

THE EFFECT OF NEUROLOGICAL IMPAIRMENT
ON THE RORSCHACH PERFORMANCE
OF SCHOOL CHILDREN

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The problem with which this investigation is concerned is that of determining the effect of neurological impairment on the Rorschach performance of children. Further investigation of the relationship between Rorschach performance and neurological impairment is undertaken since a review of the literature indicates that the primary emphasis of research has been to investigate the validity of psychometric indices of neurological involvement while relatively little attention has been given to study of the relationship between neurological impairment in children and projective test performance. Moreover, the overwhelming bulk of research related to the investigation of Rorschach performance and brain damage is concerned with adult, clinical populations.

Examination of the work of Piotrowski, Halpern and others reveals that neurologically-impaired individuals tend to evidence in their Rorschach performance characteristic responses. The five most typical responses are color naming, perseveration or repetition of responses, and limited

productivity with respect to total number of responses, human movement responses, and total number of different content categories. This investigation attempts to demonstrate that the Rorschach performance of neurologically impaired children differs significantly from the Rorschach performance of children without such impairment for five responses or variables as derived from a child's Rorschach protocol. Specifically, it is proposed that in comparison to non-neurologically-impaired children, a significantly greater number of children with neurological impairment will evidence in their Rorschach protocols fewer than fifteen total number of responses to the ten cards; at least one occurrence each of color naming and perseveration or repetition of responses; fewer than two human movement responses and fewer than six total number of different content categories.

A chi square design is employed to test the hypothesized relationship of neurological impairment to Rorschach performance in children. The subjects are similar in level of intellectual functioning, chronological age, and sex. "Neurological impairment" is operationally defined such that a "neurologically-impaired group" and a "non-neurologically-impaired group" can be composed on the basis of data stemming from neurologic and/or psychologic evaluation.

Five variables of Rorschach performance served as the dependent variables; and for each dependent variable two levels of neurological condition served as the independent variables in the chi square analyses. Chi squares were computed for each of the five dependent variables and the corresponding independent variables. Two of the five chi squares were shown to be statistically significant at the .05 and .01 levels, respectively.

The results of the chi square analyses did not support the hypothesis that neurological impairment, as defined, is related to a child's Rorschach performance, the latter measured in terms of five variables. However, a single variable, repetition or perseveration of responses, is shown to differentiate significantly the neurologically-impaired child from the non-neurologically-impaired child.

The implication of the findings are discussed in relation to the composition of the two groups utilized in the investigation. It is suggested that the Rorschach remains useful in the personality assessment of children referred to an educational or child guidance clinic regardless of a child's neurological condition. It is also suggested that neurological condition and Rorschach performance may be further investigated according to specific age levels and/or more quantitative aspects of Rorschach performance.

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CHAPTER I

INTRODUCTION

For a number of years, there have been two major approaches to the study of children with disorders or dysfunctions of the central nervous system. Investigators in the fields of neurology, neuropsychology, and neuropsychiatry have tended to approach the problem from the standpoint of localization of lesion and specific behavioral and/or perceptual considerations, and their primary interests, to name only a few, have been to relate such factors as locus of lesion, extent of damage, and stage of development of the central nervous system, with behavioral patterns and modes of perception. These investigators have emphasized the necessity of establishing definite neurologic or anatomic evidence of brain damage. Investigators working within a clinical setting have approached the problem from the standpoint of behavioral observation and psychometric assessment, and they have given primary emphasis to description of the perceptual processes presumably operating within the individual. For the clinical psychologist, brain damage or central nervous system dysfunction is not established, in

many cases, prior to testing but rather is inferred on the basis of manifestation of various behavioral patterns and psychometric indices. In this regard, investigators have more recently developed concepts of central nervous system dysfunction in children which are based upon conceptual considerations deriving from both major approaches. This combined approach defines dysfunction of the central nervous system on the basis of medical evaluation and behavioral assessment and has provided an appropriate framework within which the brain-injured child can be readily understood.

The child with dysfunction of the central nervous system, or "neurological impairment," or "minimal brain dysfunction" may be so classified on the basis of modes of perception and patterns of behavior considered characteristic of his condition (2, 5). He is often impulsive, distractible, hyperactive, emotionally labile, and he frequently evidences specific learning disabilities and perceptual deficits. He brings to a psychological test situation a well-ingrained negative self-concept, inhibited social and emotional development, and inadequately organized and integrated recall of experiences. Referral to a specific clinic or agency most often is made on the basis of failure to learn in school at a

level commensurate with apparent intellectual ability; and of disruptive social and/or emotional behavior.

For the child referred to an educational clinic, neurologic or anatomic evidence of the presence of brain damage as such is often lacking. However, this does not necessarily contraindicate organic dysfunction, for some investigators in clinical psychology consider data derived from behavioral observation and psychometric tests as indicative of definite cerebral damage or "minimal brain dysfunction" (3, 5, 6). In this regard, the primary emphasis in research has been to investigate the validity of psychometric indices of neurological impairment, while relatively little attention has been accorded to the role of projective tests in detecting minimal brain dysfunction (10). For this reason, consideration of projective test performance seems relevant to investigation of the usefulness of such methods in the detection of neurological impairment in adults and children. To be sure, the examining psychologist frequently will use both psychometric and projective tests in order to better understand a particular child's problems and difficulties. A working hypothesis of many psychological examiners is that children with neurological problems tend to reveal in their psychological test performance patterns of responding

characteristic of their psychological and neurological condition (4, 7, 8, 9).

The purpose of this study was to investigate the relationship between neurological impairment and Rorschach performance in children. A major assumption of this investigation was that dysfunction of the central nervous system affects perceptual processes to an extent that is revealed in characteristic manners in a child's Rorschach performance. Ames et al. have suggested relative to a "normal" population that sex differences in Rorschach performance "during the first ten years of life are neither large nor for the most part significant" (1, p. 288). It was assumed that this suggestion maintained for the children utilized in the present study.

The present study focused on the presence of neurological impairment. "Neurological impairment" was operationally defined on the basis of data derived from both neurologic examination and comprehensive psychological evaluation. The basic design of the study involved a comparison of the Rorschach performance of two groups of children differentiated on the basis of presence or absence of neurological impairment.

Hypotheses

It was hypothesized that the Rorschach performance of neurologically-impaired children would differ significantly from the Rorschach performance of children without neurological impairment on the basis of five variables derived from a child's performance as recorded in his Rorschach protocol. More specifically, it was hypothesized that in comparison to children with no apparent neurological impairment, a significantly greater number of neurologically-impaired children would evidence in their Rorschach performance less than fifteen responses to the ten cards; at least one occurrence of color naming; at least one occurrence of perseveration or repetition of a response; fewer than two human movement responses; and fewer than six total number of different content categories. A brief review of the literature will provide further basis for the hypothesis.

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CHAPTER II

REVIEW OF LITERATURE AND THEORETICAL BACKGROUND

Review of the Literature

The use of the Rorschach in particular and psychological tests in general to detect brain damage was questioned during the 'sixties. Studies designed to investigate the relationship between neurological impairment and psychological test performance have tended to accept the fact of brain damage on the basis of unreliable and/or invalid diagnostic criteria; moreover, the control groups used have often been unclearly defined (16). It also has been suggested that research has postulated brain damage as a singular or unitary concept, when, in fact, cerebral damage is a function of many factors, a multifaceted and complex entity (4, 8).

There is very little literature dealing specifically with the use of the Rorschach to detect brain damage in children. The overwhelming bulk of research is adult-oriented, and contradictory results obtained over the years have led some critics to doubt the usefulness, even the validity, of the Rorschach as a clinical tool (5, 9, 17).

Yet Baker (2) has noted that several of Piotrowski's Rorschach "signs," namely perplexity, impotence, repetition, and automatic phrases, have been shown to be consistently and favorably associated with mild and moderate cases of cerebral damage in adults.

The use of the Rorschach with brain-damaged subjects is as old as the test itself. Rorschach included forty-six patients with varying degrees of cerebral damage in his original study (7). However, it was not until 1936 that Piotrowski introduced his now famous "signs" of brain damage and marked the beginning of systematic research into the application of the technique in the detection of brain damage (10). He held that personality and the higher cortical functions are synonymous, and that organic disturbance in the central nervous system affects personality functioning. Piotrowski's primary assumptions were that the Rorschach "measured" the higher mental functions and was sensitive to changes in them brought about by organic disturbance. To test the validity of these assumptions, Piotrowski compared the Rorschach performances of eighteen patients "whose brain cortices have been considered to be affected as the result of an organic disease process" and fifteen patients with "no involvement of the cortical and sub-cortical structure but

who have been suffering from an organic disease of the central nervous system" (10, pp. 29-31). On the basis of the comparison, Piotrowski derived ten "signs" considered characteristic of the "organic" patients; included in the ten "signs" were total number of responses to the ten cards less than fifteen; the average time per response exceeded one minute; production of no more than one human movement response, or $M < 2$; at least one occurrence of color naming, defined by Piotrowski as "Merely the name and description of a blotch and if it is considered by the patient a satisfactory response, calling for no additional explanations"; the percentage of "good" form less than seventy, or $F + \% < 70$; the percentage of popular responses less than twenty-five, or $P \% < 25$; repetition of responses, defined as "Repetition or the giving of the same response to several inkblots"; impotence, defined as "Giving a response inspite of recognition of its inadequacy"; "Perplexity associated with distrust of one's own ability and quest for reassurance"; automatic phrases, or "The frequent use of a pet phrase in an indiscriminate fashion . . . stereotyped reactions to new situations." Piotrowski suggested that at least five "signs" must be present in a Rorschach record in

order to conclude the probable presence of brain damage. Thus, Piotrowski initiated the use of the Rorschach in the detection of brain damage in adult, clinical populations.

Zehrer (15) investigated the Rorschach performance of children with problems in adjustment and children with convulsive disorders and "known" brain damage. His study was one of the first to investigate whether suggested adult organic patterns on the Rorschach applied to children. It should be noted that the sample was small (N=44) and comparisons were made on a rough statistical basis, namely, comparisons between the mean and median number of responses produced for the Rorschach categories scored. Studying children between the ages of six to fourteen years, Zehrer found that the convulsive children provided a greater mean number of total responses than "normals" of the same age range. Moreover, convulsive children in the age range eight to fourteen years, vis-a-vis "normals," produced less mean number human movement responses. Strong perseverative trends, especially for anatomical responses, were also shown by the convulsive group.

According to Halpern (6), "Disorders of the central nervous system manifest themselves in children's Rorschach protocols only when the disturbances are located in the

cortical and subcortical areas" (6, p. 228). She delineated various Rorschach signs of brain damage in children, the more important of which are perseveration, color naming, midline emphasis, symmetry awareness, frequent use of "black" in responses, and a sharp discrepancy between reactions to the achromatic and chromatic cards. In comparison to the Rorschach performance of the schizophrenic child, Halpern suggested that the organic child likely would produce only animal movement responses rather than human movement responses. Yet Halpern's work only suggested that these signs were typical of children with central nervous system dysfunction, because she provided illustrative cases stemming from past clinical experience and not, apparently, from systematic research.

Richards and Hooper (12) investigated the relationship between brain injury occurring at birth (cerebral palsy) and Rorschach performance in children and adolescents. Matching thirty-two brain-injured subjects with thirty-two non-brain-injured subjects on the basis of chronological age, sex, and level of intellectual functioning, they found that the brain-injured group was less productive in terms of total number of responses, varied less in the number of different content categories used, tended more frequently to perseverate

content, and more frequently evidenced animal movement responses and less frequently human movement responses than the non-brain-injured group. Overall, the brain-injured children evidenced more of the Piotrowski signs than the non-brain-injured children, especially in relation to lessened productivity and movement, color naming and repetition of responses.

Shaw and Cruickshank (14) studied the Rorschach performance of epileptic children in comparison to non-epileptic children and noted only two significant differences (at the .05 level) between them: the epileptic children provided more vista responses and tended to use a greater number of different content categories than did the non-epileptic counterparts, the latter finding the opposite of that for cerebral-palsied children. Shaw and Cruickshank concluded that the results reflected rigorous matching of experimental and control groups, use of a more refined statistical analysis (t-test for matched groups), and a more homogeneous group relative to extent of severity of epilepsy than heretofore attained. The investigators noted: "On the basis of the present study, the Rorschach does not appear to be a useful clinic tool for the differential diagnosis of idiopathic epilepsy" (14, p. 424). However,

there were no "brain-injured" subjects as such included in the study, according to the authors: "Children were not included in either group if motor defects, incorrecable sensory defects, or any history which might conceivably indicate brain damage were present" (14, p. 422).

Barnes (3) attempted to improve the interpretation of the electroencephalogram (EEG) via the use of psychological tests, and, in relation to the Rorschach performance of "children," he found no correlation between Rorschach performance and EEG. For the larger population sampled, which included both college students and hospital patients, Barnes noted: "With an abnormal Rorschach the chances of having an abnormal electroencephalogram are twice as great as with a normal Rorschach" (3, p. 322). Barnes does not define explicitly an "abnormal Rorschach" other than to indicate that the absence of human movement, "blocking" and perseveration were related to slow waves in the EEG.

Assael, Kohen-Roz, and Alpern (1) investigated EEG abnormalities in seventy-two male "Juvenile Delinquents" between the ages of eight and eighteen years. Using a modified Rorschach "after Piotrowski" (but not defined in the journal article), they found the following "signs" related significantly to an abnormal EEG; total number of

responses twenty or less; percentage of good form less than seventy-five; percentage of popular responses less than seventeen; the sum of all color values three or more; and the mere incidence of rejection, perseveration and color naming. Thirty-three of fifty-four subjects who produced Rorschach protocols also evidenced "abnormal" EEG's. Of the thirty-three subjects with abnormal EEG, twenty-five evidenced four or more Piotrowski signs of organicity as compared to only five of twenty-one "normal" subjects who produced four or more "signs." The difference between the two groups was measured in terms of chi square and found significant at the .001 level.

Baker (2) and Birch and Diller (5) have indicated that the contradictory results obtained with the Rorschach have given rise to considerable skepticism relative to its validity in diagnosis of cerebral pathology in adults. However, Birch and Diller have suggested that the problem lay not in an inherent inadequacy on the Rorschach but rather in the lack of consistency from study to study with respect to the definition of "brain damage." They indicated that to overcome the problem of inconsistency in definition of brain damage, a distinction must be drawn between the "fact" or definite neurologic and/or anatomic evidence of brain damage

and its "functional" or "organic" consequence. "Organicity" is defined on the basis of patterns of behavior and "psychological functions" which reflect brain damage; "organicity" is the behavioral and psychological consequence of brain damage. In this regard, Birch and Diller indicated that brain damage can be presumed to exist if the Rorschach record contains the Piotrowski signs; the authors also noted: "One cannot conclude that cerebral defect is absent when the Rorschach test does not exhibit sign of organicity" (5, p. 188).

Hence, it has been suggested that the Rorschach is indeed "sensitive" to brain damage (at least in adult, clinical populations). Also very important to the investigation of brain damage via psychological tests is that the population utilized in the investigation be homogeneous with respect to the presence of neurological impairment.

The studies cited above suggest that the Rorschach can be utilized in the investigation of children referred to an educational or child guidance clinic and that, in general, color naming, repetition of responses, and limited production of human movement responses are characteristic of children with varying degrees of central nervous system dysfunction. These responses are included in the list of

Rorschach variables to be investigated in the present study. However, the criteria by which brain damage was established in each study discussed above varied; hence, the results are not readily generalizable. Therefore, it is crucial to the investigation of brain damage through the use of psychological tests to insure that the criteria used to identify brain damage are operationally defined and relevant to current concepts. The use of such criteria will tend to produce a relatively homogeneous group of subjects with respect to extent or type or locus of brain damage. For purposes of the present study, it is believed that a relatively homogeneous group of children with mild neurological impairment was composed. A more precise meaning of "neurological impairment" follows in the section dealing with definition of terms.

Theoretical Background

In order to better understand the purposes for which the present study was undertaken, discussion of several theoretical assumptions related to Rorschach performance is necessary. An individual's reaction to the Rorschach cards is considered a "complex perceptual process" in which past experience and physiological integrity of the central nervous system interact to determine the quality of the product, a verbal

response. To the extent that significant damage has occurred in the central nervous system, it will be reflected in one's perceptual functioning. It is a basic assumption of the present investigation that the Rorschach is sensitive to perceptual functioning and the changes occurring in this functioning as the result of organic disorders.

In the review of the literature, it was noted that color naming, repetition of responses, and limited production of human movement responses are generally considered as characteristic of the brain-damaged individual. Hence, following is a brief examination of the theoretical assumptions underlying these particular responses.

The individual with central nervous system dysfunction encounters numerous problems. As Halpern noted:

Children suffering from such conditions generally have difficulty in controlling their impulses and in developing patterned concepts in all areas, intellectual, social, emotional, perceptual and motor, with the result that their experiences tend to be weakly organized and lacking in stability. They frequently have learning difficulties, and are generally less mature and self-sufficient than they should be. Instead, the weakness of their personality organization makes for easy disorganization and regression (6, p. 228).

On the basis of weakness in personality organization, disturbances in the perceptual processes generally occur and can be "measured" with psychological tests. With respect to Rorschach performance, Halpern suggested that the disturbance

is expected to be shown in tendencies toward perseveration or repetition of content and production of animal rather than human movement responses indicating underlying emotional disorganization and regressive or immature attitudes and interests. Failure to interpret the cards is also expected to occur for the neurologically-impaired child as the result of intellectual limitations related to his condition. Hence, the child will lapse into simple description of the cards, of which color naming and color description are primary examples.

In more general terms, Schachtel (13) has suggested that dysfunction in the central nervous system inhibits the individual's ability to actively structure and integrate perceptions and leads to feelings of helplessness. As a specific result of this helpless feeling, color naming will occur as a simple or easy escape from a situation perceived as overwhelming. Moreover, Schachtel has suggested that the human movement response is a reflection of adequately organized and integrated past experiences and feelings. As a result of his neurological condition, the organic individual generally has poorly developed concepts relative to the past and present and would not be expected to be able to produce the integrated and organized human movement response.

Piotrowski has suggested that the organic subject is characterized by "a marked personality impoverishment and lack of emotional refinement" (11, p. 241). Hence, the affect of the organic subject tends to be shallow and subject to sudden change. The organic tends to reflect this emotional impoverishment in the color naming (Cn) response:

The Cn can be regarded as a sign of emotional disintegration in the sense that the emotional reactions of the patient are impulsive but shallow and quickly fade-away, lacking strength and persistence in consequence of a general mental deterioration. . . . The patient feels that he has accomplished what he set out to do . . . (11, p. 241).

Piotrowski emphasized that the human movement response is related to adjustment to the environment and is based upon stable intellectual and psychosocial functioning. "Brain-damaged" individuals generally are unable to develop integrated functioning in these areas, and production of human movement responses would be difficult, if not impossible, for them.

To summarize, the organic or neurologically-impaired individual is plagued with intellectual, emotional, and psychosocial impoverishment to an extent which seriously inhibits his integrative and organizational capacities. Therefore, he is troubled with faulty perceptual functioning and tends to reflect such in characteristic ways. The

Rorschach is considered sensitive to changes occurring in the perceptual processes as a result of brain damage. The neurologically impaired subject will reflect in his Rorschach performance characteristic responses, the most consistent of which appear to be color naming, perseveration or repetition of responses, and very infrequent production (if at all) of human movement responses. These three aspects of Rorschach performance are investigated in the present study. To these three "signs" are added total number of responses produced to the ten cards and the number of different content categories evidenced in a Rorschach protocol. The latter two "signs" stem from Piotrowski (11). He suggested that variety in content categories and level of intellectual functioning are positively correlated and the tendency to perseverate or repeat responses is a function of poor intellectual functioning (11, p. 103). It is postulated for purposes of the present study that the total number of different content categories produced and perseveration or repetition of responses are related to central nervous system integrity and relevant to investigation of the Rorschach performance of the intellectually-impooverished, neurologically-impaired subject.

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CHAPTER III

METHOD

Definition of Terms

For purposes of the present investigation, "neurological impairment" is operationally defined on the basis of (1) neurological examination data from which the neurologist concluded that the results strongly suggested minimal brain injury, neurological impairment, or the like,¹ and (2) comprehensive psychological evaluation data from which the examining psychologist concluded the probable presence of visual-perceptual inadequacies having an organic basis. Neurological examination data and comprehensive psychological evaluation data are considered important criteria in that they tend to provide indices by which a relatively homogeneous group of "neurologically-impaired" children can be established. Investigators (2, 3, 4) have suggested that such criteria are meaningful in identification of the child with minimal brain

¹Children with disorders of the central nervous system are known also, in the lexicon of neurology, as neurologically handicapped, neurologically involved, or evidencing diffuse or nonfocal encephalopathy.

injury in the absence of more definitive anatomic or neurologic evidence of brain damage.

"Absence of neurological impairment" is determined through comprehensive psychological evaluation on the basis of which the examining psychologist determined that visual-perceptual inadequacies were not apparent in the subject's overall psychometric performance; hence "neurological impairment" was considered unlikely.

A third definition important to the present study is level of intellectual functioning. All the children included in the present sample were required to evidence "average intellectual capacity," the latter operationally defined on the basis of intellectual functioning as measured by any one of the following instruments:

1. Wechsler Intelligence Scale for Children.
2. Stanford-Binet Intelligence Scale, Form L-M.
3. California Test of Mental Maturity.
4. Wide Range Achievement Test.

More specifically, intellectual functioning on any one of these instruments, indexed in terms of full scale performance and/or performance on any one of the sub-scale levels, which placed within the I. Q. range between 85 and 115, inclusive, was considered indicative of "average intellectual capacity."

The specific "signs" or Rorschach variables to be investigated were color naming, perseveration or repetition of responses, less than fifteen total number of responses, less than six total number of different content categories, and less than two human movement responses. The latter three variables are scored according to Beck's (1) criteria and derive operational meaning therefrom. Color naming, or Cn, is operationally defined as notation in the protocol of a response in which the subject apparently only attempted to name colors in a chromatic card. For example, notation in the protocol might be: "I see red, orange, blue, etc.," without further notation by the examining psychologist. The key determinant in the manifestation of color naming was that the subject's color reaction did not include an apparent attempt to perceive "something" as color; for example, "blood" in response to red, or, "I see something blue," or, "There are green, yellow, and blue things," do not represent color naming responses.

Perseveration or repetition of responses (R/P) is defined as notation in the protocol of the same response at least three times to different cards regardless of specific determinant of the response. If the subject mentioned "Bat" or "design" or "map," etc. at least three times to at least

three cards, such was considered evidence of R/P. In one protocol, color naming occurred at least three times and was considered also as R/P; also considered as R/P was repetition of the phrase "a messy thing" as noted more than three times in a protocol.

Subjects

The subjects consisted of eighty-eight male and female children referred to the Educational Clinic of the Dallas Independent School District within the last eight years for comprehensive or full-battery psychological test evaluation. Only Caucasian children were included in the study. More specifically, records of approximately 500 children were available in which was contained data stemming from both comprehensive psychological test evaluation and neurologic examination. From these 500 records were chosen a total of forty-four subjects who met the prescribed criteria of "average intellectual capacity" and "neurological impairment" and whose chronological ages were within the prescribed range, extending from six and a half to ten years, inclusive. Several hundred records were available in which was contained data stemming from comprehensive psychological test evaluation. From these records were chosen the first forty-four subjects whose chronological ages were within the

age range extending from six and a half to ten years, inclusive, and who met the prescribed criteria of "average intellectual capacity" and "absence of neurological impairment."

Procedure

Subjects were assigned to one of two groups on the basis of absence or presence of "neurological impairment," as prescribed. Each subject was also required to evidence "average intellectual capacity" as prescribed. Hence, two groups of forty-four subjects each, equivalent on the basis of chronological age, level of intellectual functioning, and sex were composed; that is, a group of subjects with "neurological impairment" (NI) and a group of "non-neurologically-impaired" subjects (NNI).

For every subject there was available a Rorschach protocol scored according to Beck's criteria. The protocols were originally obtained by professional personnel employed in the Educational Clinic as examining psychologists, the latter possessing (1) graduate training in both psychology and in psychological testing and supervised internship in the Educational Clinic, or (2) a master's degree in psychology, graduate training in psychological testing, supervised internship, and several years experience in the Educational Clinic.

The Rorschach protocols were analyzed twice, once by the experimenter and once by the Senior Psychologist in the Educational Clinic. Each analysis was done independently and in ignorance of the neurological condition and identity of the particular subject. Points of disagreement between the two independent scorers were discussed and clarified prior to statistical treatment of the data. Specifically, the Rorschach protocol of each subject was tabulated to determine if there was at least one occurrence of the following five variables:

1. Less than fifteen total number of responses to the ten cards ($R < 15$).
2. Color naming (Cn) as defined on page 26.
3. Repetition or perseveration of responses (R/P) as defined on page 26.
4. Less than two human movement responses ($M < 2$).
5. Less than six total number of different content categories evidenced in a protocol (Content < 6).

In accordance with the hypothesis stated in the Introduction with respect to these variables, it was predicted that^a significantly greater number of children with neurological impairment would evidence the above "signs" or variables in their Rorschach performance when compared to the Rorschach performance of children without neurological impairment.

In order to test the significance of difference between the NI and NNI groups with respect to each of the five Rorschach variables, five chi square analyses were carried out. To accomplish these statistical operations, five four-fold contingency tables were devised to yield two categories of neurological condition and two categories of performance for each Rorschach variable.

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CHAPTER IV

RESULTS AND DISCUSSION

Results

The two categories of performance established for each variable are indicated in Table I, as are the observed frequencies of each group corresponding to the five Rorschach variables. The results of the investigation are summarized in Table II. For each of the five dependent variables shown in Table II are listed the corresponding chi squares obtained and the level of significance at which the null hypothesis in each case is either accepted or rejected. Yates' correction for continuity (2, pp. 164-167) was applied in the cases of color naming (Cn) and human movement ($M < 2$), since the expected cell frequencies corresponding to these two variables were less than ten.

Discussion

An examination of the experimental results reveals that the obtained chi squares corresponding to the dependent variables $M < 2$ (less than two human movement responses), Cn (color naming), and Content < 6 (less than six total number

TABLE I

OBSERVED AND EXPECTED FREQUENCIES AND PER CENT
OF TOTAL OF OBSERVED FREQUENCIES FOR
EACH VARIABLE IN EACH GROUP

Rorschach Variable	Neurologically Impaired			Non-neurologically Impaired		
	O	E	Per Cent	O	E	Per Cent
		()	()		()	()
R < 15	23	(27.5)	52	32	(27.5)	72
R = 15, > 15	21	(16.5)	48	12	(16.5)	28
Cn	6	(3.5)	14	1	(3.5)	2
No Cn	38	(40.5)	86	43	(40.5)	98
P/R	20	(14)	45	8	(14)	18
No P/R	24	(30)	55	36	(30)	82
M < 2	35	(35.5)	79	36	(35.5)	82
M = 2, > 2	19	(8.5)	21	8	(8.5)	18
Content < 6	30	(32)	68	34	(32)	77
Content = 6, > 6	14	(12)	32	10	(12)	23

O = Observed Frequencies.
E = Expected Frequencies.
Per Cent = Per Cent of total of Observed Frequencies.

TABLE II

SUMMARY OF THE RESULTS OF THE
CHI SQUARE ANALYSES

Variable	df	Chi Square	Level of Significance	Null Hypothesis
R < 15	1	3.9270	>.05	Reject
Cn	1	2.5942*	<.05	Accept
R/P	1	7.5428	>.01	Reject
M < 2	1	1.7042*	<.05	Accept
Content < 6	1	.9166	<.05	Accept

*Corrected for continuity: Yates' Correction.

of different content categories) are significant at levels above .05, making it necessary to accept the null hypothesis that these chi squares obtained in the population represented by the sample could have occurred by chance. Hence, the experimental data do not support the hypothesis that Rorschach performance as measured in terms of Cn, $M < 2$, and Content < 6 is related significantly to neurological impairment in the children represented in the present sample. With respect to dependent variables $R < 15$ (less than fifteen total number of responses) and P/R (perseveration or repetition of responses), the obtained chi squares are significant at the .05 and .01 levels, respectively, making it possible to reject the null hypothesis in favor of the alternative hypothesis that the two variables are related in the population represented by the sample.

Data presented in Table I indicate that only with respect to R/P can it be stated that experimental results support the hypothesis that Rorschach performance is related significantly to neurological impairment in children. In the case of $R < 15$, the direction specified in the hypothesis is the opposite of that indicated by the experimental findings. As indicated in Table I, a significantly greater number of children without neurological impairment (seventy-two per cent) evidenced in their Rorschach performance $R < 15$,

suggesting that the tendency to produce relatively few total number of responses is more characteristic of children without neurological deficit, or, since there appears a tendency in both groups to produce relatively few total number of responses, limited productivity may be characteristic of children in the age range six to ten years, regardless of neurological condition.

The finding that P/R is significantly related to neurological impairment is in line with expectations stemming from the literature. One would expect the neurologically-impaired child, who is plagued with limited capacity to organize and integrate present percepts with past experiences, to be unable to accomplish a creative and imaginative level of perceptual functioning as required in the interpretation of an ambiguous inkblot. Rather, R/P seemingly indicates that the neurologically-impaired child tends to rely upon responses once made because of an inability to improve upon or create a better response.

However, inspection of Table I suggests that R/P is seldom evidenced in the Rorschach performance of non-neurologically-impaired children, occurring about eighteen per cent of the time. Also indicated in Table I is that R/P tends to be evidenced relatively infrequently in the

Rorschach performance of children with neurological impairment. Hence, in the individual case, R/P would seem to take on less meaning in terms of differential diagnosis and should be interpreted cautiously as suggestive of neurological impairment per se.

Although the experimental results with respect to Cn are not significant, some noteworthy observations can be made. Table I indicates that Cn occurred quite rarely in both groups and practically not at all in the non-neurologically-impaired group. With regard to Cn in adults, Baker (1) noted that schizophrenics tend to evidence the Cn response more frequently than the organic subject. Piotrowski (3) has indicated that Cn may "occur in mentally very sick adults and in very immature young children. They are produced by confused schizophrenics, epileptics, and sometimes by intellectually inferior adults having no demonstrable lesions of the central nervous system" (p. 241). Halpern has indicated that Cn may occur rarely in the Rorschach performance of schizophrenic children apparently as an effort to relate to the environment in "a most arbitrary and uncontrolled order . . ." (2, p. 196). The implication with respect to Cn in the present study is that its occurrence may relate to severe emotional maladjustment rather than

merely to level of neurological impairment. To be sure, neurologically-impaired children are also plagued with varying degrees of emotional maladjustment which, to the extent of its severity, may tend to be the primary influence related to the Cn response.

The application of the Rorschach in the detection of brain damage in adults and children is a matter of course in some clinical settings. With respect to children, the validity of application of the Rorschach as suggested is questionable on the basis of the results obtained in the present investigation. The general hypotheses that the Rorschach performance of children with neurological impairment is significantly different from that of children without neurological deficit and that the difference can be measured according to five specific "signs" have not been substantiated by the present study. As discussed above, only one of the five "signs" was significant in the direction predicted; yet surely one type of Rorschach response is not sufficient evidence of neurological impairment.

The composition of the two groups utilized in the present investigation may have considerable bearing on the overall results obtained. The information presented in Table I indicates that the two groups are more alike than

different in terms of Rorschach performance as herein measured. The implication is, then, that the two groups may not be truly distinct or different in composition. The vast majority of children have been referred to the Educational Clinic on the basis of emotional, behavioral and learning difficulties within the school setting. These children manifest common problems of poor adjustment to classroom activities and to peer relationships, negative self-concepts, basic feelings of insecurity, inadequacy and anxiety, and emotional instability with limited capacity to control their feelings. Hence, the two groups defined in the present study as "neurologically-impaired" and "non-neurologically-impaired" seemingly may be much more alike psychologically (i. e. emotionally, behaviorally, and intellectually) than they are different neurologically, that is, different in terms of visual-motor coordination or visual-perceptual functioning. Such being the case, one would not expect to find numerous significant differences between the two groups as measured by psychological tests that assess personality make-up. Hence, in the present study, the Rorschach performance of children in either group tended to reflect uniformity in psychological functioning and revealed very little in terms of neurological integrity.

Future investigations in which "neurological impairment" is more stringently defined and in which emphasis is given to more quantitative aspects of Rorschach performance may produce more meaningful and significant results. Comparisons of neurologically-impaired children and non-neurologically-impaired children which are limited to specific age ranges, as for instance at yearly or half-yearly age levels between ages six to ten years, might reveal significant differences in Rorschach performance which have been blurred in the use of a wider age range.

It is not the intent of the present study to suggest that the Rorschach is without merit in the investigation of children referred to an educational or child guidance clinic. Information provided by the Rorschach relative to a child's personality make-up remains useful primarily in terms of planning in the psychotherapeutic realm. The present study suggests only that neurological impairment as defined herein apparently has little effect in a child's Rorschach performance as measured in terms of five specific variables or "signs."

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CHAPTER V

SUMMARY

The problem with which this study was concerned was that of determining the effect of neurological impairment on the Rorschach performance of children. Further investigation of the relationship between Rorschach performance and neurological impairment was undertaken, since a review of the literature indicated that the primary emphasis of research had been to investigate the validity of psychometric indices of neurological involvement while relatively little attention had been given to study of the relationship between neurological impairment in children and projective test performance. Moreover, the overwhelming bulk of research related to the investigation of Rorschach performance and brain damage has been concerned with adult, clinical populations.

Examination of the work of Piotrowski, Halpern, and others revealed that neurologically impaired individuals tend to evidence in their Rorschach performance characteristic responses, the five most typical responses being color naming, perseveration or repetition of responses, and

limited productivity with respect to total number of responses, human movement responses, and total number of different content categories. This investigation attempted to demonstrate that the Rorschach performance of neurologically-impaired children differed significantly from the Rorschach performance of children without such impairment for these five responses or variables, as derived from a child's Rorschach protocol. Specifically, it was proposed that in comparison to non-neurologically-impaired children, a significantly greater number of children with neurological impairment would evidence in their Rorschach protocols fewer than fifteen total number of responses to the ten cards, at least one occurrence each of color naming and perseveration or repetition of responses, fewer than two human movement responses, and fewer than six total number of different content categories.

A chi square design was employed to test the hypothesized relationship of neurological impairment to Rorschach performance in children. The subjects were similar in level of intellectual functioning, chronological age, and sex. "Neurological impairment" was operationally defined such that a "neurologically-impaired group" and a "non-neurologically-impaired group" could be composed on the

basis of data stemming from neurologic and/or psychologic evaluation.

Five variables of Rorschach performance served as the dependent variables, and for each dependent variable two levels of neurological condition served as the independent variables in the chi square analyses. Chi squares were computed for each of the five dependent variables and the corresponding independent variables. Two of the five chi squares were shown to be statistically significant at the .05 and .01 levels, respectively.

The results of the chi square analyses did not support the hypothesis that neurological impairment, as defined, was related to a child's Rorschach performance, the latter measured in terms of five variables. However, a single variable, namely repetition or perseveration of responses, was shown to differentiate significantly the neurologically-impaired child from the non-neurologically-impaired child.

The implications of the findings were discussed in relation to the composition of the two groups utilized in the investigation. It was suggested that the Rorschach remains useful in the personality assessment of children referred to an educational or child guidance clinic regardless of a child's neurological condition. It was also suggested that neurological condition and Rorschach performance likely may be fruitfully

investigated according to specific age levels and/or more quantitative aspects of Rorschach performance.

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