximately one-third of the children fell below the median score, but two-thirds were above the median. This again demonstrates that children worked with daily on an individual basis made the most progress.

Specific activities planned for areas of weakness pointed out by the testing were superior to group activities given generally with no planning to meet specific needs. The observations made by the public health nurse and frequent planning sessions with the aide for each child seems to have contributed to this result.

The tool used was able to effectively screen out children with possible motor problems. A small number of children worked with on an individual or a group basis still had comparatively low scores. During the course of the school year they received further medical and psychological evaluation. Three of these children, all males, are now enrolled in special education classes. Thus the low scoring children may well be the population at risk for developing more serious problems. Research has shown that children with moderate problems are more likely to improve than those with severe ones (Cratty, 1975, p. 7).

The teacher who worked with her children as a group felt this was both enjoyable for them and a valuable learning experience. Further she felt it aided her in overall assessment of each child and increased her awareness in the area of motor development. By the close of the study period several of the other teachers were interested in the program and curious as to the results. "Before and after" movies taken during the

study period were shown to the staff demonstrating the activities the children engaged in. They were readily able to see that positive results could be achieved, in a relatively small amount of time, using simple techniques and minimal equipment. The public health nurse, aide, and interested staff members painted geometric figures, a maze, and various designs on the playground to stimulate interest in specialized motor activities at recess time.

Some of the parents were very interested in the testing and motor activities. The program was discussed with them and activities were demonstrated to carry out at home when the study period ended. This was an excellent opportunity for the public health nurse to counsel with families on parenting skills and normal growth and development.

The Head Start preschool age group appears to be ideal to work with. The children responded well to the testing and planned physical activities. Those who were not in the treatment group evidenced great curiosity about the program and were permitted to visit and observe activities after the study period ended. This stimulated interaction with their peers and allowed the children who had been involved in the program to receive positive attention and praise.

CONCLUSIONS

The statistical data was significant and supported the hypothesis that deficient motor skills in Head Start preschool children will be enhanced by planned physical activities. Individualized remediation of deficient motor skills seemed to elicit the greatest improvement in the children.

The public health nurse, because of her overall expertise in assessment of normal growth and development, is well able to screen out children with possible motor problems and plan appropriate remedial physical activities. Further, because of her background knowledge in child development, there appears to be some advantage in her supervising the planned activities. She may not need to work directly with the children but, rather, utilize a person she has trained to do this.

RECOMMENDATIONS FOR FURTHER STUDY

As a result of this study, the following recommendations are made:

1. A longitudinal study should be done to determine whether the children with low test scores do in fact have motor problems and resultant low self esteem in later school years.

2. A longitudinal study should be done to determine if the gains made in motor skills during the study period were maintained by the children, and what their adjustment is in school and in learning.

3. A more in depth study should be done of the children who remained low scorers at the end of the study period to ascertain if some common denominator is present.

IMPLICATIONS FOR NURSING PRACTICE

The public health nurse, because of her background in observation and evaluation of children can readily participate in a program of this type. She can be a valuable resource person in assessment, planning, and making appropriate referrals for children with special needs. Further,

she can serve as a consultant to schools interested in setting up a motor skills program and participate in the training of teachers and aides. This kind of activity gives her credibility with professionals and community leaders with whom she works. The sharing of knowledge which ensues serves to enhance her own expertise.

One of the most rewarding and perhaps important results, however, is the increased opportunity to interact with the families under her care. The public health nurse has an opportunity as no other professional to enter the home, do testing, and begin her interventions at the earliest possible time. Here, the parents can more readily be involved in assessment, remediation, and evaluation activities. This, in turn, helps to stimulate parent-child interaction and provides opportunities to develop positive parental attitudes.

Often time and/or money are limiting factors in the nurse working on a one-to-one basis with children. However, a program of motor skills evaluation and remediation activities can be developed to use with parent groups. In this setting the interaction of parent with parent as well as with their children increases the opportunities for mutual sharing and learning.

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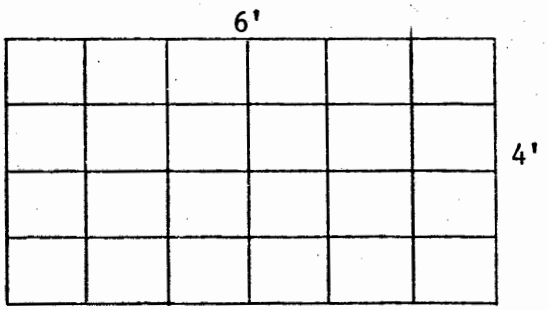
APPENDIX A



Motor Skills Test

Level 1 - Body Perception

Equipment: 4 x 6 foot mat

Preparation: The child should be placed, standing on the floor, with his toes against the mid-point of the 4-foot edge of the mat. The tester stands next to the mat with his feet on the floor.

Testing Procedure:

(a) "__(name)__, please lie down on the mat like this on your front or stomach." (Demonstrate) "Now try to do it, too."

(b) "__(name)__, now please lie down on the mat like this on your back." (Demonstrate) "Now try to do it, too."

(c) "__(name)__, now please lie down on the mat like this on your front or stomach, with your legs nearest me." (Tester assumes lying position, with his legs nearest the child, arises and then says...) "Now try to do it, too." The tester should then go to the far end of the 4-foot side of the mat, and face the child with the mat between them. Point is awarded only if feet are nearest the tester, and the child is on his stomach.

(c) "__(name)__, now please lie down on the mat on your side, like this." (Tester lies down on the mat on his left side, feet toward the child, arises, and then says...) "Now try to do it, too." Point is awarded no matter which side the child chooses to lie upon, and no matter where the feet are placed relative to the tester.

(e) "__(name)__, now let me see you raise one arm." (Allow child time to respond and then say...) "Now let me see you raise one leg. This should not be demonstrated.

Scoring: One point is given for correctly executing each of the requests. No points are deducted for a slowly executed response. Total of five points possible.

Level 1 - Gross Agility

Equipment: 4 x 6 foot mat; stop-watch

Preparation: Child is asked to stand in the center of the mat, facing a 4-foot side and the tester. Tester should be ten feet away. Then the child should be asked to lie down in the middle of the mat, his feet toward the tester.

Instructions: After the child is in the above position, the tester should say, "I would like to see how fast you can stand up and face me." A stop-watch should be started as the child's head leaves the mat, and stopped when he has his knees straight as he assumes a standing position, facing the tester. If the child does not understand, the tester should demonstrate standing up rapidly.

Scoring: One point if the child turns to his stomach first and then arises in more than three seconds.

Two points if the child turns to his stomach first and arises in under three seconds.

Three points if the child sits up, without turning over, and stands up without turning his back to the tester taking more than three seconds.

Four points if the child sits up, remains facing the tester when arising, and does so in two seconds.

Maximum points possible: five.

Level 1 - Balance

Equipment: Stop-watch, chalk

Preparation: The examiner should face the child on a level floor ten feet away from a chalk mark.

Testing Procedure: Part 1:

"Stand on the chalk mark and face me."

After the child is in the required position the examiner should say: "I would like to see how long you can stand on one foot like this - watch me..."

"The examiner should demonstrate balancing on his left foot using his arms to assist him. He should hold this position for 10 seconds.

"Now you try it too."

Evaluation: One point is scored if the required position is held for one second.

Two points are scored if the required position is held from two to four seconds.

Three points are scored if the required position is held from four to six seconds.

Four points are scored if the required position is held for over six seconds.

Testing Procedure: Part 2:

"Now let's see if you can balance on one foot with your arms folded like this--watch me."

(The examiner demonstrates the required action by balancing on one foot with his arms folded across his chest for ten seconds.

Evaluation: One additional point is scored if the arm-folded balance is held for three to four seconds. The maximum number of points obtainable from Parts 1 and 2 combined total five points -- four points for Part 1 and one point for Part 2.

Permit the child to remain balanced on both parts of this test for ten seconds, and then suggest that he stop. The scoring is not influenced by the foot he decided to balance upon, though it should be the same foot throughout.

Level 1 - Locomotor Agility

Equipment: 4 x 6 foot mat

Preparation: The examiner stands at one end of the mat.

Testing Procedure:

(a) "__(name)__, stand next to me but stay off the mat. Let's see if you can crawl along the mat like this--watch me." The examiner crawls on hands and knees demonstrating the desired action down the length of the mat away from the child, and then toward the child before saying: "Now you try it."

Evaluation: One point is scored if the desired cross-extension pattern is seen in the crawling movement.

(b) "__(name)__, let's see now if you can walk down the mat like this--watch me." The examiner walks down the mat away from the child before saying: "Now let's see if you can do it, too."

Evaluation: An additional point is scored if the desired cross-extension pattern is seen in the child's gait.

(c) "__(name)__, now can you jump across the mat like this? Watch me." The examiner takes three to four jumps along the mat away from the child using both feet together and the proper arm lift as he travels. He then says, "Now you try too."

Evaluation: One point is scored if the child leaves the ground two to three times during the trip down the mat.

(d) "__(name)__, now can you jump across the mat this way? Watch me." The examiner then jumps backwards toward the child and says, "Now let me see you do it."

Evaluation: A point is given if the child can jump backwards two to three times while proceeding along the mat without falling down. The child is permitted to look backwards when executing this test. The examiner should return to the far end of the mat to await the child, arrest his progress and prevent him from falling down.

(e) "__(name)__, now let's see you hop down the mat on one foot like this--watch me." The examiner demonstrates one foot hopping, using his left foot across the mat away from the child and then says, "Now let me see you do it."

Evaluation: One additional point is scored if the child is able to hop on one foot (either foot) from two to three times down the mat.

Maximum points possible: five.

Level 1 - Ball Tracking

Equipment: 8-1/2 inch rubber, air-filled playground ball

Preparation: The child should face the tester ten feet away. The tester should hold the ball.

Testing: The tester should then say, "Now I will bounce the ball to you. Try to catch it any way you can." The tester then throws the ball, so that it bounces once before the child gets it. The ball should bounce so that it comes chest high to the child. Two practice bounces are permitted to allow the child and the tester to become oriented to the problem. The tester should then say, "Now do you understand?" Catch it any way you can, with one or two hands."

Five throws should then be made to the child, bouncing the ball once. The ball may be returned by the child, any way he sees fit. About five seconds should be permitted between throws.

Scoring: Score one point for each time the ball is caught and controlled by the child. Maximum five points possible.

FINGER OPPOSITION

Directions:

"Touch the tips of the fingers with the thumb of the same hand rapidly in the order 5, 4, 3, 2 and 2, 3, 4, 5. The total time allowed for each hand is five seconds. Failure if a finger is touched more than once or not at all. Two attempts for each hand.

a. Tester must make sure that the fingertips are touched separately.

b. Collateral movement may be observed in this item. Both hands should be visible and neither should be resting on the table or supported in any other way.

---

1. The hand not being used may be placed in any position desired and is not observed for collateral movements.

2. It is a failure to touch fingers out of order.

3. Examiner demonstrates task two times: "Touch each finger, like this, all the way up and all the way back. You might count the fingers, 1-2-3-4, then start over coming back, 4-3-2-1." Numbering the fingers may confuse some children and should not be continued with them.

4. Either or both thumb and finger may move in the touch; tip of the finger goes down to the first crease.

Scoring:

1. Time to nearest second; two trials per hand.

2. Note error as:

   a. Tip: touch below the crease.

   b. Order: incorrect order including touching finger too many times, not often enough, and out of order.

No time is scored if error is noted.

8 seconds or under = pass, allow one point.

SEQUENTIAL ACTIONS

Directions:

Place fisted hand on table perpendicular to flat surface, then open hand, remaining perpendicular to table, and then place open hand flat on table surface.

a. Examiner demonstrates two times.

b. Allow one point if child follows proper sequence.

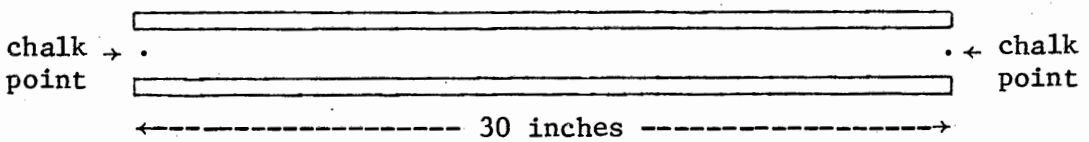
LINE DRAWING IMPULSE CONTROL

Equipment: Blackboard, chalk, stop-watch

Preparation: Three sets of two taped parallel lines (all horizontal to the ground), each set two inches apart, should be affixed to the chalkboard surface at different levels. The blackboard should be mounted to accommodate the varying eye levels of the children.

Testing Procedure:

"Do you see these two yellow lines?" The examiner indicates with his finger the set that he feels is best suited to the physical dimensions of the child. "When I give you the chalk, I want you to draw a straight line from this point to this point." The examiner marks two clearly observable chalk points at the entrance and exit of the two yellow tape lines--both points are located in between and equidistant from the yellow tape lines as seen in the diagram below. Tapes are placed two inches apart.



"I want you to draw this line as slowly as you can." The word 'slowly' should be drawn out and emphasized. The examiner then gives the piece of chalk to the child. When necessary remind the child to keep the chalk moving and in contact with the board.

Evaluation: The time taken for the child to draw the line from one chalk point to the other should be recorded in seconds. Time may be subtracted (at the discretion of the examiner) for breaks in motion and contact with the blackboard

The time allowed should be between 20 and 30 seconds. One point is allowed if the child takes at least 20 seconds.

MAZE DRAWINGS

Equipment: Large, easily held crayong, maze drawings.

Directions: Ask child to draw a line from the dog to the bone, from the snake to the hole, from the rabbit to the carrot, and from the cat to the milk.

a. Allow one point if child completes three out of our drawings, staying between the lines. (See Figure 3, page 47.)

SPATIAL RELATIONSHIP DRAWINGS

Equipment: Large, easily held crayon, dot to dot drawings.

Directions: Ask child to draw a line from one number to the other in proper sequence.

a. You may demonstrate order with the tip of your finger.

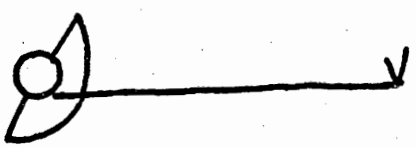
b. One point is allowed if child follows proper order, draws in correct direction, and stops at the dots. (See Figure 4, page 48.)

KRAUS-WEBER TESTS FOR MUSCULAR FITNESS

There should not be any warm-up prior to taking the tests.

Test 1

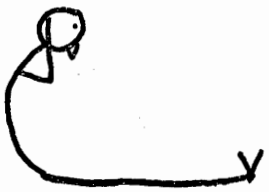
Purpose: Tests the strength of the abdominals and psoas.



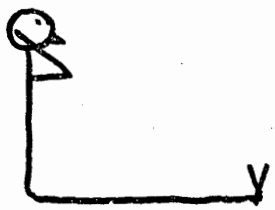
Designation: "Abdominals plus psoas" or A+.

Position of Person Being Tested:

Lying supine, hands behind back, examiner holding his feet down on the table.



Command: "Keep your hands behind your neck and try to roll up into a sitting position."



Precaution: If the person being tested is unable to perform this movement at first try, it may be because he has not understood the directions. Help him a little and then let him try again. Watch for a "stiff back sit up." This may indicate that either he has not understood you and needs further explanation with emphasis on "rolling up," or that he has very poor abdominals and is doing most of the work with his psoas. Watch also for a twist of the upper body as he sits up. This may be due to internal development of the back muscles. If unaided, he is able to reach sitting position, two points are awarded. If examiner must help him halfway to the sitting position, one point is awarded.

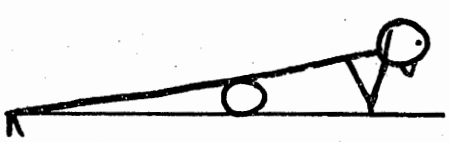
Test 2

Purpose: Tests the strength of the upper back muscles.

Designation: "Upper back" or "UB."

Position of person Being Tested:

Lying prone with a pillow under his abdomen, but far enough down as to give the body the feeling



of being a seesaw which, if weighted at either end, would be able to hold the other end in the air. This is most easily accomplished with these commands:

Command: "Roll over onto your stomach and lift up the middle so that I can slide this pillow under you." (Be sure pillow is large enough to really support him.) "Now, I am going to hold down your feet while you put your hands behind your neck and raise up your chest, head, and shoulders. Hold them up while I count to ten." The count is ten seconds.

Precaution: Do not let the person being tested drop his chest onto the table or rest his elbows. Watch for pronounced muscular development on one side of the spine. If this condition is present, the back should be checked from time to time to guard against scoliosis (curvature of the spine).

Marking: Holding for ten full seconds is passing and is marked as one point. Additional point given if held over ten seconds.

AGILITY AND BALANCE

Instructions: Child stands facing tester.

(a) "__(name)__, now let's see you walk on the line like this." (Demonstrate, using proper heel-toe gait and balance).

(b) "__(name)__, now let's see if you can step to the side like this." (Demonstrate by side stepping both to the right and to the left."

(c) "__(name)__, now let's see if you can hop like this." (Demonstrate by alternate hopping, two times on the right leg and two times on the left.

(d) "__(name)__, now let's see if you can kneel like this." (Demonstrate alternate kneeling, kneel once on right knee and rise, then kneel once on left knee and rise.

(e) "__(name)__, now let's see you run to me as fast as you can. (Observe for good start and stop, coordinated movements of arms and legs, asymmetric or inappropriate movements.

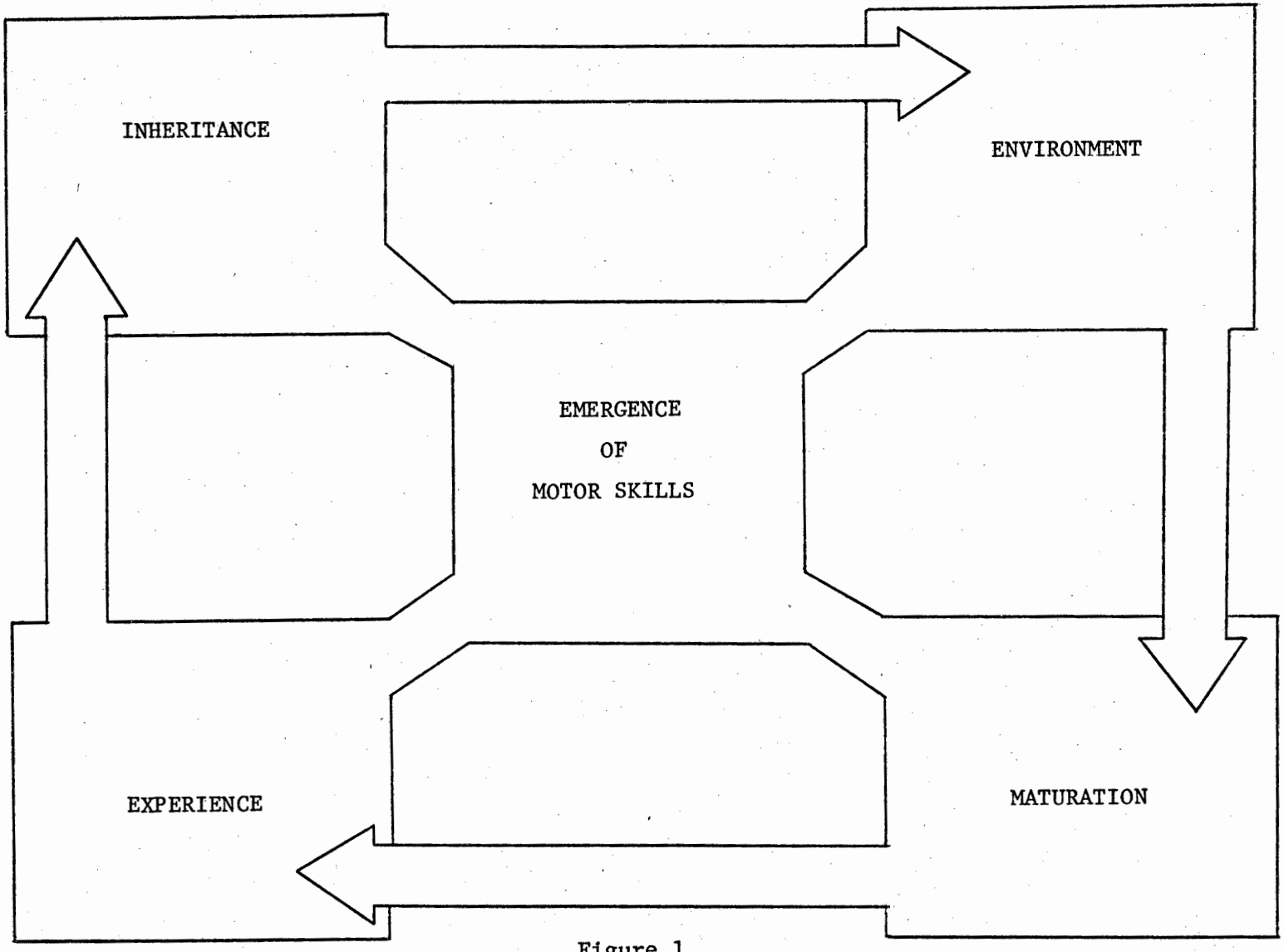


Figure 1

Model Depicting Interrelationship of Factors Influencing Development of Motor Skills

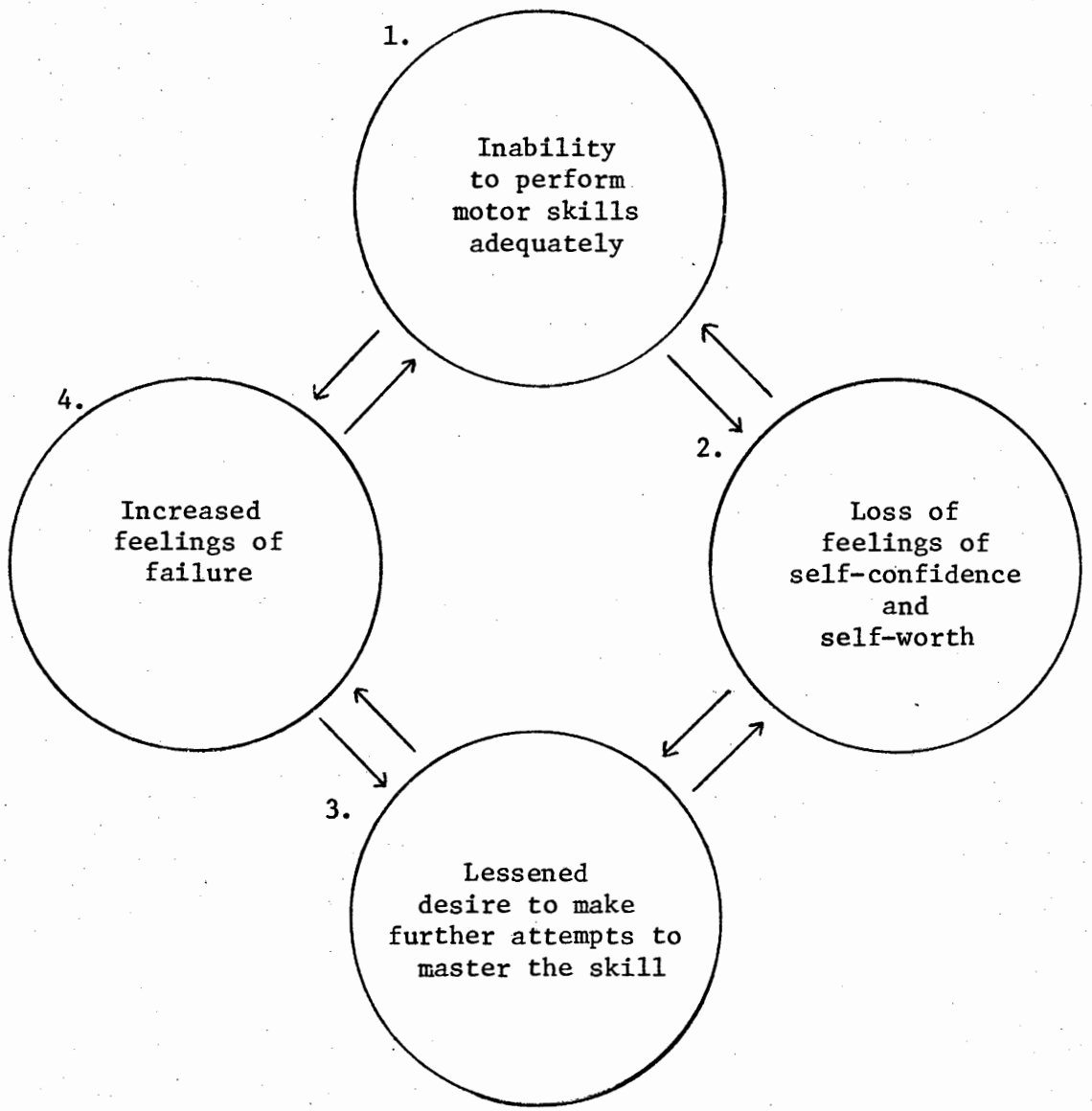


Figure 2

Model Depicting Cycle of Failure That Can Evolve From Inability to Perform Motor Skills Adequately

Figure 3

MAZE DRAWINGS

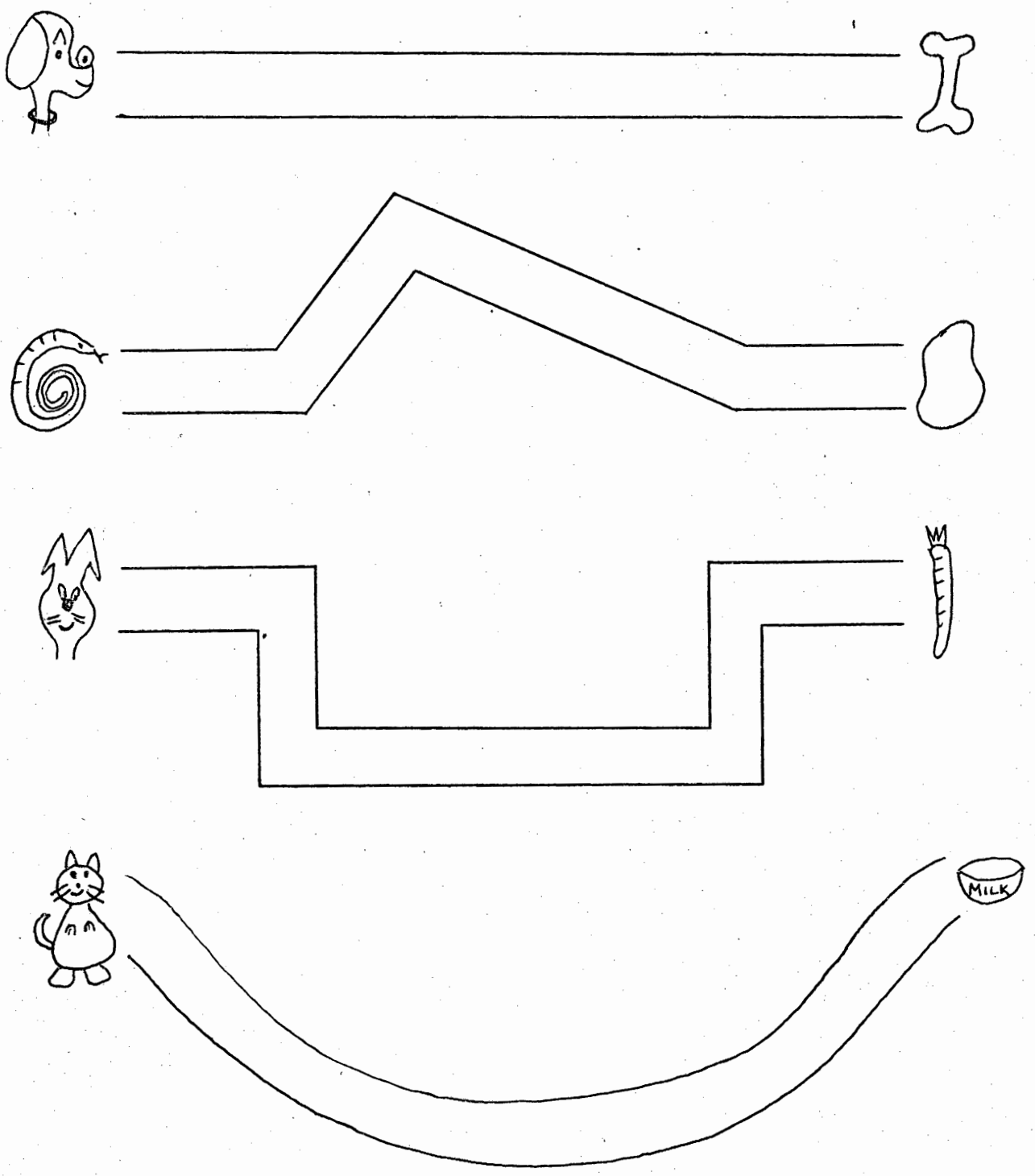
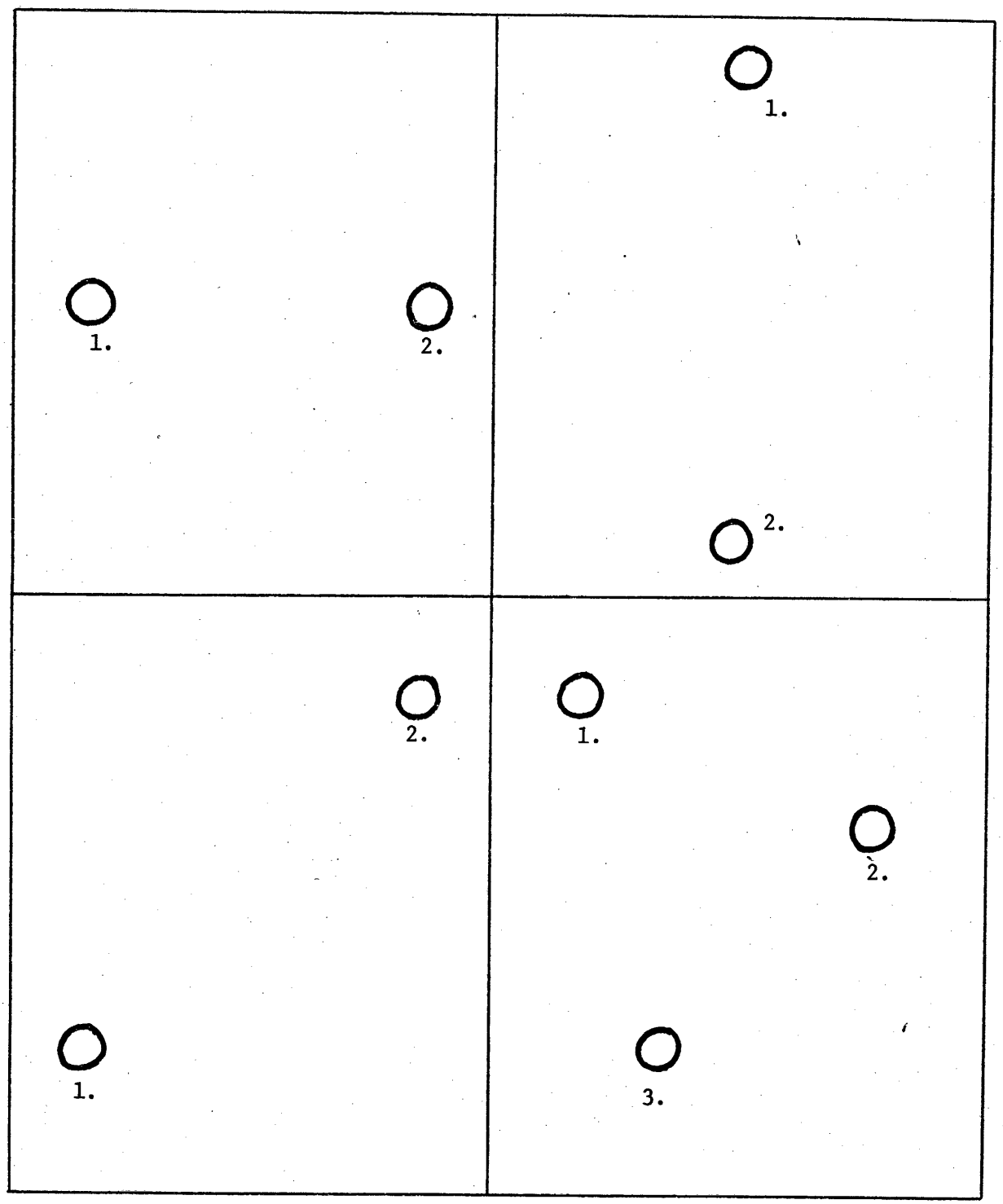


Figure 4

SEQUENTIAL DRAWINGS



APPENDIX B

Body Perception

1. Imitation of body movements--demonstrate single movements and gradually make them more complex.

2. Movements on command--say, "raise your arm, leg, hand," etc.

3. Music games--draw a circle and sing, "put your left foot in, put your left foot out," etc.

4. Body positions--tell the child to lie on his back, side, stomach, etc.

5. Relaxing and tightening--demonstrate tightening and relaxing various parts of the body.

6. Finger plays--say, "touch your elbows, knees, and toes," etc., or "Simon Says."

7. Imitation of body movements using a full-length mirror.

8. Have the child lie down on a large piece of paper and assist another child in tracing the body outline. Then have each child color their own body.

9. Have children draw themselves and name body parts.

10. Have the child close his eyes and then tell you what part of the body you are touching.

Gross Agility

1. Jumping tire--large tire with canvas stretched across the top--emphasize bending the knees and use of arms for uplift.

2. Marked 4' by 6' mat--jumping forward and backward into designated squares.

3. Marked 4' by 6' mat--hopping in designated squares.

4. Hopping on alternating feet to develop rhythm and patterns.

5. Jumping rope on the floor--tell child to show you how many ways there are to get over the rope.

6. Jumping rope--raise rope a little higher off the ground at successive intervals.

7. Jumping rope--stand in the center and swing rope in a circle and have the child jump.

8. Jumping rope--child jumps while other children are turning the rope.

9. Jump off and onto objects such as a mat.

10. Demonstrate and practice forward and backward somersaults.

Balance

1. Walking forward and backward on a low-to-the-ground balance beam.
2. Place objects on the balance beam for the child to step over.
3. Place objects on the balance beam for the child to pick up and then continue going across.
4. Walk on the balance beam with arms folded or hands on hips.
5. Walk across the floor balancing a flat object on the head.
6. Use paint or masking tape to make various lines and forms for the children to walk around.
7. Walk on curbs or low ledges around the school yard.
8. Have child balance on one foot with arms out and then folded.
9. Have child balance on one foot with eyes closed.
10. Have child balance on one foot with objects in his hand.

Locomotor Agility

1. Crawling exercises to develop good cross grid movements.

2. Walking and marching with music, again looking for good cross grid movements.

3. "Listen and Do"--records describing various body movements--sit down, run, walk, etc.

4. Walking and running on various lines and shapes painted on a playground.

5. Crawling through barrels, tires, rows of chairs, etc.

6. Various movements, stop and go games such as "Follow the Leader" and "Mother, May I?"

7. Walking, running, jumping, and hopping through various obstacle courses made to your own design.

8. Seeing how fast or how slowly the child can complete a given maneuver.

9. Rolling and beginning tumbling exercises.

10. Roller skating on indoor-outdoor carpet and then progress to smoother surfaces.

Ball Throwing

1. Throwing and catching bean bags.
2. Throwing bean bags at a target.
3. Throwing the ball with both hands and then one hand.
4. Throwing the ball with proper stance and body shift.
5. Throwing the ball at a target.

Fine Motor Skills

1. Cutting construction paper in various shapes.
2. Playing marbles.
3. Drawing exercises on the blackboard.
4. Hand and finger plays.
5. Playing with clay or dough.

Ball Tracking

1. Catching a rolled ball--roll the ball to the child and he rolls it back.

2. Catching a bounced ball--gradually increase the distances.

3. Catching a thrown ball--guide in stance and use of hands.

4. The child bounces and catches his own ball.

5. Catching bean bags.