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ABSTRACT

Compared were the performances of 28 cerebral palsied, 19 mentally retarded, and 30 normal children between the ages of 8 and 16 years on measures of four components of visual perception: figure-ground relationships, form constancy, spatial position, and spatial relationships. The figure-ground component was tested tachistoscopically; the components of form constancy and spatial positions were tested by means of the Developmental Test of Visual Perception; and spatial relations was tested by requiring each child to reproduce a geometrical pegboard design. Results showed that the cerebral palsied and mentally retarded Ss scored more poorly than normal children in each of the four visual perception components and that the cerebral palsied showed less ability in visual perception tasks than the mentally retarded. Findings supported the hypothesis that the components of visual perception are impaired in the cerebral palsied child. (DB)

VISUAL PERCEPTION DIFFERENCES IN CEREBRAL PALSIED, MENTALLY RETARDED AND NORMAL CHILDREN. John N. Drowatzky, The University of Toledo; Jean Lehman, Emmanuel Baptist Christian School, Toledo, Ohio.

The great majority of cerebral palsied children are multiply handicapped; that is, their physical handicaps are accompanied by psychological disorders. One of these impairments is a disorder of visual perception. A perception is a mental activity that gives significance to a sensation; this interpretation takes place unconsciously and immediately. As long as the parts of the whole are not dissected, there will still be a perceptual response to the relationship of parts within the whole. For example, a photograph of an acquaintance is recognizable immediately. One does not first examine the details of the eyes, mouth, nose, and hair and then combine all of these characteristics to finally conclude that this is the photograph of his friend. Essentially, the perceptual process is the "integration of parts into a new whole which is more than a mere summation of the parts (Strauss & Lehtiene, 1960; p. 29)." The perceptual modality under concern here will be limited to vision.

Frostig (1963, n.d.) has identified the components of visual perception as eye-hand coordination, figure-ground perception, perception of form constancy, perception of position in space, and perception of spatial relation after extensive testing with normal children. Later testing with brain damaged children supported her belief in the independence of these factors. Unfortunately, most research conducted to study the visual perceptual abilities in cerebral palsied children has been concentrated on figure-ground relationships.

Ambiguous figures were used by Harrower (1939) to compare the figure-ground alteration phenomenon in normal and brain-injured persons. Differences between the responses of the two groups were obtained; the alteration phenomenon was not present in most brain damaged persons as they appear to cling to their original perceptual attitude. Werner and Strauss (1941) continued this line of study with the tachistoscopic presentation of embedded figure tests. Their results indicated that brain damaged children were oriented to the background more frequently than normal persons. Consequently these investigators concluded that the brain damaged child was influenced by outside stimulation more than the average child. Moreover, the brain injured child focused upon the objects which were quantitatively conspicuous and neglected the significant objects since they were small.

More recently, Crickshank and associates (1951, 1965, 1966) have verified the impairment of the figure-ground component in cerebral palsied children. On the basis of this confirmation, the Syracuse Visual Figure-Background Test was developed based on tachistoscopic presentation of 20 embedded figure slides arranged in a series. Work with these slides showed that 34 percent of the spastic group and 18 percent of the athetoid group evidenced a perceptual problem as contrasted with only 4 percent of the normal children.

Studies by Werner and Strauss and Dolphin and Crickshank have also verified an impairment in the spatial relation component of perception in cerebral palsied children. They concluded that the cerebral palsied's poorer performance was due to their inability to relate parts to the whole and to keep from being distracted by extraneous stimuli in the testing situation and in the testing item itself.

Research using a wide variety of tests has shown that the figure-ground relationship and the spatial relationship is impaired in the cerebral palsied child. Since little work has been done with the components of form constancy and position in space, no valid generalizations can be made. Consequently, four components of visual perception (figure-ground relationships, form constancy, spatial position, and spatial relationships) were tested in 77 cerebral palsied, mentally retarded and normal children to determine if the cerebral palsied and mentally retarded had a visual perceptual impairment when contrasted with normals and if components of visual perception are independent in each of the three groups.

Twenty-eight cerebral palsied, 19 mentally retarded and 30 normal children between the ages of 8 and 16 years were tested individually in a quiet room for a period of 20 to 40 minutes. The figure-ground component was tested tachistoscopically using the 35 mm slides developed by Cruickshank. Sections III and IV of the Developmental Test of Visual Perception developed by Frostig were used to test the components of form constancy and spatial positions. The perception of spatial relations was tested with each child being required to reproduce a geometrical pegboard design as designed by Werner (1941).

Results:

Chi Square analysis indicated significant differences in figure-ground relationships in 6 of 16, or 38 percent, of slides exposed for unlimited viewing. In each of these cases the normal group far exceeded the expected value in the correct response cell while both the mentally retarded and cerebral palsied groups did not meet their expected value in the correct response cell; the scores of the retarded were not as deviant as the scores of the cerebral palsied. When the viewing time was reduced to one-half second per slide, the normal group's performance did not change while the other two groups became less accurate in their identification. Again, 6 of 16 slide comparisons produced significant Chi Square ratios.

The evaluation of form constancy perception scores produced much the same results. Analysis with the median test showed that the normal group far exceeded their expected frequency above the median (90 percent above) while both the cerebral palsied and mentally retarded groups scored mostly below the median. The mentally retarded children had 52 percent of their scores below the median while the cerebral palsied had 75 percent scoring below the median.

The evaluation of the spatial positions component of perception indicated that this component of visual perception was impaired in cerebral palsied children.

Sixty-one percent of the cerebral palsied children scored below the median as contrasted with 47 percent of the retarded and 27 percent of the normal children.

The spatial relations component of perception was found to be significantly different for all three groups of subjects. The normal children achieved the best scores, mentally retarded achieved the next best and cerebral palsied children achieved the poorest scores.

Thus, in each of the four components of visual perception tested, the cerebral palsied and mentally retarded scored more poorly than a group of normal children comparable in age. Moreover, even though the cerebral palsied were matched in intelligence with the retarded subjects, the cerebral palsied showed less ability than the mentally retarded in each of the components. Therefore, this study supports the hypothesis that the components of visual perception are impaired in the cerebral palsied child. A similar, but less severe limitation is also present in mentally retarded children.

The components of visual perception were then tested for independence through the computation of correlation coefficients. Once again differing results were obtained between the normal children and the other two groups of subjects. Eight of twelve intercorrelations computed for the normal sample were significant. In contrast, four of twelve coefficients obtained with the cerebral palsied and retarded children were significant. The four items were the same for both handicapped groups, but only two of the significant relationships obtained with the normal group involved any of these items. Thus, not only does the performance of normal children differ in precision from that of the cerebral palsied and retarded children, but the pattern and degree of relationship existing among test items for normals is different from that of cerebral palsied and mentally retarded children. This lack of independence among visual perception components in normal children is divergent from the results reported by Frostig. The reasons for this disparity need further investigation. One pressing question was raised by this study: Is the visual field background and the testing situation responsible for differences between these populations or is the difference caused by a reduced intellectual functioning capacity? This question needs to be answered as the answer can greatly effect program content.

References

Cruickshank, William M. and Raus, George M. Cerebral Palsy: its individual and community problems. Syracuse: Syracuse University Press, 1966.

Cruickshank, William M., Bice, Harry V., Wallen, Norman E. and Lynch, Karen S. Perception and cerebral palsy. 2nd. ed. Syracuse: Syracuse University Press, 1965.

Dolphin, J. E. and Cruickshank, William M. The figure-background relationship in children with cerebral palsy. J. Clinic. Psychol., 7:228-231, 1951.

Frostig, Marianne. Developmental test of visual perception. Palo Alto, Calif.: Consulting Psychologists Press, (n.d.).

_____, Visual perception in the brain-injured child. Amer. J. Orthopsychiatry, 33:665-671, 1963.

Harrower, M. R. Changes in figure-ground perceptions in patients with cortical lesions. Brit. J. Psychol., 30:47-51, 1939.

Strauss, Alfred A. and Lehtinen, Laura E. Psychopathology and education of the brain-injured child. New York: Grune & Stratton, 1960.

Werner, H. and Strauss, Alfred A. Pathology of figure-background relation in the child. J. Abnormal & Social Psychol., 36:236-248, 1941.

ABSTRACT

This study compared performance of cerebral palsied, mentally retarded and normal children on tests of visual perception measuring figure-ground relationships, spatial relationships, spatial positions, and form constancy. The results of this study indicated that performance on these tests of visual perception was impaired in cerebral palsied and mentally retarded children when contrasted with normal children. Generally, the performance of cerebral palsied children deviated further from that of the normal group than did the scores obtained from the mentally retarded sample. When correlation coefficients were computed and the components of visual perception tests analysed for independence, eight of the twelve correlations obtained for the normal sample were significant. In contrast, four of twelve comparisons were significantly related with the cerebral palsied and mentally retarded samples. These four items were the same for both atypical groups but only two of the twelve related items involved the same perceptual aspects for all three groups. Thus, not only does the performance of normal children differ in precision from that of cerebral palsied and retarded children, but the pattern of relationship existing among test items for normals is different from that of cerebral palsied and mentally retarded children.