

1970

## The Effects of a Perceptual-Motor Training Program on the Development of Motor Perception Skills on Kindergarten Children

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THE EFFECTS OF A PERCEPTUAL-MOTOR TRAINING PROGRAM  
ON THE DEVELOPMENT OF MOTOR PERCEPTION SKILLS  
ON KINDERGARTEN CHILDREN



A Thesis  
Presented to  
the Graduate Faculty  
Central Washington State College



In Partial Fulfillment  
of the Requirements for the Degree  
Master of Education



by  
James H. Gaston  
July, 1970

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## ACKNOWLEDGEMENTS

The writer expresses sincere appreciation to Dr. Everett A. Irish for his assistance and guidance in the preparation of this study.

Acknowledgements are also due to the many people within the Bellevue School District for their cooperation and assistance.

The author is grateful to his wife, Donna and his two children, Jamie Lynn and Eric for the understanding and encouragement they gave him.

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## CHAPTER I

### INTRODUCTION

It has been said that basically all learning is the result of the child's ability to move, explore, and manipulate within his environment.

The early motor or muscular responses of a child are the earliest behavioral responses of the human organism and represent the beginning of a long process of learning and development. Through these first motor explorations, the child begins to find out about himself and the world around him, and his motor experimentations and motor learnings become the foundation upon which knowledge is built.

Quite recently, increased attention has been given to learning how to learn or readiness for learning. In discussing motor learning, Kephart states:

It is logical to assume that all behavior is basically motor, that the prerequisites of any kind of behavior are muscular and motor responses. Behavior develops out of muscular activity, and so-called higher forms of behavior, thus making even these higher activities dependent upon the basic structures of the muscular activity upon which they are built. (1:35)

Neurologists, psychologists, ophthalmologists, and educators have noted that a relationship appears to exist between motor development and academic achievement. Charles A. Bucher, writing in the National Education Association Journal, says:

More research is needed to establish and define the exact relationship of physical activity, motor skills and health to academic achievement, but the evidence to

date firmly establishes the fact that a close affinity exists. (2:38)

In the past, physical educators have been chiefly concerned with motor development as it contributes to physical fitness, general health status, social adjustment, and skill development. However little attention has been given to the importance of motor activities in relation to the learning process itself. More recently motor development has been included in a number of schools as a basic readiness activity for pre-school and primary children.

Motor development has also found a place in the remedial training of older children whose scholastic achievement is consistently below that of their expected potential. Training of this type has generally become known as perceptual-motor development.

In Kephart's book, The Brain Injured Child, he points out the role of the physical educator in relationship to perceptual motor development:

As time progresses more and more attention will be needed to be given in the school situation to development of basic readiness skills among children who, for any reason, have not been able to achieve them. We can then think of physical education in the elementary school, for example, not only in terms of its contribution to muscular strength, skill, but also in terms of its contributions to total perceptual motor processes. (3:13)

A well-balanced movement education program for children would not only help them build a basic background of motor activities to prepare them for more advanced motor skills, but could also be designed to develop perceptual-motor skills that may contribute to the total learning capacities of the child.

## Statement of the Problem

The purpose of this study was to partially evaluate the effectiveness of a kindergarten perceptual-motor training program in regard to improvement of motor skills. In this evaluation the primary effort will be to measure those aspects of readiness which are closely related to the specific objectives of the perceptual motor training program (see Appendix I).

A secondary effort will be made to evaluate the general efforts of the training on aspects of readiness less closely related to the specific objectives of the program.

## Hypothesis

The hypothesis upon which the present study is predicated is that there will be significant difference in motor perception skills of the kindergarten children participating in perceptual motor training when compared with kindergarten children participating in a regular physical education program.

A second hypothesis was that the experimental group i.e., the motor perception group would be significantly different as tested by the Johnson Fundamental Skill Test.

## Delimitations of the Study

1. The control groups for this study were from one elementary school, while the experimental groups were from two schools.

2. The control school was from the Renton School District and had the services of a physical education specialist for the first sixteen weeks of school.

3. The experimental schools were from the Bellevue School District and had the services of a full time physical education specialist at one of the schools and the services of a half-time specialist at the other school.

4. Only normal physical and mental kindergarten children were included in this study.

### Definition of Terms

Perceptual-Motor-Skill. A skill that is dependent on the processing of input information being interpreted and becoming meaningful information and influencing movement output.

Perceptual Motor Training. The process of developing sensory and motor skills to react to one's environment totally.

Bilateral Movements. Those movements that involve the use of both sides of the body in a simultaneous and parallel fashion.

Unilateral Movement. Those movements that involve the use of one side of the body.

Cross Pattern. Those movements that require simultaneous use of different limbs on the opposite side of the body or the moving of the same limbs (as both arms) simultaneously but in opposite directions.

Directionality. The ability to project right and left, up and down, front and back, and direction from the body out into space.

Latrality. The complete awareness of the two sides of the body and the ability to use each separately or both sides together as the task demands.

Body Image. Refers to a complete awareness of one's own body and its possibilities of movement and performance in relationship to space.

Movement Patterns. Single movements that are organized into complex wholes.

Perception. The experiences or sensation combined to intergrate with previous experiences which give added meaning.

Perceptual-Motor. A process which includes sensory or perceptual activities and motor or muscular activities. A division of the two is impractical for anything that happens to one area automatically effects the other. Any total activity includes perceptual activity, integration, and a motor response.

Space. The area in which a child moves or occupies. His immediate surroundings as well as those far away.

## CHAPTER II

### REVIEW OF LITERATURE

It appears that educators have taken for granted that all children have acquired a well developed motor base upon which to build the more complex learnings expected of them as they enter our formal education programs.

Children who are experiencing difficulty in formal learning tasks are often given additional work in the special area of their weakness. It might be that this kind of remediation is in reality treating the result of a problem rather than its cure. Children who are unable to develop the proper readiness skills under the circumstances of their environment may be in need of additional readiness activities in the public schools.

Learning activities of primary children are primarily geared to the development of basic skills and of group experiences which they have never before encountered.

Barsch has discussed these series of experiences as:

The kindergarten year is the first full test for the terranaut (space exploration). For the first time in a very real way a child is asked to demonstrate in a peer-comparison setting the results of his five year program of basic training. All the lessons of basic motor performance, oral language structure, form perception, color disorientation, conformity to patterns, ability to follow directions (both auditory and visual) and many, many more functions in a seemingly endless list are expected to be properly organized, defined, and integrated (4:23)

The learning activities of kindergarten children are directed toward the development of skills that contribute to

symbolic interpretation. It is easy to understand why so much emphasis and attention have been given to this area since most learning is dependent upon this highly organized act. Many people are concerned over the number of poor achievers in many schools. Many of these achievement problems manifest themselves in the areas of visual interpretation.

Many children experiencing reading difficulties have normal capacity or better for learning to read. Children who are not achieving up to their expected potential are often referred to as under achievers or slow learners. New teaching techniques are continually being devised in an effort to narrow the gap between achievement and potential, however, the number of underachievers continue to grow. (5:11)

This fact suggests that for some children, one of the causes of reading and learning problems may be at the readiness level rather than at the level of formal instruction.

Educators have begun to explore the relationships of early motor development and later cognitive learning.

Katrina de Hirsch suggests that spoken, printed, and written language difficulties involve disturbances of sequential behavior and that such disturbances seem to reflect subtle deviation in the developmental process. (6:14)

After studying a group of children who were experiencing language difficulties, Delacato concluded the problem common to all of these children were physical or developmental in nature. In discussing the cause of some reading problems, Getman says: "Too frequently these problems have been over-emphasized as the cause of the difficulty. We must realize that these problems are the end results of the child's lack of sequential development."(7:33)

Studies in child development have clearly established the sequential development of the child as being a definite step-by-step process with motor development being the base of later higher order of developmental processes.

Arnold Gesell, points out the importance of motor experiences as he writes:

Time, space, number, form, texture, color, and causality, these are the chief elements in the world of things in which a child must find himself. We have shown that he acquires his command of these elements by low degrees, first through his muscles of manipulation and locomotion, through eyes, hands, and feet. In this motor experience he lays the foundations for his later judgements and concepts. He does not even count to three until he has learned to pick up and release objects one by one with eyes and fingers. Mastery of form likewise comes through motor explorations and exploitations. (8:26)

Within the past few years, increasing scientific interest has been evidenced by the increasing number of studies devoted to behavior located to movement. Contemporary research has often focused upon man's capacity to move with force, speed, and accuracy and the methods by which complex skills are learned.

The study of motor skills and learning is the concern of many academic disciplines. The medical profession is concerned with motor performance of atypical individuals, the anthropologist studies motor performance within culture as a function of evolution, the anatomist-physiologist studies motor performance as a function of structure, the psychologist uses animal subjects or employs the fine motor skills of humans to investigate many basic problems, and the human factor engineer studies manual skills in industry or within man-machine



systems. The physical education teacher, on the other hand, has as his unique area of study, factors accompanying the gross motor performance and learning of healthy human beings.

Millard points out:

Perceptual motor development has long been recognized by child development specialists a vital part of the normal development of the individual. Some workers go even further in their endorsement of motor behavior, saying that the only creative outlet of young children is in motoric expression (9:126)

### The Principles of Perceptual Motor Training.

In recent years more and more school districts have been providing programs that enhance perceptual motor and sensory motor activities. These programs have been called perceptual motor training. One example of this program is described and defined in the Reading Research Foundation as:

...a systematic, developmental program of exercises designed to improve the efficiency with which the human machine receives information from the outside world and from within itself, processes or comprehends this information by associating it with past experiences, and then utilizes the information to control and guide a purposeful motor response or behavior. (10:1)

Schools that have utilized this kind of training have based their programs on the writings and clinical experiences of such people and projects as Newell Kephart, Carl Delacato, G.N. Getman, Ray H. Barsch, Marianne Frostig, and the Winter Haven Perceptual Training Procedure.

Kephart's perceptual motor development theory. Newell C. Kephart, Director of the Achievement Center for Children at Purdue University and associates have formulated a program

which emphasizes that motor development, forms the basis for all subsequent achievement. Within this framework Kephart covers the development, achievement and training of motor skills, perception and space discrimination.

The perceptual process. Modern thinking and recent experimentation point toward the conclusion that a closed system involving a feedback control is operative in the perceptual process.

By moving within his world, exploring and manipulating his own body in relation to things around him the child is developing his sensory motor processes. Information is being supplied by his senses, then it must be interpreted and analyzed before it becomes meaningful information and can be used to influence his behavior. (11:55)

The formation of adequate motor patterns is the process of attaching to objects, events, or situations occurring within the spatial and temporal proximity of the individual.

A newborn infant is characterized by a wave of movement that sweeps through the whole body. Arms and legs are moved, not in direct relationships to their functions but only as an adjunct of the total movement. Through the long process of development the child learns to sort out and independently control the movement of his body. The child must now learn to integrate the independent movements with his reflex system which has also been undergoing a process of development. Once these processes have been firmly established and interrelated, movement patterns are developed.

The establishment of motor patterns are of extreme importance to the child, they permit him to divert his attention

from the purely motor aspects of a movement to the purpose for the movement. A child who is just beginning to walk, for example must direct all of his attention to the problem of moving from one place to another. As his walking develops into a pattern, he is then able to move automatically without having to think about moving his legs and feet. He is now free to explore and learn from his environment.

An important generalization which develops out of the motor learning is that of laterality. Laterality is the awareness within the body of the difference between right and left. After laterality has become established, the child begins to elaborate his laterality to include directionality. After this has been achieved the child begins to project his internal awareness into spacial relationships and spatial direction in relationship to himself.

The training activities generally associated with Kephart are designed to primarily develop body rhythm, temporal patterns, generalized motor patterns, balance, posture, directionality, laterality and hand-eye coordination, sensory-motor learning, ocular control, and form perception.

Delacato's neuro-psychological approach. An infant's movements from birth to about 16 weeks of age are trunkal in nature and may be compared to the fish-like stages of life on earth. This movement is controlled through the spinal cord, the medulla oblongata being the most important neural area of the brain. The infants movements at this stage are

reflexive and not oriented toward any goals.

The next higher level of neurological organization is the amphibian-like stage at which point the pons area of the brain begins to develop. At this stage of development the child crawls from one place to another using unilateral movements of the arm and leg on the same side of the body. Although the child cannot see at a distance, he is beginning to visually pursue his own hand as he moves himself about the floor.

At the age of six months the child begins to move into the mid-brain stage of development, and parallels the development of land animals which move in a cross pattern fashion. Now for the first time the child moves in the third dimension in the form of creeping. His stomach is no longer in contact with the floor and he moves in a cross pattern fashion with ease and smoothness. He is now able to coordinate functions from both sides of his body.

At one year of age the child is moving into early cortical development of the brain. This development is compared to that of the highest order of mammals, the primates. The child is becoming increasingly proficient at bilateral activity and begins to experiment with unilateral functions using both hands and legs independently. During this stage the child masters one of the most human functions, that of walking.

The final step in the progression of the human being is the development of cortical hemispheric dominance which takes place from five to eight years of age. Up until now

both hemispheres of the cortex have operated in a balanced relationship. Now the two sides of the brain begin to develop differentiated functions, one becoming the dominate hemisphere and the other assuming the subordinate role.

Carl H. Delacato, is Director of the Institute for the Advancement of Human Potential in Philadelphia, Pennsylvania. He has paralled the evolution of man with the neurological development of the human being in formulating his theory.

Neurological organization is the physiologically optimum condition which exists uniquely and most completely in man and is the result of a total and uninterrupted ontogenetic-neural development. (12:6)

This development recapitulates the phylogenetic neural development of man and begins during the first trimester of gestation and ends at about six and one half years of age in normal humans. This orderly development in humans progress is vertically through the spinal cord and all the other areas of the central nervous system up to the level of the cortex, as it does with all mammals. Man's final and unique developmental progression takes place at the level of the cortex and it is lateral.

The training activities used in the approach are usually designed to develop laterality and cortical hemispheric dominance. The specific training activities might be unilateral crawling, cross pattern creeping, cross pattern walking and jumping, and various other activities designed to establish dominance or sidedness.

Marianne Frostig's approach to perceptual development.  
She is the founder of Marianne Frostig Center of Educational

Therapy in Los Angeles. At the center a very broad therapy program for children with learning disabilities is conducted.

The interest of those at the center is in the developing of specific training programs based upon the broadest possible spectrum of testing and evaluation. They maintain that no single, narrowly defined treatment approach is sufficient to correct the varied symptoms found in any specific diagnostic category; and that the solution to learning problems lies in selecting from a range of techniques that are appropriate for each individual. A part of the Frostig Center's testing and training programs involves sensory-motor functions and experimentation in finding the best methods of appraisal for reaction time, speed, laterality, muscular coordination and strength and flexibility.

G.N. Getman's approach to perceptual motor training.

G.N. Getman, an ophthalmologist from Luverne, Minnesota, has developed an approach to learning problems centered around the child's visual development. Getman explains that sight and vision are not the same. Sight is a reflex action of turning the eyes toward a light. Vision is a process of interpreting what is seen, vision is the process of getting meaning out of what is seen. Skill of understanding and integrating what has been seen must be developed and integrated into the perceptual pattern.

The programs followed by Getman include general coordination, balance, eye-hand coordination, eye tracking, form

Ray H. Barsch's perceptual motor training approach.

Barsch gives a space oriented approach to learning. He introduces the theory of movegenic, whereas the learner is viewed as continuously engaged in an effort to achieve grace, ease, comfort and efficiency in both physical and cognitive movement. The premise of the learner as a space oriented organism seeking to establish efficiency in physical and cognitive movement has been set in a model of ten basic constructs:

(1) the organism is designed for movement, (2) the objective of movement is survival, (3) movement occurs in an energy surround, (4) the mechanism for acquiring information is the percepto-cognitive system, (5) the terrain of movement is space, (6) developmental momentum thrusts the learner toward maturity, (7) movement occurs in segments of sequential expansion and, (10) communication of efficiency is derived from the visual spatial phenomenon called language.

Barsch states that:

Man moves in space which is the terrain of learning. He moves to learn as have all men before him. His tally sheet of achievements will be marked in spatial encounters, he moves and he perceives. He perceives and he moves. He is a perceptual and all of his learning is motor. Only as we come to understand the remarkable complexity of his perceptual-motor unit, will we find the ways to assist him to achieve the highest possible level of movement efficiency. (13:333)

He tells the teacher that they must provide the learner with opportunities and experiences which will enable him to transport himself physically and cognitively, in comfort and

ease so as to promote his optimal survival.

The Winter Haven perceptual training procedure. This program began in 1953 when a four year project to gather data on probable causes of failure in the primary grades was authorized. Previous to the program the Winter Haven Lions Club had been active in visual screening within their locality. It had become apparent that children were still failing in beginning reading even though they had normal vision therefore, the membership decided to authorize further investigation.

A perceptual training program was developed not necessarily to produce a direct improvement in reading, writing or arithmetic but rather the purpose of their training was to improve the perceptual skills and/or hand-eye coordination which is the fundamental to all of those school skills.

The Winter Haven Perceptual Training Program, as similar programs, has evolved through trial, experimentation and research.

Sutphin states that:

The program is not "canned" but rather, that it is flexible and capable of being adjusted to the teacher and the pupil. As a program of directed development and perception, it employs no procedures which are new or untried. Many of the procedures are those employed in the Montessori approach. Fundamental concepts of the program are gross motor training, fine motor training, concept building through listening and speaking. (14:8)

Stress is placed upon adequate physical development, primarily development of laterality. From the development of laterality, directionality is developed from a kinesthetic awareness in the child's body.



## Motor Perception Programs In Schools

Many school districts are involved in some way with perceptual motor training. In a thesis prepared by John Plankey in 1967 he tried to determine the extent to which perceptual motor training has been included in public school curriculums, and to identify the role of the physical education in relation to this training program.

Fifty state directors of health, physical education and recreation were asked to send names and addresses of school districts in their states who were conducting programs in perceptual motor development.

Of the 50 state directors who were asked to reply in regard to perceptual motor programs in their state, 42 replied. A list of 68 school districts was compiled. Forty-nine of these replied, however 14 of these school districts indicated they were not conducting perceptual motor programs. The data from Plankey's study was received from 35 school districts throughout the U.S. Following are the results of this study:

1. Perceptual motor training in public schools is relatively recent. (86%)
2. Physical education educators have been influential in initiating perceptual motor programs. (40%)
3. Programs of perceptual motor development were generally based on the theories and writings of several individuals. (Kephart 83%)
4. Although a multi-disciplined approach is generally utilized in introducing the program, the physical education

plays a prominent role. (80%)

5. Most school districts are providing a perceptual motor training for large groups of children. (47%)

6. Tests of motor development are used in the programs. (83%)

7. Perceptual motor training is generally provided for kindergarten and first grade children. (Kg 43%, 1st 60%)

8. Perceptual motor training conducted daily 60% for an average of 30 minutes in length.

9. All of the schools used regular physical education equipment for perceptual motor training.

10. Most programs were experimental in nature. (66%)

11. 60% of the districts are planning a statistical study of the effects of their programs.

The Extent of Perceptual Training in the U.S. (15:261)

| State      | No. of Districts | State        | No. of Districts |
|------------|------------------|--------------|------------------|
| California | 2                | New York     | 2                |
| Florida    | 2                | Ohio         | 2                |
| Illinois   | 1                | Oklahoma     | 1                |
| Indiana    | 1                | Pennsylvania | 1                |
| Kentucky   | 2                | Rhode Island | 2                |
| Maryland   | 1                | Texas        | 3                |
| Michigan   | 2                | Virginia     | 1                |
| Minnesota  | 2                | Washington   | 5                |

| <u>State</u> | <u>No. of Districts</u> | <u>State</u> | <u>No. of Districts</u> |
|--------------|-------------------------|--------------|-------------------------|
| Missouri     | 2                       | Wisconsin    | 2                       |
| New Mexico   | 1                       | TOTAL        | 35                      |

Washington state had the most districts participating in a perceptual motor training program. These districts were Bellevue, Pasco, Shoreline, Quincy and Edmonds.

Since this study it can probably be assumed that more districts have developed or are developing perceptual motor training programs through out the U.S. and within our own state.

This ends the review of literature as far as a background of some of the perceptual motor programs in use today.

The Bellevue School District has used many of these ideas and practices to develop a program of their own. By implementing and using these approaches in perceptual-motor training as well as other programs in other subject areas, the district has been called a progressive district interested in new approaches and ideas in the realm of educational advancements. This is why the author has included the Bellevue perceptual-motor program in his review of literature, as it does bring us up to the present time--now, 1970.

#### The Bellevue Perceptual Motor Training Program

The perceptual motor program used in the Bellevue schools was developed to organize motor abilities for learning readiness in a sequential manner based on the development of movement patterns in children from birth through their

school years.

In following the development of children's movement patterns, it is found that the first initial movements of the infant are bilateral in function. Whatever the child does on one side, he does on the other side. Their movements are total symmetrical patterns involving the child as a whole and not differentiating the two sides.

From continuous experimentation the child begins to sort out those movements which are pertinent to the right side and those which are pertinent to the left side. The child might experiment by comparing right and left hand movements with each other and with symmetrical movements. These movements are unilateral in function in that one side of the body is involved in the activity at one time.

When the child gains strength and begins to crawl, creep, and eventually walk, another more refined type of movement presents itself. Here the child must be able to initiate movement in two segments of the body, in different places, and on opposite sides of the midline. This type of activity is cross-lateral in function.

The Bellevue perceptual motor program consists of bilateral, unilateral, and cross-lateral activities. The three activity classifications are presented in three four-week units, in the order that they have been discussed, keeping in mind the necessity of sequential presentation. The activities with these classifications can be changed during the four week unit. A change is recommended at two to three

week intervals depending upon the groups of children being worked with.

A circuit approach is used to implement the perceptual motor program. The circuit is composed of six stations: balance beams, bounce boards, chalk boards, stands, eye tracking, and stepping stones (see Appendix I).

The children enter the gym and remove their shoes. They find predetermined positions on the floor and sit quietly until all of the children are assembled. They all participate for three minutes in a large group warm-up activity. This warm-up uses activities that are of bilateral, unilateral, or cross-pattern nature depending upon the phase of the program involved. At the end of the three minute warm-up a timer bell sounds and the children remain at their positions until told to change and move on to their stations. The children know where to move by a color coded system or numbering system. The stations are color coded or numbered, if a child has a corresponding number or color they go to that station. The program utilizes the help of interested parents and sometimes students. Eight helpers or assistants are needed daily. These helpers assist the children at their stations. This frees the classroom teachers to observe their children and note difficulties and give assistance where needed.

The perceptual motor program lasts three months. The children meet daily for this program. From the time the children leave their classroom, participate in the program, and return to the classroom about thirty minutes has lapsed. This

thirty minute program takes place first thing in the morning. An outline of the complete perceptual motor training program can be found in the appendix.

Objectives of the perceptual motor training. Perceptual motor training attempts to develop these modes of learning:

1. Motoric--motor movement
  - (a) bilateral, (b) unilateral, (c) cross-pattern
2. Perceptual--sensory
  - (a) taste, (b) smell, (c) touch, (d) feeling,
  - (e) hearing, (f) seeing, (g) shaping, (h) direction
3. Conceptual--school disciplines
4. Abstracted--concept formation
  - motor + perceptual + conceptual = abstracterality

The development of the motoric to the abstractual is a sequential pattern. A child, by the time he is five years old has all of the basic movement skills learned. The physical education teacher simply trains, retrains or adapts to areas where the child can successfully achieve these basic movement patterns. The patterns, through perceptual-motor training develop into successful experiences in movement and perception or perceptual-motor experiences.

## CHAPTER III

### PROCEDURE

#### Population

The subjects for this study were kindergarten children attending three different elementary schools in the Bellevue and Renton School Districts. The socio-economic background of these children and the communities are similar and largely made up of professional and semi-professional parents.

Kindergarten children were chosen for this study because they had no previous formal instruction in the motor skill area.

The Bellevue schools are the experimental groups. These schools were selected because of the programs of perceptual-motor training that were to start at the beginning of the 1969-70 school year. The programs are generally started by the first grade children with the kindergarten children starting their programs at mid-year. The study was a year's study so the Bellevue schools were asked to start their programs with kindergarten children.

The experimental schools that took part in this study were Newport Hills Elementary and Clyde Hill Elementary.

Newport Hills Elementary had two sections of kindergarten, one morning and one afternoon. Both classes had the same teacher.

Clyde Hill Elementary had three sections of kindergarten, one morning session and two afternoon sessions. Two teachers taught these sessions.

The control school that took part in this study was from the Renton School District. The school is of similar type to the Bellevue schools and the general area is also similar. Hazelwood Elementary was chosen as the control school because the researcher could draw from a sampling that would have had little chance of having had children in the school that had been involved in perceptual motor programs, as it could very easily happen in the Bellevue schools.

Hazelwood has five sections of kindergarten, three in the morning and two in the afternoon. Three teachers share the teaching assignment at Hazelwood.

### Testing Procedure

The evaluation and testing devices that were used in this study were sections of the Purdue Perceptual-Motor Survey and the Johnson Fundamental Skill Test.

The Purdue Perceptual-Motor Survey was selected as a testing instrument because it permitted observations of various perceptual motor functions and rated them according to objective criteria.

Dr. Eugene G. Roach and Dr. Newell C. Kephart designed the survey with the primary purpose of presenting normative data as well as developing it as an instrument to assess qualitatively the perceptual-motor abilities of children in



early grades. The survey is composed of twenty-two items. These twenty-two items are divided into eleven subtests with each subtest measuring some aspect of the individuals' perceptual motor development.

Basically, the survey subtests or items can be divided into three major sections; those concerned with some aspect of laterality, with directionality, and with the skills of perceptual-motor matching.

Kindergarten children were used in this study, the rhythmic writing test of the survey was not used.

The Purdue Perceptual-Motor Survey Test included ten items:

1. Walking boards--The child was scored on three walking boards tasks, (1) walking forward, (2) walking backward, (3) walking sideway.

2. Jumping--The child performs eight jumping or hopping tasks, which were divided into four sections, (1) both feet, (2) one foot, (3) skip, (4) hop.

3. Identification of body parts--The child was asked to touch nine parts of his body as the tester asked for the particular part.

4. Imitation of movement--The child stood facing the tester and was asked to imitate seventeen arm positions.

5. Obstacle course--The child was asked to step over an obstacle (wand), duck under the wand, and to squeeze through a narrow opening made by the end of the wand and the wall.

6. Krauss-Weber--The child was asked to lie on his

stomach on a mat, with his hands at the back of his neck. He is asked to lift his head, shoulders, and chest off the floor and hold for ten seconds. He is asked to lift his legs off the floor and hold for ten seconds.

7. Angles in the snow--While lying on their backs on the floor with feet together and arms at their sides, the child was asked to move his limbs in multiple sequences. They perform ten different tasks.

8. Chalkboard--While at the chalk board the child was asked to (1) draw a large circle, (2) draw two circles simultaneously with each hand, (3) draw a lateral line from one point to another and, (4) draw two straight vertical lines simultaneously.

9. Ocular control--The child sets in front of the tester and is asked to follow a pencil with their eyes. Lateral, vertical, diagonal, and rotary movements of the pencil are made while observing the movement of both eyes. The same movements are performed for the right eye and the left eye independently.

10. Visual achievement forms--The child was asked to copy simple geometric forms. The five forms are: circle, cross, square, triangle, and a divided rectangle. Because of age, forms one through five were used.

The survey used a scoring scale of one to four with subjective scoring (see Appendix III).

This test was administered as a pre and post test to the experimental and control groups in October 1969 and May 1970.

## The Programs

The experimental group participated in the Bellevue perceptual-motor training for three months. This was a daily twenty-one minute program that covered a 60-day instructional period.

The control groups participated in a three-day per week physical education program. The kindergarten children in the Renton schools have a schedule of three periods per week set up in a primary play area with assistance and supervision of a physical education specialist for the first sixteen weeks of school.

After the perceptual-motor program's completion, the kindergarten children in the experimental schools entered into a regular, two-day per week physical education program. The New Port Hills physical education program is instructed by a full time physical education specialist.

The Clyde Hill kindergarten children also went into their scheduled physical education program. Clyde Hill has a half time physical education specialist.

Both the Bellevue and Renton physical education programs are set up for like activities for the primary grades.

The physical education programs are very similar and the number of instructional classes for the year was very close.

Renton's kindergarten children had 108 days of scheduled physical education during the 1969-70 school year. The Bellevue children, with the perceptual-motor training program had

110 days of scheduled physical education during the 1969-70 school year.

In May 1970, the Purdue Perceptual-Motor Survey was administered as a post-test to the experimental and control groups.

Interested parents assisted with the administration of the tests used in this study. The same parents were used in the pre and post-testing.

The Johnson Fundamental Skill Test was added as a post-test. It was thought that this test would provide an external criterion for testing the hypothesis. The Johnson test measures a child's achievement in basic or fundamental movement skills.

#### The Johnson Fundamental Skill Test

The Johnson test measures the child's achievement in the skills which form the basis of children's play activities.

The test items included are broken down into four major areas of skill development.

1. Zig-zag--A running test, measured in seconds.
2. Jump-and reach--A jumping test, measured in inches.
3. Throw-and-catch--Measures throwing and catching ability. Measured in points.
4. Kicking--A kicking test, measured in points.

(See appendix II).

## Statistical Procedures

Mean scores were obtained from the pre-tests and t tests were given to each set of scores.

The following statistical procedures were used:

The Fisher t-ratio was obtained between the control and experimental pre-tests, the control and experimental post tests, the control pre and post test and the experimental pre and post test in motor perception.

A Fisher t-ratio was also obtained between the control and experimental groups utilizing the Johnson Fundamental Skill Test at the end of the program.

Formula used in this study to find the mean scores, standard deviations and Fisher t-ratios.

Formula for the mean scores and standard deviation:

$$\Sigma X$$

$$\Sigma X^2$$

$$N =$$

$$M = \frac{\Sigma X}{N} = \underline{\hspace{2cm}} =$$

$$\sigma = \sqrt{\frac{\Sigma X^2}{N} - M^2}$$

$$\sigma = \sqrt{\underline{\hspace{2cm}}}$$

$$\sigma = \sqrt{\underline{\hspace{2cm}}}$$

$$\sigma = \sqrt{\underline{\hspace{2cm}}}$$

$$\sigma =$$

$$\sigma_m = \frac{\sigma}{\sqrt{N-1}} = \underline{\hspace{2cm}}$$

$$\sigma_m = \underline{\hspace{2cm}}$$

$$\sigma_m =$$

Fisher formula for t-ratios:

$$\sigma \text{ diff} = \sqrt{\sigma m_1^2 + \sigma m_2^2}$$

$$t = \frac{\text{diff}}{\sigma \text{ diff}}$$

$$\sigma \text{ diff} = \sqrt{\quad^2 + \quad^2}$$

$$t = \underline{\hspace{2cm}}$$

$$\sigma \text{ diff} = \sqrt{\hspace{2cm}}$$

$$t =$$

$$\sigma \text{ diff} =$$

## CHAPTER IV

### ANALYSIS OF THE DATA

This study was designed to provide a three month perceptual-motor program to an experimental group composed of five sections of kindergarten children from the Bellevue School District. The control group consisted of five sections of kindergarten children from the Renton School District who were deprived of the perceptual motor training program in order to assess the effectiveness of the perceptual motor program upon the experimental group.

The data for this study was collected from two sources. The Purdue Perceptual Motor Survey, and the Johnson Fundamental Skill Test. The Purdue test measures perceptual motor development and the Johnson test measures fundamental skills.

#### Interpretation of Data

The individual scores of the children in both the control and the experimental groups of the Purdue Perceptual-Motor Survey were recorded. The mean scores and mean differences between the two kindergarten groups on the pre-test, in the perceptual motor training program can be seen in Table 1.



TABLE I

A COMPARISON OF PRE-TEST MEAN SCORES AND  $t$ -RATIOS FOR THE PURDUE PERCEPTUAL-MOTOR SURVEY FOR KINDERGARTEN CHILDREN

| CONTROL PRE-TEST vs. EXPERIMENTAL PER-TEST |       |       |          |                 |             |         |      |
|--|-------|-------|----------|-----------------|-------------|---------|------|
| CONTROL                                    | M     | DIFF. | $\sigma$ | $\sigma$ -DIFF. | $\sigma$ -M | t-RATIO | SIG. |
|  | 49.39 |       | 5.96     |                 | .60         |         |      |
|  |       | 1.21  |          | .81             |             | 1.49    | N.S. |
| EXPERIMENTAL                               | 48.18 |       | 6.22     |                 | .55         |         |      |

Table 1 shows the difference between the means for the control and experimental groups as 1.21. From this a  $t$ -ratio of 1.49 was computed. This  $t$ -ratio did not prove statistically significant at the .05 level of confidence.

Table 2 shows the scores of the control groups and the experimental groups after a three month perceptual motor program. Eight months had elapsed since the pre-test.

TABLE 2

A COMPARISON OF POST-TEST MEAN SCORES AND  $t$ -RATIOS FOR THE PURDUE PERCEPTUAL-MOTOR SURVEY FOR KINDERGARTEN CHILDREN

| CONTROL POST-TEST vs. EXPERIMENTAL POST-TEST |       |       |          |                 |             |         |      |
|--|-------|-------|----------|-----------------|-------------|---------|------|
| CONTROL                                      | M     | DIFF. | $\sigma$ | $\sigma$ -DIFF. | $\sigma$ -M | t-RATIO | SIG. |
|  | 48.44 |       | 6.69     |                 | .67         |         |      |
|  |       | 10.06 |          | .81             |             | 11.18   | .01  |
| EXPERIMENTAL                                 | 58.50 |       | 6.78     |                 | .60         |         |      |

Table 2 shows that the post-test indicates a difference between the means of 10.06 and a  $t$ -ratio of 11.18.

The  $t$ -ratio of 1.49 in the pre test shows that groups were not significantly different before the program started. After training the experimental group mean was 10.06 points higher resulting in a  $t$ -ratio of 11.18 which is significant well beyond the .01 level of confidence .

A comparison was made to determine mean differences for both control and experimental groups. Using the pre and post-test scores.

TABLE 3

A COMPARISON OF PRE AND POST-TEST SCORES AND  $t$ -RATIOS FOR THE PURDUE PERCEPTUAL-MOTOR SURVEY FOR KINDERGARTEN CHILDREN

| CONTROL PRE AND POST-TEST RESULTS |       |       |          |                |            |         |      |
|-----------------------------------|-------|-------|----------|----------------|------------|---------|------|
| PRE.                              | M     | DIFF. | $\sigma$ | $\sigma$ DIFF. | $\sigma$ M | t-RATIO | SIG. |
|                                   | 49.39 |       | 5.96     |                | .60        |         |      |
|                                   |       | .95   |          | .90            |            | 1.06    | N.S. |
| POST                              | 48.44 |       | 6.69     |                | .67        |         |      |

| EXPERIMENTAL PRE AND POST-TEST RESULTS |       |       |          |                |            |         |      |
|--|-------|-------|----------|----------------|------------|---------|------|
| PRE.                                   | M     | DIFF. | $\sigma$ | $\sigma$ DIFF. | $\sigma$ M | t-RATIO | SIG. |
|  | 48.18 |       | 6.22     |                | .55        |         |      |
|  |       | 10.32 |          | .81            |            | 12.74   | .01  |
| POST                                   | 58.50 |       | 6.78     |                | .60        |         |      |

Table 3. On the pre and post-test results for the control group the mean difference between scores was .95 with a  $t$ -Ratio of 1.06 which is not significant.

The pre and post-test results for the experimental group was significant at the .01 level of confidence. The mean difference was 10.32, with a  $t$ -Ratio of 12.74.

This tends to substantiate that the experimental group improved a great (10.32) deal while the mean of the control actually decreased (.95).

The individual scores for the four tests used in the Johnson Fundamental Skill Test were recorded and computed. The mean differences and scores between the control and experimental kindergarten groups were then computed into  $t$ -Ratios to determine differences. Table 4 illustrates these findings.

TABLE 4

A COMPARISON OF TEST SCORE MEANS AND  $t$ -RATIOS FOR THE JOHNSON FUNDAMENTAL SKILL TEST FOR KINDERGARTEN CHILDREN

| CONTROL vs. EXPERIMENTAL KICKING |       |       |          |                |            |         |      |
|----------------------------------|-------|-------|----------|----------------|------------|---------|------|
| CONTROL                          | M     | DIFF. | $\sigma$ | $\sigma$ DIFF. | $\sigma$ M | t-Ratio | SIG. |
|                                  | 25.98 |       | 8.09     |                | .83        |         |      |
|                                  |       | 1.35  |          | 1.13           |            | 1.19    | N.S. |
| EXP.                             | 24.63 |       | 8.36     |                | .77        |         |      |

| CONTROL vs. EXPERIMENTAL JUMP-REACH |      |       |          |                |            |         |      |
|-------------------------------------|------|-------|----------|----------------|------------|---------|------|
| CONTROL                             | M    | DIFF. | $\sigma$ | $\sigma$ DIFF. | $\sigma$ M | t-RATIO | SIG. |
|                                     | 6.31 |       | 1.28     |                | .01        |         |      |
|                                     |      | .44   |          | 3.61           |            | 1.22    | N.S. |
| EXP.                                | 5.89 |       | 4        |                | .37        |         |      |

| CONTROL vs. EXPERIMENTAL ZIG-ZAG RUN |       |       |          |                |            |         |      |
|--------------------------------------|-------|-------|----------|----------------|------------|---------|------|
| CONTROL                              | M     | DIFF. | $\sigma$ | $\sigma$ DIFF. | $\sigma$ M | t-RATIO | SIG. |
|                                      | 10.48 |       | 1.54     |                | .16        |         |      |
|                                      |       | .60   |          | .18            |            | 4.38    | .01  |
| EXP.                                 | 11.09 |       | 1        |                | .019       |         |      |

| CONTROL vs. EXPERIMENTAL THROW-CATCH |       |       |          |                |            |         |      |
|--------------------------------------|-------|-------|----------|----------------|------------|---------|------|
| CONTROL                              | M     | DIFF. | $\sigma$ | $\sigma$ DIFF. | $\sigma$ M | t-RATIO | SIG. |
|                                      | 12.83 |       | 6.01     |                | .62        |         |      |
|                                      |       | .62   |          | .86            |            | .72     | N.S. |
| EXP.                                 | 13.45 |       | 6.40     |                | .59        |         |      |

In computing the Johnson Fundamental Skill Test, it was indicated by the statistics that there was only one area of significant difference.

The zig-zag run test had a mean difference of .60 and a  $t$ -ratio of 4.38 which is significant at the .01 level of confidence in favor of the control group.

The kicking test indicated a difference between the means for the control and experimental groups was 1.35. A  $t$ -Ratio 1.19 showing no significance at the .05 level of confidence.

The jump-reach test shows a mean difference of .44 and a t-Ratio of 1.22 showing no significance at the .05 level.

The throw-catch test indicated a mean difference of .62 and a t-Ratio of .72 which is not significant at the .05 level of confidence.

## CHAPTER V

### SUMMARY, CONCLUSIONS, DISCUSSIONS AND RECOMMENDATIONS

#### Summary

This study was an attempt to determine if motor development or basic skills could be improved by a perceptual-motor training program. Three areas investigated were to: (1) gain a better understanding of perceptual motor training, (2) review various perceptual motor programs, (3) evaluate the effectiveness of a perceptual motor training program on the perceptual motor skills of kindergarten children.

The procedures of this study are summarized as follows:

1. The subjects used in this study were kindergarten children from the Bellevue and Renton School Districts in the State of Washington.
2. The Bellevue kindergartners numbered 100 and were the experimental group.
3. The Renton kindergartners numbered 126 and were the control group.
4. The Purdue Perceptual-Motor Survey was administered as a post test to the control and experimental groups in October 1969.
5. The experimental group participated in a perceptual motor training program for three months.
6. The control group participated in a regular physical education program.

7. In May 1970 the Purdue Perceptual-Motor Survey and the Johnson Skill Test was administered to the control and experimental groups as post-tests.

8. The test scores were computed.

9. The pre and post-tests were treated statistically to determine mean scores and mean differences were found to compute t-Ratio scores for the control and experimental groups.

### Conclusions

After examining the statistical data it was noted that the experimental group improved significantly in perceptual motor skills. Refer to Tables 2 and 3.

This study supported and accepted the hypothesis that a perceptual motor training program would improve perceptual motor skills in kindergarten.

The experimental group was not significantly different in three of the four items of the Johnson test and were significantly different in one of the zig-zag run where they did poorer than the control group.

It may well be that these findings will be changed when the children reach the second or third grade. Note recommendation #3 at the conclusion of the paper.

At the present time the conclusions of this study are that perceptual motor training increases perceptual motor learning, but does not improve scores in kicking, throwing and catching, zig-zag run, or the jump reach.

The conclusions and findings of this study indicate a significant improvement in perceptual motor skills. These skills are believed by many the foundations on which to build the movement patterns for total motor and perceptual awareness.

### Discussion

The improvements made by the experimental group on the Purdue Perceptual-Motor Survey were at the .01 level of confidence.

The statistics also showed a loss in points of the control groups mean score from the pre to the post-test. The control groups mean score on the pre-test was 49.39. The mean score on the post-test was 48.44 or a .95 loss.

The mothers that assisted and helped to administer the tests for this study noted that the children from the experimental group participating in the perceptual-motor training were able to follow directions and to carry out tasks they were directed to do. The control group needed more direction and had to have demonstrations and directions repeated. The children in the experimental group were also quieter and easier to work with.

### Recommendations

On the basis of the findings of this study and the review of literature, the author recommends the following:

1. Movement programs and perceptual skills should be incorporated in the primary physical education program.



2. Remedial type programs could use many of the activities used in the perceptual-motor training.

3. A similar study should be made on the same children at the beginning of the third grade. It is the writers contention that this is imperative.

4. The study could be of scholastic nature to see if perceptual motor training effects achievement.

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## APPENDIX I

BELLEVUE PUBLIC SCHOOLS  
Bellevue, Washington

1 September 1968

MOTOR PERCEPTUAL SKILLS PROGRAM

The motor perceptual skills program is structured to enable the child to become aware of and to be able to use his motor and perceptual capabilities in such a way as to enhance his learning. This program is most appropriate for early primary levels. The following statements further define the program:

General Objectives

1. The program provides experiences that will follow the sequential pattern of motor and perceptual development which will lead to the conceptual and abstractual stages.
2. The program provides for the development of fundamental skills in the bilateral, unilateral and cross pattern developmental stages.
3. The program will provide experiences that will lead to the development of attitudes and understandings conducive to later learning.
4. The program challenges the individual at his level of skill and comprehension.
5. The program provides for successful experiences; every child succeeds.

Specific Objectives

1. Each child will learn to listen attentively to directions.
2. Each child will be able to follow directions given in a variety of ways.

3. Each child will be able to identify parts of the body.
4. Each child will learn to move his body bilaterally, unilaterally and cross laterally.
5. Each child will have an awareness of locomotor patterns.
6. Each child will have skills developed in agility, flexibility and strength.
7. Each child will develop a sense of balance.
8. Each child will develop a posture which will allow him to stand, sit and move with good body mechanics.
9. Each child will develop laterality and a sense of directionality.
10. Each child will develop a knowledge of such patterns as reach, grasp, release, and propulsion.
11. Each child will develop sensory-motor skills in the following: gustatory, olfactory, tactual, kinesthetic, visual, auditory, form, and directionality.
12. Each child will develop concept skills based on his sensory-motor experiences.
13. Each child will develop his abstractual sense to his potential.



BELLEVUE PERCEPTUAL MOTOR PROGRAM

Circuit Training Stations

STATION 2

x x x x x x x x x x x

Jump Board

STATION 1

x x x x x x x x x x x

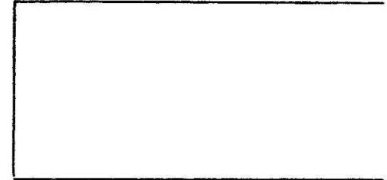
Balance Beam

STATION 3

x x x x x x x x x x x

Chalkboard Activities

STATION 6



Stepping Stones

STATION 4

x x x x x x x x x x x

Stunts

STATION 5

x x x x x x x x x x x

Follow object with eyes

BELLEVUE PUBLIC SCHOOLS  
Bellevue, Washington

MOTOR-PERCEPTUAL SKILLS

DAILY ACTIVITY PLAN

First four-week program outline

Bilateral Activities

I. Large Group Participation Activities (3 minutes)

- A. Toe touch
- B. Squat bender
- C. Imitation of body movements  
(Do as I do - naming body parts, as they are touched)
- D. Angels in snow (bilateral only)

II. Station Activities

A. Jump board (3 minutes)

1. jump with both feet forward and back
2. turn right
3. turn left

B. Balance beam (3 minutes)

1. walk across forward
2. walk across backward
3. walk forward knee-tuck right and left

C. Chalk board activities (3 minutes)

1. Making large circles using both hands: Have student stand erect and bend elbow and go forward until fingers touch board. Bend forward until nose touches board. Leader or teacher places a chalkmark (X) where nose touched. Teacher hands child two pieces of chalk and child draws large circles on chalkboard.

D. Stunts (3 minutes)

1. Rabbit hop
2. Mule kick
3. Burpee

## Motor-Perceptual Skills - Page 2

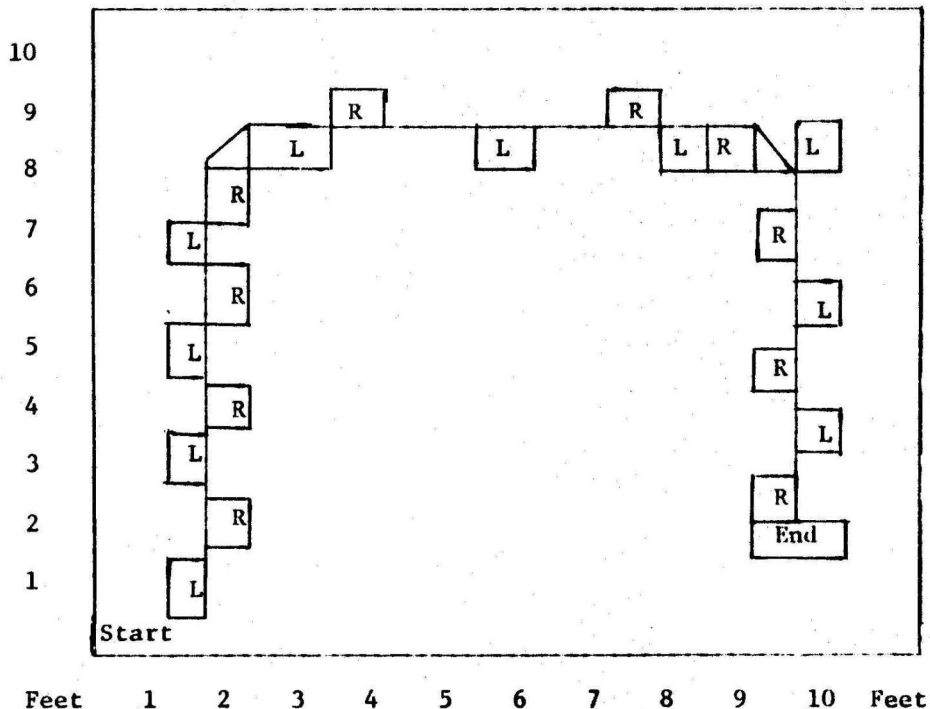
## E. Following an object with eyes: (3 minutes)

1. Children sit Indian fashion on floor. Keep head stationary. Roll ball left to right. Children follow ball with eyes only.

## F. Stepping Stones (3 minutes)

1. Child jumps with two feet from one square to next square.

(Directions for making stepping stones: Place masking tape with bits of paper--colored, to designate left and right feet--in an irregular pattern as suggested below in sketch.)



BELLEVUE PUBLIC SCHOOLS  
Bellevue, Washington

MOTOR-PERCEPTUAL SKILLS

DAILY ACTIVITY PLAN

Second four-week program outline

Uni-lateral activities

- I. Large group participation activities (3 minutes)
  - A. Simon says "place right hand on head," etc.
  - B. Simon says "place left hand on knees."  
(Add activity stressing up-down position.)
  - C. Unilateral crawl - 1st week stationary; 2nd & 4th weeks moving.
  - D. Angels in snow (bilateral and unilateral)

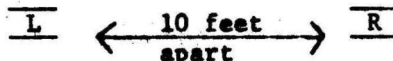
II. Station Activities

- A. Jump Board (3 minutes)
  1. hop on right foot across, forward and backward
  2. hop on left foot across, forward and backward
  3. turn right, hopping on right foot
  4. turn left, hopping on left foot.
- B. Balance Beam (3 minutes)
  1. step right across beam, pointing with right hand  
Say "right, right, right," as hand moves out.
  2. walk back across beam stepping left, pointing left  
and saying, "left, left, left," as hand moves out.

\* Eye Position:

During 1 and 2 above, eyes should be focused on a colored marker (8½"x11") located on a wall parallel to the beams and approximately 8 feet from the floor. When children move right, their eyes should focus on the right marker. When moving left, eyes should focus on the left marker.

Balance beams should be approximately 20 feet from wall.



Unilateral Activities  
Page 2

C. Chalkboard activities - repeat bilateral activities (3 minutes)

1. making circles
2. horizontal lines
3. vertical lines

D. Stunts (3 minutes)

1. Elephant walk
2. right-left toe touch
3. right-left toe kick
4. roll right 3 rolls, stand up. Lie down, roll left 3 rolls, stand up.

E. Following an object with eyes (3 minutes)

1. children repeat former eye exercise
2. do same activity using right eye only
3. do same activity using left eye only

III. Large group activity

A. Stepping Stones

Add verbal response as they step. As right foot comes down say "right," etc.

BELLEVUE PUBLIC SCHOOLS  
Bellevue, Washington

MOTOR PERCEPTUAL SKILLS

DAILY ACTIVITY PLAN

Third four-week program outline:

Cross Pattern Activities

I. Large group participation activities (3 minutes)

Coordinating exercise

A. Exercise I (3 minutes)

1. Hands on hips
2. Jump to forward stride position
3. Shift, change feet.

B. Exercise II (3 minutes)

1. Extend right hand and left foot forward
2. Return to original position
3. Extend left hand and right foot forward
4. Return to original position

C. Creeping - cross pattern (3 minutes)

1. Cross pattern--that is, opposite hand and knee should touch at the same time.
2. Knees are lifted between each step but toes are dragged along remaining in constant contact with the floor.
3. Knees are never allowed to cross. They should move forward in parallel lines.
4. Hands should point forward and palms should be flat on the floor with fingers together.
5. The head and neck must turn. It is not sufficient to have the eyes rotate from hand to hand.

D. Angels in Snow - repeat unilateral plus cross pattern (3 minutes).

## II. Station Activities

### A. Jump Board (3 minutes)

1. Stride position jump
2. Extend arm on opposite side as they jump
3. Jump on right foot, extend right arm sideward and left foot sideward; return to starting position.
4. Jump on left foot, extend left arm sideward and right foot sideward; return to starting position.

### B. Balance Beam (3 minutes)

1. Cross right foot over left, using grapevine step.
2. Walk beam - stop at center - pick up article from floor - continue walking beam.
3. Repeat, using other side.
4. Repeat above backwards.

### C. Chalkboard Activities (3 minutes)

1. Repeat horizontal and vertical line activities
2. Bilateral vertical line activity
3. Make figure eight; horizontal and vertical.

### D. Stunts (3 minutes)

1. Toe Touch  
Touch right hand to left toe without bending knees.
2. Same as above, using left hand to right toe.
3. Mountain Climber  
Squat position, hands on floor  
Fingers forward  
Left leg extended to rear  
Knees straight  
Right leg drawn up against chest  
Alternate leg position.
4. Puppy Dog Run
5. Human Crab
6. Jumping Jacks - cross pattern

**E. Eye Exercises (3 minutes)****Finger Jumps - near - far - near**

1. Stand up
2. Clasp hands together with both thumbs up and hold them directly in front of you with forearm touching body.
3. Look at your thumbs - look at me - now at your thumbs. Do not move your head - move only your eyes.
4. Same as above. Substitute near and far for thumb and teacher.
5. Then substitute here and there for near and far.

**F. Stepping Stones (3 minutes)**

1. Walk forward
2. Leap from one stone to another, using correct foot for each stone.
3. Walk backward.



BELLEVUE PUBLIC SCHOOLS  
Bellevue, Washington

PERCEPTUAL SKILL DEVELOPMENT

After a child establishes himself in the spatial world through movement, exploration and manipulation, he must have perceptual meaning established. Perception gives meaning to events, objects or situations and provides a background for conceptual and abstractual development. It is essential that the perceptual development be matched to the motor learning. In other words, new learning is added to the old. In perceptual development, the tactual and kinesthetic systems are developed first through such matching. Later visual and auditory information is integrated and in turn built on to the earlier tactual and kinesthetic system. When these have been totally integrated and organized, form perception is developed. Finally, directionality can be established. The development of these perceptual skills are dependent upon and related to the motor skills which are developed in the first phase of the program.

The following perceptions are developed in a child:

1. Gustatory (taste)
2. Olfactory (smell)
3. Tactual (touch)
4. Kinesthetic (feeling of motion)
5. Auditory (hearing)
6. Visual (seeing)
7. Form (shaping)
8. Directionality (directing)

Gustatory and Olfactory Perceptions

The gustatory and olfactory perceptions are usually developed satisfactorily before a child enters school. A limited amount of time can be spent in the classroom developing these perceptions.

Tactual Perception

The tactual perception skills refer to developing the sense of touch to get tactuality or meaning from that which is touched. Two types of experiences are provided for children in this area:

1. Synthetic touch

## 2. Analytic touch

Some tactual experiences that can be used within the classroom are:

1. Tingle boards
2. Texture boards
3. Form discrimination boards
4. Feel boxes
5. Popcorn letters
6. Clay experiences
7. Sand tray for tracing
8. Back tracing activities
9. Temperature changing activities
10. Raised letter and number boards

To touch does not mean tactual perception. Tactuality develops in an orderly sequence:

1. Sensitivity - stimulation
2. Awareness - meaning link begins to form
3. Perception - meaning (understanding) is established

### Kinesthetic Perception

Kinesthetic perception is the feeling of movement. It is the system for achieving purposeful transport. The muscles, tendons and joints are the organs involved in kinesthetic perception; therefore, the stimulation comes from within the organism. Kinesthesia is only present when meaning emerges. The child must be aware of changes to have kinesthesia. Habitual movement is not kinesthesia. The body learns to move up, down, left, right, forward, backward. Some kinesthetic experiences that can be used in the classroom are:

1. Chalk board activities
2. Air writing
3. Activities involving moving body parts by imitating or following verbal directions

### Auditory Perception

A child learns to listen so he can listen to learn. Sound is constant in our

environment. Sound moves and the child moves. There must be spatial interweaving if a child is to achieve auditory perception. Sound comes from space and is always directional and distance related. Sound comes from above, below, front, back, left, right, and variations of these.

The basic survival sequence for auditory perception is (1) alert, (2) scan, and (3) localize. This must be followed by meaning and evaluation by the listener. The child must build a foreground and a background for sound and be able to change from one to the other quickly. A child must learn to handle his own sounds as well as the sounds in space. He must be able to organize what he hears. Both receptive and expressive levels of auditory functioning must achieve efficiency.

Some experiences within the classroom that help develop auditory perception are:

1. Listening to sounds in the school environment.
2. Listening to similar sounds and being able to discriminate.
3. Listening post activities.
4. Listening to rhythm patterns.
5. Imitating sounds of others.
6. Following directions.

### Visual Perception

Visual perception refers to what people see. As Dr. Ray Barsch writes, "Eyes do not tell people what they see. People tell eyes what to look for." Healthy and anatomically complete eyes must learn to perform.

A child must organize his visual space world. First, a child seeks to hold a visual image. Then he defines the image, and finally he interprets the image if he has visual perception.

The perception of the spatial world involves color, texture, surfaces, edges, slopes, shapes, etc. Perception of useful and significant things to which we usually attend are such things as objects, places, people, signals, and symbols. A child has usually received visual efficiency by age 7-8. All senses are beholden to vision.

Some experiences within the classroom that enhance visual efficiency are:

1. Observing environment and later classifying and organizing what is seen.
2. Visual tracking activities: vertical, horizontal, and diagonal.
3. Template training activities.

4. Cutting, pasting and organizing.
5. Visual discriminating differences in shapes, sizes, etc.
6. Classifying pictures and things as to color, texture, shape, etc.
7. Channel writing.
8. Reading symbols, words, numbers.

### Form Perception

Everything in our universe is made up of five forms: circle, triangle, square, rectangle, and cross. Children first need to recognize these forms in their environment and later in their immediate surroundings in letters, numbers, words, etc.

Classroom activities that help to develop form perception are:

1. Have children physically make the basic shapes.
2. Identify shapes in the environment.
3. Make form books - place items or pictures which are that shape in a book.
4. Template training.
5. Discriminate shapes when one shape is super-imposed on another.
6. Identify shape of letters, numbers, etc.

### Directionality

Directionality (i.e. up, down, forward, backward, left, right, and variations of these) is an extension of the motor development. Laterality must be established before one can have directionality: Laterality comes from within the body. Directionality is outside the body.

Classroom activities that develop directionality after laterality has been established are:

1. Imitation activities.
2. Following directions (turn right, step left, etc.)
3. Marking right side of paper, left side, top and bottom.
4. Following directions to tear paper, to do chalk board activities, etc.

5. Using maze type activities
6. Using puzzles.
7. Control reader.
8. Visual tracking activities.
9. Template training.
10. Reading left to right.
11. Performing operations in mathematics.

## APPENDIX II

DIRECTIONS FOR ADMINISTERING TESTS

(Robert D. Johnson, "Measurement of Achievement in Fundamental Skills of Elementary School Children, " Research Quarterly, 33:1, March 1962)

Zigzag Test

Equipment: Four folding chairs and one stop watch.

Markings: Four folding chairs are placed 6 feet apart on a gymnasium floor, between a starting line and an X placed on the wall of the gymnasium. The first chair is placed 6 feet from the starting line, and the last chair is placed 6 feet from the wall. The X, 6 inches in size, is 4 feet from the floor and placed on the wall. The length of the starting line is one foot. There should be an area 20 feet long behind the starting line that is free from obstruction.

Directions For Performance: The subject is instructed to stand behind the middle of the starting line and, on the command "Go," to run either to the right or to the left of the first chair, to zigzag around the three remaining chairs, to touch the X, to return in the same manner, and to touch the starting line with his foot.

Scoring: Time to the nearest tenth of a second required for running the course. Three trials are given, with the shortest time being the score. For any of the following fouls the subject is required to run the course again: having any part of the forward foot over the starting line when the command is given; not zigzagging around the chairs in the prescribed manner; and not touching the X on the wall before returning toward the starting line.

Jump-And-Reach

Equipment: Chalk dust, and one piece of construction paper, 6 inches wide and 3 feet high, ruled off in half inches.

Markings: Horizontal lines are drawn on the construction paper one-half inch apart. The paper is fastened to the wall at such a height that the 0 line on the chart is just below the point that represents the standing reach of the shortest performer.

Directions For Performance: The subject stands with one side of his body parallel with the wall chart. He dips his forefinger in chalk, reaches as high as possible, and makes a chalk mark on the chart. He then jumps upward as far as possible and makes a mark on the wall at the peak of his jump.

Scoring: The score is the inches (to the nearest half inch) between the two chalk marks. The subject is given five jumps, with the highest jump recorded as his score. The subject is not allowed to make any preliminary steps forward before the jump.

### Kicking Test

Equipment: One soccer ball.

Markings: On a flat wall space, a target area five feet high and ten feet wide is marked with one-half inch tape. This area is divided into five equal rectangles placed perpendicular to the floor. The number 5 is taped in the center rectangle of the target, number 3 is taped in the rectangles adjacent to the center rectangle, number 1 is taped on the two remaining rectangles. On the floor three lines 3 feet long are marked: one is 10 feet from the wall; one, 20 feet; and one, 30 feet from the wall.

Directions For Performance: The subject places the soccer ball behind the 10-foot line marked on the floor. From that position he attempts to kick the ball in such a manner that it may hit the wall target. The subject kicks three times from each of the lines marked on the floor. Two practice kicks are made at each line before the three kicks for the record are made.

Scoring: The subject receives the number of points indicated on the target area into which the ball is kicked. If the ball is kicked on a line between two areas, the score is that for the area with the large number. A ball kicked from in front of the restraining floor line counts zero, and another trial is given.

### Throw-And-Catch Test

Equipment: One 8 1/2-inch playground ball (grades 1, 2, and 3) and a regulation-sized volleyball (grades 4, 5, and 6).

Markings: A 3-foot square is placed on a flat wall with one-half inch tape. Its bottom line is 4 feet from the floor. An inner square, 10 inches in from all four sides, is placed on the wall target. Starting 3 feet from the wall, and in line with the wall target, there are placed five 2-foot squares, each 1-foot behind the other.

Directions For Performance: With both feet inside the first square the subject stands facing the wall target and throws the ball at the wall target; keeping both feet inside the square he attempts to catch the ball in the air when it



rebounds from the wall. The throw should be made with an underhand motion. After two practice trials the subject is given three trials for record when he is in each of the five squares.

Scoring: Two points for successfully throwing a ball in or on the inner wall target square; two points for successfully catching the rebounding ball in the air while standing in the floor square; one point for successfully throwing a ball in or on the outer wall target square; one point for successfully catching the rebounding ball in the air, on or outside the floor square. The subject's score is the total points scored from all five squares. If the subject steps out of the square while throwing, the throw is nullified and another trial is given.

## APPENDIX III

Name \_\_\_\_\_ Date of birth \_\_\_\_\_  
Address \_\_\_\_\_ Sex \_\_\_\_\_ Grade \_\_\_\_\_  
\_\_\_\_\_  
School \_\_\_\_\_  
Examiner \_\_\_\_\_ Date of examination \_\_\_\_\_  
\_\_\_\_\_

# **THE PURDUE PERCEPTUAL-MOTOR SURVEY**

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1300 ALUM CREEK DRIVE  
COLUMBUS, OHIO 43216**

*A Bell & Howell Company*

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Citation:

Roach, Eugene G., and Newell C. Kephart. *The Purdue Perceptual-Motor Survey*. C. E. Merrill, 1966.

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