AN EVALUATION OF THE EFFECT OF A SPECIFIC
PERCEPTUAL TRAINING PROGRAM
ON CLASSROOM SKILLS IN KINDERGARTEN

THESIS

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By

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The purpose of the evaluation was to test effectiveness of a visual, visual-motor, and auditory perceptual skills training program devised by Dr. Jerome Rosner, and to confirm or deny application of this training to improved classroom skills. Subjects were 38 kindergarten children, 20 in the Contrast Group, and 18 in the Experimental Group. Both groups received the same training in the basic curriculum of readiness skills. The Experimental Group also received training in the Visual Analysis and Auditory Analysis Skills programs. Pretests and posttests were administered, tabulated, and analyzed. Differences in raw score means were sufficient to indicate more than a chance factor and all tests demonstrated a plus factor for children in the Experimental Group.
TABLE OF CONTENTS

LIST OF TABLES ........................................ ii

CHAPTER

I. INTRODUCTION ........................................ 2
   Background of the Problem ............................. 2
   Statement of the Problem ............................... 4
   Limitations ............................................. 5
   Methodology ............................................ 6

II. REVIEW OF THE LITERATURE .......................... 7
   Theories of Motor Development ........................ 7
   Relation of Motor Skills and Learning ............... 13
   Research on the Developmental Approach ............. 19

III. PROCEDURES FOR CONDUCTING THE EVALUATION .... 22
   Description of Conditions and Participants ......... 22
   Test Instruments and Administration ................. 24
   Procedure ............................................. 25
   Training Program ..................................... 26

IV. REPORT AND ANALYSIS OF THE DATA ................. 31
   Comparison of Test Results ............................ 34
   Analysis of the Data .................................. 43
   Subjective Observations ................................ 44

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS .... 46
   Summary ............................................... 46
   Conclusions .......................................... 47
   Recommendations ...................................... 48

Appendix A .............................................. 50
Appendix B .............................................. 52
BIBLIOGRAPHY ........................................... 53
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pretest and Posttest Conditions</td>
<td>26</td>
</tr>
<tr>
<td>2. Experimental Group Scores on Pretests and Posttests</td>
<td>32</td>
</tr>
<tr>
<td>3. Contrast Group Scores on Pretests and Posttests</td>
<td>33</td>
</tr>
<tr>
<td>4. Comparison of Test Data, Experimental Group and Contrast Group</td>
<td>34</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Background of the Problem

Impetus for study and research into the field of perceptual motor development as related to academic achievement has been accelerated with the advent of in-depth studies of early childhood education.

Among the foremost proponents of the basic premise of inseparability of perceptual skills and academic achievement were optometrists Gerald Getman, Harry Wachs, and Jerome Rosner. These optometrists agree on the basic premise that dysfunction in perceptual skills will cause academic difficulty, if not outright failure; albeit, there are some differences in their terminology and, in some areas, in their approach to the problem.

Of the educators interested in the field of motoric and perceptual skills, Dr. Maria Montessori, in the early 1900's, held that learning is not really owned until it "gets in the muscles" (34: 17). Other educators, Newell C. Kephart (28), Jack Frymier (15), and B. J. Cratty (7), cite the development of motoric and perceptual skills as of primary importance in academic achievement. Kephart and Cratty, in particular, have devoted a great deal of time
and research to developing a variety of programs to enhance motor and perceptually related skills to promote academic achievement.

In the field of reading, such authorities as George D. Spache (46), also an optometrist, Verna Dieckman Anderson (2), Arthur Heilman (23), and Katrina DeHirsch (8), devote substantial sections of their published works to the perceptual areas of development, giving them no less a degree of importance than the optometrists.

Published materials referred to above first aroused the interest of the investigator, whose concern was then emphasized by observing young children in the classroom who exhibited symptoms of perceptual deficits.

Dr. Jerome Rosner's latest book (41) agrees in theory with the previous authors cited, but Dr. Rosner proposes a specific program of training for children with learning disabilities. He sets forth a step-by-step guide for testing and training the child who has difficulty learning from the pre-school level through the primary grades; and, concerning the perceptual activities, he declares there is a transference of ability from perceptual training to academic skills.

Dr. Rosner does not, however, provide any measures of reliability, validity, or numbers of children with whom this program was used, nor does he give any indication of the
degree of academic improvement accomplished by the children in his program.

General activities which Dr. Rosner recommends are those included in any good basic preschool curriculum, particularly one founded on Piagetian principles; but of special interest are the specific training programs for the seemingly high risk child.

**Statement of the Problem**

Is it possible to enhance classroom skills through intensive training in a specific program of auditory perceptual, visual perceptual, and visual motor skills?

Dr. Jerome Rosner, Director, Perceptual Skills Project of Learning Research and Development Center, University of Pittsburgh, Pittsburgh, Pennsylvania, founder of the Pace School for children with learning disabilities, and author of the six-volume teacher resource program, *Perceptual Skills Curriculum*, believes such training is basic.

The purpose of this evaluation was to determine if, by intensive training in perceptual skills, in addition to a normal kindergarten curriculum, a group of children of varying abilities would show a measurable degree of growth in classroom skills as compared to another group of children of varying abilities who were exposed only to a similar normal kindergarten curriculum. The specific areas of
intense training included were: 1. visual perception, 2. visual and auditory motor, and 3. auditory perception; following the program outlined by Dr. Rosner (41).

The integration of sensory learning as described by these three areas of skills provides the foundation for learning and for comprehension or perception. Visual perception is the ability to receive a visual stimulus, to relate it to previous experience and to perceive meaning from it. Visual and auditory motor perception are the abilities to receive a stimulus either visual or auditory, or in combination, and to respond motorically with some degree of efficiency. Auditory perception requires the ability to receive an auditory stimulus, to process the information, and to perceive meaning from it. On page 13 a section of Chapter II, subtitled Relation of Motor Skills and Learning, describes these processes in greater detail, and relates the value of efficiency in these areas to the learning process.

**Limitations**

Major limitations in the effectiveness of this comparative evaluation were in the highly selective groups of children who were enrolled in the particular school and who participated in the evaluation; in the absence of individually matched children in both groups; and in the difference in daily time spent in the classroom.
Methodology

The two groups of children selected for participation had been arbitrarily assigned to form heterogeneous classes for the team of teachers who were interested in the project, and who wished to participate. Differences between the two groups were the numbers of hours spent daily in the classroom, and the inclusion of the intensive training with the experimental group.

Pretests were administered in September, 1975, to determine the base line of skills with which the children entered the program. Posttests were administered in April and May, 1976, to determine the degree of progress. The instruments included were Metropolitan Readiness Test, Level II, Form P (MRT-P), Beery-Buktenica Test of Visual Motor Integration (VMI), Test of Visual Analysis Skills (TVAS), and Test of Auditory Analysis Skills (TAAS). All testing was done by an impartial examiner in groups of ten or fewer, dependent on the directions for administering the test.

The final evaluation was made on the basis of the difference between the raw scores on pretests and the raw scores on the posttests in each group and a comparison of the differences between the total scores and the mean scores of the two groups. Certain subjective statements were made from observation of classroom behavior by teachers who were in daily contact with both groups of children.
CHAPTER II

REVIEW OF THE LITERATURE

"It is high time that movement came to be regarded from a new point of view in educational theory....when accepted there (at school) at all, it has only been under the heading of 'exercise,' 'Physical Education,' or 'games.' But this is to overlook its close connection with the developing mind." So speaks Dr. Maria Montessori as early as 1949 (34: 12).

In 1974, Bob Strauss of Trinity University stated, "Classroom learning doesn't start with the push of a pencil; it starts with motor-behavior development." He defines "motor-behavior learning" as the ability to express motorically the results of internalizing sensory information with past experiences. These past experiences are gained through motor movement (48). In the intervening years, many educators have become increasingly involved in this aspect of child development.

Theories of Motor Development

One of the most controversial advocates of the process of physical and neurological development is Dr. Carl H. Delacato (9). According to Delacato, the whole process of development of readiness to read begins at birth and continues in a sequential continuum of neurological organization.
until about the age of 6 or the age when teaching reading is begun formally. This continuum forms the basis of human perceptual abilities. In Delacato's view, perception is a fundamental process of learning to see, move, hear, feel, and talk. Any short cuts in these developmental processes of the sensory modalities sequentially, logically and according to the development of the human nervous system, will disrupt formation of good perceptual abilities.

Superimposed upon the development of perceptual abilities are the apperceptions which are built from experiences, and, in turn, result in conceptualization and in teaching the ultimate goal in reading. This goal is human conceptual comprehension.

In a more definitive manner, Frymier (15) equates learning with behavioral changes which may be either overt or covert, and which result from maturation or fatigue as well as from learning per se. Learning to read can only follow certain developments in a child's maturational progress. Frymier also says unless and until fine muscles of the eye develop along with the neuro-muscular apparatus which controls their movements, no child can learn to read. In this respect, the intellectual aspects of learning must follow the physical development and should be divorced from thinking of learning in terms of primarily a school activity.
Learning is instigated by stimuli of varying quality and quantity which must be received in the central nervous system from all modalities, and there collated, perceived, and ultimately acted upon. Hence, Frymier's reference to the senses as the "gateway to the mind." Perception then, takes place as a result of the stimulus and indicates that the organism has given meaning to it, drawing upon past experience to relate to the new material or experience. Thus the learner provides the meaning (in reading) and his percepts occur around patterns of meaning to which he adds and reorganizes his perceptions into larger clusters, thereby gaining insights which in turn modify behavior. In this respect, Frymier feels that observations of behavior are the main source of information relative to learning.

If learning begins with the nature and extent of the stimuli, it follows that anything which diminishes their quantity or quality will impede the process; likewise, the sequence in which stimuli are made available will have profound effect on the degree and quality of learning. Repeated exposure to a given stimulus facilitates learning, if each experience is meaningful (15). As stimulus deprivation will impede learning, so will anything which affects sensory receptors, making them less efficient in forwarding stimuli to the central nervous system.
Psychologically, learning was originally conceived as an accumulation of stimulus $\rightarrow$ response bonds (24: 4-6). However, such learning is largely reflexive behavior, and in order to cope with his environment, the child must develop increasing scope and flexibility of these initial reflex responses. In structuring this development, three processes are involved:

1. Chaining is performed when one reflex is attached to another as in the patterns: stimulus $\rightarrow$ reflex 1 $\rightarrow$ (becomes the) stimulus $\rightarrow$ (for) reflex 2.

2. This is followed by integrating whereby reflexes are tied so that one stimulus may call forth two or more reflex responses, simultaneous in time and expanding in space the scope of the initial response.

3. Conditioning will then increase the flexibility of the stimulus (Pavlov 1927). Isolated reflexes are integrated into systems through these three processes.

At the same time, generalized movement is being refined. This presents the opposite picture, for it is too gross to permit adaptive behavior, as the reflex was too specific to elicit more than one automatic response, and must be differentiated so that parts of the organism can operate independently of the initial sweep motion involving the whole body. Basically, differentiation takes place in two progressions--cephalo-caudal or head-to-tail or toe, and proximo-distal or
inside-out, trunk-shoulder-elbow-wrist-fingers. These progressions must take place sequentially or the result is an isolated group of responses not firmly related to the activities of the rest of the organism. Isolated responses of this nature are sometimes referred to as "splinter skills." For example, the child whose level of differentiation and integration do not include the fingers, but who is forced to learn to write, "learns" this particular task as if it were the initial reflex, and as such "sees" it as unrelated to his own body of learnings (8: 7-9).

Kephart (28), an often quoted authority in the area of neurological and sensory development, follows this physical differentiation process with a similar theory for sensory differentiation and integration which are used as instruments for manipulation of information from the environment and for modification of behavior on the basis of these manipulations.

Ultimately, Kephart says, sensory differentiation refines the stimulus, and motor learning refines the response, resulting in a built-in processing system in which external information and internal response can be coordinated into adaptive behavior (28).

Kephart elaborates on the neurological processing system as beginning in the structural unit, the neurone, whose function is development of a neural impulse which is transmitted across the synapse, space between neural fibers, to
establish a neural circuit. When this occurs, one or more synaptic knobs develop which increase in size and number each time the synapse is used. Since the knob itself is anatomical, the function has altered the structure, and permanently, since even in disuse, the knobs never completely disappear. Once the structure has been altered by a function, this will influence future function; hence by its own activity the nervous system patterns its own functions. This patterned structure now intercepts the input, processes it, and in turn dictates behavior. This system of development results in interrelationships of neural circuits, dynamic in nature, and the emergence of new neural patterns are observable as new or more complex or efficient means of processing data.

From this vantage point, it is not difficult to bridge the dichotomy of the normative approach to child development and Piaget's theory of cognitive development as a series of stages. Learning would then occur by accumulation until sufficient data were processed to form a new pattern, and would then leap abruptly to a new stage where all new data would be processed by the new pattern, as all existing data would also be reprocessed and interpreted in light of the new method. Development within a stage then is gradual, between stages, abrupt.
Although terminology varies with each author, the basic premises underlying the philosophies of Frymier, Kephart, and Piaget are not incompatible.

**Relation of Motor Skills and Learning**

Knowing facts is important, but not so important as knowing how to think since technological and cultural changes in our society are so rapid that facts readily become obsolete. In Piaget's theory, all thinking develops from the coordination of external movements. Coordination of body movements and sense inputs become a prerequisite to the application of body and sense activities to specific problems and tasks. The thought processes which control specific muscles or sense activities need training, not the muscles or senses themselves. This is not inconsistent with the foregoing theories because Piaget develops this line of thinking further by stating that movement and thinking are interdependent. Through watching development of sensori-motor intelligence, Piaget determined that the roots of logic are in actions, not words (22).

Many children perform academic tasks inadequately because they have not mastered the movement control on which these tasks depend (16). Piaget maintains that the child must perform concrete operations in order to develop the necessary cognitive skills to progress from a low-level abstraction to a high-level abstraction which then becomes conceptual in nature (16).
Pursuant to the original concept of relationship between sensory/motor development and academic achievement, visual and auditory stimuli provide static information which require no response for fulfillment; however, perception of these stimuli supply the data on which behavior is based. Motor information is largely tactual and kinesthetic and the motor responses supply the movements which are overt aspects of behavior. These two forms of data must become so interrelated that they come to have the same meaning.

Kephart refers to this sensori-motor relationship as the "perceptual-motor match" and is adamant in his belief that motor information is the basis for the match which must be made in the proper direction, or distortions and deviations are the result.

Kephart is upheld in his theory by Gesell (1941) in his illustration of development of eye-hand coordination; namely, that the eye follows the hand as it explores until it is taught to "see" what the hand "feels," so the first step is hand-eye. Because the eye is more efficient, it begins to take the lead, and coordination finally becomes eye-hand; now the eye can lead, the hand follow. Ultimately, the eye functions alone and perceptual and motor data are so closely matched that one can be translated to the other.

As described by Anderson (2: 77), this visual form perception (imagery, memory) is the "ability to establish a
mental image so complete, recall might include form, texture, smell, weight, color, irregularity, and any discriminating feature that gives the impression identity."

As an authority in the field of teaching reading, Spache (46) capsules this same process: "The human brain is composed of several million cells and interconnecting neurons. Within each cell are stored memory traces for facts, words, or physical acts. The nature of these traces may be...or simply a predisposition for the cell to react upon demand because of its previous training." Spache relates the same progression of perceptual skills as do Gesell and Anderson in visual-tactual experiences beginning in infancy, substituted for by visual movements, communication and speech patterns, yielding in turn to visualization and symbol manipulation, reading. Spache further states, "Restriction of these experiences retards the child's entire physical and intellectual development to a point below his inherited potential." (46).

The consensus seems to be that when any area of development is only delayed, the teaching directive is to supply experiences to enhance development; whereas in disrupted development, the task is to help the child achieve developmentally or teach him how to learn rather than to present facts to be learned.

DeHirsch (8) agrees with Spache and Getman by saying that an educator cannot wait passively for maturation to
occur, nor can he expose the child to instruction inappropriate to his level of growth. Training plays a significant part even in those functions in which maturation of the central nervous system is of primary importance, according to Paul Schilder (43: 7).

The areas singled out for attention at the pre-school level in order to give greatest impetus to learning skills are a well-developed sense of directionality, that is: left-right, up-down, front-back, curves and angles in three dimensional and two dimensional representation; bilateral coordination, eye-hand coordination; visual acuity, as well as perception and memory; auditory discrimination and comprehension; articulation and verbal expression; and environmental experience.

Heilman (23) cites the same areas as DeHirsch, Kephart, Getman, and Spache, but he gives greatest credence to the experience factor as demonstrated by the culturally deprived child. Ocular motility, or the ability of the eyes to act in concert to track a moving object or to focus on a specific point, is pointed out as being singularly important by most authors. Spache and Anderson both refer to Getman's definition of a good program. "When visual steering, coordinated bilateral motor actions, audition, touch and speech are integrated, elaborated, reinforced, and repeated, the children are being physiologically prepared for the world of
school. This is readiness in action." (18).

George Early, Achievement Center for Children, Purdue University, and Newell Kephart, Glen Haven Achievement Center, Fort Collins, Colorado, collaborated on a case study showing marked academic gains of a 13-year old boy based on a training program of gross-motor control and the perceptual-motor match (11). The boy had been removed from the classroom to receive training in gross motor skills and sensory reception for six months. Anderson (2) devotes Appendix A of her book to developmental activities, with bilateral coordination at the top of the list. J. Frances Huey (27) devotes an entire chapter to Acquiring Body Control and Expression, Thinking with Muscles. In The Thinking School conceived by Hans Furth and Harry Wachs (16), they constructed the entire program on Piagetian theory, translating much of it into the area of "thinking implied in body actions." Cognition also stems from these activities according to Furth and Wachs. In the first year of the program there was one experimental first grade classroom and one control first grade classroom. In the second year the program expanded to include the second grade with one control group, one experimental group. Exceptional progress was said to be made by the experimental group. Marianne Frostig and David Horne (14) begin their program for visual perception with body image, concept, and schema exercises, and progress to paper and pencil exercises for
developing perception of figure-ground, spatial relationships, size and shape relationships, and connecting dots in sequence for eye-hand coordination. Kephart devotes half of his book to various exercises and activities designed to correct and/or encourage proper development in these areas.

Gross motor skills relate to the mobility of the child, and it is not inconceivable that a child who can run well, walk erectly, throw and catch a ball, may still be subject to faulty motor-planning. Motor-planning refers to the fully integrated neural system which allows the child to respond without hesitation to a new motor stimulus. The child whose gross motor skills are not integrated will have to take time to think out his muscular plan of action at each change in body movement. The clumsy child, or one without neural organization must concentrate his thinking ability on holding his body erect, keeping his balance, and avoiding objects that obstruct his path. Similarly, the child who lacks discriminative or fine motor skills will have difficulty attending the task of printing, cutting, and similar activities because his attention is taken up with how to hang on to the pencil, crayon or scissors, and further, how to make them work (16, 28).

In the introduction to his book, B. J. Cratty (7: 8) states, "Particular skepticism should be directed toward any technique--whether balance-beam walking, visual training, or crawling on the floor--that is vastly different from the
classroom operation it is purported to remediate." This statement embodies the crux of the controversy between the motor developmentalists and the academicians. Educators tend to believe that time spent outside the formal teaching/learning situation after the child reaches elementary school age is not necessarily to his best advantage. The preference is to find alternative methods of instruction in order to reach the modality by which the child learns best, and to determine what, if any, deficits exist in his channels of communication and begin at the point of deficit with remedial instruction (35, 22, 5).

Research on the Developmental Approach

There are many case studies of progress made by individual children cited by Kephart, Early, Getman, Furth and Wachs, and others. These case studies report the child's progress only in the most general terms. For example, "after six months training, the child's reading achievement improved the equivalent of one grade level," (11), but was this due to maturation, improved health, home conditions, one to one tutoring, or the perceptual and motor training program? Without a control, and with only one child, this is impossible to determine. Adequately controlled research studies involving more than 10 children fail to document the authenticity of these motor development programs (35: 375-385). Indeed, 80%
of the results of these studies failed to validate these approaches (35:383).

"Until the merits of the activities have been clearly shown by carefully designed research, we maintain that these approaches must be viewed as highly experimental, non data-based intervention strategies." (35:385).

On the other hand, Dr. Rosner does claim positive transference of skills to academic work through his training program in visual and auditory perceptual skills. The method he advocates is analytical, both visually and auditorily, and the sequence moves from gross to fine perceptions. Visual analysis skills training is begun on the level that the child demonstrates competency on his screening test, the lowest level of which is a geoboard with five pins, progressing to 25 pins, and reproducing structured designs with rubber bands. The next step is to transfer this tactile/kinesthetic method to paper and pencil, gradually increasing in degree of difficulty the linear drawing to be produced. These drawings are made after the child has analyzed the manner in which the lines connect the dots on his paper in much the same fashion as the Frostig materials. However, in working with the Frostig exercises, experience indicates that they seem to produce only a greater facility for success at doing Frostig exercises.
Auditory analysis is begun with the gross perception of syllables in compound words and then progresses through beginning, final, and medial sounds to the distinction of, and substitution for, one of the two sounds in a consonant blend.

As in the case of other researchers and methodologists, Rosner cites no controlled studies in this book and proposes use of his method with the individual child in a one-to-one teaching situation. In a classroom setting, this would prove highly impractical if not impossible.

Thus it was determined to adapt Rosner's program to a classroom setting in an effort to evaluate the effectiveness of the training on small groups of children. It was also decided to compare the progress of this group of children, labeled the Experimental Group, with progress of a similar group of children, labeled the Contrast Group, who did not have the special training. The results of the evaluation and comparison are reported in Chapter IV.
CHAPTER III

PROCEDURES FOR CONDUCTING THE EVALUATION

Description of Conditions and Participants

In order to evaluate the effectiveness of Rosner's program, the two class groups selected to participate were as nearly alike as possible. The physical setting and equipment were the same for both groups, since they occupied the same classroom. The classroom had three walls, with one side open to a large space shared with three other classrooms. The floor was carpeted. The group of children who received the special perceptual training was designated as the Experimental Group, while the group used for comparison was designated the Contrast Group. The Contrast Group of 20 children participated in a morning program from 9:00 a.m. to 12:00 noon. The Experimental Group of 18 children participated in an afternoon program from 12:50 to 3:00 p.m. The team of eight teachers was the same for both groups, including the homeroom teacher.

The students in each group had been arbitrarily assigned by the school administrators to the classroom of the participating teachers prior to the conception of the evaluation. The children in both groups were from white, upper-middle class families who live in the same metroplex area in North Texas and are generally private school oriented. The
religious background varied, including Catholic, Protestant, and Jewish families, but religious affiliation was not a pertinent factor to this evaluation.

The main differences between the Contrast Group and the Experimental Group were: 1. the children in the Contrast Group were beginning their third year in the same school building, although in a new area of the school; whereas the children in the Experimental Group were new to this particular school setting; 2. the Contrast Group spent three hours per day in the classroom while the Experimental Group spent only two hours per day at school; and 3. the Experimental Group met with special interest teachers--Creative Dramatics, Music, Library, and French on each Wednesday, whereas the Contrast Group met these same area teachers once a week, but each on a different day and for the same 30-minute time period.

Since results of the tests administered contain no privileged information regarding the children, parental permission to involve the children in the program was not deemed necessary. School administrators gave permission to conduct the training and evaluation, and supported it fully.

The Contrast Group consisted of nine girls, and 11 boys ranging in age at entrance to the program from five years three months to six years zero months, except for one child who was six years four months of age. The Experimental Group
consisted of 11 girls and seven boys ranging in age from five years zero months to six years one month.

**Test Instruments and Administration**

The Metropolitan Readiness Test, Level II, Form P (MRT-P) was selected to measure the possible effect of perceptual training on development of classroom skills because it was the single measure used in this school to assess the students' readiness for first grade. The Beery-Buktanica Test of Visual Motor Integration (VMI) was included in the testing program to determine whether this type of visual program would indeed have an effect on overall perceptual development and that it would not just provide training in the expertise of producing dot patterns.

The Test of Visual Analysis Skills (TVAS), and the Test of Auditory Analysis Skills (TAAS) are the screening tests designed by Dr. Rosner for correct placement of the student in his specific training program. There was no documentation available for the TVAS or the TAAS, although Dr. Rosner does give norms of average performance for each grade level (41: 69, 79). Copies of these test instruments are included as Appendix A and Appendix B. From the results of these tests the 18 children in the Experimental Group were placed in fluid groups which changed as frequently as skill development indicated.
Procedure

The testing program was begun with the TVAS and TAAS in order that training could begin as soon as possible after the opening of the school year. No other tests were scored until the end of the project when all pretests and posttests were scored, each child assigned a number, and results tabulated accordingly.

All pretesting was completed between September 10, 1975, and October 1, 1975, and the specific training sessions began with the Experimental Group on September 29, 1975. These sessions continued through the fall until November 20, 1975, and resumed on January 5, 1976, following the winter holidays. The sessions were then continued until April 20, 1975, when the posttest procedures began.

The same three members of the teaching team, with whom the children were familiar, administered both pretests and posttests. As indicated in Table 1, page 26, and pursuant to Directions for Administration accompanying the MRT-P, the test was administered in groups of ten or less, and in three sessions for each group of children. The VMI was administered to groups of five children, the TAAS individually, and the TVAS to two students at a time by providing equal view of the stimulus pattern, but with one student's response protected from the view of the other student being tested.
### Table 1

Pretest and Posttest Conditions

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Child/Teacher Ratio</th>
<th>Sessions</th>
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<tbody>
<tr>
<td>Metropolitan Readiness Test, Form P</td>
<td>10 to 1</td>
<td>3</td>
</tr>
<tr>
<td>Visual Motor Integration</td>
<td>5 to 1</td>
<td>1</td>
</tr>
<tr>
<td>Test of Visual Analysis Skills (Appendix A)</td>
<td>2 to 1</td>
<td>1</td>
</tr>
<tr>
<td>Test of Auditory Analysis Skills (Appendix B)</td>
<td>1 to 1</td>
<td>1</td>
</tr>
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**Training Program**

In the limitation of time available daily to present the same regular curriculum offered to the Contrast Group, it became necessary to limit the auditory training sessions of the Experimental Group to a whole class activity which was conducted in daily segments of five minutes at the beginning of the class day, immediately after the pupils arrived at school. Hence, the auditory program began at the lowest base for all children, whereas the visual program was begun at each child's diagnosed skill level. As pupil skill and interest grew, there were days when the auditory training period was extended to a maximum of 10 minutes. The 10-minute
periods were limited to the spring months of March and April. In the Experimental Group, fluid groups derived from scores on the TVAS received a minimum of 30 minutes of training a week in specific visual activities as prescribed by Dr. Rosner. All grouping of children and training sessions were done by the investigator. These visual training sessions were offered to each child two or three days a week for a maximum of 15 minutes each session. Those children who scored three or less on the screening test, thus exhibiting the greatest weakness, were given three sessions weekly for September, October, and November, while all other children had only two weekly sessions during this time. Beginning in January, all children in the Experimental Group were exposed to only two training periods weekly. There were never any training sessions, visual or auditory, on Wednesday.

Rapport developed with the children during these sessions was excellent. They enjoyed doing the tasks. An atmosphere of competition between students and teacher was promoted by the children to prove that they could be successful no matter how intricate the lines to be reproduced or the sounds to be identified.

At its lowest level, the visual analysis training began with a geoboard of five pins on which the child constructed a design of rubber bands copying from another geoboard on which
the design had already been placed. The trainee then transferred this design to a line drawing on a map of five dots placed beside his geoboard. After a series of such reproductions, the same designs were used again, but rotated in orientation, first $45^\circ$, then $90^\circ$, then $180^\circ$. In the spring, in the more highly skilled groups, this presented a challenge for the children to discover a design they had produced earlier and to determine the degree to which it had been rotated.

When skill in producing line drawings on the dot maps negated the need for first using the geoboard, this step was omitted. Likewise, as skill on a five-dot map increased, it was exchanged for a map of nine dots, which in turn gave way to a 25 dot map. This progression is demonstrated on the screening test in Appendix A. Ten of the children became so proficient that the stimulus remained on the 25 dot map, but the child's map was first reduced to 17 dots, then nine, and again to five, making it mandatory for him to be able to visualize mentally the missing dots on his map, and to locate them spatially for correct starting and stopping of his lines. The final step in developing his visual analysis skill was a blank map of the same size as the stimulus pattern on which he reproduced a complicated line drawing by visually and spatially orienting himself to the space provided.
Visual perceptual training is expected to enhance the child's ability to analyze, understand, and decode the symbols of written language and mathematics, as well as to increase his directionality. In reproducing the dot-to-dot drawings, the child improves his skill in sequencing, handwriting, and eye-hand coordination; all essential and basic skills for learning classroom skills (2, 5, 15, 28, 35).

Auditory analysis training sessions were begun at the gross level of recognition of first or last word in a compound word and then verbalizing that word. Words used in all levels were those provided by Dr. Rosner in the word lists in his book (41: 138-165). At Level I, the lists consisted of words such as seesaw, oatmeal, baseball, steamship, cupcake, and sometime. The hierarchy of auditory skill progressed from identification of beginning, final, and medial consonant sounds; medial vowel sounds; substitution of beginning and final sounds; omissions of beginning sounds to produce a new word; omission of a medial sound to produce a new word, to substitution and/or omission of one sound of a consonant blend at the beginning or end of a given word.

For all of these exercises, the child had no visual input as the teacher screened her face from view as she pronounced the stimulus word.

In the area of general motor skills training, Dr. Rosner describes (41: 171-178) activities germaine to most broad
kindergarten curriculums and both Contrast Group and Experimental Group were exposed to the same basic program with the exception that the Experimental Group had two 30-minute periods weekly in rhythmic and fine motor skill activities and the Contrast Group received only one 30-minute period weekly in the same skills. Music records that were used consistently with both groups, and which proved to be effective training tools were: 1. Fun Activities for Fine Motor Skills (30); 2. Rhythm Stick Activities (20); 3. Perceptual Motor Rhythm Games (6); and 4. Creative Movement and Rhythmic Expression (39); and in the Experimental Group only, the clapping and rhythm activities recommended by Dr. Rosner in his book (41: 172-178).

The foregoing procedures provided the thrust of the training and quickly became an integral part of the program provided for the Experimental Group.

Both groups were given the same basic concept building in reading readiness, alphabet recognition and phonics, introduction to numbers and mathematical concepts, science, social studies, music, and art. The materials they used for these activities and for development of perceptual skills in other ways were the same.

Reports of the results of the testing program and the comparison of growth demonstrated between the Contrast and the Experimental groups are detailed in Chapter IV.
CHAPTER IV

REPORT AND ANALYSIS OF THE DATA

The purpose for administering both pretests and post-tests was to determine the difference in achievement before and after the training program for the Experimental Group. The resulting scores were then compared and contrasted with the scores of the Contrast Group in order to evaluate the effectiveness of Dr. Rosner's perceptual training program.

Raw scores on all tests for the Experimental Group are tabulated in Table 2, page 32. All test scores for the Contrast Group are reported in Table 3, page 33. The single departure from reporting raw scores in these tables and in the narrative is the data on results of the Beery-Buktanica Test of Visual Motor Integration (VMI). These raw scores have been converted to age equivalent norms on the table provided by Beery and Buktanica in the test administration manual. This procedure was followed to facilitate understanding and interpretation of the growth patterns demonstrated by the children.

Table 4 shows the range of scores for each group, the mean score on each pretest and on each posttest and the difference in the mean scores achieved by each group.
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Experimental Group Scores on Pretests and Posttests

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### Table 4
Comparison of Test Data
Experimental Group and Contrast Group

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<th>Posttest Mean</th>
<th>Range</th>
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#### Comparison of Test Results

In the Experimental Group as shown in Table 4, the mean of the pretest scores on the Test of Auditory Analysis Skills were lower than those of the Contrast Group by 1.56. A majority of 15 of the 18 students scored 3 or below on the
scale of 0 to 13, while the other three students scored 5, 6, and 8, as reported in Table 2.

Children in the Contrast Group were entering their third year in this particular school setting in which the phonic approach to reading is emphasized. With a background of consistent exposure to auditory sound discrimination, similar to the tasks included in the test, nevertheless of the 20 students in the group, a majority of 13 students scored 3 on the scale of 0 to a high of 13, which is still at the level of gross discrimination between the parts of compound words on the TAAS. The remaining seven students scored 6, 7, or 8, as reported in Table 3.

The kindergarten year in this school presents an accelerated, in-depth phonic approach to reading so that the expected outcome for both groups would be a measurable increase in auditory discrimination skills. As shown in Table 2, the maximum increase in the Experimental Group was 12 points made by a student whose pretest score was 1 on the 13-point scale, 13 being the highest possible score, and whose posttest score was 13 on the same scale. One-third of the group, six students, scored the maximum of 13 points on the posttest. The Contrast Group, however, did not show a significant growth pattern. The maximum increase of the raw score by any student was 6 on a 13-point scale, and this increase was demonstrated by only two students. While three
students increased their raw scores by 3 on the 13-point scale, the scores of seven students were the same on the pretests and posttests. The highest posttest scores were made by two students who had scored 8 on the pretest, and who increased their scores to 10 on the 13-point scale.

The Experimental Group showed a mean score of 2.94 on the TAAS pretest, with a range of scores from a low of 1 to a high of 8 on a 13-point scale shown on Table 4. The posttest mean was 9.38, an increase of 6.4 points, within a range of scores from 4 to 13. It is interesting to note that of the five scores of 1 on the pretest, three were increased to a score of 6, 1 to a score of 7, and 1 to a maximum score of 13. Another child, student number 36, Table 2, who scored 3 on the pretest, increased his score by only 1 point. This was the smallest increment of growth of any child in the Experimental Group as indicated in columns three and four in Table 2. There were also six maximum scores of 13 on the TAAS posttest.

In the Contrast Group, the TAAS pretest mean was 4.5 with an actual range of only 5 points, a low of 3 to a high of 8 on the 13-point scale. This would seem to reflect the previous phonic training in auditory discrimination of letter sounds. However, continued practice in the same traditional method of teaching phonics did not produce the increase in auditory skills shown by the Experimental Group, who received
the special training in addition to instruction with the traditional method of teaching phonics. The Contrast Group showed a 1.65 increase in mean score, with a posttest mean of 6.15. The actual range on the posttest scores was from a low of 3 to a high of 10 on the 13-point scale. There were eight children in this group whose scores did not increase, seven who scored 3 on the pre- and posttests, a level of gross auditory discrimination on the scale, and the eighth student had pretest and posttest scores of 6 on the 13-point scale. These scores are shown in columns three and four in Table 3.

By comparing the numbers of children in each group who increased their scores from 4 to 12 points, there were only two children in the Contrast Group as opposed to 17 in the Experimental Group who increased their scores. It is possible that the training program led to developing skills tested, thus helping to explain the discrepancy between posttest scores of the two groups. Traditional methods of phonic teaching in auditory discrimination emphasize beginning, ending, and medial consonant sounds as well as other skills similar to those tested. Since both groups received this traditional method of instruction, it seems reasonable to assume that the technique of the Rosner program provided the plus factor that produced the difference in growth pattern between the Experimental and Contrast Groups.
The mean scores on the Test of Visual Analysis Skills were much closer for the two groups on the pretest, as shown in Table 4. The Experimental Group pretest mean was 5.0 with a range of scores from 0 to a high of 8 on an 18-point scale. The Contrast Group pretest mean was equal to 5.5 with a range of scores from 0 to 9 on the 18-point scale. Increase in achievement of visual skills was lower for both groups as well. The Experimental Group registered a mean of 10.44 on the posttest with a range of scores from 6 to 18; with 10 students scoring 10 or more, indicating a substantial increase, but not as great as in auditory development. One child increased his score only one point while one child decreased his score by one point. The Contrast Group had a mean equal to 7.2 and a score range of 5 to 13, with only one student scoring above 9 on the posttest, two students scoring the same on both tests, and three students each scoring one point less.

In comparing the results of the TVAS pre- and posttests for both groups, one would expect the Experimental Group to score considerably higher since the training program was calculated to improve the specific skills tested. It was basically for this reason that the Test of Visual Motor Integration (VMI) was included, in order to check growth of visual-perceptual-motor skills with an instrument totally unrelated to Dr. Rosner's program.

Scores on the VMI were computed in age level expectations by years and months, and a score six months above or
below the actual chronological age is considered within the normal range for that age. The mean age of the Experimental Group at entrance to the program was 5 years 8 months, with an actual range from 5 years 0 months to 6 years 0 months. The mean age of the Contrast Group at entrance to the program was 5 years 9 months, with an actual age range from 5 years 2 months to 6 years 4 months. Actual age of each child in both groups at the beginning of the program is listed in Table 2 and in Table 3.

The VMI pretest in the Experimental Group registered a mean of 5 years 5 months. On the posttest the mean was 7 years 11 months, the difference between highest and lowest scores was 25.8 months, a discrepancy of more than two years between members of the group. This wide variance reflects and emphasizes the difference in rate of development between a perceptually "normal" child, and one who is experiencing perceptual deficits. On the VMI pretest, nine children scored from 6 to 23 months below age level, whereas on the posttest, only three children scored from 6 to 14 months below age level. These three children were identified during the span of the project as having specific learning disabilities. These figures are reported in Table 2.

In the Contrast Group, the mean on the VMI pretest was 5 years 1 month. On the posttest the mean was 6 years 11 months with a difference between highest and lowest scores of
19.3 months. On the pretest, 13 children in the Contrast Group scored from 6 to 16 months below age level expectations. On the VMI posttest, four of these children retained a score from 6 months to 15 months below age level expectations, although each of them gained at a rate in excess of the actual number of months in the program. In addition, five children in the Contrast Group remained between 1 and 5 months below their actual age level on posttest scores. Of the four children whose scores were lowest, Table 3, one had been identified during the course of the project as having specific learning disabilities, and two others as having a developmental perceptual lag.

Rapid growth of fine motor and perceptual skills between the ages of five and seven is very normal and to be expected. By comparing the VMI scores achieved by both groups, however, it would seem to indicate that the growth pattern demonstrated by the Experimental Group was directly related to Dr. Rosner's visual analysis training program. The difference in the pretest and posttest mean of each group clearly shows greater growth in the Experimental Group. Table 4 shows a difference in mean of 5.44 points growth for the Experimental Group, and only 1.7 in the Contrast Group.

Data to this point does indicate a favorable response to the specific training program, but the final consideration lies in the comparison of results on a measure of achievement
of classroom skills to determine if there is an effect of the perceptual skills training on classroom skills.

The Metropolitan Readiness Test, Level II, Form P (MRT-P) subtests cover the areas of alphabet recognition and sound relation, school language, quantitative concepts, quantitative operations, visual matching and perception. Since this test is measuring acquired skills of children, the majority of whom are not reading, all directions are given orally. Stimulus words and sentences are usually given only once and the examiner is cautioned against repeating. This intensifies the need for auditory perceptual skills and auditory processing skills in the performance of the task.

Using the Battery Composite raw score on the MRT-P as a basis for comparing the Contrast and Experimental Groups, the Experimental Group MRT-P pretest composite mean was 61.5 with a range of scores from 41 to 85. The posttest composite mean of the Experimental Group was 78.22 with a range of scores from 68 to 84, the highest composite pretest score decreasing by 2 points. The Contrast Group pretest composite mean was 66.25 with a range of scores from 55 to 85. The posttest composite mean for the Contrast Group was 78.25 with a range of scores from 67 to 87. See Table 4 for a comparison of these mean scores and ranges of scores.

The low score on the pretest composite for the Contrast Group is 13 points higher than the low score in the
Experimental Group, while the high score was the same. On the posttest, the low score for the Experimental Group was 1 point higher than the Contrast Group score, and the high score was 3 points lower than that of the Contrast Group. These scores show that more children in the Experimental Group improved their scores to a greater degree than did children in the Contrast Group. The last two columns of Table 2 and Table 3 support this finding by showing that a total of 12 of the 18 students in the Experimental Group increased their composite score by a range of from 16 to 34 raw score points.

In the Contrast Group of 20 students, only five students increased their battery composite raw scores by a difference of 16 to 23 points, 23 being the maximum increase. Deriving a mean from the difference in the number of raw score points between pretest and posttest composite scores for each child in each group shows the mean number of points increase in the Experimental Group as 16.7. The Contrast Group had a mean number of raw score points increase of 11.7, a difference of 5 raw score points in favor of the children who had the special training. These comparisons show more rapid progress by a greater number of students in the Experimental Group than that shown by the Contrast Group.
Analysis of the Data

All phases of the data related to posttest scores on all tests indicate a plus factor for the children who participated in the experimental program. Those children who showed the greatest rate of improvement were normal students with no identifiable learning disabilities. The three students identified in the Experimental Group as having specific learning disabilities progressed beyond expectations of growth for their level of skills, although it remained below age level as it did for similar children in the Contrast Group. It is almost unbelievable to find an additional eight students in a group this small who are experiencing visual perceptual deficits, but this proved to be the case, and one of these children had also sustained moderate to severe motor damage resulting from cerebral palsy. These deficits became obvious in the difficulties experienced by these children in progressing through the levels of skills in the TVAS program, as well as in other materials used in the development of perceptual skills in the basic kindergarten curriculum.

The natural intelligence of some children makes it possible for them to learn to compensate in some manner for deficits of this nature, but the degree to which these children compensated seems to indicate the strength of the visual analysis and auditory training. Several of these children were coping so well they were reading pre-primer
level books before the end of the program and two of them were reading fluently at a first reader level and beyond. Indeed, it would appear from the progress made by several children, that the deficits might have been merely developmental since they were almost consistently self-correcting by the end of the training.

**Subjective Observations**

All reporting done in this chapter thus far is based on the objective tabulated data gathered during the course of the evaluation. In the classroom, however, it is often possible to utilize the teacher's subjective observations for additional information relating to children's behavior and modus operandi. With the team of eight teachers providing combined evaluations of the two groups of children, both collectively and individually, these observations seem particularly worth of note.

It was a consensus of opinion among the team of eight teachers who were involved with both groups, that the Experimental Group, as a whole, became:

1. better able to listen and follow oral directions;
2. more skilled at screening out distracting environmental noises in auditorily attending the task at hand;
3. better able to identify visual clues to provide the desired response;
4. more motorically and rhythmically adept beyond the level of development normally expected for their chronological age;

5. more precise in their manuscript writing skills, and perhaps most valuable to the classroom teacher;

6. more able to function cohesively as a group than the children in the Contrast Group.

It is necessary to insert a note of caution. In using Dr. Rosner's skills training program with the average classroom, results of this limited evaluation indicate a possibility of masking some of the difficulties of a high-risk child and delaying his identification for individual attention and help. Whether or not this delay would provide a major problem in his development cannot be determined by this short term training program.

It should also be noted that the children in both groups were a highly selective group as compared with the general population, and results reported here are not indicative of the school population as a whole. The children involved came to school with a wide range of background experiences, far more than the average 5 and 6-year old child. They were all from upper income families, who also have a high educational background, and are very interested and active in securing exceptional educational opportunities for their children.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this evaluation was to evaluate the effectiveness of Dr. Jerome Rosner's perceptual skills training program as outlined in his book, *Helping Children Overcome Learning Disabilities* (41) when it was adapted to a classroom group work situation rather than one-to-one tutoring. This evaluation also attempted to determine whether the intensive skill training would actually effect improvement of the classroom skills of this particular group of kindergarten children.

Student Population

Students who were participants in the study were in their kindergarten year in a private school patronized by upper middle class white families who live in the same general geographic fringe area of a large southwestern city.

The Contrast Group consisted of nine girls and 11 boys, while the Experimental Group had 11 girls and seven boys, making a total group of 38 students. All children were between the ages of five years zero months and six years four months.
Training Program

The Experimental Group received special auditory training four times a week for five minutes each for five months, and 10 minutes each for two months. Special visual analysis training sessions were conducted twice each week for 15 minutes each. The balance of the curriculum was essentially the same for both groups.

Results of the Special Training

At the conclusion of the study all tests were scored, tabulated, and results of the two groups compared by mean scores as well as total scores. All test results indicated a greater rate of growth for members of the Experimental Group than that of the Contrast Group.

Conclusions

The problem of the relationship of training of perceptual skills and its effect on achievement of classroom skills is far from being solved. However, it may be concluded within the limited scope of this evaluation, that the effect of Dr. Rosner's perceptual skills training program on classroom skills was a positive one for this particular group of kindergarten children.

Knowledge of the normal developmental growth of average children in the kindergarten year indicates that a portion of the growth pattern demonstrated on the tests which were
administered is to be expected. However, the differences shown between the increase of scores in the two groups are too great to be considered accidental or to be the result of chance. Based on these differences, it might be predicted that by following Rosner's specific program of auditory, visual, and visual-motor perceptual training, it is possible to enhance the classroom skills to differing degrees according to the specific abilities of the individual children involved.

These particular screening tests--The Test of Visual Analysis Skills and the Test of Auditory Analysis Skills, will aid in diagnosis of specific perceptual needs of individual children, but participation in the training program may serve to mask the degree of the perceptual difficulties the child may have.

Recommendations

After a thorough review of all materials collected during this evaluation, it is possible to make the following recommendations:

1. The perceptual skills training program requires experimental studies in situations where children come from more diverse backgrounds, socio-economic groups, and with a wider range of abilities.

2. Longitudinal studies are recommended to determine the sustaining power of Dr. Rosner's program as the children
proceed to more specific and difficult academic demands.

3. The value the children in the Experimental Group received from Dr. Rosner's program was sufficiently demonstrated in classroom management and operation, as well as in academic skill development, to warrant consideration of its use in curriculum planning for preschool children in a normal, heterogeneous classroom rather than restricting use of the program to children with specific learning disabilities in a tutorial situation. Thus some children with learning disabilities might be able to function acceptably in a regular classroom rather than being set apart in a special educational situation to meet their needs.
APPENDIX A

Test of Visual Analysis Skills. The child is directed to reproduce the lines shown on one dot map on another map with corresponding dots. Stop testing when child makes errors on two successive patterns.

Item 1

Item 2

Item 3

Item 4

Item 5

Item 6

Item 7

Item 8
Number of dots on child's map differs from the number on the examiner's in Items 10 through 18.
APPENDIX B

Test of Auditory Analysis Skills. Items A and B are demonstration items. Stop testing after two successive errors.

A  Say cow*boy*  Now say it again, but don't say boy
B  Say steam*boat*  Now say it again, but don't say steam
1  Say sun*shine*  Now say it again, but don't say shine
2  Say pic*nice*  Now say it again, but don't say pic
3  Say cu*cumber*  Now say it again, but don't say (q) cu
4  Say co*at*  Now say it again, but don't say /k/
5  Say me*at*  Now say it again, but don't say /m/
6  Say ta*ke*  Now say it again, but don't say /t/
7  Say ga*me*  Now say it again, but don't say /m/
8  Say w*rote*  Now say it again, but don't say /t/
9  Say ple*ase*  Now say it again, but don't say /z/
10 Say cl*ap*  Now say it again, but don't say /k/
11 Say pl*ay*  Now say it again, but don't say /p/
12 Say sta*le*  Now say it again, but don't say /t/
13 Say sm*ack*  Now say it again, but don't say /m/
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