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The Effectiveness of Perceptual Training as a Corrective Measure for Reading Disability

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THE EFFECTIVENESS OF PERCEPTUAL TRAINING AS A CORRECTIVE MEASURE FOR READING DISABILITY

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INTRODUCTION

The Problem

Underachievement in the classroom has been a problem to teachers and administrators for many years. Kurtz and Swenson (1959, pp. 402-403) state the problem quite aptly:

> Old and still persisting is the question of why some students achieve well in school while others achieve poorly. We can answer with some assurance that intelligence is a factor in school achievement, but we must admit with equal assurance that intelligence is not the only factor. It is common knowledge that some students with lesser measured ability do better work in school than other children with greater measured ability.

The fact that low intelligence is not the only cause of poor achievement is borne out by the fact that correlations between intelligence tests and achievement usually fall between .30 and .60 indicating that factors other than intelligence are affecting achievement (Ladd, 1933).

Despite the improved educational preparation of today's teacher, the more effective teaching techniques, and the constant up-grading of instructional facilities, the problem of the underachiever still persists. Children of average or above average ability continue to work below capacity and to drop behind their classmates. In the area of reading, these low achievers are most critically hurt because reading skill

is a necessary tool for the understanding and mastery of most of the other school subjects.

Although the problem of underachievement is not confined to any one group, any level of the socio-economic strata, or any age level, it is a problem which is more common to some groups than others. Indian children, in particular, often achieve very poorly in the public school system. Their school career is often one of failure and frustration resulting in a drop-out rate of approximately seventy percent during the first twelve years of school (Yakima Indian Agency, 1967). Those who do choose to remain in school often make poor grades and meet with relatively little success.

Why do these and other children have difficulty in school? This is an extremely difficult question, the answer to which lies within environmental, emotional, physical, and psychological as well as educational factors. Much is now being done to improve, or at least better understand, these and other factors which might be interfering with school progress. For example, school nurses and school social workers make home visitations in an attempt to discover unsatisfactory home conditions and to suggest to parents possible corrective measures; school counselors and school psychologists are employed by many school systems so that help for children with emotional and psychological problems can be made available. Different methods of teaching have been initiated, subsequently abandoned, and then re-instituted in

the hope that one or a combination of several different methods would be found which could effectively and consistently help children who were not working in accordance with their individual capacities. A survey of the history of reading methodology reflects this pattern. Teaching reading has passed through the alphabet method, the phonics method, and several combinations of these methods (Diack, 1960, pp. 52-72). Yet none of these was found to be a panacea for the low achievers in the reading program, and it is doubtful that such a panacea will ever be found.

Adequate perceptual development is accepted as the essential requirement for reading readiness. Attempts at teaching reading are usually postponed until the child is six years old, primarily because it is felt that he does not develop the perceptual skills necessary for reading until that time. Methods of teaching reading to pre-school children incorporate attempts to compensate for perceptual immaturity by using over-sized letters in the printed materials.

A question arises concerning whether or not immature perceptual ability is confined only to the younger children in school. A possible answer is that some of the children who are older chronologically, yet have difficulty with the task of reading, might be handicapped by perceptual immaturity which prevents them from making the fine discriminations between letters and letter combinations which are necessary for successful reading.

A great deal of interest has been shown recently in the perceptual development and perceptual training of children who show marked retardation in reading skills. This interest has, in turn, led to an increase in the design and implementation of experimental and empirical studies concerned with the characteristics of these poor readers, the relationship of reading ability to perceptual development, and the effectiveness of perceptual training as a corrective measure for reading difficulties. These studies have contributed greatly to our present knowledge of perceptual development and have answered many questions. Yet, there are still many questions left unanswered which call for further research.

Background and Relevant Research

The Role of Perceptual Maturation and Learning in the Development of Reading Ability

Reading is a task which man has imposed upon himself. It requires the ability to recognize the form of words and to distinguish details of shape as well as the cognitive process of associating symbols to objects or events. Hence, accurate visual perception is essential for the adequate reader.

Approximately ninety-eight percent of all infants are born with hyperopic or far-sighted vision. By the age of six months binocular fixation and orientation is acquired, and by six years it is well developed. Because of their unfamiliarity

with words and their meanings, reading is a difficult process for children and necessitates numerous fixations. Often the child's eyes will fixate upon each individual word or part of a word rather than upon phrases or entire lines as do those of an adult. Regressions to previously encountered words in the line of print are also common in young children, but by the age of ten or twelve years, the number of regressions and fixations normally becomes stable with approximately .4 regressions and 6.0 fixations per printed line.

Another cause of the difficulties encountered when a child learns to read is the fact that new laws must be learned. Alexander and Money (1967) pointed out that the letters of the alphabet defy the previously learned "law of object constancy." This law which implies that "...any object has the same name, meaning, or symbolic value regardless of changes in its directional orientation or rotation in space, and despite the addition, removal, translocation, or camouflage of component parts (p. 404)," must be replaced by the "law of directional constancy" and the "law of form constancy." Directional constancy requires that letters of the same shape must also have the same directional orientation if they are to represent the same symbol. For example, the word "saw" does not have the same symbolic value as the word "was." The latter law to be learned (that of form constancy) requires that letters of similar shape must be identical in all parts

if they are to represent the same letter. Therefore, "c" is not "e" no matter how much the two letters may resemble one another, and "then" has a meaning different from "them."

These new laws must be conceptualized before reading ability may develop. Conceptualization may be more difficult for some children than others as a result of a developmental defect or maturation lag in space-form perception or directional orientation. According to Alexander and Money, directional orientation begins with orientation to one's own body, progresses to right-left orientation to a person facing you, and finally to the combining of right-left orientation to going and coming in space. Usually spatial orientation is well developed by the fourteenth year; however, in cases where such development has not yet reached completion, the task of reading becomes very difficult indeed.

The most desirable circumstances would permit the child to grow up in an environment which allowed him to progress normally through the sequential development of directional orientation and space-form perception. Unfortunately, however, many of the popular methods of child care today may actually inhibit the perceptual development of children (Sutphin, 1964). For example, the popular practice of bottle-feeding infants encourages, in most cases, the use of only one eye; namely, the one away from the mother. Breast feeding involves a shifting from side to side which encourages the use of both eyes and

provides practice in focusing them. Playpens inhibit movements and discourage crawling, an activity which develops neurophysiological cross-patterning. Also, many of today's commercial toys require fine motor skills instead of the gross motor skills which should precede the fine skills in the normal developmental sequence.

Piaget (1959), too, stressed the role of maturation in perceptual development, stating that perceptual development is closely related to general mental growth. The function of decentralization, or the freeing of the child's attention from the dominating aspect of the visual field, is, according to Piaget, an activity of co-ordination and comparison which is closely related to intelligence. He went on to say that to note whether the child lets his eyes dwell on the dominant point (centering) or directs his eyes to include the characteristics and organization of the whole field (decentralization) gives an indication of mental age with greater decentralization skills being indicative of greater mental age (the term "perceptual age" recommended by Maslow et al (1963) seems to be more appropriate in this context because of the broad connation of "mental age"). This decentralization, which is the result of higher order perceptual organization, is necessary if the child is to differentiate between the symbol groupings which make up words. The implication for the teaching of reading is that the reading

readiness program should include perceptual decentralization activities such as recognizing hidden figures or other such activities which help establish figure-ground relationships. Similar activities might also be helpful for children encountering difficulties in reading because of perceptual immaturity.

DeHirsch (1957) also emphasized the fact that the child's ability to cope with perceptual organization is basic to reading. The young child or perceptually immature child is not able to differentiate single parts of a field. Yet reading requires the ability to differentiate small details and to understand the relationship between parts and the whole. Harris (1957, pp. 33-34, 229-231) implied the same thing when he stated that it was possible for a child with "normal vision" to have immature visual perception. The perceptually immature child notices the dominant features of the visual field but does not pay attention to details. Because of this, differences between letters are not noted. This results in reversal errors which are quite common among young children. Reversal errors such as mistaking "m" for "w" and "no" for "on" decrease in frequency as the child grows older and matures perceptually.

Harris (1957, pp. 383-393) asserted that a child who does not perceive a word clearly will not be able to remember it. Thus, the development of sight vocabulary would be hindered as a result of perceptual deficiencies. He suggested

four methods of perceptual training which might help correct inadequate visual memory of words: The kinesthetic method which employs a great deal of tracing and writing activities; the phonic method which utilizes the sounding of letters and the blending of sounds and is best used as a supplement to other methods; the visual method which teaches words as wholes on the basis of shape and configuration; and the combination method which combines the features of all three methods.

The general consensus among the foregoing authorities seems to be that there is a high correlation between visual deficiencies and retardation in school progress, particularly in the area of reading. Although it cannot be assumed that school retardation is always the result of visual defects, it certainly does appear they are closely related. Perceptual tests have been developed and administered because it is felt that the control the child has over his body is a good indication of academic achievement. The child who has not developed laterality to the point where he can perform bilateral tasks smoothly will have difficulty achieving balanced kinesthetic visual matching. This lack of neurological organization is frequently exhibited in such reading problems as reversals and regressions.

Thus maturation and learning are important to the development of adequate visual perception which, in turn, facilitates reading ability. Now it will be shown that the cultural

environment within which the child reared may also affect his perception of the world. Later, specific studies and empirical evidence will be cited in support of these theoretical observations.

The Role of Culture in Perception

Although perceptual growth and development varies with each individual child, it can also be viewed as an outgrowth of the particular culture within which the child is reared. Sutphin (1964) made just such a point in her discussion of the ramifications of some of the present methods of child rearing in the United States today.

Catterall (Catterall and Weise, 1959) defined perception in its broadest sense as "...a process—never static—in which we integrate current sensory input into the organism in light of past sensory experiences...perception tends to be selective according to one's past experiences and to one's basic emotional needs(p. 213)."

Diack (1960), too, pointed out that a conscious visual perception requires the involvement of past experience and the involvement of other centers as well as the visual. He maintains that the concept of the innate organization of perception, requiring only maturation, which is advocated by Gestalt psychologists is valid only when limited to the fact that the numerous stimuli striking the receptor cells of the retina are organized without effort by the infant into a

pattern so that the two images received from the two eyes correspond to one physical world. What Diack stresses is that language plays a very important role in perception—a role which Diack feels was overlooked by Gestalt theorists.

Thus, perception, in its broadest sense, extends into the field of psycholinguistics. In the process of learning the native language the individual also learns certain behavior patterns and learns to perceive the world according to the ways in which it is verbally labeled. An experiment by Hill (1964), which contrasted the ease with which Ghanian and Californian children learned the two mathematical concepts of ordered sets and identical sets, seems to strengthen the foregoing statement. The results supported the hypothesis of different "natural" concepts which were defined as the concepts preferred at the onset of the experimental situation. The ordered set concept received the most correct responses at the onset of the California experiment while identical sets were more "natural" for Ghanian children. These findings indicate that some educational approaches will be more effective with different cultural groups.

In conjunction with this approach to perception, Vernon (1962) listed and defined several opposing perceptual types. He used the term "perceptual type" to refer to the individual's perceptual modes which cause him to perceive in certain ways in all perceptual situations. Such dichotomous perceptual

types as the synthetic versus analytic, objective versus subjective, active versus passive, and confident versus cautious were thoroughly discussed. These will not be discussed in this paper, but what is important to note is that certain perceptual types might well exist and may be the result of the experiences of the child within his own cultural setting.

Some Characteristics of Poor Readers

Previous studies have supported the assumption that reading retardation is closely correlated with perceptual retardation and have brought to light some of the characteristics often found among disabled readers.

Money's (Money, Alexander, and Walker, 1965) work with male disabled readers ranging in age from eleven to fourteen years emphasizes the importance that directional orientation, mentioned earlier in this paper, has for reading. The disabled readers made significantly more errors in the Road-Map Test, requiring the subject to designate either right or left turn patterns at each of thirty-two choice points, than did boys of normal reading ability. These results indicate that inferiorly developed direction sense often accompanies reading disability.

Developmental impairment of direction sense was offered by Alexander and Money (1967) as a possible explanation for the fact that boys have a higher incidence of reading dis-

ability than do girls by a ratio of at least two to one. They stated that males are a "developmental variant" of females and that they perform better on the Road-Map Test than do girls, indicating a more highly developed direction sense, but one which might more easily become impaired.

The results of these two studies by Money (1965, 1967) seem to be contradictory. In the first study, it was found that disabled readers performed poorly on the Road Map Test. Yet, in his second article he stated that boys did better on this test than did girls even though there is a higher incidence of disabled readers among boys. He attempted to explain this contradiction by suggesting that the direction sense of boys is more complex than it is in girls and that, because of its complexity, it is more likely to suffer developmental impairment which may, in turn, cause difficulty with directional orientation in reading. Perhaps further studies comparing performances on the Road Map Test of both boys and girls with reading difficulties would help to clarify this point.

Catterall (Catterall and Weise, 1959) also considered the problem of the high incidence of reading difficulties among boys. He reported that sixty to eighty percent of all reading disability cases are boys. The following are listed by him as "possible reasons" for reading difficulties among boys:

1. Reading is more of a recreational experience for girls.

2. Reading materials do not adequately challenge the interest of boys.

3. There is a need for more men teachers in the elementary schools.

4. Different rates of maturation noted for boys when contrasted with girls may explain some of the reading difficulties encountered by boys (p. 218).

Another characteristic of disabled readers was brought out in a study conducted by Elkind, Larson, and Van Doorninch (1965). Using an embedded figures test, they found that slower readers scored more poorly when required to locate figures embedded in a background than did a group of average readers. Both groups were then given training which provided practice in finding embedded figures on another form of the test. It was found that the poorer readers took more trials to reach the criterion desired during this training period. A re-test utilizing the same test form that was used in the first testing indicated that, although both groups did show improvement as a result of training, the difference between mean scores obtained by both groups was not decreased. Because both groups were equated on the basis of I. Q., it was inferred that perceptual decentralization, as measured by the ability to find figures hidden in a dominant form, was different from general intelligence as measured by a non-verbal test.

An earlier study by Elkind (Elkind, Koegler, and Go, 1962), which followed a design similar to that mentioned above,

compared the ability of children between the ages of six and eight to reverse figure and ground. As a result of the clues provided during the training period, all three age groups made significant improvement in the ability to reverse figure and ground. Significant differences between age groups, with the older children surpassing the younger ones, were noted on both initial and subsequent tests. An inverse relationship in the number of training clues required and the age of the group was also observed, with the six year olds requiring the most clues. These results indicate that training is helpful in learning to reverse figure and ground, and also that maturation plays an important role.

Lackman performed a study (1960) in which he used a three-group design with subjects of normal intelligence who had either (1) reading retardation, (2) no reading retardation but were referred to the clinic for "psychological reasons," or (3) no reading retardation and no referral to the clinic for "psychological reasons." He found age to be a significant variable, with the younger children producing more distortions in the reproduction and recall of drawings presented on the Bender-Gestalt Test. Distortions were also more frequent among the disabled readers when compared with normal readers. Thus, again empirical evidence indicates that maturation is important to perceptual development and that perceptual retardation is a characteristic of retarded readers.

Coleman (1953) found males with reading disability to show a one year retardation in perceptual development, as measured by the Alpha Test of the Otis Quick-Scoring tests, when compared to a group of average readers. The Alpha Test was selected for the purposes of the study because of its heavy perceptual weighting. Coleman also noted a tendency for perceptual retardation to cumulate as the chronological age of the child increased. A similar relationship between reading disability and perceptual retardation was noted in a later study by Coleman (1959). In that study, the disabled readers received low scores on the P scale of the SRA Primary Mental Abilities Test. This scale includes such measures of perceptual acuity as the ability to discriminate fine details accurately and rapidly. Because of the findings of these two studies, Coleman suggests that retardation in perceptual development is characteristic of reading disability cases and that this retardation may exist before reading difficulties are noticed or it may be the result of the inability to read and make visual discriminations. He further suggests that perceptual development tests be administered in cases of reading difficulties and that perceptual training be employed to help raise reading achievement.

Similarly, Walters (Walters, Van Loan, and Crofts, 1961; Walters and Doan, 1962) found that average and advanced readers surpassed retarded readers in the areas of perceptual

closure, as measured by the Steer-Beatty Closure-Threshold Test, and perceptual differentiation, as measured by the Steer-Allen Figure-Ground Confusion Test. Retarded readers, in addition to experiencing these perceptual difficulties, were described as having trouble with decision-making and the cognitive process of uniting symbols with objects.

In his discussion concerning the normal development of visuomotor skills, De Hirsch (1957) referred to the developmental progression which begins with a scribble at age three and progresses to the correct perception and reproduction of patterns at age eleven. Yet, the visuomotor skills of some children do not develop in this period and they still copy incorrectly at an older age because they have difficulty handling the pencil and trouble with manual control. Use of immature forms such as loops instead of dots, which are characteristic of ages four and five, are also noted in these children. Most children who later develop reading difficulties seem to have trouble patterning words and sentences in speech as well; they tend to reverse both oral and printed symbols.

Children with developmental language lags are often hyperactive. De Hirsch states that, "Their trouble with inhibition and channeling of impulses seems to be but another aspect of their inability to organize stimuli (arising from inside as well as from outside) into behavior configurations (p. 573)."

He contends that, because of their inability to exclude some stimuli, these children cannot focus their attention on a specific task or gestalt. Therefore, they have trouble concentrating and sitting still. De Hirsch suggests that the phonetic approach is usually more satisfactory as the instructional approach to reading for these children because it does not emphasize the undifferentiated configurations which the child sees.

Studies by Lowder (1956) and Kagerer (1960) tend to substantiate the relationship of visuomotor skills to reading ability as suggested by De Hirsch. Lowder found that a significant relationship existed between school achievement and copying performance as measured by the Winter Haven Perceptual Forms Test. The most difficult items, the divided rectangle and the horizontal diamond, were the best discriminators. Although Kagerer found that copying ability of a first grade child did not predict reading ability in the fourth grade, he did find a relationship between fourth grade reading achievement and copying performance in the second and third grades.

When comparing the results on the Weschler Intelligence Scale for Children of good and poor readers, Burks (1955) became aware of another characteristic of disabled readers. He found that the poor readers did best on Picture Arrangement, Block Design, and Comprehension subtests. Even though the first two appear to have perceptual weighting, the authors

proposed that the poor readers did best on these subtests because they had in common a "(1) relative lack of need for long or short term symbolic memories; and conversely, (2) the immediate availability of structured stimulus(p. 491)." The poor readers did poorest on the Information, Arithmetic, and Coding subtests. On the basis of these findings, Burks stated that:

> ...poor readers, as a group, approach learning situations in a more concrete manner as a result of an inability to handle abstractions. Since the reading process inherently consists of abstractions strongly depending on memory functions, these children are handicapped (1955, p. 493).

In another study concerned with the characteristics of disabled readers, Budoff and Quinlan (1964) compared the performance of average and retarded second grade readers on aural and visual paired-associates paradigms. They found that retarded readers were more rapid aural learners than were the average readers while the latter were slightly better visual readers. These findings would seem to support De Hirsch's recommendation of a phonetic approach in reading programs for disabled readers.

The above-mentioned studies have brought to the foreground many of the common characteristics of the disabled reader. Considerable support has been demonstrated for the assumption that these children do not possess well-developed perceptual and visuomotor skills. Some support has also been given to the hypothesis that poor readers have difficulty

in the reading process because of an inability to handle abstractions (Burks, 1955; Walters, Van Loan, and Crofts, 1961; Walters and Doan, 1962). The suggestion that these children are more rapid aural learners than visual learners is closely correlated with these perceptual difficulties.

The Possibilities of Perceptual Training as a Corrective Measure for Reading Difficulties

A large number of the studies cited (Budoff and Quinlan, 1964; Catterall and Weise, 1959; Coleman, 1953, 1959; De Hirsch, 1957; Elkind, Koegler, and Go, 1962; Harris, 1957; Kagerer, 1960; Piaget, 1959; and Sutphin, 1964) suggest not only that reading disability is closely related to perceptual retardation but that many cases of reading disability can be corrected or prevented by means of perceptual training.

It is upon these assumptions that the program by Getman and Kane (1964) and other perceptual training programs are founded. In congruence with this, Getman and Kane list the following as the premises of their program:

1. Academic performance in today's schools depends heavily upon form and symbol recognition and interpretation.
2. There are perceptual skills which can be developed and trained.
3. The development of perceptual skills is related to the levels of coordinations of the body system, i.e. the better the coordinations of the body parts and body systems, the better the prospects are for developing perception of forms and symbols.

> 4. The child whose perceptual skills have been developed and extended is the child who is free to profit from instruction and to learn independently. The greater the development of perceptual skills, the greater the capacity for making learning more effective (p. III).

The philosophy of the perceptual training program is that in order to gain the readiness necessary for reading, the child must first acquire physiological organization through manipulative experiences with the environment. Success with concrete perceptual tasks is necessary before the child can adequately cope with the abstract concepts presented in the classroom.

One study concerned with the effectiveness of perceptual training with regard to reading improvement was conducted by Programs to Accelerate School Success (P.A.S.S.,Inc., 1962). Four groups of first grade children were given a reading comprehension test before and after a perceptual training program. When post-test scores were compared with scores predicted on the basis of pre-test results and the gains expected during the fifteen week period, it was found that the experimental group, which had received thirty minutes a day of perceptual development procedures recommended by Getman and Kane (1964), surpassed the others in reading comprehension gains. Developmental procedures employed included practice in general coordination, balance, eye-hand coordination, eye movements, form recognition, and visual memory. Further experimentation with the program was

recommended.

In another study conducted by Justice and Sands (1964) thirteen male students in a special education class for social adjustment were given two twenty-minute training periods daily for one school semester. These children, ranging in age from eight to eleven years with I. Q.'s ranging from 85 to 110, were classified as "underachievers." The control group was selected from the lower third of the regular third and fourth grade classrooms. The experimental group made greater gains in visuomotor sequencing, as measured by the Illinois Test of Psycholinguistic Ability, than did the control group. According to results on the California Achievement Test, the experimental group made greater gains in reading and language, but less in arithmetic than did the controls. The Wechsler Intelligence Scale for Children revealed no gains for either group other than what was attributed to the practice effect. The experimental group also made greater gains on the Bender-Gestalt Test. Although the gains were small, the experimentors felt the program was helpful for the Ss in the experimental group. It was suggested that benefits of the training would become more apparent as the duration of the program increased.

Maslow, Frostig, Lefever, and Whittlesey (1963) cited a pilot training study as an exemplification of the benefits which can result from perceptual training. Kindergarten

children were ranked and paired according to scores on the Frostig Developmental Test of Visual Perception. One half of the Ss were given eighteen sessions of eighty-five minutes each of perceptual training as recommended by Frostig and Horne (1964). On retesting it was found that, although both groups gained, the experimental group's gains were significantly greater than those of the control group.

Somewhat different results were obtained by Popp (1967) when she conducted a similar study. In this latter study twenty-five kindergarten children received visual perception training according to the Frostig Program for the Development of Visual Perception. The twenty-five Ss in the control group did not receive this training. Comparisons of preliminary and final results on the Metropolitan Readiness Test, The Frostig Developmental Test of Visual Perception, and the Goodenough Draw-A-Person Test indicated that the experimental group made significant improvement in visual perception skills following the training program but did not reach a significantly higher readiness level. Popp concluded that while perceptual training may improve perceptual skills it does not necessarily improve other readiness skills.

A longitudinal study underway by Simpson under the guidance of Kephardt (Catterall and Weise, 1959), involves half of a kindergarten class as an experimental group receiving developmental, perceptual-motor training and half

as a control group. Second year preliminary results, as measured by test-retest changes on standardized reading tests, indicated that the experimental group was advancing more rapidly than the control group.

These studies involving perceptual training programs indicate that such training has met with varying degrees of success. More research needs to be done in order to determine just how effective perceptual training programs are for the correction of reading disability.

Another problem related to perceptual training is determining the length of daily training necessary for beneficial effects to be incurred. In other words, are brief periods of perceptual training administered by the classroom teacher effective in improving perceptual and reading skills? This is particularly important because it is often difficult for the school to schedule, in its already full program, large time segments daily for all of the children displaying signs of perceptual retardation. This task is even further complicated by the need to provide training exercises to small groups of from five to ten pupils. Yet all of the above-mentioned studies have involved extensive daily training periods which would be difficult to incorporate as a part of the school program on a yearly basis. One of the purposes of this study will be to determine if brief training periods can be equally effective.

The Indian Child in School

Educational Problems of Indian Children. Indian children are often underachievers and seem to have their greatest difficulty in the areas of reading and language. An extensive study conducted by Coombs, Kron, Collister, and Anderson (1958) involved a comparison between white children and Indian children in several academic areas. When compared with non-Indian children, the Indian children seemed to have more difficulty in the area of reading vocabulary than in any of the other areas tested. Reading comprehension was another area of weakness for the Indian children but was not as low as the former. Coombs and associates felt that the difference in achievement between reading vocabulary and reading comprehension might be explained by the fact that it is sometimes possible to derive partial understanding of a passage even if several of the words are unknown to the reader. It was also found that the less Indian genetic background and the more pre-school English spoken, the higher the group achieved educationally. These factors by themselves were not believed to be the determinants of academic success except as an indication of the degree of acculturation of the group. Thus, a lesser Indian genetic background and a greater amount of English spoken in the home seemed to be characteristic of a cultural environment which more closely resembled that of the non-Indian children.

These latter findings confirmed those of an earlier study (Anderson, Collister, and Ladd, 1953) which also found a difference between "mixedbloods" and "fullbloods" with regard to educational achievement. This difference was attributed to the difference in environments and resultant cultural experiences. Of the five types of Indian educational systems compared in the study—public schools, day schools, mission schools, non-reservation boarding schools, and reservation boarding schools—the Indians attending public schools showed the best overall performance on the tests administered. A larger percentage of the Indian children attending public schools spoke English as their pre-school language than was found in any of the other situations investigated. Findings suggested "...that as the cultural and educational backgrounds of Indian children become more like those of white children in the public schools, the more closely will the educational achievement of Indian children match that of white children."

An article entitled "Fifteen Years of Indian Education" (U.S. Dept. of Interior, 1951) pointed out that since 1928, it has been the preferred policy to place Indian children in public schools near their homes rather than placing them in boarding or Indian Day schools, Therefore, increasing numbers of Indian children attend public schools today. The U. S. Dept. of Interior (1966b) reported the number of Indian children attending public schools in 1964 to be 79,286 as

opposed to 246 in 1900. This is an increase of approximately 32,130 percent. This increase may be compared with the overall increase in enrollment in our public schools between 1900 and 1960 which was approximately 27,000,000 as the number of children attending public schools jumped from approximately 15,500,000 to 42,500,000, an increase of approximately 175 percent (Butts, 1964). Another article published by the U.S. Dept. of Interior (1965) stated that of the approximately 147,000 Indian children of school age, two-thirds, or 98,000, attend public schools.

Yet, in spite of the fact that Indian children attending public schools tend to do better than those in other systems, these children still encounter problems, particularly in the area of reading. Because reading difficulties are more likely to occur when there is a disturbance in perception no matter what approach to reading is employed, evidence seems to support the hypothesis that perceptual difficulty might be one of the primary factors related to this reading retardation.

Cultural Influences Which May Inhibit Success in School.

As was mentioned earlier, perception is partly dependent upon cultural background. Thus, it can be assumed that some cultural practices are more conducive to good perceptual development and adequate educational adjustment.

Values of various Indian cultures differ markedly from

those of our own culture. Pratt (1957) points out, for example, that many Indian cultures are not competitive as we are. In those cultures no one takes credit for personal achievement; instead, everything is considered a group endeavor. Thus, Indian children from this type of background are somewhat out-of-place in our highly competitive school system.

Schools play an important role in helping Indian children make the transition from their culture to our own. Yet the Indian culture must be respected and understood. It should not be lost in the transition. If the school carelessly replaces one element with another, disintegration and rootlessness for the child may be the result. Pratt states that the cultural change must be slow if it is to be effective; teachers must understand and appreciate this fact.

Along with the difficulties arising from a differing cultural background, Indian children often come from a bilingual home which further complicates the school situation. Ladd (1933) compared the reading age of three English and foreign speaking groups—those only speaking and hearing English, those hearing a foreign language in the home, and those speaking and hearing a foreign language at home. It was found that reading age declined as the groups became more foreign in their home environment. Indian children from a bilingual home have even more difficulty with language skill

because most Indian languages bear very little syntactic resemblance to English (Whorf, 1940). The Hopi language is a good example of this; different words are used to show different degrees of certainty or expectation instead of past, present, and future tenses. The Hopi language is a "timeless language"; it replaces our Western categories of time, velocity, and matter with experiential categories.

McPherson (1955, 1956) discussed the problems of the bilingual child in general by emphasizing the need for an understanding of English before beginning the formal reading program:

> One of the chief pitfalls for the bilingual child is that of being rushed into reading before he has acquired enough English to understand what he is expected to read. Because he can memorize easily he often gives the impression he is reading (which is getting "meaning" from the printed word) when he is only word-calling. If this procedure is allowed to continue, the child bogs down in a year or so and is considered stupid when, in reality, it is only a matter of not knowing enough English, learned through experience, before starting to read(p. 4).

According to Robert P. Meuhe, Education Specialist of the Yakima Indian Agency and Mr. Joe Williams, Branch of Indian Education, Portland, Oregon Area (1968), the Yakima reservation does not represent a true bilingual situation because the Indian language is used primarily by the older people. However, regardless of the amount of Indian spoken, the quality of the English spoken in the home is poor. Also, they maintain, the lack of nursery rhymes and reading

material in the homes causes the children to be unprepared to meet the demands of school, particularly in the areas of reading and language. The type of activities and games conducted in the home stresses rough and violent activities, and relatively few, if any, thinking games are practiced. According to Meuhe, this places Indian children at a disadvantage in the classroom because they often have not developed the self-control necessary to meet teacher expectations in that setting.

Federal Aid Programs Designed to Aid Indian Children.

Approximately fifty percent of the Yakima Indian children participate in Operation Head Start (Meuhe, 1968; Williams, 1968). This program was initiated under the Economic Opportunity Act of 1964 in order to help pre-schoolers bridge the gap between reservation life and the public school classroom. Funds for Operation Head Start are available for needy public schools serving Indian children under the authorization of the Johnson-O'Malley Act. This program has received favorable acceptance in the Northwest states of Washington, Oregon, and Idaho, where there are about 6,800 Indian children of school age (U.S. Dept. of Interior, 1966a). On the national scale, the U.S. Dept of Interior (1967) reported that Operation Head Start enrolled 10,000 Indian children on reservations with a total of $5,033,000 appropriated for that purpose during the 1966 fiscal year. In that same year, $8,654,000

was appropriated under the Johnson-O'Malley Act to assist fourteen states and four separate school districts with large Indian populations.

According to Joseph Batali (1968), Coordinator of Federal Funds for the Mount Adams School District, the White Swan Grade School, with approximately sixty to sixty-five percent of its entire school population of 440 consisting of Indian children, received the following federal assistance in the 1967 fiscal year:

Johnson-O'Malley Act	$ 9,000.00
Operation Head Start	6,000.00
Public Law 874, In Lieu of Taxes	33,000.00
Elementary-Secondary Education Act	45,000.00
Total	$93,000.00

Public Law 874 provides funds in proportion to the amount of Indian land in the district. This Indian land is not taxable thus it lowers the tax revenue available to the district. Public Law 874 was created to help compensate for this loss of revenue. The Elementary-Secondary Education Act of 1965 provides funds for the underprivileged children in the district. With approximately eighteen percent of the school population classified as underprivileged, the Mount Adams School District received $61,000 in 1967. Because approximately three-fourths of the children classified as underprivileged are Indian, $45,000 of this total represents the

amount granted due to the Indian enrollment.

It was emphasized by Mr. Meuhe and Mr. Williams (1968) that, although this kind of financial assistance is helpful to the schools, it does not correct all of the disadvantages created by unfavorable environmental conditions. As mentioned earlier, there is a seventy percent drop-out rate for Yakima Indian children during the first twelve years of school. Of the few who finish high school almost all receive some form of additional vocational training or attend college. The percentage of those taking post-high school training is high, close to ninety percent, because of the wide breadth of programs available to them and the relative ease of obtaining grants. At present three hundred students from the three Northwest states are attending college on tribal scholarships or grants and more may be attending on their own.

Effective Methods of Correcting the Problem of Low Achievement in School Among Indians. From the foregoing, the chief problem for educators seems to be that of finding the cause of and reducing the rate of drop-outs. A five year survey (Yakima Indian Agency, 1967) revealed that, "There is a widespread cultural, physical, and emotional deprivation among Indian children on the reservation (p. 2)." This deprivation results in the lack of readiness apparent in many of the Indian children entering the first grade. For example, eighteen of the forty-two first grade Indian children enrolled at

one of the schools on the reservation were not ready for first grade work according to readiness tests and teacher evaluation. Considering this poor start, it is not too difficult to see why the school days of the Indian child are often characterized by low achievement, poor attitudes, and high absenteeism.

In order to create a more successful school climate and to reduce the drop-out rate, an ungraded system with emphasis upon programed learning has been suggested. This concept was tested at a six week education camp in the summer of 1966 (Yakima Indian Agency, 1966). The forty pupils ranging in age from eleven to sixteen years and from the sixth to tenth grades were selected for participation because they were operating at a level at least two years behind their expected grade placement. After six weeks of study these students showed an average of eight months growth in academic achievement as revealed by a comparison of pre- and post-camp test scores on the California Achievement Test.

Because of the success encountered by the 1966 program, two camp sessions were held the following summer (Yakima Indian Agency, 1967). Forty-two girls and boys from the seventh to eleventh grades attended the first four week session and fifty-eight boys and girls from the fourth to sixth grades attended the second session. Comparisons between pre-camp and post-camp California Achievement Test scores showed gains of up to 3.4 years with forty-two of the one

hundred students showing gains of more than one full academic year. The average growth of each individual as obtained from the total battery results of the test was one academic year. No losses or regressions were noted on the total battery results. The study does not mention whether any of the Ss had also participated in the program of the previous year.

The above-described programs appear to have been extremely effective. However, it must be remembered that conditions of learning were ideal. Interested subjects were carefully screened and were selected only if teachers and administrative personnel felt they would benefit from the program. Teachers and aides, too, were carefully chosen. The educational staff was selected so that there was one teacher and one teacher's aide for every eight to ten pupils. Several recreational leaders were also on the staff. These conditions, although very conducive to learning, are not feasible for the public schools as they exist today. Another, more feasible plan must be developed to help these low achievers within the conventional school system.

If perceptual training is helpful in correcting reading difficulties, as much of the foregoing evidence suggests, perhaps a perceptual training program incorporated into the school schedule would enable both Indian and non-Indian children to improve their reading ability. This would, in turn, enhance their achievement in many of the other school subjects.

Hypotheses

The present study will compare the differences in perceptual development found between (1) normal readers and disabled readers and (2) Indian children of a reservation cultural background and non-Indian children. Its purpose will be to determine if perceptual differences do exist between normal readers and disabled readers and between Indian children and non-Indian children. Secondly, it will attempt to determine the effect of perceptual training upon both perceptual development and reading achievement.

The hypotheses to be tested are stated in null form because not enough research has yet been conducted in the field of perceptual development and perceptual training of different cultural groups to enable their statement in directional form. These hypotheses are:

1. There is no significant difference between the perceptual development of normal readers and disabled readers.
2. There is no significant difference between the perceptual development of Indian and non-Indian children.
3. Perceptual training does not improve perceptual skills significantly.
4. Perceptual training does not improve reading skills significantly.
5. With regard to the improvement of perceptual skills of

children with Indian and non-Indian cultural backgrounds, perceptual training is not more beneficial for any one group.

6. With regard to the improvement of reading ability of children with Indian and non-Indian cultural backgrounds, perceptual training is not more beneficial for any one group.

CHAPTER II

METHOD

Subjects

Subjects (Ss) in the study consisted of fifty-three children in the second, third, and fourth grades at White Swan Grade School. Thirty-five of the Ss had been selected to participate in the newly initiated remedial reading program. These children were recommended for participation in the program by their respective teachers in the spring of 1967. The teachers were asked to list the children in their classroom whom they felt could best benefit by remedial reading instruction. It was suggested that both reading and composite scores on the Iowa Achievement Tests be consulted when available. The performance level of the child in the area of reading as compared with his achievement level in other areas received prominent consideration. Other bases for recommendation consisted of results on the Scott Foresman Basic Reading Test accompanying the reading series as well as the subjective evaluation of the individual teachers. The children referred were further screened by the remedial reading teacher (Rt) and the school counselor using the Spache Diagnostic Reading Scales, an individual reading test. On the basis of this test, sixty-two percent of the children

referred were placed in the remedial reading program.

The children selected to take part in the program were then divided into six sub-groups meeting during different class periods. Three of the sub-groups were arbitrarily assigned to group RN (Remedial Reading, No Perceptual Training) and three to group RP (Remedial Reading, Perceptual Training). Assignment to the groups was determined by the grade level of the children in the sub-groups, the number of Indian and non-Indian children, the scheduled reading time, the mean age, and the total number of Ss so that the groups were matched as evenly as possible with regard to these factors. For a break-down of the distribution of these factors in each group, see Table 1.

The RP group consisted of a total of seventeen Ss, ten of whom were Indian and seven non-Indian; the RN group consisted of eighteen Ss, thirteen of whom were Indian and five non-Indian. The mean age of both groups was eight years, eight months. Six of the RP Ss were in the second grade, six in the third, and five in the fourth. Of the RN Ss, eleven were in the second grade, four in the third, and three in the fourth. In the RP group there were six males and eleven females. There were thirteen males to five females in the RN group. Two of the RN sections met during the morning and the third met during the afternoon. One of the RP sections met in the morning while the other two sections were scheduled

Table 1

COMPOSITION OF THE GROUPS

Characteristic	Group Classification RP	RN	C
Mean age	8-8	8-8	8-6
Second grade	6	11	8
Third grade	6	4	5
Fourth grade	5	3	5
Indian	10	13	11
Non-Indian	7	5	7
Male	6	13	10
Female	11	5	8
Total Ss	17	18	18
Session Number	I, V, VI	II, III, IV	
Mean I. Q.	89	88	
I. Q. Range	70 to 107	58 to 106	

during the afternoon.

The initial number of Ss of the sub-groups was held relatively constant with seven, five, and six Ss in the RP sub-groups and six, five, and eight Ss in the RN sub-groups. These numbers include two Ss who began the program but moved from the area before the final testing in January. Although more children were added to the remedial reading groups after the preliminary testing, they were not included as Ss in the study. These additional pupils, although increasing the size of the groups were distributed so that no sections became disproportionately large. At the end of the experiment the RP sub-groups consisted of eight, nine, and nine members while the RN sub-groups consisted of nine, seven, and nine members.

Once the number and distribution of the remedial groups (RN and RP) were determined, the number of pupils needed from each grade level along with their distribution with regard to sex and cultural background was decided upon so that a control group of "normal" readers could be selected which matched as nearly as possible with the experimental groups. Pupils fulfilling these requirements were randomly selected from the school files. Once a S fulfilling the grade level, sex, and cultural requirements had been drawn from the files, his records were consulted to ascertain that he fell within the category of a "normal" reader. The basis for placement

in the "normal" reader classification had been arbitrarily set within the range of the fortieth to eighty-fifth percentile on the last Scott Foresman standardized test administered during the 1966-1967 year. This range of percentile scores was selected because it encompassed the upper portion of the "low average" rank, and the "average," "high average," and "high" ranks as set up by the test standardization. Children falling in the "very low," "low," the bottom of the "low average," and the "very high" ranks were rejected as possible Ss because it was felt that their reading achievement was either too poor or too high to be considered "normal" readers. Using this procedure eighteen Ss were placed in group C (Control). Eleven of these Ss were Indian and seven were non-Indian. The group consisted of eight second grade children, five third grade, and five fourth grade children. Eight years, six months was the mean age of these Ss. In this group the ratio of male to female was ten to eight respectively.

Although the figures given are for the fifty-three Ss who completed the study, there were originally fifty-six. Three children, one from each of the groups, moved from the area before the culmination of the study at the end of the first semester of school.

Design

The three-group design allowed two levels of control:

The group C served as a control to assist in the determination of the effectiveness of the remedial reading program while group RN served as a second-level control to determine the effectiveness of the perceptual training given group RP. In the first instance, participation in the remedial reading program was the independent variable. Gains in perceptual development, as measured by the Frostig Developmental Test of Visual Perception and the Winter Haven Perceptual Forms Test, and gains in reading achievement, as measured by the Gates Primary and Advanced Primary Reading Tests, were the dependent variables. In the second aspect of the study, participation in the perceptual procedures and activities outlined in Getman and Kane's The Physiology of Readiness (1964) was the independent variable with the dependent variables remaining the same as described above.

Apparatus

The remedial reading instruction took place in a sunny, well-lighted room. Children's original stories and poems could be seen on every bulletin board and wall. It was well equipped with a listening station and nine earphones, a phonograph, a tape recorder and a collection of teacher-made tapes, an overhead projector and screen, four filmstrip viewers, a quantity of filmstrips which were available for the use of the pupils, and a moderate-sized library. The Rt had made a large number of transparencies to be used on the overhead

projector. These dealt with beginning sounds, vowel sounds, digraphs, diphthongs, and other phonetic skills. These transparencies were in frequent use, contributing to a phonetic approach to reading. The methodology of the Rt was highly correlated with suggestions and procedures outlined in the teacher's manual, Language Experiences in Reading (Van Allen and Allen, 1967).

Other materials used included the Scott Foresman Talking Books, level 1; a Peabody Language Kit (with puppets), level 2; sets of Dolch words for the primer, first, second, and third grade levels and cards with Dolch phrases; D. C. Heath and Company's Reading Caravan Series including Peppermint Fences, Sky Blue, Star Bright, Meadow Green, Peacock Lane, Silver Web, and Treasure Gold; and a supply of flash cards made by the Rt containing words causing difficulty.

A Science Research Associates (SRA) laboratory, level 1B, was available in the room for those pupils who were able to read the materials. Extensive use was also made of the school library which was easily accessible because of its location across the hall from the remedial reading room.

Getman and Kane's Physiology of Readiness program including manual, walking beam, templates and slides, had been purchased by the school. One portion of the room was kept free of furniture so that Ss could perform the suggested exercises. The room chalkboard was used for the eye-hand

coordination exercises. As a tachistoscope was not readily available, the overhead projector was used in its place. A slide with a figure to be reproduced or completed was placed upon a piece of paper from which a square hole had been cut corresponding to the size of the slide. Another paper was placed upon the slide and was removed for the time interval specified by Getman so that the slide would be projected upon the screen for this brief interval only. Although this procedure allowed only the brief viewing of the slides, it did not provide the accurateness of timing that would have been provided by a tachistoscope.

Procedure

Preliminary perceptual tests were administered on September 21, 1967, immediately after the remedial reading candidates had been screened and assigned to the program. These perceptual tests included the previously mentioned Frostig Developmental Test of Visual Perception and the Winter Haven Perceptual Forms Test, both of which were administered to all Ss. On September 26, make-up tests were administered to those Ss not present for the original testing session.

Due to a delay in the arrival of the Gates Reading Tests, these were not administered until October 13, 1967. The second grade Ss were given the Gates Primary Reading Test, Form I, while the third and fourth grade Ss were given the Gates Advanced Primary Reading Test, Form I.

The perceptual tests were administered in four sessions with approximately fifteen pupils at each session. The Gates Reading Test was administered in two sessions with approximately twenty-seven pupils at each session. However, for the final testing both perceptual and reading tests were administered in four sessions with approximately fifteen pupils per session. During all of the testing sessions both the Experimentor (E) and the Rt were present in the room. The remedial reading classroom was used for all testing sessions with the exception of the preliminary Gates testing which took place in the school cafeteria.

Remedial reading instruction and perceptual training began on September 25, 1967. Remedial reading instruction encompassed a wide variety of activities with strong emphasis upon phonetic skills. Transparencies which were frequently shown on the overhead projector dealt primarily with beginning sounds, vowel sounds, digraphs, diphthongs, and other phonetic skills. More practice pronouncing and hearing sounds was provided using both the tape recorder and individual echo phones. These echo phones were created out of half gallon milk cartons from which three-quarters of one side had been removed by a lateral cut. Ss could pronounce a sound into the base of the carton and hear their sound with a minimum of outside interference.

Along with its use in the presentation of transparencies

Figure 1

REMEDIAL READING INSTRUCTION

Listening Station Activities

Phonics Lesson on Overhead Projector

dealing with phonic skills, the overhead projector was also used to present phrases and short lines of print for the purpose of developing phrase reading skills. Flash cards, too, were used to assist in the development of phrase reading. Many of the ideas incorporated into the reading program originated in Language Experiences in Reading (1967).

Frequent use was made of the listening station. The Scott Foresman talking books could be played upon the phonograph while the Ss followed the story in the corresponding books. A collection of teacher-made tapes had been developed to be used upon the tape recorder at the station. These tapes consisted of stories, poetry, choral readings, and practice in phrase reading and phonic skills.

Phrase reading, as well as receiving emphasis and practice on the overhead projector and tape recorder, was also encouraged through the use of Dolch phrase cards. Dolch word cards for primer, first, second, and third grade levels were also used as a means of teaching discrimination between some of the more difficult words.

Occasionally the Peabody Language kit, level two, was used. The puppets, which were included in the kit, were used, particularly at the beginning of the year, to encourage self-expression by allowing the Ss to express themselves through this medium. The Ss also participated in other forms of creative dramatic activities such as acting out classroom

situations.

D. C. Heath and Company's Caravan Series was used for most of the group reading experiences. Books on seven levels were available. The particular book used varied among the different groups depending upon their reading level.

Approximately fifty percent of the time spent by the Rt was in working with the entire group of seven to nine children. The other fifty percent was spent by the Rt working with one or two individuals at a time. The schedule varied from day to day with some days devoted entirely to group work, some entirely to individual activities, and, on many days, to a combination of the two. However, a particular lesson plan was held relatively constant for all groups during the day.

Creative writing and an enjoyment of reading were encouraged. The walls and bulletin boards were display areas for original stories written either during class time following the discussion of a topic or at home by individuals. Short poems written on the children's reading level were also displayed and frequently changed. These were usually read in unison by the group, then discussed.

The room was kept open during noon hour and before and after school. The children were free to browse through the library, view the filmstrips, read the stories of other children, or work on areas which were giving them difficulty. On numerous occasions while E was in the room during these

free times, several students were usually observed quietly browsing. Frequently the Rt would provide individual help for those children who sought it during the lunch hour.

The same teacher worked with all of the remedial reading groups. The same general skills were presented and developed with all groups. Despite an attempt to maintain a similarity of instruction, however, alterations were made to adjust to the various grade and reading levels and to the predominant needs of each particular group.

According to the estimate of the Rt, approximately eight to ten minutes a day four days a week, or approximately forty minutes a week, were spent by the RP group practicing Getman and Kane's perceptual training procedures. Thus, these Ss spent approximately two-thirds of their scheduled session working on reading skills and the other one-third working on perceptual skills. Periodic observations by the E tended to substantiate these approximations.

The perceptual training exercises were taken from Getman and Kane's The Physiology of Readiness (1964). The training program was divided into six general groups of activities in conformance to the six sections outlined in the manual. Approximately three weeks were spent on activities intended to develop each of six perceptual skills. However, more time was spent on areas of greater difficulty, as judged by the Rt, and less time spent when most of the Ss appeared to have

sufficiently mastered the exercises. Mastery of a series of exercises was determined by the Rt to have been achieved when the Ss could readily perform the exercises smoothly with a minimal amount of assistance or directives.

The first series of exercises provided practice in general coordination. It was designed to help Ss develop coordination of body parts by means of head and bilateral arm and leg movements, rolls, sit-ups, and hopping activities. Next, exercises intended to develop interrelationships of the sides of the body were performed. These exercises stressed practice in balance and concentrated primarily on walking beam activities. During the third series of training procedures eye-hand coordination was practiced in order to train the hands of the Ss to work as a team and to coordinate visual-tactual systems. Activities included two-hand chalkboard routines such as drawing bilateral circles, bilateral vertical and horizontal lines, and following dots. The next series of exercises provided practice in eye movements so that ocular fixation, ocular span, and ocular sweep might be further developed. These exercises included eye jumps between spread thumbs, both near and far, and several eye pursuit movements. Practice in form recognition was provided by having the Ss trace various-shaped templates, including circles, squares, triangles, rectangles, and diamonds at the chalkboard and at their seats. These exercises were intended

Figure 2

PERCEPTUAL TRAINING ACTIVITIES

Practice in General Coordination with Emphasis on Laterality

Practice in the Coordination of Visual-tactual Systems

to help the Ss learn to perceive forms, control hand movements, and discriminate figure-ground relationships. The last series of exercises which provided practice in visual memory was intended to enhance recall and re-visualization skills. For these training procedures the overhead projector, adapted as previously described to provide the brief viewing intervals enabled by a tachistoscope, was used to help the Ss learn to recognize and reproduce forms from memory or to locate a dark dot on the proper segment of a form. For these exercises each S was given a dittoed sheet; these were numbered and contained the incomplete forms when completion exercises were practiced. Unfortunately, the groups had just started on this last series of training exercises at the close of the experiment.

Final testing was conducted on January 24 and 25, 1968, immediately after the end of the first semester of school and seventeen school weeks after the program's inception. Make-up tests were administered the following week for the five Ss who were not present during the regular testing session.

In addition to the preliminary and final testings with the Frostig Developmental Test of Visual Perception, the Winter Haven Perceptual Forms Test, and the Gates Reading Tests, all of the remedial reading Ss were given the Peabody Picture Vocabulary Test during the first semester of school.

This vocabulary test, which yields an intelligence quotient and gives an indication of language development, was administered individually by the school counselor.

One week after the final testing, Ss in the remedial reading program were given a five point rating scale (Appendix E) to allow them to evaluate the class, the Rt, and their opinion of their learning. Ss in the RP group were also asked to rate the perceptual training exercises.

The results of the tests were then statistically analyzed in an attempt to reject the following null hypotheses:

1. On the basis of initial test results on the Frostig and Winter Haven, there will be no significant differences between the perceptual development of normal readers and disabled readers.
2. On the basis of initial test results on the Frostig and Winter Haven, there will be no significant difference between the perceptual development of Indian and non-Indian children.
3. There will be no significant difference in gains in perceptual development, as measured by the Frostig and Winter Haven, between the group of disabled readers receiving perceptual training and those not receiving it.
4. There will be no significant differences in gains in perceptual development, as measured by the Frostig and Winter Haven, between the Indian and non-Indian children.

5. There will be no significant difference in gains in reading achievement, as measured by the Gates Reading Tests, between the group of disabled readers receiving perceptual training and those not receiving it.

6. There will be no significant difference in gains in reading achievement, as measured by the Gates Reading Tests, between the Indian and non-Indian children in the remedial reading program.

CHAPTER III

RESULTS

Statistical Treatment of Data

Because of the inequality of the number of Ss in the cells and because it was questionable whether the scores obtained using each of the three testing instruments were of an interval nature, non-parametric statistics were used in the evaluation of the results. The Mann-Whitney U test was used to evaluate the effects of differences in cultural background and the Kruskal-Wallis one-way analysis of variance was used to determine differences between the three reading groups. When significant differences were obtained on the Kruskal-Wallis, the data were further analyzed using the Mann-Whitney U to determine where these differences lay. Both tests are on the ordinal level of measurement. A significance level of .10 was selected because statement of the operational hypotheses in null form required that two-tailed tests be used.

Reading Ability of the Groups

The rank order of reading quotients obtained on the initial testing for each of the three reading groups indicated that the Ss in the control group, who were defined as "normal" readers, did significantly better ($p<.05$) on the Gates Reading

Test than did the two remedial reading groups. The median for group C was 105.0 while for groups RP and RN it was 93.0 and 89.5 respectively. There was no significant difference between the two remedial reading groups. Similar comparisons between reading groups within each cultural group also indicated that there were no significant differences between the two remedial reading groups but that the control group was significantly superior to these in reading ability as measured by the Gates (Table 2 and Figure 3).

Table 2

BETWEEN GROUP DIFFERENCES ON THE GATES READING TEST

	Median Score of Group		
	RP	RN	C
Indian	92.5	89.0	108.0
Non-Indian	94.0	93.0	106.0
Over-all	93.0	89.5	105.0

Underscoring of median scores on the tables signifies that the scores do not vary significantly from one another but that these scores are significantly different from other median scores not included in the continuous underscoring. Double underscoring indicates p=.01; single underscoring indicated p=.05; while a dashed underscoring indicated p=.10.

Hypothesis 1: On the basis of initial test results on the

Frostig and Winter Haven, there will be no significant differences between the perceptual development of normal readers and disabled readers.

The results on the two perceptual tests, the Frostig and the Winter Haven, were compared to determine if there was a significant difference between the perceptual development of normal readers and disabled readers. Both perceptual measures revealed no significant difference between the two remedial reading groups but did indicate that the control group did significantly better on both tests than did either of the remedial reading groups ($p<.05$). Thus the null hypothesis was rejected because "normal" readers were found to do significantly better on the perceptual tests than did the disabled readers (Table 3 and Figure 3).

Table 3

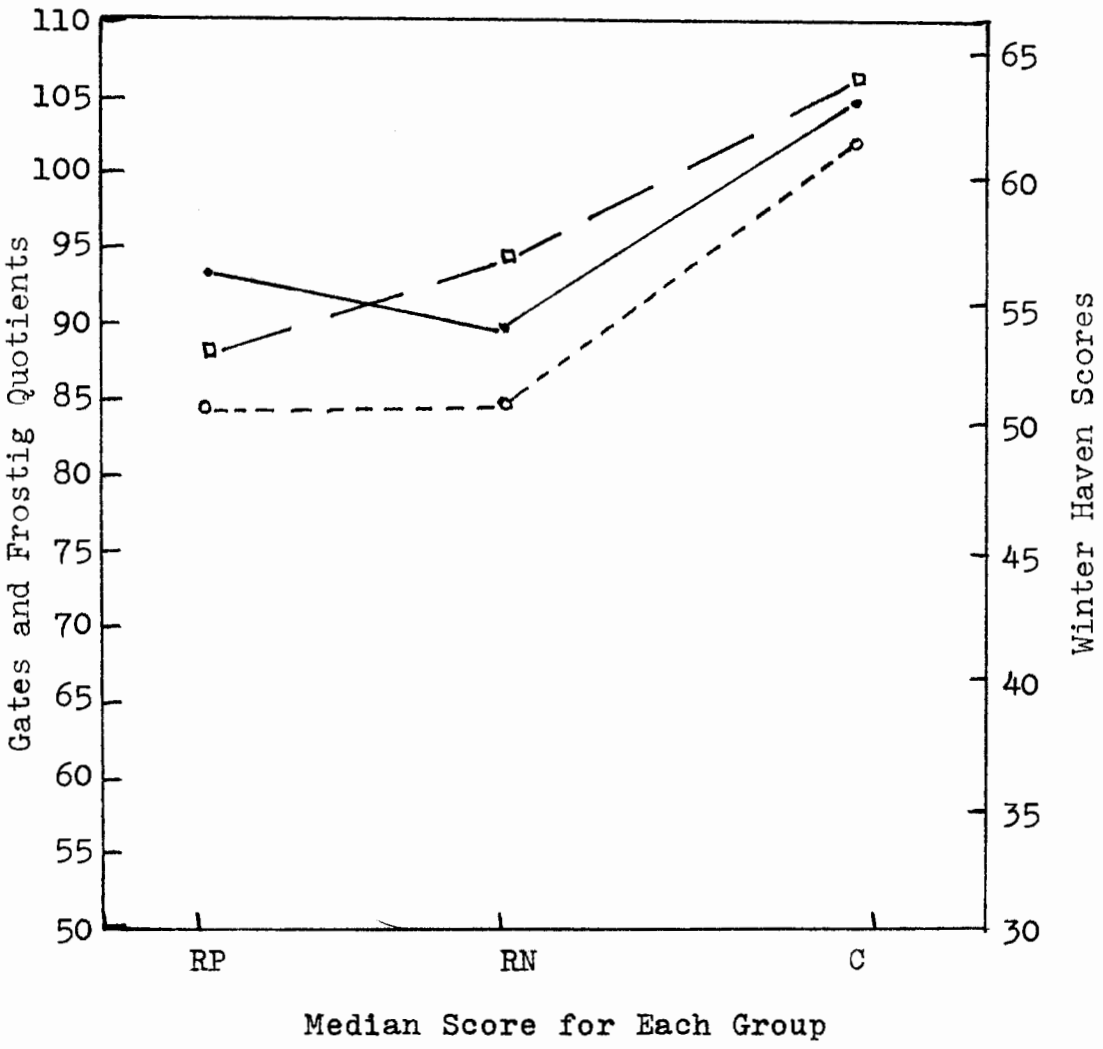
BETWEEN GROUP DIFFERENCES ON PERCEPTUAL TESTS

	Median Score of Group		
	RP	RN	C
Frostig	85.0	85.5	102.0
Winter Haven	53.0	57.0	63.5
n	17	18	18

When comparisons were made between reading groups within each cultural group, the differences were less distinctly defined. The Ss of Indian (I) background in all of the three reading classification groups varied significantly from each

Figure 3

BETWEEN GROUP DIFFERENCES ON READING AND PERCEPTUAL TESTS WITHOUT REGARD FOR CULTURAL DIFFERENCES



other ($p<.05$). On this same test on the non-Indian (N) level, while there was no significant difference between groups RP and C, group RN did much more poorly ($p<.01$). Results on the Winter Haven indicated that there were no significant differences between groups RP and RN on either cultural plane. Neither were there significant differences between groups RN and C. However, there was a significant difference between groups RP and C at the .05 level within both cultural groups (Table 4).

Table 4

BETWEEN GROUP DIFFERENCES ON PERCEPTUAL TESTS:

COMPARISONS WITHIN CULTURAL GROUPS

		Median Scores of Groups		
		RP	RN	C
Winter Haven	Indian	52.0	56.0	63.0
	Non-Indian	53.0	60.0	66.0
n	Indian	10	13	11
	Non-Indian	7	5	7
Frostig	Indian	77.5	86.0	104.0
		RN	RP	C
	Non-Indian	75.0	93.0	97.0

Hypothesis 2: On the basis of initial test results on the Frostig and Winter Haven, there will be no significant difference between the perceptual development of Indian and non-Indian children.

The second hypothesis deals with the relationship of perceptual development to cultural differences. When the performance of Indian and non-Indian Ss on both perceptual tests and on the reading test was compared, no significant differences were found. The only exception to this was that in group RP the non-Indian Ss did better than did the Indian Ss ($p<.01$) on the Frostig. This trend was reversed in the RN group on the same test with the Indian Ss surpassing the non-Indian Ss ($p<.05$). However, when the two remedial reading groups were combined and the differences between the two cultural groups compared, no significant differences between the performance of Indian and non-Indian Ss on the Frostig were found. Therefore, the null hypothesis could not be rejected.

Table 5

BETWEEN CULTURE DIFFERENCES ON PERCEPTUAL TESTS

Group	Number			Median, Frostig				Median, Winter Haven	
	I	N	Total	I	N	I	N	I	N
RP	10	7	17	77.5	93.0	83.5	88.5	52.0	53.0
RN	13	5	18	86.0	75.0			56.0	60.0
C	11	7	18	104.0	97.0			63.0	66.0
Total	34	19	53	87.0	92.5			59.5	60.0

The last four hypotheses deal with the changes which took place during the course of the study. Hypotheses three and four deal with the changes occurring in perceptual development; hypotheses five and six deal with changes occurring in

reading quotients. Results on the Frostig and Gates were converted into quotient form in order to correct for the variance in age of Ss and the effects of maturation of Ss during the study. The Winter Haven also has a correction factor which is added into the total score to compensate for differences in ages of Ss.

Hypothesis 3: There will be no significant difference in gains in perceptual development, as measured by the Frostig and Winter Haven, between the group of disabled readers receiving perceptual training and those not receiving it.

Differences between the preliminary and final test results of each S were computed and ranked. It was found that Ss in the remedial reading program tended to make greater gains in their perceptual development, as measured by the Frostig, than did Ss not in the remedial reading program ($p<.05$). Although Ss in group RP did somewhat better than did Ss in group RN who did not receive perceptual training, there were no significant differences between the gains made by each group. Thus the null hypothesis could not be rejected on the basis of results obtained on the Frostig.

Comparisons between groups on the Winter Haven yielded somewhat different results. Group RP made significantly greater gains ($p<.05$) on this perceptual test than did either of the other two groups. No significant differences were found between gains made by groups RN and C. Therefore,

Table 6

BETWEEN GROUP DIFFERENCES

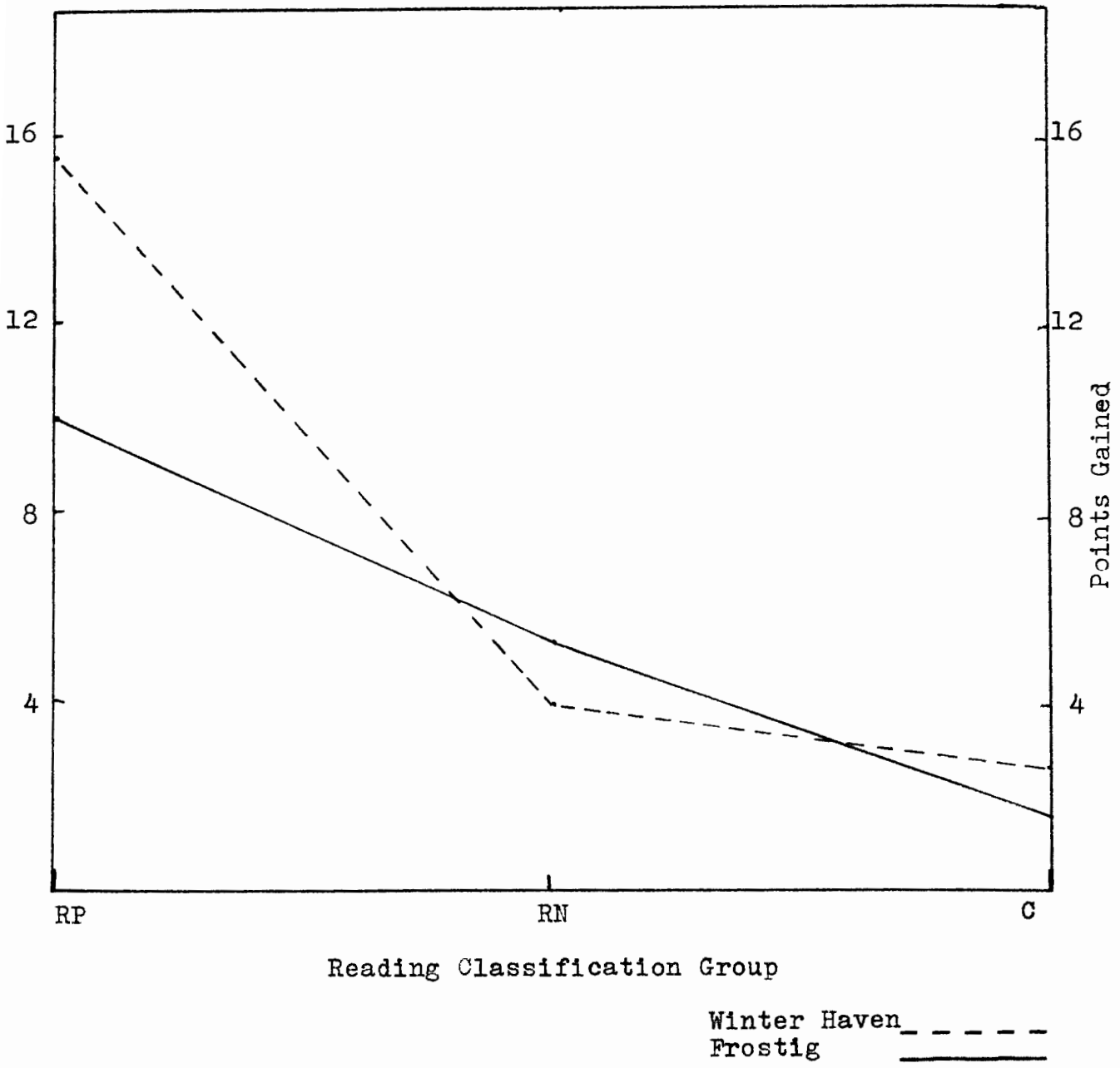
IN GAINS IN PERCEPTUAL DEVELOPMENT

	RP	RN	C
Median Gain on Frostig	10.0	5.5	1.5
Indian	13.5	5.0	1.0
Non-Indian	3.0	10.5	2.0
Median Gain on Winter Haven	15.5	4.0	2.5
Indian	13.5	13.0	3.5
Non-Indian	15.0	0	1.0
Number	17	18	18
Indian	10	13	11
Non-Indian	7	5	7

Figure 4

COMPARISON OF MEDIAN POINTS GAINED

ON PERCEPTUAL TESTS



results of the Winter Haven do allow rejection of the null hypothesis. Disabled readers receiving perceptual training do make greater gains in the perceptual skills measured by the Winter Haven than do disabled readers not receiving such training (Table 6).

Comparisons on the Frostig between reading groups within cultural groups found differences existed only between groups RP and C ($p < .10$). The differences between groups RP and RN and between groups RN and C, however, were not significant. Similar results, at the .05 level of significance, were found when comparing the gains made on the Winter Haven by Indian Ss in the three reading groups. The non-Indian Ss in group RP made significantly greater gains ($p < .01$) on the Winter Haven than did groups RN and C. Thus, although hypothesis 3 cannot be rejected for Indian Ss, it can be rejected for Ss of non-Indian cultural background; non-Indian disabled readers receiving perceptual training make greater gains in perceptual skills, as measured by the Winter Haven, than do non-Indian disabled readers not receiving such training. Table 6 is a tabular presentation of these results.

Hypothesis 4: There will be no significant differences in gains in perceptual development, as measured by the Frostig and Winter Haven, between the Indian and non-Indian children.

Comparisons between gains made on both perceptual tests between Indian and non-Indian Ss yielded no significant differences.

Therefore, hypothesis four cannot be rejected. Table 7 summarizes these results.

Table 7

BETWEEN CULTURE DIFFERENCES

IN GAINS IN PERCEPTUAL DEVELOPMENT

Group	Number I	Number N	Number Total	Median, Frostig I	Median, Frostig N	Median, Winter Haven I	Median, Winter Haven N
RP	10	7	17	13.5	3.0	13.5	15.0
RN	13	5	18	5.0	10.5	13.0	0
C	11	7	18	1.0	2.0	3.5	1.0
Total	34	19	53	4.5	3.5	4.5	5.5

Hypothesis 5: There will be no significant difference in gains in reading achievement, as measured by the Gates Reading Tests, between the group of disabled readers receiving perceptual training and those not receiving it.

Hypothesis 6: There will be no significant difference in gains in reading achievement, as measured by the Gates Reading Tests, between the Indian and non-Indian children in the remedial reading program.

Hypotheses five and six are concerned with differences in gains in reading achievement between the disabled readers receiving perceptual training and those not receiving it and between Indian and non-Indian children. All tests showed no significant differences in gains in reading achievement as

Table 8

BETWEEN GROUP DIFFERENCES

ON CHANGES IN READING QUOTIENTS

Median Gain (or Loss)	RP	RN	C
Total Group	1.5	1.5	-.5
Indian	-.5	2.0	.5
Non-Indian	2.5	-1.0	-1.0
Number	**RP**	**RN**	**C**
Total Group	17	18	18
Indian	10	13	11
Non-Indian	7	5	7

Table 9

BETWEEN CULTURE DIFFERENCES

ON CHANGES IN READING QUOTIENTS

Reading Group	Median Change on Gates	
	Indian	Non-Indian
RP	-.5	2.5
RN	2.0	-1.0
C	.5	-1.0
Total	1.0	0

measured by the Gates (Tables 8 and 9). Therefore, the null hypothesis could not be rejected in either instance.

Summary of Results Concerning Hypotheses

In summary, results of the statistical tests used allowed the rejection of the first hypothesis. Thus, normal readers showed significantly better perceptual development, as measured by the Frostig and Winter Haven, than did the disabled readers.

The second hypothesis, stated in null form, could not be rejected. There was no significant difference between the perceptual development of Indian and non-Indian Ss as measured by the two perceptual tests.

Statistical analysis of scores on the Winter Haven allowed the partial rejection of the third hypothesis: Ss receiving perceptual training, particularly those of non-Indian cultural background, made significantly greater gains in the perceptual skills measured by the Winter Haven Perceptual Forms Test than those not receiving such training. Complete rejection of the hypothesis was not possible, however, because analysis of gains on the Frostig did not lead to the same conclusion: Disabled readers receiving perceptual training did not make significantly greater gains in the perceptual skills measured by the Frostig Developmental Test of Visual Perception than did disabled readers not receiving such training.

The fourth, fifth, and sixth hypotheses could not be

rejected. There was no significant difference in gains in perceptual development or reading achievement between Indian and non-Indian Ss. Finally, there was no significant difference in gains in reading achievement between any of the groups and, more specifically, between the disabled readers receiving perceptual training and those not receiving it.

Other Results of the Study

The Mann-Whitney U test was used to determine if sex differences played a role in the results obtained on the preliminary testing or in the changes incurred during the study. No significant differences between male and female Ss were found in any of the comparisons.

Table 10

DIFFERENCES BETWEEN SEXES ON INITIAL SCORES AND GAINS ON PERCEPTUAL AND READING TESTS

Test Instrument	Median, Initial Testing		Median, Points Gained	
	male	female	male	female
Frostig	87.0	90.0	5.5	3.5
Winter Haven	60.0	58.5	2.0	10.5
Gates	92.5	101.5	1.5	.5
N	29	24	29	24

Pearson Product-Moment Coefficients of Correlation were computed between the scores obtained on the initial testing of the perceptual tests and the reading test. The correlation

between the Winter Haven and the Frostig was .19 and between the Winter Haven and the Gates it was .20. Neither of these reach the .05 level of significance. The correlation between the Frostig and the Gates was .63 which is significant at the .01 level. The correlation between the scores on the Gates obtained by the Ss in the remedial reading program and the I.Q. results of the Peabody Picture Vocabulary Test was found to be .38 ($p<.05$).

Table 11

CORRELATION BETWEEN TEST INSTRUMENTS

ON INITIAL TEST RESULTS

	Winter Haven	Gates
Frostig	.19	.63**
Winter Haven		.20

An Eta Coefficient of Curvilinear Correlation of .62 was obtained when raw score points gained on the Gates were compared with chronological age. This correlation is significant at the .01 level. The plotting of column means upon the frequency distribution reveals a hyperbolic curve of the type often seen on typical growth curves (Figure 5).

According to the I.Q. scores obtained on the Peabody, group RP was found to have a mean I.Q. of 89 with a range of 70 to 107; and group RN was found to have a mean I.Q. of 88 with a range of 58 to 106.

Figure 5

FREQUENCY DISTRIBUTION OF RAW SCORE POINTS GAINED IN READING ACHIEVEMENT ON CHRONOLOGICAL AGE

	7-0	7-6	8-0	8-6	9-0	9-6	10-0	10-6*	11-0*	Frequency
45-49		1								1
40-44	1	1								2
35-39	1	1								2
30-34	3	2								5
25-29	1	1								2
20-24	1	2	3	2						7
15-19	1	1	0	0	2	0	1			5
10-14			2	1	2	0	0			5
5-9			0	1	1	0	2			4
0-4			2	4	1	0	1	0	1	9
-5-1			1	1	3	1	1	0		7
-10-6								1		1
f	8	9	8	9	9	3	5	1	1	53
M	27.9	26.4	12.0	8.3	6.8	.3	4.8	-7.0	4.0	

* Ss in last two columns not included in computation of Eta because of low column frequencies.

Because hand preference may play a role in perceptual ability, the Ss were asked to indicate which hand they used to write. One S in group RP indicated that he was left-handed; two Ss in group RN and one in group C also indicated that they were left-handed.

When asked whether they could speak a language other than English, three Ss in group RP, two in group RN, and one in group C indicated that they could do so. Of these children, only one girl in group RP reported that another language (Spanish) was spoken constantly in the home. The other Ss reported that they just spoke a little of the second language and could understand it when spoken.

Upon checking the school's attendance records for the first semester of school, it was found that the average absenteeism for Ss in groups RP, RN, and C was 4.71, 8.41, and 4.89 days respectively.

At the end of the program all Ss in the remedial reading program were asked to evaluate the remedial reading program, the Rt, their learning, and the perceptual training exercises on a five point rating scale with a score of five indicating the most favorable response and a score of one the least favorable. Attitudes of all Ss toward the remedial reading class and the Rt were favorable with no responses falling below four. Only one S marked the three space which indicated that he had learned "a little." All others indicated they had

learned "very much" (spaces four and five). Two of the Ss in the group RP gave an evaluation of four to their enjoyment of the perceptual exercises while the rest gave an evaluation of five. The attitude of Ss toward the program, then, did not appear to vary greatly among individual Ss or between groups.

CHAPTER IV

DISCUSSION

The Relationship of Perceptual Development to Reading Ability

Results of this study indicated that retarded readers placed in the remedial reading program scored significantly lower on both perceptual instruments employed than did "normal" readers. These findings are in agreement with those of previous studies (Coleman, 1953, 1959; De Hirsch, 1957; Elkind, Koegler, and Go, 1962; Lackman, 1960; Walters, Van Loan, and Crofts, 1961) which have found perceptual retardation to be a characteristic of poor readers.

Some rather interesting differences were noted when comparisons were made between reading groups within each cultural group. For example, when comparing perceptual scores obtained by Indian Ss in all three groups, all groups were found to vary significantly from one another on the Frostig with group RP performing the poorest and group C performing the best. The Winter Haven detected a significant difference between group RP, which did the poorest on this measure, and group C, which did the best. This same trend was also noted among the non-Indian groups on this test; yet, on the Frostig the non-Indian Ss of group RN were found to do significantly poorer ($p<.01$) than either of the other two groups.

The above-mentioned differences cannot be attributed to differences in I.Q., age, or sex composition of the groups. No significant differences were noted in the mean I.Q. of each group or in a comparison of the scores obtained by males and females included in the study. Mean ages of the groups did not vary more than two months; this cannot be considered a factor because age differences were compensated for by using quotients, and allowance was made for age differences in the scoring of the Winter Haven. Differences between groups in the remedial reading program are probably the result of arbitrary assignment of Ss to groups. Discrepancies between groups among non-Indians might be the result of small and unequal group sizes.

The Relationship of Perceptual Development to Cultural Background

Statistical analysis of the results indicated that Indian Ss did not vary significantly in perceptual development from non-Indian Ss of a similar reading ability. However, Indian and non-Indian Ss in the remedial reading program did more poorly on both perceptual tests than did the Ss defined as "normal" readers in either cultural group. Thus, retardation in perceptual development, as measured by the Frostig and Winter Haven perceptual tests, appears to be related to reading ability and not to cultural background.

It cannot be concluded from these results, however, that Indian Ss did not differ from non-Indian Ss in their perceptual

development. As mentioned earlier, perception is a constantly changing process by which sensory data is organized and integrated into patterns or gestalts (Catterall and Weise, 1959; Diack, 1960; Hill, 1964; Vernon, 1962). This process is dependent, in part, upon past experience, the native language spoken, concepts incorporated into the individual's culture, and the unique qualities of each individual. The Frostig Developmental Test of Visual Perception and the Winter Haven Perceptual Forms Test, though giving an indication of perceptual development, do not test all of the areas of perception which might be controlled or influenced by cultural background.

A shift in perceptual developmental skills was noted, with Indian Ss of group RP falling behind the non-Indians of that same group while the Indian Ss of group RN surpassed the non-Indian Ss. It can be hypothesized that these results are related to the small and unequal cell sizes and the arbitrary assignment of Ss to the groups on the basis of reading schedules. This hypothesis is supported when the two groups in the remedial reading program are combined; no significant differences in the perceptual development were found between Indian and non-Indian Ss placed in the remedial reading program.

The Effectiveness of Perceptual Training in the Development of Perceptual Skills

The results of this study suggest that perceptual training does help improve perceptual skills. This improvement

of perceptual skills, however, was not accompanied by a corresponding improvement in reading ability.

The remedial reading group receiving perceptual training (group RP) made significantly greater gains on the Winter Haven than did the other two groups. The differences in gains within each cultural group indicated that it was the non-Indian Ss receiving perceptual training who made the greatest gains in the aspects of perception measured by the Winter Haven ($p<.05$). Thus, it may be concluded that the non-Indian Ss benefited from those aspects of the perceptual training procedures which emphasized form recognition and copying, the perceptual skills most heavily weighted on this test. A possible reason for the non-Indians' need for further practice in these areas might be that non-Indian children have access to coloring books and other commercial materials which ordinarily do not encourage copying skills. On the other hand, many Indian children may not have access to such materials and may, therefore, be encouraged to copy or create their own pictures instead of merely coloring ready-made pictures. Non-Indian children may need additional practice in the development of copying skills and might, therefore, benefit from a perceptual training program which provides this practice.

The remedial reading group which did not receive perceptual training (group RN) made greater gains on the Winter Haven than did group C which was not in the remedial reading program. These latter gains, while they do indicate a trend, were not

found to be significant. However, both group RP and group RN made significantly greater gains ($p<.05$) on the Frostig than did group C. This fact, along with the trend noted on the Winter Haven Perceptual Forms Test, seems to indicate that the remedial reading program itself was helpful in improving perceptual skills. In fact, it is possible that the perceptual training program added little over and above the contribution of remedial reading instruction to the improvement of perceptual abilities of the Ss.

Although the aspects of the remedial reading program which were instrumental in improving perceptual development cannot be determined at this time, it can be hypothesized that the phonetic approach of the program which encouraged the visual and aural discrimination of letters and letter groupings were instrumental in the improvement of perceptual skills.

No significant differences between gains made on either perceptual test by Indian and non-Indian Ss were noted. Indian and non-Indian Ss in the remedial reading program, and particularly those in group RP, made greater gains perceptually than did Ss in group C. Again, it must be emphasized that the two perceptual tests employed may not be testing all of the areas of perceptual development which might differentiate the perceptual ability of the two cultural groups.

The Effectiveness of Perceptual Training as a Corrective Measure of Reading Disability

Perceptual training was not found to result in increased

gains in reading skills. The group receiving perceptual training did not make greater gains on the Gates than did the groups not receiving such training. These results conflict with findings of several of the studies cited. Studies conducted by P.A.S.S., Inc. (1963), Maslow and associates (1963), and Simpson (Catterall and Weise, 1959) all found that groups receiving perceptual training made significantly greater gains in reading skills. Justice and Sands (1964) also noted a similar trend although the differences in gains between the experimental group and the control group were small. The length of training in the present experiment differed markedly from the above-mentioned studies, however. The training exercises in the present study never exceeded ten minutes a day while the training periods of the previous studies provided from thirty to eight-five minutes of perceptual training daily. It appears that longer periods of training are necessary if improvement in reading skills is to result. It can be concluded that perceptual training is not an effective corrective measure in the improvement of reading difficulties when only small time segments are spent daily in the performance of perceptual training procedures and exercises.

The results of this study are in agreement, however, with those obtained by Popp (1967) who, after using the Frostig Program for the Development of Visual Perception for one academic year, found perceptual training to result in improved

perceptual skills but not in increased readiness for reading, as measured by the Metropolitan Reading Readiness Test.

Both remedial reading groups made greater gains in reading quotients than did the "normal" readers although these differences in gains were not significant. These gains in reading skills measured by the Gates do not reflect the improvement in reading ability expressed verbally in the subjective evaluations of several classroom teachers whose pupils were participating in the remedial reading program and of the school psychologist. Again, the limitations of this test, and any one test of reading, must be mentioned. The Gates subtests—word recognition, sentence reading, and paragraph reading—emphasize word recognition and reading comprehension skills. The test includes no appraisal of oral reading skills, nor does it directly test word analysis and phonic skills. It may well be, then, that Ss who received remedial reading instruction did improve in other areas not measured by the Gates.

It must be remembered that this study does not indicate how the Ss receiving remedial reading instruction as well as their regular classroom reading instruction would have progressed if they had not been receiving special instruction daily. Children recommended for the program were recommended because they were not progressing in the area of reading as rapidly as their classmates and at a rate comparable with their progress in other academic areas. Thus, it could be hypothesized

that disabled readers who are in the regular classroom and who do not receive remedial reading instruction would not show an increase in reading quotients; their reading quotients might, in fact, drop as their increase in age was not followed by a corresponding increase in reading skills.

Inter-correlations indicated that the Frostig Developmental Test of Visual Perception was a very good predictor of reading ability as measured by the Gates Primary and Advanced Primary Reading Tests. The correlation between these two measures was .63 with a significance level of .01. The Winter Haven Perceptual Forms Test was not found to be a good predictor of performance as measured by either the Frostig or the Gates. Correlations were found to be .19 and .20 respectively. It appears, then, that the Winter Haven may measure aspects of perception which are not assessed by the Frostig and are not closely related to reading ability as measured by the Gates. However, its value as a diagnostic tool for reading disability cases is illustrated by the fact that Ss in the remedial reading program did significantly more poorly on this measure than did Ss in group C. This relationship between performance on the Winter Haven and reading achievement is supported by studies conducted by Lowder (1956) and Kagerer (1960) which found copying performance, as measured by the Winter Haven, to be related to reading ability and school achievement.

The fact that the Winter Haven measures different aspects

of perceptual development than does the Frostig became apparent when results regarding hypothesis three were considered. After the perceptual training program, group RP made significantly greater gains than did either group RN or group C in the perceptual skills measured by the Winter Haven. However, in the perceptual skills measured by the Frostig there was not a significant difference between the gains made by either remedial reading group.

The correlation between the Peabody Picture Vocabulary Test and the Gates was .38, which was significant at the .05 level. This correlation fell within the range (r=.30 to .60) which is typically reported for comparisons between intelligence and reading achievement test results (Ladd, 1933). Thus, it is apparent that intelligence is not the only factor operating to enhance or retard reading ability. The correlation between the Frostig and the Gates ($r=.63$; $p<.01$) adds strong support to the hypothesis that perceptual development is one of the factors affecting reading achievement. The question still remains: Can perceptual ability be trained, and, if so, what is the most effective method of improving reading ability through perceptual training? The studies cited, as well as the present experiment, have employed various training procedures and have met with varying degrees of success. Yet none of these programs seems to have reached the level of success the high correlation between the Gates and the Frostig indicates is

possible. Perhaps perceptual skills are not as easily trained as is sometimes suggested; or perhaps training must extend over a year's time or more in order for the child to benefit more fully from the program than is immediately apparent. This latter possibility offers continued hope for teachers, but the former possibility must not be ignored completely.

Individuals inherit, as a result of genetic differences, different perceptual capacities which, in turn, are differentially developed through training and experience. Thus, perceptual modes may represent unique characteristics of each individual which may have become deeply ingrained in his behavioral repertoire through past experiences both as an individual and as a member of a particular culture. Discussions by Catterall and Weise (1959), Diack (1960), Hill (1964), and Vernon (1962) suggest that this is indeed a possibility which must be considered. Perception, from this point of view, would not seem to be a process which can always be "trained."

The Role of Age, Sex, Attitude, Hand Preference, and Language Background of Subjects

Regardless of how reading ability might best be developed, the Eta coefficient of curvilinear correlation of .62 found in this study between chronological age and gain on the Gates indicates that it is best developed in younger children. In spite of remedial reading instruction and perceptual training,

a leveling off of gains as the age of Ss increased was observed. Older Ss did not make as great a gain in reading achievement as did younger Ss (Figure 5, page 71).

Comparisons between male and female Ss indicated no significant differences between their performance on the initial test or in the amount of gains made on either of the perceptual tests or the reading test. This should not be confused with findings on previous studies which have noted a greater incidence of reading disability among boys. Comparisons in the present study were made between sexes only after their assignment to the program on the basis of their reading achievement. Slightly more boys than girls participated in the remedial reading program; nineteen boys and sixteen girls received remedial reading instruction.

The Ss' rating scale indicated that there was very little variance in attitudes towards the remedial reading program, the Rt, or the perceptual training procedures among individuals and among groups.

No conclusions could be made regarding the effect hand preference or bilingualism played in the study because the incidence of both factors was slight. Neither did absenteeism seem to have any influence upon the results of the study.

General Conclusion

In conclusion, the results of this study indicate that formal perceptual training is of questionable value in the

improvement of reading ability. Remedial reading instruction with a phonetic emphasis seems to result in almost the same amount of perceptual growth as does the more formalized perceptual training. It appears, then, that when only limited periods of time are available for the correction of reading difficulties, this time might best be utilized in the development of phonetic skills. As the results of this study indicate that younger children seem to make greater gains in reading skills than do older children, it seems reasonable to assume that it is desirable if the disabled reader can be recognized at an early age and corrective procedures initiated.

CHAPTER V

SUMMARY

This study compared the differences in perceptual development found between (1) normal readers and disabled readers, and (2) Indian children of a reservation cultural background and non-Indian children. Subjects were fifty-three children of both Indian and non-Indian backgrounds ranging from the second to the fourth grades at White Swan Grade School.

Two perceptual tests, the Frostig Developmental Test of Visual Perception and the Winter Haven Perceptual Forms Test, and a reading test, the Gates Reading Test, were administered to all Ss at the beginning of the school year to determine their level of perceptual development and reading achievement at the beginning of the experiment. Ten minutes of daily perceptual training was given over one school semester. A comparison was then made between the group of disabled readers which had received perceptual training and the group which had not in order to determine the effectiveness of perceptual training.

Results indicated that the disabled readers did more poorly on initial testing of both perceptual tests ($p<.05$) than did the group of normal readers. While perceptual training

appeared to improve perceptual skills, no significant effect of such training upon reading achievement was noted. Remedial reading instruction without perceptual training also resulted in the improvement of perceptual skills. The greatest growth in perceptual skills was realized by the non-Indian Ss receiving perceptual training. Younger Ss were found to make greater gains in reading achievement than did older Ss.

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APPENDIX A

APPENDIX A

PERCEPTUAL QUOTIENTS ON

FROSTIG DEVELOPMENTAL TEST OF VISUAL PERCEPTION

Subject	Group	Age in September	September Quotient	January Quotient	D
1	RP-N	8-2	94	95	1
2	RP-I	9-4	65	82	17
3	RP-I	10-8	87	74	-13
4	RP-N	7-3	110	121	11
5	RP-I	9-0	76	93	17
6	RP-I	9-4	68	89	21
7	RP-N	8-10	88	91	3
8	RP-N	10-4	83	89	6
9	RP-N	7-5	93	95	2
10	RP-I	7-3	84	102	18
11	RP-I	9-1	85	86	1
12	RP-I	7-5	87	85	-2
13	RP-I	9-1	79	85	6
14	RP-N	7-6	98	114	16
15	RP-I	10-3	66	76	10
16	RP-N	7-11	89	91	2
17	RP-I	9-8	67	84	17
18	RN-I	11-3	78	78	0
19	RN-I	8-6	83	94	11

Subject	Group	Age in September	September Quotient	January Quotient	D
20	RN-N	10-3	63	74	11
21	RN-I	8-4	83	91	8
22	RN-I	9-4	81	94	14
23	RN-N	8-3	73	79	6
24	RN-I	8-6	91	80	-9
25	RN-I	8-11	86	91	5
26	RN-I	8-8	83	88	5
27	RN-N	8-11	85	96	11
28	RN-I	7-10	87	105	18
29	RN-I	9-1	83	92	9
30	RN-I	8-4	95	95	0
31	RN-N	8-11	83	98	15
32	RN-I	7-3	95	90	-5
33	RN-I	7-4	91	92	1
34	RN-I	7-11	89	85	-4
35	RN-N	10-2	75	77	2
36	C-N	7-1	122	125	3
37	C-I	7-7	121	125	4
38	C-N	8-1	97	104	7
39	C-N	7-11	110	95	-15
40	C-N	9-4	95	94	-1
41	C-I	7-8	121	110	-11
42	C-I	7-10	125	118	-7

Subject	Group	Age in September	September Quotient	January Quotient	D
43	C-N	10-4	93	95	2
44	C-I	8-6	104	102	-2
45	C-I	8-7	80	95	15
46	C-I	9-7	100	101	1
47	C-I	9-4	98	94	-4
48	C-N	8-4	88	98	10
49	C-I	8-3	115	114	-1
50	C-I	8-2	137	126	-11
51	C-N	7-11	114	107	-7
52	C-I	9-10	81	87	6
53	C-I	8-6	94	97	3

APPENDIX B

APPENDIX B

SCORES ON WINTER HAVEN PERCEPTUAL FORMS TESTS

Subject	Group	Age in September	Score in September	Score in January	D
1	RP-N	8-2	53	72	19
2	RP-I	9-4	60	66	6
3	RP-I	10-8	75	55	-20
4	RP-N	7-3	46	62	16
5	RP-I	9-1	61	67	6
6	RP-I	9-4	48	60	12
7	RP-N	8-10	59	70	11
8	RP-N	10-4	51	66	15
9	RP-N	7-5	67	69	2
10	RP-I	7-3	53	84	31
11	RP-I	9-1	46	61	15
12	RP-I	7-5	34	54	20
13	RP-I	9-1	61	59	-2
14	RP-N	7-6	28	60	32
15	RP-I	10-3	51	69	18
16	RP-N	7-11	55	68	13
17	RP-I	9-8	51	67	16
18	RN-I	11-3	64	65	1
19	RN-I	8-6	35	60	25

Subject	Group	Age in September	Score in September	Score in January	D
20	RN-N	10-3	72	68	-4
21	RN-I	8-4	33	55	22
22	RN-I	9-4	66	60	-6
23	RN-N	8-3	60	56	-4
24	RN-I	8-6	25	51	26
25	RN-I	8-11	58	50	-8
26	RN-I	8-8	35	49	14
27	RN-N	8-11	67	67	0
28	RN-I	7-10	48	58	10
29	RN-I	9-1	61	77	16
30	RN-I	8-4	56	61	15
31	RN-N	8-11	41	47	6
32	RN-I	7-3	29	60	31
33	RN-I	7-4	67	64	-3
34	RN-I	7-11	60	60	0
35	RN-N	10-2	47	52	5
36	C-N	7-1	72	79	7
37	C-I	7-7	61	65	4
38	C-N	8-1	58	68	10
39	C-N	7-11	69	61	-8
40	C-N	9-4	64	48	-16
41	C-I	7-8	71	67	-4
42	C-I	7-10	51	56	5
43	C-N	10-4	66	67	1

Subject	Group	Age in September	Score in September	Score in January	D
44	C-I	8-6	60	65	5
45	C-I	8-7	59	56	-3
46	C-I	9-7	61	73	12
47	C-I	9-4	76	75	-1
48	C-N	8-4	60	65	5
49	C-I	8-3	52	59	7
50	C-I	8-2	69	65	-4
51	C-N	7-11	73	72	-1
52	C-I	9-10	63	75	12
53	C-I	8-6	63	56	-7

APPENDIX C

APPENDIX C

READING QUOTIENTS ON

GATES PRIMARY AND ADVANCED PRIMARY READING TESTS

Subject	Group	Age in October	October Quotient	January Quotient	D
1	RP-N	8-3	92	96	4
2	RP-I	9-5	92	88	-4
3	RP-I	10-9	82	77	-5
4	RP-N*	7-4	105	106	1
5	RP-I	9-1	93	99	6
6	RP-I	9-5	83	84	1
7	RP-N	8-11	92	90	-2
8	RP-N	10-5	83	91	8
9	RP-N*	7-6	104	108	4
10	RP-I*	7-4	103	105	2
11	RP-I	9-2	105	101	-4
12	RP-I*	7-6	98	104	6
13	RP-I	9-2	106	101	-5
14	RP-N*	7-7	103	105	2
15	RP-I	10-4	78	82	4
16	RP-N*	8-0	94	96	2
17	RP-I	9-9	84	83	-1
18	RN-I	11-4	75	75	0

*Second grade Ss given the Gates Primary Reading Test

Subject	Group	Age in October	October Quotient	January Quotient	D
19	RN-I	8-7	89	88	-1
20	RN-N	10-4	82	87	5
21	RN-I*	8-5	85	87	2
22	RN-I	9-5	87	91	4
23	RN-N*	8-4	94	93	-1
24	RN-I*	8-7	87	88	1
25	RN-I*	9-0	87	85	-2
26	RN-I*	8-9	85	86	1
27	RN-N	9-0	91	90	-1
28	RN-I*	7-11	94	98	4
29	RN-I*	9-2	86	98	12
30	RN-I*	8-5	90	92	2
31	RN-N	9-0	98	96	-2
32	RN-I*	7-4	101	104	3
33	RN-I*	7-5	100	102	2
34	RN-I*	8-0	93	97	4
35	RN-N	10-3	93	88	-5
36	C-N*	7-2	118	124	6
37	C-I*	7-8	112	113	1
38	C-N	8-2	124	121	-3
39	C-N*	8-0	106	102	-4
40	C-N	9-5	104	100	-4

*Second grade Ss given the Gates Primary Reading Test

Subject	Group	Age in October	October Quotient	January Quotient	D
41	C-I*	7-9	102	105	3
42	C-I*	7-11	91	98	7
43	C-N	10-5	97	96	-1
44	C-I	8-7	115	116	1
45	C-I*	8-8	89	90	1
46	C-I	9-8	113	109	-4
47	C-I	9-5	108	111	3
48	C-N	8-5	110	104	-6
49	C-I*	8-4	103	98	-5
50	C-I	8-3	127	122	-5
51	C-N*	8-0	97	103	6
52	C-I	9-11	101	100	-1
53	C-I	8-7	118	115	-3

*Second grade Ss given the Gates Primary Reading Test

APPENDIX D

APPENDIX D

SCORES ON PEABODY PICTURE VOCABULARY TEST

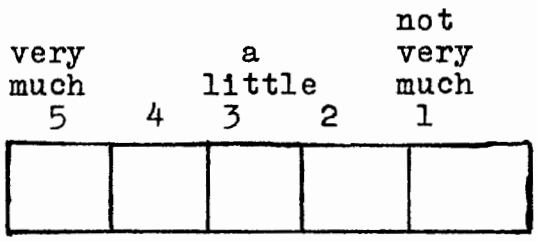
Group RN		Group RN	
Subject	Score	Subject	Score
1	70	18	91
2	79	19	99
3	80	20	58
4	102	21	95
5	90	22	105
6	79	23	100
7	103	24	76
8	106	25	83
9	107	26	85
10	102	27	79
11	76	28	88
12	95	29	85
13	85	30	81
14	97	31	81
15	79	32	95
16	93	33	106
17	70	34	92
		35	88

APPENDIX E

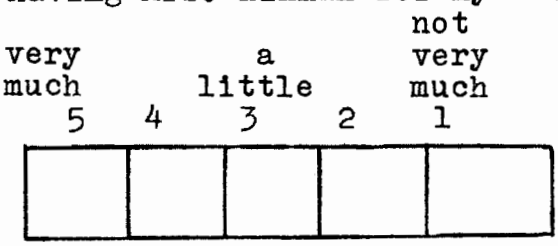
APPENDIX E

RATING SCALE

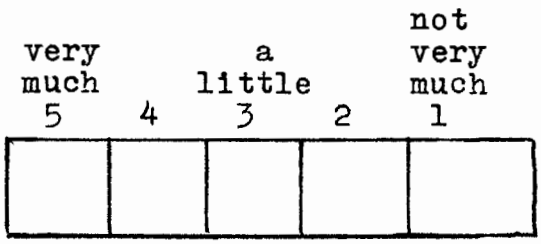
1. I like the reading class...



2. I like having Mrs. Hinman for my reading teacher...



3. I think I learned...



* *

This last question to be answered by groups 1, 5, and 6 only.

4. I liked the exercises we did in class...