1961

Pattern Analysis of Movement Responses and Location Choices on the Rorschach

Thomas F. Grib
Loyola University Chicago

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by

Thomas F. Grib

A Dissertation Submitted to the Faculty of the Graduate School of Loyola University in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

June

1961

LIFE

Thomas F. Grib was born in Chicago, Illinois, August 25, 1933.

He graduated from De La Salle Institute in June, 1951, and received the degree of Bachelor of Arts from Loyola University in June, 1955.

The author began his graduate studies at Loyola University in September, 1955. From 1956 until 1957 he was employed as a Graduate Assistant, and during the academic year of 1957-1958 he was engaged as a Teaching Fellow by the Department of Psychology at Loyola. He served as a research assistant for the Commonwealth Fund project at Loyola from December, 1957 until February, 1960. He received the degree of Master of Arts from Loyola University in February, 1959.

While studying for his Doctor's degree he completed internships at Mercy Hospital Psychiatric Clinic and at the Illinois Youth Commission's installations at St. Charles and Joliet, Illinois.

At present he is employed as Staff Psychologist at Mercy Clinic in Chicago, and as a part-time Lecturer at Loyola University.

ACKNOWLEDGMENTS

This investigation, part of a larger research project, was supported in part by a grant from The Department of Public Welfare, Mental Health Service, Psychiatric Training and Research Authority, Project Number 1752.

The author is especially indebted to Horace J. A. Rimoldi and Frank J. Kobler, and wishes to express his gratitude for their interest and assistance in this research.

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CHAPTER I

INTRODUCTION AND PURPOSE

The method of personality investigation published by Hermann Rorschach in 1921 was primarily an empirical one. Rorschach regarded his test not as a finished experimental product but as a tentative clinical tool for diagnosis whose theoretical foundation was, as yet, incomplete. He specified that the conclusions drawn should be viewed as observations rather than theoretical deductions. Among other things, he was dissatisfied with the insufficient quantitative basis for the test and its interpretation.

Recent writers have returned to Rorschach's view of his technique as a method of observation rather than as a personality test (Ainsworth, 1954) and to his concern for quantification (Beck, 1959) as a measure of furthering research on the instrument.

According to Ainsworth it is more productive to regard the Rorschach as a method of observation and appraisal than to class it as a "test" of personality. She points out what she believes to be a crucial difference between the Rorschach and the typical psychological test:

> The typical psychological test deals with one variable or function, and attempts to provide a means of placing all tested individuals on a continuum with respect to that function....Projective techniques such as the Rorschach deal with n functions or variables and attempt to describe the

> individual in terms of a dynamic pattern of interrelated functions or variables. This multiplicity of interrelated and interdependent variables constitutes the most important difference between projective techniques and other types of psychological tests and presents one of the greatest problems of validation (Ainsworth, 1954, p. 410).

She reasons that, by regarding the Rorschach as a method of observation rather than as a test, research will focus on the various interpretive hypotheses attached to these observations (number of human movement responses, form level, location choice, etc.) rather than following the pattern of test validation. In this way, the basic foundations and principles of the technique will be investigated. These principles, as a result of such investigation, may then be either discarded, modified or refined.

Beck argues for a statistical validation and procedure for the Rorschach. According to him, one should proceed by establishing norms, based on statistics, for a group and use them as points of departure to evaluate other groups. He states that

> Another pitfall has been that of using it (the Rorschach) practically before the necessary research has been carried on for the problem presented by the personality group in question....The empiric research must always first establish the personality pattern, in whatever group (Beck, 1959, p. 275).

The present study was planned with the above criteria in mind; namely, that it treat the data as observations rather than test scores and that it do so in a quantifiable manner.

The purpose of this research is twofold: first, to investigate patterns of movement responses and location choices on the Rorschach to see if, in fact, different patterns are revealed, and second, to determine whether the characteristic pattern (or patterns) of neurotics is

different from the pattern manifested by normal subjects.

These two variables, movement responses and location choices, were selected for investigation for the following reasons: The movement responses on the Rorschach are considered the most important single variable and have attached to them the richest variety of interpretive hypotheses. The location choices are probably the most objectively recorded variable and present the least problems in scoring. Furthermore, since movement responses on the Rorschach seem to involve the greatest degree of projection on the part of the individual (Beck, 1951; Klopfer, Ainsworth, Klopfer and Holt, 1954; Piotrowski, 1957; Rorschach, 1942), and the location choices he uses are thought to reflect his "manner of approach" in perceiving and dealing with reality (Klopfer et al., 1954; Klopfer and Kelley, 1942; Rorschach, 1942), analysis of these responses would seem to be among the most fruitful in attempting to discover differences in the response patterns of normals and neurotics.

Rather than attempting to describe the personality characteristics of individuals on the basis of their pattern of responses, the main purpose of this study is to ascertain whether there are different patterns of response which may form the foundation for further research (i.e., investigation into the actual significance of the various patterns). Thus, this study is of an exploratory rather than of a validating or predictive nature, and is related to construct validity as contrasted to concurrent or predictive validity. It is essentially concerned with mapping out an area rather than being primarily predictive in purpose.

Although Rorschach experts have always stressed that interpretations should be based on patterns of response and not on individual "signs" or isolated indicators, the problem of scoring or objectively characterizing patterns has always been a vexing one.

In regard to handling patterns of Rorschach data statistically, Cronbach points out that, while patterns of scores are considered in clinical practice, "there is no practical statistical procedure for studying the infinite complex interrelations of scores and indications on which the clinician relies" (Cronbach, 1949, p. 417).

The method employed in this study for the characterization and comparison of movement responses and location choice patterns was the pattern analysis technique developed by Rimoldi and Grib (1960). This technique was selected for the following reasons:

1. It treats the data as observations, rather than as measurements. The responses of the subjects are not assigned any a priori weights, scores or values, but are merely recorded as present or absent.
2. It takes into account not only the responses given, but also those responses which may have been made, but were not. That is, all of the behavior of the subject is considered as constituting his response pattern; rejecting a card is just as much a response as is seeing a human being in action on the card.
3. The analysis takes place at the level of patterns of responses, not of isolated responses per se. It has been shown (Rimoldi and Grib, 1960a, 1960b) that the same response has a different

interpretation according to the pattern in which it occurs.

4. The method provides a quantitative basis for the characterization and comparison of response patterns.

While the method of pattern analysis to be used in this study does not pretend to be a complete solution to the problem of handling Rorschach data statistically, it is felt that it does provide an objective, quantitative basis for characterizing and comparing patterns of Rorschach responses.

CHAPTER II

REVIEW OF THE LITERATURE

It is not the purpose of this chapter to give a comprehensive review of the voluminous literature on the Rorschach, which is currently well past the 2,000 mark (Murstein, 1960). Readers interested in more inclusive coverage are referred to reviews by Ainsworth (1954), Barrell (1950), Bell (1948), Hertz (1942; 1951), Klopfer et al. (1956), Piotrowski (1947; 1957) and Rickers-Ovsiankina (1943).

The survey of literature related to this study will be discussed under three headings: (1) Rorschach research methodology; (2) pattern analysis; and (3) meaning and interpretation of movement responses and location choices.

Rorschach Research Methodology

The experimental studies of the Rorschach reported in the literature can be classified into two types, those taking a "holistic" or molar approach and those using a molecular approach.

The molar approach traditionally deals with clinically interpreted case records. The Rorschach record is usually interpreted qualitatively and in a highly complex manner, and many studies have been based on these interpreted records.

In one type of study, the "matching technique," a number of judges are required to match personality sketches based on Rorschach interpretations with sketches written on the subjects by using other techniques such as psychiatric interviews, peer and teacher ratings, case history material and so forth. The matchings using both techniques are then compared. In one such study, Vernon (1935) reported a contingency coefficient of .833 ± .0315, which indicates a high degree of agreement between the matchings.

Benjamin and Ebaugh (1938) performed a study which fits in this category. One of the authors examined a group of patients psychiatrically, while the other made a diagnosis on the basis of Rorschach performance. There was complete agreement in 85 per cent of the cases (39 out of 46) and only minor disagreements in 5 other cases. Another illustration of the molar approach was Krugman's report (1942) of an average contingency coefficient of .83 between Rorschach evaluations of problem children and case history material.

Although studies of this type may be indications of the validity of the Rorschach they are not proofs. The agreement is affected by factors besides the Rorschach such as the training of the judges and the number of elements to be matched. Cronbach (1949) points out that even though the matching is perfect this does not guarantee that each element of each personality description was correct, especially if the group of subjects is quite heterogeneous. Hunter (1939), for example, using a highly selected sample, reports that only 5 out of 50 Rorschach reports on school children were correctly matched by all judges with personality descriptions

written by teachers.

Another reason for discouraging holistic methods as a means of investigating the Rorschach is that techniques such as "blind analysis," matching, or studies predicting success or failure on some performance criteria from general Rorschach performance, do not tell us enough about the operation of the test itself, what elements were responsible for the correctness of the prediction and which ones were misleading.

A further criticism frequently leveled at the holistic approach as a measure of Rorschach test validity is that interpretations depend as much on the clinical acumen of the interpreter as they do on the test itself. At least, it is held, the contributions made by each cannot be determined separately (Rabin, 1951).

Studies using the molecular approach attempt to investigate the validity of single Rorschach scores or combinations of scores. The majority of these studies have been of a statistical nature and have treated the Rorschach scores directly, with clinical judgment eliminated. Although studies using the molecular approach have been designed in order to overcome the shortcomings of molar studies, the results have, in general, been disappointing (Ainsworth, 1954).

One of the main criticisms of molecular studies is that they do not include enough data pertaining to the scoring categories. The usual procedure has been to deal with data in the form of simple summation of the number of responses in various scoring categories. This procedure, however, may result in two groups appearing similar when, in fact, they are

not so. Thus, two groups producing an equal number of human movement responses but using different cards will appear identical if only the number of responses is taken into account, when, actually, the groups may be quite dissimilar regarding the location of their responses.

Studies of this type, usually dealing with only the raw quantitative data pertaining to the scoring categories frequently result in conflicting findings. The following two studies of Rorschach factors related to intelligence serve as an illustration.

Wishner (1948) made a correlational study of Rorschach indicators of intelligence among a group of 42 neurotics. He correlated 17 "reputed intelligence factors" with the various subscores of the Wechsler-Bellevue. Number of responses (R), number of whole responses (W), and Beck's organizational measure, Z, turned out as the three highest indicators of intelligence on the Rorschach. In another study, using 228 college students, Altus and Thompson (1949) tested Rorschach's suggestion that a large percentage of sharply conceived forms (F+%), many movement responses (M), many whole responses (W), and a low per cent of animal forms (A%) characterized high intelligence. They found correlation coefficients of .35 and .45 for the M and W respectively, while neither F+% nor A% seemed significantly related to intelligence.

Ainsworth feels that the conflicting results of molecular studies are due to the interrelated and interdependent nature of the Rorschach scores, and that "each separate hypothesis is applicable only within a certain range of configurations and is modified by the particular

configuration in which it appears" (Ainsworth, 1954, p. 412). Ames, Learned, Metraux and Walker (1952) agree with Ainsworth that "the chief problem in (Rorschach) validation is the difficulty of designing a study which would give results that might be treated statistically, and yet would utilize the patterning of variables" (Ames et al., 1952, p. 13).

Although many Rorschach workers have stated the need for a method of handling patterns of Rorschach scores, it is only within the last five years (Klopfer and Spiegelman, 1956) that this method has been advocated as the primary method of Rorschach analysis.

Klopfer and Spiegelman, in discussing methodological research problems with the Rorschach, criticize studies which deal with only one variable on the test or use a group of variables as "signs" of particular nosological groups. They state that:

> One of the most obvious statistical reasons for the inappropriateness of the sign approach is the empirical fact that there are hardly any signs whatever that prove to be "pathognomic" (Klopfer and Spiegelman, 1956, p. 270).

In addition, they question whether dealing with isolated variables or groups of indicators by simply summing their occurrence and then treating the results statistically is really "being objective" as other investigators claim. Klopfer and Spiegelman feel that working with only the totals of different Rorschach scores takes them out of the full context in which they were observed, and foregoes the possibility of using the "natural pattern" of the observed phenomena. Instead of using a molecular approach, they propose using observed patterns of scores as the proper basis for research on the Rorschach, and seem to be the first to relate the

utilization of patterns of scores to a basic Rorschach rationale. They argue for the adaption of a phenomeonological approach as a basis for Rorschach interpretation and research. They formulate the basic ideas of this adaption as follows:

> The observable phenomena, both in the field of internal (introspective) and external observation, do not offer themselves in the form of an unstructured mass of related items. Rather, they fall into a "natural" pattern or configuration with specific foci and emphases.
>
> The observer cannot avoid using a definite frame of reference in describing his observations. This frame of reference, however, may impinge on the natural pattern of the observed phenomena--even distort or destroy the pattern. On the other hand, it may leave this natural pattern undisturbed, or throw it into clearer relief.
>
> The phenomenological approach, as understood here, focuses on this interplay between the observer's frame of reference and the natural pattern of the observed phenomena. The phenomenologist deliberately attempts to modify his frame of reference in order to achieve maximal clarity of the natural pattern in the observed phenomena (Klopfer and Spiegelman, 1956, p. 276).

They go on to state that, within the clinical field, the object of observation is the behavior of the patient, and that Rorschach records are condensed samples of observable behavior. Furthermore, they feel that it is easier to apply the phenomenological approach in interpreting Rorschach records than in interpreting clinical behavior, since it is harder for several observers to agree on the "natural" pattern of observed clinical behavior because this behavior is beyond the limits of a relatively standardized situation within a limited time.

"The most important problem in the use of the phenomenological approach in the Rorschach," according to Klopfer and Spiegelman, "is the

task of subdividing the natural pattern of the total record into sub-wholes, without losing any of the important idiosyncratic characterization" (Klopfer and Spiegelman, 1956, p. 279).

In sum, Klopfer and Spiegelman argue for using the "natural patterns" of the patient as they appear in the Rorschach responses, without distortion or destruction of this pattern.

Pattern Analysis

Various techniques of pattern analysis have been described in the past. However, most of the methods have concerned themselves with the question of the scalability of the items (Stouffer, Guttman, Suchman, Lazarsfeld, Star and Clausen, 1950; Green, 1956; White and Saltz, 1957), or measuring the distances between items (Osgood and Suci, 1952). Summaries of these procedures have been described by Gaier and Lee (1953), White and Saltz (1957) and Torgerson (1958).

In the scalogram approach, a particular arrangement of items is compared to a perfectly scalable model and the measure of agreement with the model is expressed, usually as a function of the number of "errors" observed when comparing the two patterns. Since each "error" receives an identical value, the ability of such techniques to discriminate between subjects making the same number of errors is not present. Furthermore, since these techniques are designed to estimate the degree of departure of a group of items from perfect scalability, their use is limited to problems involving the hypothesis of scalability.

In 1949, Cronbach described a method called "pattern tabulation"

designed to deal with patterns of scores with particular reference to the Rorschach. This method involves normalizing the scores for each person and considering the resulting profile, which is expressed numerically in terms of the deviation of the normalized scores from their average for each person. The patterns can be plotted to show the distribution of patterns in the group (Cronbach, 1949b).

This method, however, cannot deal with more than three scores at a time, and functions best when these scores are equally reliable and equally intercorrelated (Cronbach, 1949a). This specification is not usually met when using Rorschach data. In addition, Cronbach's method does not provide a purely quantitative characterization of the over-all pattern, nor can it discriminate, in a pure quantitative manner, between different patterns.

Block, Levine and McNemar (1951) described a procedure for testing for the existence of psychometric patterns which is somewhat similar to Cronbach's method. After converting the determinant raw scores into McCall T-scores, they then plot the scores for the various determinants. Thus, each determinant receives a T-score value and, when the scores for various determinants are plotted, this gives the "profile."

Wirt (1956), using this method, found differences in the determinant patterns of normal, neurotic and psychotic persons, but no differences in their card patterns (number of responses per card). This method is not able to compare over-all patterns of the groups, but can only report differences between the determinants separately. Furthermore, the separate

patterns are not themselves quantitatively characterized.

In sum, the previous techniques of pattern analysis have not been able to characterize patterns as a whole in quantitative terms, nor have they been able to compare complete patterns with one another in a purely quantitative manner; the best they have been able to achieve is a means of quantifying and comparing the separate elements of the patterns. Furthermore, these methods treat all scores as equivalent in their contribution to the over-all pattern. In terms of Rorschach theory, this does not seem to be advantageous. It means, for example, that a deviation in a determinant such as M, which is regarded by most authors to be the most personally revealing of all Rorschach determinants, is treated as equivalent to a similar deviation in m, a determinant whose meaning is less clearly defined and is not even scored by some experts.

Lastly, these methods all involve transformations of the original data as observed and may thus distort the "natural pattern" of observed responses.

The primary method of analysis to be employed in this study will be the method of pattern analysis described by Rimoldi and Grib (1960a; 1960b). This technique for objectively characterizing and quantitatively comparing patterns of responses uses an original type of scoring procedure which has wider application than those previously discussed. The technique not only provides a measure of agreement for the separate elements of a pattern, but also expresses the agreement of the pattern as a whole with another pattern in a purely quantitative manner. The method can deal with

any number of scores along a number of dimensions, and makes no assumption concerning the correlation between the separate items or scores. Deviations between patterns (or between separate elements of patterns) are expressed in an unambiguous manner, with both the minimal and maximal possible deviations being taken into account. Finally, the method treats the natural pattern of responses as they are observed without prior transformation, scoring or distortion.

Any type of response can be handled by the technique provided that it can be dichotomized (presence/absence of a particular trait, choice/non-choice of a stimulus, etc.). The data are arranged in an n-dimensional matrix, the number of dimensions depending on the number of response variables. In characterizing the response pattern, each cell of the matrix is assigned a numerical weight based on the contribution of both subject and item to the over-all pattern.

An observed pattern of responses can be evaluated against an hypothetical, expected or another observed pattern by comparing the congruence of the cells of both response matrices. This method yields an "Index of Agreement" which varies from 1.00, representing complete agreement, to 0, representing complete disagreement or largest possible deviation between the patterns.

For a fuller description of the assumptions, properties, procedure and applications of the method see Rimoldi and Grib (1960a; 1960b). The technique has been used by Tabor (1959) to explore the interpretive procedure followed by Rorschach experts in making a diagnosis from Rorschach

protocols, and by Mohrbacher (1960) to investigate the clinical diagnostic process of psychiatrists, psychologists, and social workers. An example of the procedure is presented in Appendix III.

Meaning and Interpretation of Movement Responses and Location Choices

Although there have been numerous studies dealing with movement responses (Altus and Altus, 1952; King, 1958; Klopfer et al., 1954; Phillips and Smith, 1953; Piotrowski, 1952; Thomas, 1955) and location choices (Beck, 1945; Klopfer et al., 1954; Rorschach, 1942; Siegel, 1951), none of them have dealt with individual patterns of response in a quantitative manner. Instead of considering individual patterns, the investigators have been concerned with certain specific patterns likely to occur in many records. Also, the approach taken has frequently imposed the limitation that the same pattern of scores must be studied in all cases.

Many Rorschach investigators consider the human movement response (M) to be Rorschach's most original contribution to his method of personality appraisal, and several later workers have stressed the importance of animal (FM) and inanimate (m) movement[1] (Klopfer et al., 1954; Piotrowski, 1957; Phillips and Smith, 1953; King, 1954).

The human movement response, because of its revealing nature, is considered the most important of the movement responses. Although he recognized that movement interpretations involving animal forms and

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[1]The abbreviations M, FM, and m representing human movement, animal movement, and inanimate movement respectively will be used extensively in this study.

inanimate objects were produced by subjects, Rorschach held that they were not true movement responses and assigned them no specific meaning.

Rorschach gave more attention and assigned more space to his discussion of M than any other component. He viewed it as reflecting the most human elements of the personality, specifically mentioning six interpretations of it: intelligence, creativity, suggestibility, emotional stability, rapport and empathy (Rorschach, 1942). Most other Rorschach workers have accepted these interpretations with some modification, either expanding or limiting its meaning but not changing it essentially.

Klopfer et al. (1954) regard M as "perhaps the most significant and yet, interpretively the most elusive single determinant." They relate its significance to the four areas of imaginal life, emotional integration, empathy and ego function. They state that:

> The M response thus touches upon all of the most important aspects of the well-functioning personality, bridging the gap between inner resources of drive and fantasy and the outward orientation of reality testing and object relations (Klopfer et al., 1954, p. 255).

Within these four areas of imaginal life, emotional integration, empathy, and ego function, Klopfer et al. attach seven interpretive hypotheses relating to intelligence, imagination, inner stability, value system, self-acceptance, empathy and self-concept (1954, pp. 256-264).

Phillips and Smith (1953) hold that all movement responses, possibly except those involving abstract content, reflect some aspect of role-taking and assigning (p. 60). They relate M to self-control, empathic participation, sensitivity to others and freedom of self-expression in

conformance with long-range goals (pp. 69-75).

Piotrowski, in his latest work (1957), restates his 1936 "nuclear definition" of the human movement response:

> The M represent the conception of life according to which the individual makes his adjustment to reality. The M stand for the most individual and integrated strivings which dominate the individual's life. Thus the M indicate traits stabilizing the relation between the individual and his environment (Piotrowski, 1957, pp. 140-141).

The scoring of animals seen in action (FM) was introduced by Klopfer and Sender (1936), and has been adopted by Piotrowski and Phillips and Smith.

Klopfer et al. (1954) attach the following interpretive hypothesis to FM responses:

> FM responses indicate an awareness of impulses to immediate gratification, which, in contrast with the conscious goals represented by the M responses, tend to be impulses regarding which the person often lacks insight, understanding and acceptance. These impulses stem from the most primitive or archaic layers of the personality, either having an instinctual basis or having been acquired very early in the life of the individual--in his pre-verbal years--or both (Klopfer et al., 1954, p. 265).

In regard to FM, Piotrowski (1957) feels that, besides being a measure of physical buoyancy, it reflects the roles in life that were prominent in the individual's past, which influence overt behavior only in states of lowered integration, diminished consciousness or defective self-control. Phillips and Smith (1953) and Klopfer et al. (1954) stress the importance of interpreting FM in relation to M. The former authors state that, in the adult, the degree of FM dominance over M reflects the degree to which productive potential is wasted.

Inanimate movement (m) has received the least amount of attention in the literature, and its clinical significance is somewhat ambiguous and vaguely defined. Piotrowski (1957) views m as reflecting the prototypal life roles of the individual that are less well integrated into his personality. For Klopfer et al. (1954) inanimate movement represents an awareness of forces outside the control of the subject which threaten his personality integration. Phillips and Smith (1953) emphasize the feeling of the individual that the forces represented by m are beyond his control.

The interpretive hypotheses connected with the individual's location choices (W, D, d, Dd and S)[2] are related to his intellectual manner of approach to his environment. The way he approaches the inkblots is thought to be a sample of how he uses his intelligence in life situations (Klopfer et al., 1954), how an individual attacks his problems (Beck, 1945), and how he uses his available mental and physical energy (Piotrowski, 1957).

Rorschach distinguishes a series of "apperceptive types" according to the relationships of W, D and Dd to each other as they occur in the individual's responses. He states that:

> The idea of apperceptive types would be defined most clearly if the strictness or laxity of the succession of the W's, D's, etc. could be expressed simultaneously in a single formula. This could not be done without undue complications, and the type had to be fixed simply according to the number of W's, D's, etc., produced by the subject (Rorschach, 1942, p. 43).

Thus, even with the inception of the method itself there was the suggestion

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[2]The abbreviations W, D, d, Dd and S representing a response using the whole blot (W), a large usual detail (D), a small usual detail (d), a rare detail (Dd) and the white space (S) following Klopfer et al.'s definitions (1954) will be used in this study.

that patterns of responses, not isolated responses, are the most fruitful means of defining different types of individuals.

CHAPTER III

METHODOLOGY AND PROCEDURE

Sample

The data for this research was obtained from the Rorschach protocols of 200 normals, 100 male and 100 female, and 127 neurotics, 59 male and 69 female. The subjects are the same ones used by Siegel (1960) and Jacobs (1960) for normative studies of the movement responses of normals and neurotics.

It was decided to use these subjects for several reasons: (1) they were carefully selected on the basis of completeness of Rorschach records, accuracy of scoring and accuracy of diagnosis to be included in normative studies on movement responses; (2) data from other tests (usually the Thematic Apperception Test, Minnesota Multiphasic Personality Inventory, and a Wechsler intelligence test) and case history material is available for the neurotics; (3) extensive normative data regarding the movement responses of both groups has already been reported (Jacobs, 1960; Siegel, 1960); (4) comparisons of the data on movement responses of both groups have been made (Siegel, Jacobs and Kobler, 1960).

The data for the movement responses was obtained from the tabulation sheets prepared by Siegel (1960) on the normal group and Jacobs (1960) on the neurotic group. The data for the location choices was gathered from

the original Rorschach protocols of the subjects.

The Rorschach protocols for the normal group were administered by graduate students as part of their training in accordance with requirements of a course in projective techniques. The protocols employed were those of full-time white undergraduate students between the ages of 17 and 25 who had volunteered to take a Rorschach when a request had been made by instructors or graduate students. The final sample was composed of 200 students, 100 male and 100 female. The essential data concerning the normals is presented in Table 1.

Table 1

Means, Medians and Standard Deviations for R, M, FM, m, Age, and Education for Normals[a]

Item[b]	Mean		Median		S. D.	
	Male	Female	Male	Female	Male	Female
R	31.33	28.09	27.50	24.00	15.49	13.42
M	2.79	3.33	3.09	2.67	2.16	2.65
FM	2.96	2.89	2.45	2.45	2.33	2.25
m	0.88	0.73	0.56	0.96	1.03	0.89
Age	20.23	19.88	20.81	20.93	1.77	1.78
Ed	14.46	14.95	14.50	14.53	1.12	1.60

[a]N = 200; 100 males, 100 females.

[b]R = number of responses; M = human movement responses; FM = animal movement responses; m = inanimate movement responses; Ed = years of schooling.

The neurotic sample was obtained from the protocols of Rorschach tests administered by graduate students in an internship program who tested patients from various hospitals and clinics in the Chicago area. The protocols employed were those within an age range of 16 to 60 and diagnosed "psychoneurotic" by the student examiner. These were then rechecked for accuracy of diagnosis and for completeness of the Rorschach record by several psychologists and finally, all tests available in the battery including a case history and psychiatric evaluation were scrutinized in order to determine the accuracy of the diagnosis. On the basis of these criteria a sample of 127 neurotics, 59 male and 68 female, were obtained. The essential data concerning the neurotic group is presented in Table 2.

Table 2

Means, Medians and Standard Deviations for R, M, FM, m, Age, Education, and IQ for Psychoneurotics[a]

Item	Mean		Median		S. D.	
	Male	Female	Male	Female	Male	Female
R	21.56	19.68	18.43	15.68	12.33	12.27
M	1.92	1.74	1.20	1.20	2.71	2.21
FM	2.56	2.07	2.23	1.46	2.15	1.88
m	0.36	0.43	0.17	0.22	0.71	0.74
Age	31.16	32.24	27.76	30.64	11.08	9.48
Ed	12.40	12.14	12.50	12.37	3.17	2.82
IQ	111.29	108.10	111.60	107.95	10.80	11.82

[a]N = 127; 59 males, 68 females.

Procedure

The human and animal movement responses (M and FM) and the location choices of the two groups, normal and neurotic, were subjected to pattern analysis for the purpose of identifying and comparing their response patterns. It was originally intended to include an analysis of inanimate movement (m) responses, but so few were given (the means and medians of both groups were less than one response) that it was impossible to identify a pattern of responses. Furthermore, the number of subjects giving m responses was so small that it was impossible to obtain matched groups of more than ten subjects each.

In identifying and comparing the various response patterns of the two groups the following outline was adhered to:

Step I: Patterns of movement responses and location choices were determined separately for the males and females of both groups. The patterns were characterized quantitatively by means of the weighting system described by Rimoldi and Grib (1960).

Step II: The consistency of each pattern was determined, and measures of the homogeneity of normals and neurotics were obtained.

Step III: The movement response and location choice patterns of neurotics were compared to the normal patterns using pattern analysis.

Identification of Movement Patterns

The method followed for identifying and characterizing the movement responses was identical for both groups, as well as for both types of movement, human (M) and animal (FM). The procedure was as follows:

The ten Rorschach cards were ranked in order of the frequency of

subjects giving a movement response to the card. This was done separately for M and FM and for each sub-group (normal males, normal females, neurotic males, neurotic females). The rank order of the cards in terms of frequency was used as the basis for establishing the response pattern of the group.

The subjects are then ranked in terms of the number of cards to which they gave movement responses.

The data are then arranged in a two-dimensional matrix, the rows representing subjects (ranked in order of number of cards to which a movement response was given), and the columns representing cards (ranked in order of frequency of movement responses). An example of the response matrix is given in Figure 1, where the X's designate the cards on which a movement response was given.

Rorschach Cards

Subjects	III	VII	IX	II	X	IV	I	V	VI	VIII
a	X									
b	X	X								
c	X	X		X						
d	X	X	X	X						
e	X		X	X	X	X				
f	X	X	X	X	X	X		X		

Fig. 1. Example of response matrix of movement responses.

The arrangement of filled-in and empty cells constitutes the total (group) pattern. In addition, each subject is characterized by his peculiar arrangement of filled-in and empty cells.

In order to characterize the pattern in a quantitative way, each cell of the matrix is assigned a numerical weight in terms of the contribution of both subject and stimulus (Rorschach card) to the total pattern. The procedure and underlying rationale for the weighting process has been explained elsewhere (Rimoldi and Grib, 1960a; Rimoldi and Grib, 1960b).

After identifying and quantitatively characterizing the pattern of each sub-group, they were then evaluated against their own pattern as a measure of consistency (i.e., agreement with the pattern of their own group). The following rationale was formulated for estimating the consistency of a group by comparing it with its own pattern:

Once the response pattern of a group (in terms of the rank order of cards according to frequency of movement responses) has been determined, it is important to test the individuals comprising the group for their agreement with the pattern. Suppose, for example, that the rank order of Rorschach cards in terms of number of subjects producing an M response on each card was as follows: III, VII, IX, II, X, IV, I, V, VI, VIII. If, then, an individual giving M responses to two cards was in agreement with the group pattern, we would expect these M's to occur on cards III and VII. Similarly, we would expect an individual giving M responses to four cards to produce these responses on cards III, VII, IX and II if he is in perfect agreement with the group pattern. The measure of consistency, then,

is the Index of Agreement obtained by comparing a group with its own pattern. The Index of Agreement expresses the agreement of two patterns as a ratio which varies from 1.00, representing complete agreement, to 0, representing complete disagreement or the largest possible deviation between the patterns.

Once the measure of consistency has been obtained, it may be used as a basis for comparing other groups for their agreement with the pattern in question.

As an indication of the homogeneity of each group (normal and neurotic) an Index of Agreement was calculated between the males and females of the normal group, and also between the males and females of the neurotic group.

Comparison of Movement Patterns

After the movement response patterns have been established for both normals and neurotics, and measures of consistency and homogeneity obtained for each group, the neurotic pattern was then evaluated for agreement with the normal pattern. Comparisons were made separately for males and females. The results are reported in terms of Indexes of Agreement.

A second comparison was then made between two groups of normals and neurotics matched for age, sex, educational level and total number of responses. The matched groups were composed of two groups of 20 males each (normals and neurotics) and two groups of 15 females. The small size of the matched groups was due to the relatively heterogeneous character of the neurotic group.

Table 3 presents the means, medians, standard deviations and chi-squares (using the median test) for age, education and number of responses for the matched groups. None of the chi-square values is significant.

Table 3

Means, Medians, Standard Deviations and X^2 for Age, Education and R for Normals and Neurotics

Item	Mean		Median		S. D.		X^2
	Normal	Neurotic	Normal	Neurotic	Normal	Neurotic	
Age:							
Ma	22.05	22.40	22.50	22.00	2.25	3.12	0.133
Fe	21.86	22.67	22.00	22.00	2.05	2.54	0.00
Educ:							
Ma	14.65	14.50	14.50	14.50	1.15	1.88	0.00
Fe	14.67	13.40	15.00	13.00	1.13	2.06	1.22
R:							
Ma	26.05	26.60	24.50	22.00	12.55	15.53	0.133
Fe	25.73	22.00	24.00	22.00	13.17	11.08	0.536

Identification of Location Choice Patterns

In order to partial out differences in the total number of responses, as recommended by Cronbach (1949), only the first response to each card was used for the analysis of location choice patterns.

The pattern of location choices (W, D, d, Dd, and Reject) for each group was determined by ranking the different location choices for each

card in terms of frequency. Thus, for card I, if ten persons gave a W as the location of their first response, five gave a D, and two gave a d, the pattern would be W-D-d. An example of the response matrix of location choices is presented in Figure 2.

Rorschach Cards

Subjects:	I					II					III					IV					V		
	W	D	d	Dd	r	W	D	d	Dd	r	W	D	d	Dd	r	W	D	d	Dd	r	W	D	d
a	X					X					X					X					X		
b	X						X						X							X	X		
c	X					X						X				X					X		
d	X					X								X			X				X		
e		X					X							X		X						X	
f	X					X					X						X				X		
g	X					X					X						X				X		

Fig. 2. Example of response matrix of location choices.

After identifying the location choice patterns for each sub-group separately, the patterns were characterized quantitatively following the same procedure described for the characterization of movement response patterns.

Measures of consistency for each sub-group and measures of the homogeneity of the normals and neurotics were then obtained. The procedure followed was the same as that described for movement response patterns. Results are reported in terms of Indexes of Agreement.

The location choice patterns of only the matched groups as described in Table 3 were analyzed.

Comparison of Location Choice Patterns

The procedure followed was identical to the comparisons made for the matched groups on movement response patterns. The neurotics, both male and female, were evaluated with respect to the location choice patterns established by the matched group of normal males and females. Results are reported in terms of Indexes of Agreement between normal and neurotic patterns. All patterns of all sub-groups were tested for their significance against the hypothesis that such a pattern could have arisen by chance.

CHAPTER IV

RESULTS AND DISCUSSION

The results of the pattern analyses of movement responses and location choices will be discussed separately. The discussion of each will be covered under four main headings: (1) identification and characterization of patterns; (2) homogeneity of groups; (3) consistency of patterns; and (4) comparison of patterns.

Results of Pattern Analysis of Movement Responses

(1) Identification and characterization of patterns: The identification of movement response patterns was based on the frequency of subjects giving a movement response(s) to each card. The human movement (M) patterns for each sub-group is presented in Table 4.

Table 4

Human Movement Response Patterns of Normals and Neurotics

Group		Rank Order of Cards
Normals[a]	Male	III, VII, IX, II, IV, X, I, V, VI, VIII
	Female	III, VII, IX, II, I, IV, X, V, VI, VIII
Neurotics[b]	Male	III, IX, VII, I, V, IV, X, II, VI, VIII
	Female	III, VII, I, II, IV, V, IX, VI, VIII, X

[a] 90 males; 93 females.
[b] 43 males; 57 females.

The bracketed cards had equal frequencies of subjects producing movement responses. Note that the number of subjects upon which the patterns are based is less than the total number of subjects in the normal or neurotic group. This is because some subjects did not produce any human movement responses.

In order to characterize the above patterns in a quantitative manner, the data was cast into a two-dimensional matrix as described in Chapter III, and each cell of the matrix was assigned a weight based on the contribution of both subject and card to the total pattern. These weights were determined following the method described by Rimoldi and Grib (1960a; 1960b). The particular arrangement of weights characterizes the pattern in a quantitative manner. The results of the characterization of human movement response patterns is presented in Appendix I, Tables 13 through 16.

The animal movement (FM) response patterns for each sub-group are presented in Table 5.

Table 5

Animal Movement Response Patterns for Normals and Neurotics

Group		Rank Order of Cards
Normals[a]	Male	(VIII, X, II), V, (VII, IX), (III, IV, VI), I
	Female	VIII, X, II, VII, V, III, I, IV, VI, IX
Neurotics[b]	Male	X, VIII, (II, V), VII, III, (I, IV), VI, IX
	Female	(II, VIII), X, V, VII, IV, IX, VI, III, I

[a] 86 males; 93 females.

[b] 49 males; 57 females.

The quantitative characterization of these patterns is presented in Appendix I, Tables 17 through 20.

For the normals, the cards eliciting the highest number of M responses are cards III, VII, IX and II, while those eliciting the least M responses are cards V, VI, VIII. Both males and females of the normals were identical in this respect. These results show high agreement with results reported in the literature. Ranzoni, Grant and Ives (1950) found that cards III, VII and II were strongest in eliciting M, while cards V, VI and VIII were weakest. In another study, Allen (1953) using both the standard Rorschach cards and an experimental set of achromatic blots, found for both sets that cards IX, III, VII and II received the most M responses, and cards V, IV, X, VI and VIII of both sets received the least M responses. Phillips and Smith (1953) reported that cards VI and VIII rarely elicit an M, while cards III, II, VII and IX are about equal in eliciting the most M responses.

While the normals appear to be in high agreement with the findings in the literature, the neurotics appear somewhat less so (see Table 4).

In regard to FM, both normals and neurotics produced the highest number of animal movement responses to cards VIII, X, II and V. These results are supported by Ranzoni et al. (1950) who found that cards VIII, V and II ranked highest in number of FM responses. Phillips and Smith (1953) report that cards on which FM is frequently elicited are (in order), VIII, V, II and I.

(2) Homogeneity of groups: Simple inspection of Table 5 suggests that the normal males and females are more in agreement with each other

than are the neurotic males and females. The mere rank order of the cards, however, does not give an accurate picture of the agreement or deviation between the patterns, since it does not indicate the individual patterns upon which the total group pattern is based. Furthermore, it also does not indicate the individual card frequencies, but only their rank order. A deviation in pattern between cards having nearly equal frequencies of responses does not represent as great a deviation as does a deviation between cards having highly dissimilar frequencies. A better indication of the deviation between patterns is provided by pattern analysis, which takes into account both the individual deviation from the pattern as well as the extent of the deviation based on the weights assigned to each element of the pattern.

The Index of Agreement between the normal males and females is .69, while the Index of Agreement between neurotic males and females is .61, for human movement patterns. These figures were interpreted as indicating a slight tendency for the normal males and females to be more homogeneous than neurotic males and females in their pattern of human movement responses.

The Index of Agreement between the animal movement (FM) patterns (see Table 5) of normal males and females is .74, while the Index of Agreement between the neurotic males and females is only .54. These results were interpreted as indicating a rather strong tendency for the normal males and females to be more homogeneous than neurotic males and females in their pattern of animal movement responses.

Notice that simple inspection of Tables 4 and 5 would lead one to believe that the normal males and females are more homogeneous with respect to human movement patterns (Table 5). Pattern analysis, however, shows the reverse to be true: the normal males and females were more homogeneous with respect to FM patterns than M patterns.

The reason for this apparent discrepancy is that Tables 4 and 5 represent only summaries of group behavior, but do not indicate the inter-individual variation from the total group pattern. Pattern analysis, on the other hand, provides us with a measure of the variation within the group from the pattern established by that group. Furthermore, one would suspect on logical grounds that all deviations (or "errors") are not equivalent. Therefore, simply counting errors, all of which are treated equivalently, is a cruder measure than counting errors which are differentially weighted according to their seriousness. Pattern analysis, by assigning a weight to each cell, takes into account the "seriousness" of errors and, in this way, provides a finer discrimination than simply counting the number of errors.

In summary of the above, Table 6 shows the Indexes of Agreement obtained when the normal males were compared to the normal females and a similar comparison made between the neurotic males and females. For both M and FM, the normals are more in agreement (homogeneous) than the neurotic males and females.

(3) Consistency of patterns: After the movement response patterns of each group were identified, as presented in Tables 4 and 5, a measure of the consistency of patterns was obtained by evaluating each sub-group

Table 6

Indexes of Agreement Obtained by Comparing Males and Females of Each Group[a]

Subjects	Index of Agreement	
	M	FM
Normals	.69	.74
Neurotics	.61	.54

[a]All Indexes of Agreement significant at $< .001$ level of confidence.

separately with respect to its own pattern. The results are presented in Table 7.

Table 7

Indexes of Agreement Obtained by Evaluating Each Group With Respect to Its Own Pattern ("Consistency")[a]

Group		Indexes of Agreement	
		M	FM
Males	Normal	.75	.70
	Neurotic	.68	.62
Females	Normal	.68	.67
	Neurotic	.69	.61

[a]All Indexes of Agreement significant at $< .001$ level of confidence.

Notice that, with one exception, the normals have higher Indexes of Agreement than the neurotics. This was interpreted as an indication that, on the whole, normals performed more consistently than neurotics with respect to their patterns of movement responses. The one exception is that the neurotic female pattern appears slightly more consistent than the normal female pattern for M responses.

(4) Comparison of patterns: Table 8 shows the results of comparing the neurotics' performance to the movement patterns established by the normals. The Indexes of Agreement for the normals are, in this case, the

Table 8

Indexes of Agreement Obtained by Evaluating Each Group With Respect to the Normal Pattern[a]

Group		Indexes of Agreement	
		M	FM
Males	Normal	.75	.70
	Neurotic	.64	.65
Females	Normal	.68	.67
	Neurotic	.66	.56

[a]All Indexes of Agreement significant at $< .001$ level of confidence.

measures of consistency reported in Table 7. These measures of consistency may be used as a basis for the comparison of other groups with the normal pattern.

In all cases the Index of Agreement for the normals, in Table 8, is higher than that of the neurotics. This may be interpreted as an indication that there is a difference in the movement response patterns of the two groups.

The greatest differences appear between the M patterns of the normal and neurotic males, and between the FM patterns of the normal and neurotic females.

Since previous studies (Altus and Thompson, 1949; Fiske and Baughman, 1953; Lotsop, 1953) have shown that the total number of responses (R), educational level and age are three of the most significant variables affecting Rorschach responses, a second comparison of movement response patterns was made between groups matched for these three variables as described in Chapter III.

Table 9 presents the results obtained by comparing the movement response patterns of the matched groups. The results show the differences

Table 9

Indexes of Agreement Obtained by Evaluating Matched Groups With Respect to the Normal Pattern[a]

Group		Indexes of Agreement	
		M	FM
Males	Normal	.75	.69
	Neurotic	.59	.57
Females	Normal	.75	.75
	Neurotic	.57	.49

[a]All Indexes of Agreement significant at $< .001$ level of confidence.

between the patterns of normals and neurotics to be even greater than for the unmatched groups.

It is interesting to note that, for the normals, the Indexes of Agreement tended to increase when the effects of R, age, and education were controlled, whereas the Indexes of Agreement for the neurotics decreased. This seems to indicate that, if the three variables mentioned are not held relatively constant when comparing groups, their effects tend to blur the differences between the Rorschach movement response patterns of the two groups.

In summary of this section, the following conclusions may be stated:

1. The normal males and females tended to be more homogeneous than the neurotic males and females with respect to their patterns of both M and FM responses.
2. On the whole, the M and FM patterns of the normals, both for males and females, tended to be more consistent than the M and FM patterns of neurotics. The one exception was that female neurotics were slightly more consistent than female normals with respect to patterns of M responses.
3. The movement response patterns, both for M and FM, of normals and neurotics tend to be dissimilar. The differences between their patterns become greater when age, education and number of responses are held constant.

Pattern Analysis of Location Choices

(1) Identification and characterization of patterns: The pattern of location choices for each group was based on the frequency of the location areas used in the first response to each card. The location choice pattern, for each group, in terms of the location most frequently used for the first response to each card, is presented in Table 10.

Table 10

Location Choice Patterns of Normals and Neurotics

Group		Rorschach Cards									
		I	II	III	IV	V	VI	VII	VIII	IX	X
Normal[a]	Male	W	W	W	W	W	W	W	D	D	D
	Female	W	W	W	W	W	D	W	W	D	D
Neurotic[b]	Male	W	W	W	W	W	W=D	D	D	D	D
	Female	W	W	W	W	W	W	W	D	W	D

[a] 20 males; 15 females.
[b] 20 males; 15 females.

The quantitative characterization of the location choice patterns is presented in Appendix II, Tables 21 through 24.

Table 10 indicates that the location choice of first responses tends to be rather similar for both groups, with agreement on six of the ten cards. These results are in agreement with the findings of Phillips and Smith (1953) who report that both normals and neurotics tend to produce

the same pattern of first responses.

(2) Homogeneity of groups: The Index of Agreement between the patterns of normal males and females was .68, while the Index of Agreement between the neurotic males and females was .66. This indicates that the normals of both sexes are about as homogeneous as neurotics of both sexes. There is a slight tendency for the normals to be more homogeneous than neurotics.

(3) Consistency of patterns: As a measure of consistency, Indexes of Agreement were obtained for each sub-group in comparison with their own pattern. The results are presented in Table 11.

Table 11

Indexes of Agreement Obtained by Evaluating Matched Groups With Respect to Their Own Pattern of Location Choices[a]

Group		Indexes of Agreement
Males	Normal	.74
	Neurotic	.70
Females	Normal	.69
	Neurotic	.69

[a]All Indexes of Agreement significant at < .001 level of confidence.

Table 11 shows the normal males to be slightly more consistent than the neurotic males, and the females of both groups, normal and neurotic,

to be equal regarding the consistency of their location choice patterns. The males of both groups exhibit a slight tendency to be more consistent than the females.

(4) Comparison of patterns: The results of the comparison between location choice patterns of normals and neurotics is presented in Table 12. The Indexes of Agreement of normals with their own pattern ("consistency") is shown as a basis for the comparison of neurotics to the normal pattern.

Table 12

Indexes of Agreement Obtained by Evaluating Matched Groups of Normals and Neurotics to the Normal Pattern of Location Choices[a]

Group		Indexes of Agreement
Males	Normal	.74
	Neurotic	.68
Females	Normal	.69
	Neurotic	.69

[a]All Indexes of Agreement significant at $< .001$ level of confidence.

The results presented in Table 12 indicate there are small differences between the location choice patterns of normals and neurotics. The differences between males appear greater than the differences between females.

In summary of the results of the investigation of location choice patterns, it may be stated that there were only slight tendencies for the

normals to be more homogeneous and consistent than the neurotics, and only a small difference between the normal and neurotic patterns of first responses. These results are supported by Phillips and Smith's findings that, "In general, both normal and neurotic individuals tend to produce the expected pattern of first responses" (1953, p. 228).

Criticisms of the Present Study

The criticisms of the present study may be related to two areas: (1) the sample; and (2) treatment of data.

(1) Criticisms regarding the sample: The most salient criticism regarding the sample seems to be that of the "normality" of the normal sample. Although no specific checks were made of the "normality" of the 200 normals, they were assumed to be a relatively "normal" sample of college students. In an unpublished Master's thesis, Kelly (1959) found no significant difference between those students who volunteered for psychological testing and those who did not volunteer. This tends to support the assumption that this sample is a good representation of the normal college undergraduate from the college population from which it was drawn. There was no reason for assuming that this population was abnormal in a psychiatric sense.

The neurotic sample was selected from clinical patients in various installations in the city of Chicago. In order to determine that only those individuals who were psychoneurotic were included in the sample, the accuracy of the diagnosis was confirmed by several clinical psychologists who examined each case on the basis of a battery of tests, case history

material, and a psychiatric evaluation.

(2) Treatment of the data: While several possibilities for more extensive treatment of the data suggest themselves, they were beyond the scope of the present study. They may, however, be pointed out as possibilities for further investigations.

One obvious suggestion would be to include more data in future studies. The present study limited itself to include only two dimensions of the movement responses, their number and the card on which they appeared. Subsequent studies may show even greater differences between normal and neurotic patterns of movement responses if other dimensions, such as form level, expansiveness, location choice and originality were included in the analysis. Since the present study was primarily an exploratory one to investigate the possibilities of treating patterns of Rorschach scores in a quantitative manner, a much less ambitious design was employed. On the basis of the present findings, however, it would seem that further applications of the method are indicated.

The same suggestion would apply to the handling of location choices; namely, that more data be included. While the present study showed only small differences between normal and neurotic patterns of location choices for the first response to each card, perhaps greater differences would be revealed if the location choices of all responses would be included. The problem would then arise of how to partial out the effects of R, since the total number of responses affects the proportions of W, D, d, etc. to different degrees.

Since the pattern analysis technique employed in this study also provides an Index of Agreement for each subject and for each stimulus, various ways of using these indexes may be suggested. An investigation of the Indexes of Agreement for each of the ten Rorschach cards, for example, would reveal which cards were reacted to consistently and which ones elicit varied reactions from groups of individuals. Another possibility is that of separating individuals into different groups on the basis of their individual Indexes of Agreement and then investigating the behavioral (or other) correlates of the groups. If desired, the Index of Agreement may be used as a variable to be correlated with other variables in order to demonstrate possible relationships.

Although this study was hypothesis-free, the method of pattern analysis employed may be used to test the agreement of group (or individual) patterns with particular hypothetical or expected patterns. Furthermore, since pattern analysis may be extended to more than two dimensions, it permits the investigation of the interrelationships of two or more variables (e.g., color responses and movement responses together, or the interrelationships between color, shading, form and movement responses).

CHAPTER V

SUMMARY

The purpose of this study was to identify and compare the patterns of movement responses and location choices produced by a group of 200 normal college students and a group of 127 neurotics.

The analysis was carried out at the level of patterns of responses rather than dealing with either the Rorschach performance as a whole or with the simple summation of the number of responses in the various scoring categories. Holistic approaches, which traditionally employ clinically interpreted entire case records, have been criticized for their vagueness, inability to separate the specific contributions of the test itself from those of the interpreter, and failure to provide a means of investigating the individual components of the interpretation. The atomistic methods, which investigate the validity of single Rorschach variables or combinations of variables, have frequently resulted in conflicting findings, presumably because of their failure to include information beyond the raw quantitative data pertaining to the scoring categories.

Klopfer and Spiegelman (1956) suggest that Rorschach research should concentrate on the "natural patterns" of observed responses as the primary method of analysis and interpretation. Although Rorschach experts have always stressed that interpretations should be based on patterns of response and not on individual "signs" or isolated indicators, the problem of

scoring or objectively characterizing and comparing patterns of responses has always been a vexing one. While the method of pattern analysis employed in this study does not pretend to be a complete solution to the problem, it is felt that it does provide an objective, quantitative basis for characterizing and comparing patterns of response.

The primary method of analysis used in this study was the pattern analysis technique developed by Rimoldi and Grib (1960a) for objectively characterizing and quantitatively comparing patterns of responses. The method provides a measure of agreement between patterns, the Index of Agreement, which varies between 1.00, representing complete agreement (i.e., identity of patterns) and 0, representing complete disagreement, or largest possible deviation between the patterns.

The movement responses and location choice patterns of two groups, normals and neurotics, were identified and compared. Measures of consistency of patterns and homogeneity of the groups were also obtained. Results are reported in terms of Indexes of Agreement.

The results of the study are summarized as follows:

1. The normal males and females tended to be more homogeneous than the neurotic males and females with respect to their patterns of both M and FM responses.
2. On the whole, the M and FM patterns of the normals, both for males and females, tended to be more consistent than the M and FM patterns of neurotics. The one exception was that the female neurotics were slightly more consistent than female normals with

respect to patterns of M responses.

3. The movement response patterns, both for M and FM, of normals and neurotics tend to be dissimilar. The differences between their patterns become greater when age, education and number of responses are held constant.

4. Normals and neurotics differ more in their movement response patterns (M and FM) than in their location choice patterns. These results are supported by findings in the literature.

5. There were only slight tendencies for normals to be more homogeneous and consistent than neurotics in regard to location choice patterns.

6. There were only small differences between the normal and neurotic patterns of location choices.

Criticisms of the present study and implications for further research are discussed.

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APPENDIX I

CHARACTERIZATION OF MOVEMENT RESPONSES

Tables 13 through 16 present the quantitative characterization of the human movement (M) responses of each sub-group, and Tables 17 through 20 present the characterization of the animal movement (FM) responses. These are characterizations of group patterns, not of the individual observed patterns of response. The numbers under the heading "Pattern" in Tables 13 through 20 refer to the number of cards on which a movement response (M or FM) was given. All subjects producing a movement response on only one card will have the quantitative characterization corresponding to Pattern 1 in the table; all those producing movement responses on two cards will have the quantitative characterization corresponding to Pattern 2, and so on.

Note that the tables have been reduced in size so that all the subjects are not represented individually. If duplications are excluded, there are only a limited number of individual patterns, and all these patterns are represented. Since the pattern to be characterized is the group pattern, rather than individual patterns, all subjects giving responses to the same number of cards will have the same quantitative characterization. Therefore, in order to reduce the size of the table, the characterization of each individual pattern will appear only once. Each pattern is characterized by its particular arrangement of weights, which were determined by following the procedure described by Rimoldi and Grib (1960a) for the quantitative characterization of patterns.

The weights in parentheses are the weights corresponding to the presence of a movement response. All decimal points have been omitted from the tables.

Table 13

Quantitative Characterization of M Response Patterns of Normal Males

Pattern[a]	Rorschach Cards									
	III	VII	IX	II	IV X	IV X	I	V	VI	VIII
1	(37)	37	59	92	104	118	121	122	123	123
2	(74)	(52)	52	81	92	104	106	108	109	109
3	(111)	(77)	(58)	71	81	92	94	95	96	96
4	(148)	(103)	(77)	(38)	69	79	80	81	82	82
5	(184)	(129)	(96)	(47)	(29)	66	67	68	69	69
6	(221)	(155)	(116)	(57)	(34)	(10)	54	54	55	55
7	(258)	(181)	(135)	(66)	(40)	(11)	(06)	41	41	41
8	(295)	(207)	(154)	(75)	(46)	(13)	(07)	(03)	27	27

[a] Number of cards on which an M response(s) was produced.

Table 14

Quantitative Characterization of M Response Patterns

of Normal Females

Pattern	Rorschach Cards									
	III	VII	IX	II	I	IV	X	V	VI	VIII
1	(33)	35	62	80	100	115	123	126	129	129
2	(66)	(48)	55	71	89	102	110	112	115	115
3	(99)	(73)	(51)	63	78	89	96	98	100	100
4	(132)	(97)	(68)	(50)	67	77	82	84	86	86
5	(165)	(121)	(85)	(62)	(37)	64	69	70	72	72
6	(199)	(145)	(102)	(75)	(45)	(21)	55	56	57	57
7	(232)	(169)	(120)	(87)	(52)	(25)	(10)	42	43	43
8	(265)	(194)	(137)	(100)	(60)	(28)	(11)	(06)	29	29

Table 15

Quantitative Characterization of M Response Patterns

of Neurotic Males

Pattern	Rorschach Cards									
	III	IX	VII	I V	I V	IV X	IV X	II	VI	VIII
1	(46)	53	80	96	107	112	112	112	112	115
2	(92)	(49)	71	85	95	100	100	100	100	102
3	(139)	(74)	(42)	75	83	87	87	87	87	89
4	(185)	(99)	(56)	(30)	71	75	75	75	75	77
5	(231)	(124)	(70)	(38)	(16)	62	62	62	62	64
9	(416)	(222)	(126)	(68)	(29)	(10)	(10)	(10)	(10)	13

Table 16

Quantitative Characterization of M Response Patterns

of Neurotic Females

Pattern	Rorschach Cards									
	III	VII	I	II	IV V	IV V	IX	VI VIII X	VI VIII X	VI VIII X
1	(47)	55	84	98	103	105	114	114	114	114
2	(95)	(50)	75	87	91	93	101	101	101	101
3	(143)	(74)	(37)	76	80	82	89	89	89	89
4	(190)	(99)	(50)	(27)	68	70	76	76	76	76
5	(238)	(124)	(62)	(33)	(24)	58	63	63	63	63
6	(286)	(148)	(74)	(40)	(28)	(23)	51	51	51	51

Table 17

Quantitative Characterization of FM Response Patterns

of Normal Males

Pattern	Rorschach Cards									
	II VIII X	II VIII X	II VIII X	V	VII IX	VII IX	III IV VI	III IV VI	III IV VI	I
1	(35)	22	66	85	105	119	125	126	126	126
2	(70)	(58)	59	76	94	105	111	112	112	112
3	(105)	(87)	(50)	66	82	92	97	98	98	98
4	(140)	(115)	(67)	(46)	70	79	83	84	84	84
5	(175)	(144)	(83)	(57)	(28)	66	70	70	70	70
6	(210)	(173)	(100)	(68)	(34)	(12)	55	66	66	66
7	(245)	(202)	(117)	(80)	(40)	(14)	(03)	42	42	42

Table 18

Quantitative Characterization of FM Response Patterns

of Normal Females

Pattern	Rorschach Cards									
	VIII	X	II	VII	V	III	I	IV	VI	IX
1	(40)	31	66	96	111	116	118	120	120	120
2	(79)	(59)	59	85	99	104	105	107	107	107
3	(119)	(88)	(54)	75	87	91	92	94	94	94
4	(158)	(117)	(71)	(32)	74	78	79	80	80	80
5	(198)	(147)	(89)	(40)	(15)	65	65	67	67	67
6	(237)	(176)	(107)	(49)	(18)	(08)	52	54	54	54
7	(277)	(205)	(125)	(57)	(21)	(09)	(06)	40	40	40

Table 19

Quantitative Characterization of FM Response Patterns

of Neurotic Males

Pattern	Rorschach Cards									
	X	VIII	II V	II V	VII	III	I IV	I IV	VI	IX
1	(37)	28	63	86	111	119	121	124	124	124
2	(73)	(57)	56	76	99	106	108	110	110	110
3	(110)	(85)	(54)	67	87	92	94	96	96	96
4	(146)	(113)	(72)	(45)	74	79	81	83	83	83
5	(183)	(142)	(90)	(56)	(19)	66	67	69	69	69
6	(219)	(170)	(107)	(67)	(22)	(09)	54	55	55	55
7	(256)	(198)	(125)	(78)	(26)	(10)	(05)	41	41	41

Table 20

Quantitative Characterization of FM Response Patterns

of Neurotic Females

Pattern	Rorschach Cards									
	II VIII	II VIII	X	V	VII	IV	IX	VI	III	I
1	(47)	48	80	94	108	112	114	114	114	114
2	(94)	(55)	71	84	96	100	102	102	102	102
3	(141)	(82)	(42)	73	84	87	89	89	89	89
4	(188)	(109)	(56)	(33)	72	75	76	76	76	76
5	(236)	(136)	(70)	(41)	(12)	62	63	63	63	63
6	(283)	(164)	(84)	(50)	(15)	(05)	51	51	51	51

APPENDIX II

CHARACTERIZATION OF LOCATION CHOICES

Tables 21 through 24 present the quantitative characterization of the location choice patterns for each sub-group. These are characterizations of group patterns, not of the individual observed patterns of responses. Since each subject will have the same number of location choices (i.e., ten), it follows that all subjects will have the same quantitative characterization in accordance with the group pattern. Therefore, in order to reduce the size of the tables, the individual subjects will not be represented since the characterizations of their patterns will be identical.

The weights in parentheses are the weights corresponding to the location choice that was selected by the group. All decimal points have been omitted from the tables.

Table 21

Quantitative Characterization of Location Choice Patterns of Normal Males

Rorschach Card	Location Choice				
	W	D	d	Dd	Reject
I	(50)	60	100	90	100
II	(75)	80	100	95	100
III	(85)	85	100	100	100
IV	(65)	70	100	95	100
V	(95)	95	100	100	100
VI	(80)	85	95	100	100
VII	(55)	60	100	95	100
VIII	65	(65)	100	100	100
IX	65	(60)	100	95	100
X	60	(60)	100	100	100

Table 22

Quantitative Characterization of Location Choice

Patterns of Normal Females

Rorschach Card	Location Choice				
	W	D	d	Dd	Reject
I	(73)	80	100	93	100
II	(73)	80	100	93	100
III	(80)	87	100	93	100
IV	(73)	93	100	87	93
V	(80)	100	80	100	100
VI	67	(53)	93	100	93
VII	(60)	60	100	100	100
VIII	(60)	60	100	100	100
IX	67	(53)	100	87	100
X	73	(60)	100	87	100

Table 23

Quantitative Characterization of Location Choice Patterns of Neurotic Males

Rorschach Card	Location Choices				
	W	D	d	Dd	Reject
I	(80)	85	100	95	100
II	(55)	65	100	90	100
III	(65)	70	100	95	100
IV	(75)	85	90	100	100
V	(95)	95	100	100	100
VI	(45)	55	100	95	95
VII	75	(50)	100	80	95
VIII	65	(65)	100	100	100
IX	80	(50)	90	90	90
X	85	(75)	95	100	95

Table 24

Quantitative Characterization of Location Choice Patterns of Neurotic Females

Rorschach Card	Location Choices				
	W	D	d	Dd	Reject
I	(67)	80	100	87	100
II	(60)	80	100	93	87
III	(87)	93	100	100	93
IV	(67)	80	93	100	93
V	(87)	100	87	100	100
VI	(47)	87	87	93	80
VII	(73)	73	100	100	100
VIII	67	(60)	100	100	93
IX	(47)	67	93	100	87
X	73	(73)	100	100	100

APPENDIX III

PATTERN ANALYSIS: AN EXAMPLE OF THE PROCEDURE

The following is a brief example of the procedure followed for the characterization and comparison of patterns. A more complete description of the method is presented in Rimoldi and Grib (1960a).

Let Figure 3 represent an experimentally observed pattern in a system of four subjects and four stimuli. Responses of the subjects are designated as X cells or empty cells according to whether a particular trait is present (choice of stimulus, producing a movement response, etc.) or absent (not choosing the stimulus, not giving a movement response, etc.). If the trait is present an X is entered in the cell; if it is not present, the cell is left empty.

		Stimuli 1	2	3	4	Σ X cells	Σ empty cells
Subjects	a	X				1	3
	b	X	X			2	2
	c	X	X	X		3	1
	d	X	X	X	X	4	0
Σ X cells		4	3	2	1	10	
Σ empty cells		0	1	2	3		6

Fig. 3. Observed pattern of responses.

Characterization of Patterns

A set of weights can be defined in order to characterize the patterns of response illustrated in Figure 3 (Rimoldi and Grib, 1960a). These weights are defined in terms of the designation of a cell as the intersection of a row and a column, such that the total contribution of the

corresponding arrays (i.e., both subject and stimulus) is taken into account. Since the X cells and empty cells represent qualitatively different phenomena (i.e., the presence or absence of a particular trait or attribute) the weights for each type of cell (X or empty) are determined separately. For all X cells, the weight is defined as the total number of X cells in the corresponding row multiplied by the total number of X cells in the corresponding column, and this product divided by the total number of X cells in the entire matrix. The formula, as given by Rimoldi and Grib (1960a) is:

$$W_{X_{ij}} = \frac{R_i C_j}{T}$$

where:

$W_{X_{ij}}$ = weight of X cell in row i and column j.

R_i = number of X cells in row i.

C_j = number of X cells in column j.

T = total number of X cells in entire matrix.

Similarly, for all empty cells, the weight is defined by Rimoldi and Grib (1960a) as:

$$W_{O_{ij}} = \frac{\overline{R}_i \overline{C}_j}{\overline{T}}$$

where:

$W_{O_{ij}}$ = weight of empty cell in row i and column j.

$\overline{R}_i$ = number of empty cells in row i.

$\overline{C}_j$ = number of empty cells in column j.

$\overline{T}$ = total number of empty cells in entire matrix.

The complete table of weights for the example in Figure 3 is presented in Figure 4. The weights in parentheses refer to the weights of X cells.

		Stimuli 1	2	3	4
Subjects	a	(.4)	.5	1.0	1.5
	b	(.8)	(.6)	.67	1.0
	c	(1.2)	(.9)	(.6)	.5
	d	(1.6)	(1.2)	(.8)	(.4)

Fig. 4. Quantitative characterization of observed pattern of responses illustrated in Figure 3.

The weighted matrix presented in Figure 4 is the quantitative characterization of the response patterns illustrated in Figure 3.

Comparison of Patterns

Suppose we now wish to evaluate the agreement of another set of responses, as presented in Figure 5, with the pattern shown in Figure 3.

		Stimuli 1	2	3	4
Subjects	a'	X			
	b'	X		X	
	c'	X	X		X
	d'	X	X	X	X

Fig. 5. Pattern of responses to be compared with pattern illustrated in Figure 3.

A measure of agreement between patterns is provided by the Index of of Agreement, which expresses the agreement as a ratio which varies from 1.00 (complete agreement) to 0 (complete disagreement or largest possible deviation).

The Index of Agreement is calculated as follows:

1. The sum of weights of the cells which are congruent (i.e., are the same, X or empty) in both patterns is determined. The weights employed are those of the "model" or criterion pattern (i.e., the weights of Figure 4 in this example).

2. The sum of all the weights of the cells of the criterion pattern (Figure 4) is calculated.

3. The totals of (1) and (2) are corrected for the minimum possible agreement between the patterns by subtracting from each of them the minimum sum of weights of congruent cells possible within the system of the patterns.

4. The Index of Agreement is the ratio between the corrected sums of (1) and (2). That is:

$$\text{Index of Agreement} = \frac{\left(\begin{array}{c}\text{sum of weights}\\ \text{of congruent cells}\end{array}\right) - \left(\begin{array}{c}\text{minimum possible}\\ \text{sum of weights}\\ \text{of congruent cells}\end{array}\right)}{\left(\begin{array}{c}\text{total weight of}\\ \text{model pattern}\end{array}\right) - \left(\begin{array}{c}\text{minimum possible}\\ \text{sum of weights}\\ \text{of congruent cells}\end{array}\right)}$$

In our example, the values of the various calculations are as follows:

1. The sum of the weights of cells which are congruent in both patterns (i.e., all cells except b2, b3, c3, and c4) is 11.30.

2. The sum of the weights of the criterion pattern (Figure 4) is 13.67.

3. The minimum sum of weights possible for congruent cells is 7.00.

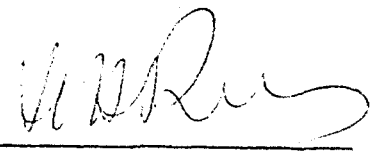
4. The Index of Agreement is $\frac{11.30 - 7.00}{13.67b - 7.00} = \frac{4.30}{6.67} = .64$

APPROVAL SHEET

The dissertation submitted by Thomas F. Grib has been read and approved by a board of five members of the Department of Psychology.

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the dissertation is now given final approval with reference to content, form, and mechanical accuracy.

The dissertation is therefore accepted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy.



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Signature of Adviser