THE EFFECT OF PERCEPTUAL TRAINING ON

SCHOOL READINESS SKILLS

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This study sought to determine if visual perceptual training could be effectively used to improve the school readiness skills of kindergarten children. A review of the literature indicated that few activities are undertaken in kindergarten which do not require some adequacy in visual perception. Few deliberate attempts to train visual perception have been reported in the past. To date, one of the best organized attempts to produce an entire program has been the Frostig Program for Development of Visual Perception.

The Metropolitan Readiness Test was administered to two kindergarten classes to establish the similarity of the groups. The daily curriculum for both groups was the same except that the Frostig Program for Development of Visual Perception was used fifteen minutes daily for ten weeks with the training group. After this training, both groups were tested again with the Metropolitan Readiness Test, and the comparative gains were examined for any significant differences by means of a t test. The hypothesis was confirmed. In comparing the significance of improvement between Experimental and Control Groups, it was found that five subtests

and the total score improved significantly greater for the Experimental Group than for the Control Group. Two subtests and the total score were significant at the .01 level, and three subtests were significant at the .05 level.

If the relation of perceptual competence to general school progress is accepted, the Frostig Program for Development of Visual Perception may have a place in early school programs. This study indicated that perceptual skills appear to be learned more rapidly under a program specially designed for that purpose. If these abilities are learned, it would seem essential that the school curriculum include some exercises of this type to prepare children in this area. If the gains registered by the training group are indicative, it seems that a significant improvement in those skills necessary for success in the first grade has occurred. The results of this limited study coupled with similar successes by other investigators should encourage further study in this area. Larger groups should be employed and every effort should be made to include children from a more diversified socioeconomic level; studies could then be made to better understand the effect of this type of program on children from more social levels. More information is needed on the role of perception in the acquisition of readiness skills.

THE EFFECT OF PERCEPTUAL TRAINING ON SCHOOL READINESS SKILLS

THESIS

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CHAPTER I

INTRODUCTION

The effect of perceptual training on school readiness has been a subject of great concern and study. Ewalt (1962) and Hammond and Keital (1964) estimate that between 10 and 20 percent of today's school population are handicapped by some form of visual or perceptual disability resulting in academic underachievement. Teachers are becoming more aware of children who are perceptually handicapped. These children may have normal or above-average intelligence but are unable to communicate adequately either through reading or listening. They also may be unable to communicate adequately through speaking or writing even though their hearing and vision are within normal limits. These children may not be able to read, but do well in oral discussions; conversely, they may be able to read, yet are unable to discuss ideas and concepts in class.

Hammond and Keital considered this type of underachievement as a serious educational problem. Children with a perceptual handicap may be unable to perform adequately such everyday tasks as playing catch, tying their own shoe laces, or merely running up a flight of stairs without using their hands to steady themselves. There has been an increasing

recognition among educators that these children can be helped through perceptual training.

Much remedial work is already being provided by specially trained teachers. More of this type of work is needed, based on the following rationale. First, the number of special teachers available is not sufficient to meet the demand of students requiring perceptual training. Secondly, in most states, in order for a student to receive special training, he must either be classified as perceptually handicapped or be recommended for such instruction by a psychological examiner. In many instances in which perceptual problems are found, they are thought to be of secondary importance or not severe enough to require individualized attention. A third reason for more remedial work is that by the time a child is classified as perceptually handicapped, it is likely that he has already developed a poor attitude toward learning as well as his own faulty methods of compensating for his deficiencies. At this point, the process of "unlearning" ineffective response patterns must precede the acquisition of more adequate ones.

Kephart (1960) stated that perceptual training should begin early in the educational process:

> Over a number of years, research studies have indicated that slow-learning children lack basic readiness skills which, it is often assumed, the average child brings with him when he enrolls in kindergarten or the first grade. Since these skills enter into a major portion of the activities prescribed by the school, the child who has not developed them will find a large number of tasks impossible.

> The (perceptual) training task is easier at earlier ages and the problems are less complicated by compensations and alterations in learning which the child has been forced to adopt in attempting to perform the tasks assigned him. . . . The teacher already spends a great deal of time with the slow-learning child. Much of this time could be more profitably spent by concentrating on pre-academic skills rather than by continued drilling on the academic activities from which the child has already demonstrated that he is not ready to profit. If readiness can be achieved by giving such special attention early, many slow-learners can fall in with the rest of their fellows and continue learning through the customary activities of the group [pp. vii-viii].

Does perceptual training of kindergarten children improve their basic school readiness skills? Are children who receive perceptual training better equipped to handle regular school work than those who do not receive it? Will perceptual training in the early grades reduce the incidence of perceptual disabilities as the children progress through their academic careers? These broad questions prompted the present investigation.

Statement of the Problem

This investigation was an attempt to determine whether visual perceptual training had any effect on school readiness skills of kindergarten children. In other words, this was a study to determine whether a visual perceptual training program can be used effectively in a regular classroom as a developmental technique to improve the general school readiness of kindergarten children.

Hypothesis

It was hypothesized that perceptual training would significantly improve general school readiness skills.

This hypothesis was operationalized for this study to mean that a group of kindergarten children who receive ten weeks of training in visual perceptual skill development would improve more on a standard measure of academic readiness than a similar group who received no special training.

Limitations

Subjects were chosen from two kindergarten classes in one elementary school in order to control for major differences in socioeconomic factors.

Assumptions

The Metropolitan Readiness Test gave a relatively accurate picture of the dimensions it was purported to measure.

Statistical Procedures

One-tailed tests at the .05 level of significance were accepted as confirming the hypothesis.

CHAPTER II

REVIEW OF THE LITERATURE

Psychologists have found that visual perception is vital to the learning process of young children. Educators were able to trace many learning problems to defects in visual perceptual ability. Interest in this area of learning has been generated, in part, by the problems of slow-learning children in the classroom. Stimulated by the desire to help these handicapped children, psychologists have engaged in research which also has been of value in preparing normal children for learning challenges they will encounter in elementary school.

Research on Kindergarten

The quality of kindergarten programs was not of interest to the general public until the entire school system came under close scrutiny. Sears and Dowley (1963) reported that "as a result, at least in part, of apparent Russian superiority in certain areas of science and engineering, the emphasis has swung back to a somewhat closer scrutiny of our educational system [p. 820]." As the United States began taking a more active part in space and scientific technology, the public has demanded better training at every level of education, beginning with kindergarten. Kindergarten is considered

important since it provides the initial experience with the world outside the family and often sets the pace for the remaining years of school.

A study of the practices of kindergarten teachers was compiled by the National Educational Association (N.E.A.) (1961). They found that almost 80 percent of public and 50 percent of private kindergarten teachers reported pupil planning and evaluation of their programs. Pupil planning was limited and did not occur every day, however. Most public school schedules provided a regular daily sequence. In 54 percent of the schools activities were given a definite time allotment. Most kindergarten teachers indicated that they varied the schedule between active and quiet periods; they also employed individual, small group, and total group activities. Ninety percent of the teachers listed activities in kindergarten as listening to stories, counting, conversing, games, rhythms, rest periods, coloring, drawing, telling stories, block building, and arts and crafts. Some teachers indicated that kindergarten children participated in as many as fourteen activities, but the median in both public and private schools was eight activities.

The N.E.A. (1964) was concerned with the purposes and goals of kindergarten programs in stating,

> Broad purposes around which most thoughtfully planned programs in nursery and kindergarten are built seem to fall into four areas in which teachers help each child grow in self-understanding, develop satisfying relationships

> with people, increase awareness and knowledge about the world, and make use of developing powers to communicate and think [p. 9].

There have been trends in kindergarten programs but as yet there has been no development of a universal philosophy of kindergarten education. The N.E.A. (1964) found that

> Programs reflect differing values, purposes and professional preparation of teachers. There are standards--recognized only by some; there are goals--which differ; there are teachers--who are individuals from a wide variety of backgrounds; there are schedules and programs and activities--with different emphasis. What a child in school A gains may differ from what another child gains in school B as night differs from day [p. 9].

There are many reasons for the great differences in kindergarten programs. Each kindergarten is suited to meet the needs of the school in which it is located. Underlying such a basic difference might be a question of the relative degree of maturation and experience of the children in a kindergarten class. In the early years of life the rate of individual development is rapid, yet rates of development vary widely among individual children. Some skills tend to develop in spite of training while others develop only through practice opportunities. Discovering what skills are most effectively acquired through practice is the problem of education in general. The N.E.A. (1964) placed increased emphasis on the skills being taught in kindergarten. They reported,

> One of the major questions raised but not answered for early childhood education has to do with how much systematically teacher

> structured and how much child-structured experience is optimal for learning during these years. . . . [p. 45].

Practices in kindergarten have been discussed in general terms among educators, but little has been said concerning the effectiveness of particular programs. Fast (1957) studied the effectiveness of kindergarten training on first-grade reading. Those children who did not have kindergarten training achieved lower than those with kindergarten experience. This was true throughout the first-grade level. Further, those without kindergarten experience never caught up. The kindergarten program itself was not discussed except in the brief statement that readiness training was presented. The Grade Teacher (1965) devoted an entire issue to kindergarten programs, but no authors presented statistics to bear out the effectiveness of any particular program. Some skills were included in the goals of various programs. The following were among those listed: using art to get children ready for reading utilizing left-to-right progression, recognizing differences in configurations, understanding relationships of words to each other, relating a story from pictures, telling events in sequence from a picture, grouping similar objects, and gaining familiarity with the community. Projects were suggested, but no statistics were included to prove that these projects would help the children involved. The same issue also related the use of the Frostig Program for Development of Visual Perception in the

St. Louis area schools. Again, no statistics were presented to bear out the findings of the program. The N.E.A. (1964) gave more specific goals for kindergarten programs as found in the following areas: language ability, both receptive and expressive; sensory-perceptual skills, including the areas of visual-motor function and auditory discrimination; conceptual abilities, concerning information and concepts; and developing a positive self-image through various techniques.

Research on Kindergarten Children

Today's kindergarten children have broader experiences, including television and a greater number of books than kindergarten children in the past. Much has happened both historically and socially in the five years before children come to kindergarten. Too often learning experiences have occurred too quickly, resulting in confusion and little comprehension on the part of children. Hymes (1954) stated that the kind of experience children see with their eyes or hear with their ears was not sufficient to develop basic skills. He found that it was also important for children to touch with their hands. Kephart (1961) extended this idea, proposing that children need more opportunity to practice and develop skills:

> Modern technology has increased the demands for adaptive behavior. At the same time no similar increase has offered the child greater opportunities for the basic, concrete experimentation on which such adaptive behavior must be

> based. Higher and higher degrees of skill is provided in the practice of elementary skills upon which these higher skills are based.
>
> Many children are coming into our schools lacking in basic perceptual skills. As a result of this basic lack, they are less able to participate in the formal education activities which are arranged for them and they are less able to learn from these activities. They become the slow learners in the classroom [p. 16].

Hammond (1957) agreed that children have not acquired the abilities needed for success at the kindergarten level. Even though more of their needs and abilities are known than ever before, it remains difficult to provide the learning experiences for these children in the classroom setting. This deficit may well pave the way for problems in other areas as well.

Stress on achievement as early as kindergarten has steadily increased within the past few years. Heffernan (1957) reported:

> The kindergarten program is primarily concerned with helping children (1) develop the behaviors essential to effective social living, (2) increase facility in oral expression, (3) deepen and expand their understanding and response to music, (4) increase their joy and facility in the use of various art and construction materials, (5) expand their knowledge and appreciation of their natural environment, and (6) develop motor-coordination, bodily control, good posture, and ability to handle equipment in their environment with safety and satisfaction [p. 18].

Wills and Stegeman (1956) believed that there is general agreement among educators that certain activities should be included in kindergarten programs. These activities

supposedly enable children to obtain the above goals. Basic plans for kindergarten programs have traditionally included such activities as flag salute, singing, show and tell, story time, rhythm activities, looking at books, associating some words with pictures, bead stringing, lunch time, arrival, and dismissal.

Gesell and Ilg (1946) believed that five-year olds have not usually been thought of as just school beginners, but completed preschool children. Even so, the typical kindergarten program demands a certain level of readiness on the part of children in four basic areas: motor, symbolic, social, and numerical. Children in most kindergartens are expected to hop, jump, throw a ball, draw simple forms such as a circle, and build with blocks as part of motor behavior. These children should be able to tell a story of some experiences they have had, interpret the meaning of a picture, and identify missing parts. They should be able to put on their outer garments, cooperate with others and obey necessary commands. They should be able to count to four and know the differences between large and small, many and few, and similar number concepts. A sense of laterality and directionality as well as the perception of forms must be incorporated into their knowledge.

Even the tasks which appear the most simple to adults require a number of skills. Radler and Kephart (1960) illustrated that for young children, drawing a square

presented the need for many kinds of abilities. He showed that prior to even beginning the square, abilities were involved. There was the need for gross motor abilities such as maintaining a sitting position, moving fingers, separating hands from each other, and recognition on paper and in space of up and down, right and left, and forward and backward. In addition, they must recognize the visual stimulus, translate the visual recognition into commands from the brain to the muscles, translate nerve impulses received by muscles into movement patterns, and then create new sets of recognitions, messages, and translations based on the marks made in the process of drawing the square. Drawing a square is but one of the many tasks which are usually included in the kindergarten program. For many kindergarten children this is not a difficult task, for they had the opportunity to acquire the needed skills prior to entering the class. For others the task may be insurmountable, for their experience did not permit the previous acquisition of this skill. Radler and Kephart stated, "Even in the simplest of 'learned skills,' many activities of the child's body are required in the integration of movements in order to execute a finished product [pp. 66-67]." Typical five-year olds have been expected to achieve in most of these tasks even though they require many skills which should have developed prior to reaching kindergarten. It was no surprise to eductors to learn that some children come to school who

have not had the experiences necessary to acquire these skills. As Kephart has pointed out, more is expected of children, but the opportunities for them to be ready for school achievement are less frequent.

Gesell and Ilg (1946) explained that five-year olds are typically children in whom coordination has reached a new maturity, even though they may still be awkward in many manipulations. They are more independent than when they were younger. They like to have adults nearby, but their play is not highly social. They are constantly active, working in short bursts of energy and readily showing fatigue. They learn chiefly by doing, experiencing, or observing. If they are taught, they can tell their full name, age, address, and father's name. They can cut, paste, and draw. Kawin (1963), in working with five-year olds, found that they usually have a vocabulary of about 2,000 words with which they may be able to make sentences, tell a complete story, and "read" pictures. Language ability among five-year olds differs greatly. For some children, the words are simple; for others, they are complicated. If the language experiences and training of children have been good, they can use language well to explain what they mean.

A study of the ability of kindergarten children to maintain posture of the eye in response to light and retinal stimulus was made by Small (1958). Using a test measuring ocular pursuit, he found that some children could maintain

an eye fixation for only a few seconds, even when the stimulus (a penlight) was held immobile. Others were able to move their eyes in an almost smooth manner. When Small correlated ocular pursuit abilities with subtest scores of the Primary Mental Abilities Test and the Metropolitan Readiness Test, he found that ocular pursuit scores were significantly correlated with visual matching and copying subtests of the Metropolitan Readiness Test and with the space subtest on the Primary Mental Abilities Test. Small reported that

> . . . ocular pursuit abilities and the ability to reproduce visually perceived forms are less strongly correlated with tests of verbal ability than they are correlated with tests of visual matching, copying, and space ability, and further, that ocular pursuit ability is not significantly correlated with number ability as measured in the criterion test, whereas number and copying ability are significantly correlated.
>
> It appears that the correlations between test and criterion subtest scores are significant where the presentation of, the processing of, and the response to the problems is accompanied through what might be described as a visual-perceptual-motor mechanism, and that the correlations are generally not significant where an auditory perceptual-visual-motor mechanism might be involved, as in the verbal tests [p. vii].

Smith and Dechant (1961) reported that perceptual differences among children of kindergarten age may be caused by slowness in the maturation of the eyes:

> To become ready to read, children need not only distance acuity but also adequate near-point vision and depth perception. Binocular coordination, ability to center, to focus, and to change fixation readily are skills that are important for reading. It is possible that

> some children are not ready for reading, at near-point at least, before the age of eight. The tissues of the young eye are extremely plastic [p. 437].

Heffernan (1964) found that kindergarten children were not ready to learn to read. Approximately 25 percent had the neurological maturity to cope with symbolism. These children were able to receive the visual image, but could not make use of the image received. A complex neurological, physical, and social task such as reading makes many demands on the nervous system of children. For many children of kindergarten age, the neurological system was not found to be developed well enough to make the necessary connections.

Research on Learning in Young Children

Learning for young children is dependent on a number of areas of behavior. Frostig (1962a) stated that a lag in any of the six areas of development may lead to learning difficulties. The six areas include perceptual development, sensory-motor activity, higher thought processes, language, emotional adjustment, and social adjustment. Gesell (1940) spoke of four major fields of behavior: motor characteristics, adaptive behavior, language, and personal-social behavior. Perceptual adjustment was included as one facet of "adaptive behavior," in addition to alertness, intelligence, and various forms of constructiveness and exploitation. Dolch (1950) divided development of learning into five areas which also agreed closely with those suggested by

Frostig. The areas mentioned were physical, social, mental, emotional, and language. Dolch referred to "language" as the most important area relating to reading. Concerning general perceptual development, Dolch explained the interdependence of all areas indicating that all must be developed in harmony.

There has been considerable contention concerning the relative importance of the various areas of development in learning. Barch (1962) reported having seen many changes in emphasis through the years among professionals. He considered this beneficial because each change gave psychologists and educators a new perspective. Barch explained that early emphasis was on such phenomena as hyperactivity, distractibility, perseveration, and disinhibition. This emphasis was followed by a "neurological" period concerned with behavioral manifestations. Other periods of emphasis included the "perceptual" period, with major interest in various perceptual distortions; the "social" period, during which there was an intensive study of language phenomena; and most recently, the "motor" period, which involves a careful study of movement patterns and motor efficiency. Each new period was regarded as a means of meeting new needs which were not previously emphasized. Barch views this present period as a "behavioral-perceptual-social-language-motor" stage, including all others, but emphasizing the motor learning.

Frostig was influenced by the research of Piaget. The period of maximum visual perceptual development in normal children ends at approximately seven and one-half years of age, according to Frostig. In Piaget's taxonomy of developmental periods, the years prior to age seven are referred to as "the period of preparation for concrete operations [p. 86]." Piaget found that at age seven the articulated representations or intuitions of the previous period were replaced by cognitive abilities. Children become rational and well-organized in their adaptions and appear to have a fairly stable and orderly conceptual framework which they systematically bring to bear on the world of objects around them.

Research on Perception

William James (1890), one of the early psychologists, noted, "Whilst part of what we perceive comes through our senses from the object before us, another part always comes . . . out of our head [p. 103]." After reviewing a number of current theories of perception, Smith and Dechant (1961) concluded, "Divergencies in theories lie mainly in the specific interpretation and orientation of each [p. 20]." They reported that psychologists generally agreed that the perceptive processes ". . . includes initiation by a stimulus, preparation for a response (perception itself), and culmination in a response [p. 26]." It is through perception that the graphic symbol achieves meaning. Perception is determined to a large extent by experience, but it

is also dependent upon biological and neurological factors. The body must be able to receive and organize the stimulus, or perception cannot take place. Frostig (1962b) was primarily concerned with these biological and neurological factors. She explained,

> What is possibly the most frequent cause of learning difficulties is perhaps the least recognized of all. This is a disturbance of the child's perceptual abilities, either his visual perception, his auditory perception, or his kinesthetic perception (muscle sense). Perception means the recognition of the world around us. What we perceive by means of our senses is all we have to connect us with other human beings and with the inanimate objects in our daily lives. Without adequate perception a child is isolated from its environment [p. 55].

Like many other psychological concepts, the boundaries of perception are somewhat nebulous. Flavell (1963) reported that Piaget's definition of perception covers a more narrow and restricted range of behaviors than does most other theorists. Piaget believed that behaviors that involve much beyond a modicum of judgment, inference, classification, or reorganization should be classified as intellectual rather than perceptual acts. Piaget stated that perception was more than just raw sensations. Frostig (1962b) described perception as melting into a concept of sensation on the one hand, and of concept formation or cognition on the other. Ittelson (1963) simply described perception as "a crucial process intimately involved in the effective functioning of the individual [p. 671]."

Frostig (1963b) estimated that 2 to 4 percent of all school children in the lower grades have a perceptual disturbance. This may be due to either brain damage, an emotional problem or maturational delay. The problem of delay in maturation is considered important by many educational authorities. Conant (1962) pointed out that children vary greatly in such matters as home environment and experience, ability to hear and see clearly, language ability and vocabulary, and interest in reading. These maturational, emotional, and experiential factors result in a wide disparity in the time children are ready for a more sophisticated learning challenge.

Frostig (1962b) believed that in many cases perceptual disturbance was minor and children would eventually overcome this difficulty. When children realize that they are unable to perform as well as their classmates in a particular area, they may become emotionally disturbed because of their failure. Although this failure may be due to a relatively minor problem, overzealous parents may complicate the problem by trying to push the child beyond his present capabilities. For this reason, Frostig advocated early assistance in perceptual development, indicating "A child with perceptual difficulties who receives perceptual training between the ages of three and seven and one-half has a good chance of overcoming his difficulties, especially if the training is commenced in the period [p. 57]." Cronbach (1962)

supported this point of view by encouraging educators to change teaching methods, rather than postpone educational efforts. Cruickshank (1961) also advocated early training to prevent learning problems, commenting,

> If a child has a healthy body, but one that will not do what he wants it to, if he has eyes that see, but do not see things the way other eyes see them, if he has ears that hear, but have not learned to hear the way other ears do, he cannot tell anyone what his difficulty is: it just seems to him that he is always wrong, to such children. This is the kind of behavior in a learning situation which the teacher will have to understand if she is to help the child. There are the symptoms of developmental lags in the child's experience which develop into 'specific learning disabilities' [p. 131].

Research on Development of Perceptual-Motor Abilities

Perceptual-motor abilities in children develop from initial motor performance, e.g., undifferentiated movements by the new-born infant of his arms and legs. Fairly soon, infants learn that they can control where their limbs go and begin to direct their placement. This developmental stage is known as the perceptual-motor matching stage in which children learn to reach for specific objects. Their motor activity is directed by what they perceive as being "out there." Following this period, children usually develop form perception and space structure. By the age of six or seven, children have usually achieved a relationship of self to those objects in the environment which are not self (Kephart, 1960).

According to Kephart, the normal perceptual-motor developmental process of many children breaks down "At one of the earlier stages, children either failed to develop further or developed in an atypical or distorted manner [p. 120]." Many of these breakdowns reveal themselves in the early elementary grades through difficulties in learning and low academic achievement and are usually associated with deficiencies in perceptual-motor readiness.

Bruner (1958) defined perceptual readiness as the relative accessibility of categories to afferent stimulus inputs. He believed that the failure of perceptual readiness comes about first through a failure to learn appropriate categories for sorting the environment and for following its sequences, and second, through a process of category interferences or perceptual defense. This position, however, has been seriously questioned by many persons.

Harris (1949) suggested that failure of perceptual readiness resulting in a perceptual disability may be caused through physiological immaturity. He stated,

> Even if the eyes are normal, the child may have immature visual perception. Seeing a thing does not always mean noticing its details. Many young children pay attention only to the main characteristics of visual stimuli--the size, shape, color--and ignore the details. When asked to match letters or words they make many errors, not because of faulty vision, but because they do not notice differences which are obvious to older children [p. 29].

Frostig and Horne (1964b) in their discussion, "Causes of Disabilities in Visual Perception," stated the following:

> It is often extremely difficult to discover the factors contributing to a child's disabilities in visual perception. The cause may be pathological in origin, such as minimal brain dysfunction, or it may be simply a lag in perceptual causes. Sometimes the problem may result from an emotional disturbance sufficiently severe to cause the child to pay more attention to his inner feelings and fantasies than to the stimuli of his outer environment [p. 9].

Frostig and Horne then go on to point out that, whatever the etiology of the child's perceptual disability, what is most important is that the "difficulties be diagnosed and remedial measures be instituted as early as possible to avoid the undesirable emotional complications that inevitably result from failure to learn [p. 9]." Frostig and Horne also recommended that their program for the improvement of visual perceptual disability be instituted within the regular classroom as a preventive or developmental measure.

Research on Testing and Training of Perceptual Disabilities

In Bruner's (1958) theory of relative category accessibility, two ways of overcoming inappropriate perceptual readiness were postulated. The first was by re-education of the misperceiver's expectancies, and the second was by constant close inspection of events and objects. Bruner tended to favor the former alternative. Although re-education was the more complex of his two alternatives, it was thought

to be more economical in terms of time used for the purpose of categorizing perceptual phenomena. If, within the academic setting, the perceptual disability was seen to be sufficiently severe, children could be referred to a specially trained teacher for individualized attention throughout the re-education process.

Sutphin (1964) believed that within the regular classroom setting teachers can provide both visual and kinesthetic learning experiences. Games emphasizing development of gross motor coordination as well as tracing and cutting exercises, emphasizing fine motor coordination, were thought to be beneficial. Also by building a common vocabulary in the classroom, the teacher was helping children develop concept formation. This ability depends upon the ability to perceive accurately and classify or categorize accordingly.

Barsch (1962) reported that many grade school classrooms had a number of children whose learning problems could be traced to some organic dysfunction. Individualized evaluation could determine which of these problems was sufficiently serious to warrant special techniques. He felt that a definition of the problem was imperative so that educators could concentrate on creative instructional techniques. Benton (1962) agreed that children must be defined psychologically and educationally if they were to be helped. He wrote, "Once we deal with behavioral concepts, we can hope to be able to verify, to measure, to experiment, and to

theorize usefully [p. 4]." Barsch said that it was important for the educator to understand how the human organism goes about the daily business of processing his perceptions into meaningful relationships.

Frostig (1962b) believed that perceptual training should be the basis for teaching both normal and retarded children. The point was made that children could not be categorized by their obvious physical or psychological abilities or handicaps. Frostig contended that this method

> . . . tends to give a child a permanent inescapable label; and it ignores the fact that the common symptom distinguishing the children in the group may have a different etiology and may require a totally different mode of treatment [p. 11].

Frostig believed that one must understand the abilities and difficulties of any child in order to determine what teaching procedure should be applied. Cruickshank (1961) has also encouraged this understanding in analyzing reading disturbances. "When a child has difficulty in reading, the first task is to try to discover the reason [p. 235]." He has offered these examples:

> If he cannot distinguish a square from a triangle, he will not be able to tell an A from an H. If a picture of a swing and a picture of a table look the same to him, he cannot see the differences between M and W [p. 235].

Cruickshank suggested a solution to the problem which involved careful observation and questioning in the areas of visual discrimination, language development, and left-to-right progression.

Experience at the Frostig School led to the construction of the Frostig Program for Development of Visual Perception. Frostig (1964a) reported that

> Disturbances in visual perception were by far the most frequent symptoms and seemed to contribute to the learning difficulties. Children who had difficulty in writing seemed to be handicapped by poor eye-hand coordination, and children who could not recognize words often seemed to have disturbances in figure-ground perception. Other children were unable to recognize a letter or word when it was written in different sizes or colors, or when it was printed in upper-case print and they were used to seeing it in lower-case. It was postulated that these children had poor form constancy. Like everyone else who has worked with young children, we noticed that many children produced letters or words in "mirror writing." Such reversals or rotations indicated a difficulty in perceiving position in space, while interchanging the order of letters in a word suggested difficulties in analyzing spatial relationships. As a rule, these latter children could neither read nor spell longer words. It was also observed that many of the children with evident disabilities in visual perception had difficulty in paying attention and/or showed behavioral deviations [p. 464].

Various visual perceptual abilities were not isolated, defined, nor organized until Frostig and Horne (1964b) recognized their value as diagnostic tools. It was their original hypothesis that, "A child whose perceptual development has for any reason been slower than that of most of his age-mates will be handicapped in his initial school adjustment and academic progress [p. 1]."

Educators have urged the utilization of the period of time when conditions within children were favorable to the

development of certain skills. The area of visual perception is very sensitive to training when children are of kindergarten age. This period was the most opportune time for presenting visual perceptual training tasks. Little effort has been made to devise a program which would provide training in visual perception. Not until 1964 was a program made available for use in public school systems. The Frostig Program for Development of Visual Perception was designed to provide training as a developmental program.

CHAPTER III

METHOD

Goals for kindergarten programs have been left largely for each community to determine. Most schools have had the common goal of preparing five-year olds for the first grade of elementary school. The manner in which kindergarten children have been prepared for entering school had differed greatly. Underlying most kindergarten programs have been some basic assumptions about the development of the typical five-year old and his ability to achieve. More of the educational needs and abilities of kindergarten children are known than ever before, yet it has remained difficult to provide appropriate training for them in the classroom setting. When children have not acquired the readiness skills needed for success at the kindergarten level, they may well experience later learning problems. By providing visual perceptual training in kindergarten, important basic skills could be developed. The Frostig Program for Development of Visual Perception (FPDVP) contained the basic elements for this type of training program.

Subjects

Thirty-nine kindergarten children selected from a rural elementary school in central Illinois participated in this

study. Subjects chosen were eligible for kindergarten as set by state requirements, had no special learning problems, and were enrolled in regular kindergarten classes. The Experimental and Control Groups were formed by separating the children based on the bussing schedule. Those transported in the morning were enrolled in the Control Group (N = 21). Children bussed to school in the afternoon were placed in the Experimental Group (N = 18).

Instruments

The Metropolitan Readiness Test (MRT) was used as the criterion measure. It is a test designed to predict the extent to which kindergarten children have developed the skills and abilities that contribute to readiness for first-grade instruction. The MRT was chosen as the measuring instrument for this study because of its construction, statistical analysis, and ease of administration and scoring. This test was developed by G. H. Hildreth, N. L. Griffith, and M. E. McGauvran. The MRT has the following subtests: (1) word meaning, a sixteen-item picture vocabulary test; (2) listening, a sixteen-item test of ability to comprehend phrases and sentences instead of individual words; (3) matching, a fourteen-item test of visual perception involving the recognition of similarities; (4) alphabet, a sixteen-item test of ability to recognize lower case letters of the alphabet; (5) numbers, a twenty-six-item test of number

knowledge; and (6) copying, a fourteen-item test which measures a combination of visual perception and motor control. The first four subtests were intended to emphasize those abilities important in learning to read. Subtest five dealt with number concepts, numerical operations, and a wide variety of quantitative problems. The last subtest involved the reproduction of simple geometric forms, numbers, or letters, and was designed as an indicator of mental maturity and physical development. It also revealed the tendency toward reversals where present in drawing and writing. Griffith (1953) reported that the MRT was standardized on a nationwide sample of more than 15,000 children during their first month of first grade. Median reliability coefficients based on retests with parallel forms over short intervals were given as .83 for reading readiness, .84 for number readiness, and .89 for total readiness scores. He also reviewed the correlation between the MRT given in September, 1948, and the number scores of the Primary I Battery of the Metropolitan Achievement Tests administered in February, 1949, and reported,

> The correlation is so startling as to indicate the value of the Metropolitan Test in predicting school success of first grade children. The wise teacher will avail herself of its usage [p. 604].

Gardner (1953) also highly recommended the MRT in stating,

> The test has a high level of excellence and careful workmanship both with respect to item construction and statistical analysis. From the technical point of view, the Metropolitan Readiness Test is among the superior readiness tests now available [p. 605].

The Frostig Program for Development of Visual Perception (FPDVP) was selected to provide the basic elements of visual perceptual training for kindergarten children. This test consisted of five sets of work sheets, each covering a specific ability to be trained: perception of position in space, perception of spatial relationships, perceptual constancy, visual-motor coordination, and figure-ground perception. Within each set of work sheets, the exercises for a particular type of training began with the easiest items and progressed through those of medium difficulty to those that were most difficult. The FPDVP was used in the present study because of its widespread acceptance and use by profesionally trained teachers of perceptually handicapped children. Ellingson (1967) reported,

> Frostig gives us research and exercises in the areas of visual perception via her program for perceptual development. This program of graduated exercises is designed to help the younger child gain visual perception and it may be considered a prime example of a fine technique. And yet, to look at it, or administer it to a child, it seems simple and tedious, but--it works [p. 27].

The first area of visual perception to be trained according to Frostig's approach was perception of position in space which was defined as perception of the relationship of an object to the observer. Spatially, children are always the center of their own worlds and perceive objects as being behind, before, above, below, or to the side of themselves. Children with faulty perception of position in space are

handicapped in many ways. Their visual world is distorted; they are clumsy and hesitant in their movements, and they have difficulty understanding what is meant by such words as "in," "out," "up," "down," "before," "behind," "left," and "right." These difficulties become most apparent when children are faced with their first academic tasks, because letters, words, phrases, numbers, and pictures appear distorted and confusing. Children with such difficulties in perceiving the proper position of an object in relation to their bodies are likely to perceive "b" as "d," "p" as "q," "on" as "no," "saw" as "was," "24" as "42," and so on. This type of perceptual problem makes it difficult, if not impossible, for children to learn to read, write, spell, and do arithmetic.

The second area of visual perception to be trained by the FPDVP was the perception of spatial relationships which was defined as the ability of an observer to perceive the position of two or more objects in relation to himself and in relation to each other. For example, children given the task of stringing beads have to perceive the position of the bead and the string in relation to one another.

The third area of visual perception to be trained was perceptual constancy. This involves the ability to perceive that an object possesses unchanging properties, such as a specific shape, position, and size, in spite of the variability of the image the object has on his eyes. Where

constancy of shape is concerned, two- and three-dimensional forms are recognized as belonging to certain categories of shapes, whatever their size, color, texture, mode of representation, or the angle from which they are seen by the perceiver. Children with adequate perceptual constancy will recognize a cube seen from an oblique angle, even though the retinal image differs from that presented by the cube seen squarely from the front.

The fourth area of visual perception to be trained was visual-motor coordination, the ability to coordinate vision with movements of the body or parts of the body. When children reach for an object, their hands are guided by their vision. When they run, jump, kick a ball, or step over an obstacle, their eyes direct the movements of their feet. The smooth accomplishment of nearly every action depends upon adequate eye-motor coordination.

The fifth area of visual perception to be trained by the FPDVP was figure-ground perception. To understand this ability and its importance, it is essential to remember that children perceive most clearly those things to which their attention is turned. The human brain is organized so that it can select from the mass of incoming stimuli a limited number, which become the center of attention. These selected stimuli (auditory, haptic, olfactory, and visual) form the figure in the perceptual field, while the majority of stimuli form a dimly perceived ground. For instance, a girl

bouncing and catching a ball in a play yard has her attention directed toward the ball, which is the figure in the scene she perceives. Since other features of the play yard (sandbox, teeter-totter, flower bed, toy pail) are not the focus of her attention, they form the dimly perceived ground, of which she is probably only sufficiently aware of to avoid collision. The figure is that part of the field of perception that is the center of attention. When attention is shifted to something else, the new focus of attention becomes the figure, and what was previously the figure recedes into the ground. If the little girl puts down her ball and picks up the pail, the pail becomes the figure in her field of vision and the ball becomes part of the ground.

Procedure

In the present investigation, the MRT was given prior to and following a ten-week training period with the FPDVP. The directions in the MRT test manual were followed. Pre- and posttesting were administered in three sessions by the teacher of the kindergarten classes. In Session I, Word Meaning and Listening subtests were given; in Session II, Matching and Alphabet; and in Session III, Numbers and Copying were tested. A brief rest period between two tests within a session was provided. All tests were hand-scored.

The FPDVP was used for the training program. After the classes were organized, both the Experimental and Control

Groups followed the regular classroom curriculum with only one exception: the teacher of the Experimental Group devoted fifteen minutes each school day to training with the FPDVP, during which time the Control Group continued regular classroom activities. The daily classroom curriculum for both groups is listed in Table 1. The instructions in the FPDVP

TABLE 1

Daily Program

Time Allotted	Activity
25-30 minutes	Free Activity Blocks and tinkertoys, Lincoln logs Clay Painting Books Role playing--kitchen area Coloring, writing Games (number and letter) Puzzles
15 minutes	Opening Exercises Calendar-counting, left-right progression Roll Call Discussion of school or personal events Poems, songs
20 minutes	Structured Lesson Reading readiness papers Left-right discrimination Relationships Language development Alphabet Following directions Listening skills

TABLE 1--Continued

Time Allotted	Activity
	Math readiness Number recognition Sets Number Sequence Counting Flannel board Magnetic board Writing skills
15-20 minutes	Outside
10 minutes	Milk, rest period
10 minutes	Story
15 minutes	Frostig Training Program (Experimental Group only)
25-30 minutes	Structured Lesson Science program Art projects Music

were followed. The training period for the Experimental Group lasted ten weeks. All worksheets included in the beginning program for kindergarten children were completed during the training period.

After the ten-week period of instruction, the MRT was administered for the second time to both the Experimental and Control Groups. The results were recorded and the data were processed at a university computer center. The *t* test was used to determine if significant differences were present between the Experimental and Control Groups. This difference

was used as an index of improvement of general school readiness skills due to the FPDVP training program.

CHAPTER IV

RESULTS AND DISCUSSION

The hypothesis for this study was to determine if a visual perceptual training program could be effectively used in a regular classroom to improve the school readiness of kindergarten children. This hypothesis required that the improvement of the Experimental Group, as indicated by the difference between pre- and post-training MRT scores, significantly exceed the improvement of the Control Group, also indicated by the difference between the pre- and post-training MRT scores.

A comparison of the means of the Experimental and Control Groups is presented in Table 2. The mean of improvements for these groups is also included. The Experimental and Control Group's total score means at pretest showed only a minimal difference. Both groups had improved on all subtest means and on the total score means by the end of the training period. The Experimental Group improved more than the Control Group on five of the six subtest means. The improvement of the total score mean for the Experimental Group was twice that of the improvement of the total score mean of the Control Group.

TABLE 2

A Comparison of Means for the Metropolitan Readiness Test

Subtest	Experimental				Control				Improvement			
	Pre-E		Post-E		Pre-C		Post-C		Imp-E		Imp-C	
	$\bar{M}$	s	$\bar{M}$	s	$\bar{M}$	s	$\bar{M}$	s	$\bar{M}$	s	$\bar{M}$	s
Word Meaning	7.44	2.04	9.89	2.56	7.67	2.33	8.10	2.17	2.44	2.41	.43	2.56
Listening	8.28	1.81	9.17	2.47	8.14	3.17	9.24	2.51	.89	2.08	1.09	2.95
Matching	4.61	2.52	8.44	1.50	5.48	2.91	7.48	3.08	3.83	2.83	2.00	2.78
Alphabet	6.22	3.02	9.39	2.75	7.52	3.93	8.67	3.40	3.17	3.33	1.14	2.50
Numbers	9.17	3.13	12.83	2.75	8.52	3.56	9.52	2.99	3.67	4.67	1.00	2.77
Copying	4.17	3.00	7.78	2.24	5.62	3.17	7.00	3.89	3.61	2.50	1.38	2.20
Total	40.06	10.28	57.50	9.53	42.48	14.25	49.95	13.48	17.44	10.74	7:48	5.06

Pearson Product-Moment Correlation coefficients were also computed between the pre- and posttest total MRT scores for both Experimental and Control Groups in order to utilize the t test for (matched) dependent groups. The correlation between pre- and post-data for the Experimental Group was .41, while the coefficient for the Control Group was .91.

Tests of the significance of gains in MRT scores are shown in Table 3. There were no significant differences between scores of the Control and Experimental Groups at pretest. The Experimental Group scored significantly higher than the Control Group on the total score and two of the six subtests at posttest. Both groups gained significantly on the total test as a consequence of the kindergarten experience, but the Experimental Group gained significantly more than the Control Group on five of the six subtests and on the total score.

These results support the hypothesis that kindergarten children trained with a visual perceptual program improve significantly greater in general school readiness skills than children without such training. The results further suggest that the FPDVP can be effectively used as a developmental technique within the regular classroom.

TABLE 3

A Comparison of t Test Results for the Metropolitan Readiness Test

Item	Pre-EC[a]	Post-EC[b]	IC[c]	IE[d]	IEC[e]
Chronological Age	- 1.07	- 1.49	. . .	. . .	. . .
Word Meaning	- .33	2.41*	.75	4.17**	2.51**
Listening	.17	- .10	1.67	1.76*	.25
Matching	- .99	1.02	3.23**	5.58**	2.04*
Alphabet	- 1.14	.72	2.04*	3.93**	2.17*
Numbers	.60	3.05**	1.61	3.24**	2.21*
Copying	- 1.46	.75	2.81**	5.95**	2.96**
Total	- .60	1.99*	6.61**	6.70**	3.79**
df	37.00	37.00	20.00	17.00	37.00
Significant t .05 level* .01 level**	 1.70 2.46	 1.70 2.46	 1.72 2.53	 1.74 2.57	 1.70 2.46

[a]Degree of significance between pre-Experimental and pre-Control.

[b]Degree of significance between post-Experimental and post-Control.

[c]Degree of significance of improvement between pre-Control and post-Control.

[d]Degree of significance of improvement between pre-Experimental and post-Experimental.

[e]Degree of significance of improvement of Experimental as compared with improvement of Control.

CHAPTER V

SUMMARY, FINDINGS, AND CONCLUSIONS

The purpose of the study was to determine if a visual perceptual training program could be effectively used within the regular classroom as a developmental technique to improve the general school readiness skills of kindergarten children as indicated on a standard measure of academic readiness.

A survey of the psychological and educational literature of kindergarten programs indicated that few activities have been undertaken in kindergarten which do not require some adequacy in visual perception. A number of research studies explored the function of visual perception in the early learning situation. There was general agreement that visual perceptual abilities are correlated with academic progress. However, very few deliberate attempts to train visual perceptual skills have been reported in the past. Over the years educators have suggested various ways in which training could be used successfully with young children. To date, one of the best organized attempts to produce an entire program for development of visual perception has been the Frostig Program for Development of Visual Perception, published in 1964.

Two kindergarten classes were selected to participate in the study. The afternoon class was designated as the

Experimental Group and the morning class as the Control Group. The Metropolitan Readiness Test was administered to both groups as the pretest. This test served to establish the similarity of the groups. For ten weeks the program for both groups was similar except that the FPDVP was used fifteen minutes daily with the Experimental Group. After this training both groups were tested again with the MRT and the comparative gains were examined for any significant differences. The hypothesis was confirmed. The Experimental Group indicated gains on the MRT which were significant. In comparing the significance of improvement between Experimental and Control Groups, it was found that five subtests and the total score improved significantly greater for the Experimental Group than for the Control Group. Two subtests were significant at the .01 level.

If the relation of perceptual competence to general school progress is accepted, then the Frostig Program for Development of Visual Perception may have a place in early school programs. This study indicated that perceptual skills and abilities appear to be learned more rapidly under a program specially designed for that purpose. If these abilities are learned, it would seem essential that the school curriculum include some exercises of this type to prepare children in this area. If the gains registered by the Experimental Group on the MRT are indicative, they suggest a significant

improvement in those skills necessary for success in the first grade.

It might be well to consider the use of this program particularly with children who will benefit most. These children could be grouped for visual perceptual training according to their special needs and individual developmental status. Children can best be helped by educational methods based on developmental processes which are adapted to their specific needs.

The results of this limited experiment coupled with similar successes by other investigators should encourage further study in this area. Larger groups should be employed and every effort should be made to include children from a more diversified socioeconomic level; case studies could then be made to better understand the effect of the program on children from more social levels. A continuing study of those children who participated in this study as members of the Experimental Group might also be revealing. Will their apparent progress in this study be reflected in continued success as the children move into the first grade? More information is needed on the role of perception in the acquisition of readiness skills.

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