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A STUDY OF SOME FACTORS IN THE BENDER GESTALT REPRODUCTIONS OF NORMAL AND DISTURBED CHILDREN

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

A STUDY OF SOME FACTORS IN THE BENDER GESTALT REPRODUCTIONS OF NORMAL AND DISTURBED CHILDREN

CHAPTER I

THEORY AND PROBLEM

Introduction

The Bender Gestalt-Motor Test (7) has been used widely in various clinical settings since it was introduced by Lauretta Bender some eighteen years ago, but the bibliography on this test is much less extensive and impressive than one might imagine.

Perception of form was investigated by several workers with psychotics during the 1930's and interest was centered on the level of receptor thresholds of these patients. When the thresholds were discovered to be about the same as those of normals, this approach was abandoned (10).

Real interest in the Bender Gestalt as a diagnostic instrument began during World War II and arose from the demands of war upon psychology for more rapid and effective methods for differential diagnosis (49). It was widely used in many installations in the Armed Forces where its simplicity

and quickness of administration and its rapid evaluation for clinical patterns made it a time-saving device toward clinical disposition (49). The test cards and instruction manual were not available for more universal clinical use until 1946. As with many similar techniques, investigations concerning the use of the test have far exceeded those pertaining to the nature of the test and the processes involved in response patterns. Specifically, the main interest has been to demonstrate the differential diagnostic utility of the test (4, 5, 8, 11, 12, 22, 23, 32). Within recent years several attempts have been made to establish objective standards for scoring test responses. In this respect the work of Billingslea (10), Gobetz (18), Keller (27), and Pascal and Suttell (37) are pertinent. Most of the work in the standardization and quantification of the test has been done with adults. Pascal and Suttell state: "Our purpose at this point . . . is not to standardize the test for children, but rather, to use knowledge of the deviations made by children as a basis for qualitative clinical judgment of adult records" (37, pp. 42-43).

The responses of children and the processes involved in their response patterns remain a relatively unexplored area for investigation.

Theory

Bender defines the gestalt function ". . . as that

function of the integrated organism whereby it responds to a given constellation of stimuli as a whole; the response itself being a constellation, or pattern, or gestalt" (7, p. 3). Furthermore, she states that integration occurs by differentiation and contends that the pattern of response is determined by the whole integrated state of the organism and the whole setting of the stimulus. According to Bender, then, any deviation in the total organism will be reflected in the final sensory-motor pattern in response to the given stimulus pattern.

The reproduction of the Bender designs is determined by something more than the stimulus. Bender suggests that it is the product of the whole test situation, including the whole integrated state of the organism. It follows, then, that any reproduction of the stimulus figure will reflect any deviation of the total organism. Deviations in response have their basis in deviations in the total responding organism. Assuming that the total responding organism is involved and that the organism functions as an integrated whole, the given stimulating constellation may be used in more or less similar situations to study the gestalt function in various pathologically integrated conditions.

Billingslea (10) notes that the Bender Gestalt Test was built on the premise that accurate visual-motor perceptual behavior is a skillful act. He states:

> This skillful perceptual act is considered to involve (a) sensory reception, (b) central neural interpretation, and (c) motor reproduction (hand drawing) by the perceiving subject of the stimulus objects. The premise goes further and states that this total perceptual process can be distorted by neural injury, by variations in intellectual level, and by maladjustments in the emotional organization of the perceiving subject (10, p. 1).

Pascal and Suttell (37) elaborate the assumptions made by Bender as follows:

> We would, in general, agree with this formulation. The overwhelming mass of clinical evidence gathered with the Rorschach test has served to fashion current opinion regarding the positive effects of experience on responses to perceived stimuli. To substantiate this view a good deal of experimental evidence has been forthcoming. Study of the drawings of psychiatric patients has a considerable history, and the evidence available suggests that when these are compared with those of normal controls discriminating differences can be found. Thus, one would expect that on a task such as copying B-G designs, performance would not only be a function of the individual's capacity to perceive correctly and execute the figures but also of the individual's interpretation of them, i.e., what they and the task mean to him in the light of his own experience /Pascal and Suttell reference numbers omitted/ (37, p. 6).

Pascal and Suttell clearly indicate that three fundamental factors are involved in the copying of the Bender geometric figures: (1) sensory perception, (2) interpretation, and (3) motor reproduction. These authors also observe that deviant performance in the reproduction of the Bender designs should be a function of the "interpretative factors" which obtrude between perception and motor reproduction, if the ability to perceive and to execute the designs is accepted as given.

Pascal and Suttell conceive of the Bender Gestalt-

Motor Test as a work sample which involves not only the capacity to perceive and to execute the designs, but also a factor which they designate as an "attitude."

They state that

> The test situation for the individual, once he is subjected to it, becomes a bit of reality with which he has to cope. We would expect, therefore, that in those persons in whom the attitude toward reality is most disturbed, we will find greater deviations from the stimuli. Our findings corroborate this expectation. In the populations tested by us, of normal intelligence and free of brain damage, the greatest number of deviations were found in the psychotic subjects, fewer in psychoneurotic subjects, and least in non-patients (37, p. 8).

They conclude that some factor other than the ability to perceive and to reproduce the designs is being measured in the scoring of the Bender Gestalt-Motor Test when used with individuals of normal intelligence (37, p. 8). The quotation just given suggests that the term perception has a rather broad meaning for Pascal and Suttell. In limiting the interpretative or ego function in referring to the Bender designs, everything else is assigned to the perceptual function. That is, in addition to sensation, in perception they included seeing Figure A as a circle and a square, Figure Number 1 as twelve dots in a line, etc.

One of the first studies designed to evaluate the validity of the assumptions made by Pascal and Suttell was that of Kleinman (29). He demonstrated in his comparative study of normal and schizophrenic adults that they differ in the interpretative-response phase of the Bender Gestalt but

not in the perceptual phase. Kleinman found, then, that the Bender Gestalt designs involved no difficulty for adults at the sensory level and indicated that deviant performance on the Bender figures is a function of interpretative factors which obtrude between perception and execution.

In the beginning Bender was concerned with the problem of personality, its dynamic patterns, and perception. She approached the problem of perception and action by demonstrating the primitive forms of experience and the maturation process in the course of development. She showed, too, the continuous interplay between sensory and motor factors.

Woltmann (49) notes that Bender's studies of children's drawings indicate that the gestalt principles discovered by Wertheimer do not apply to the early graphic maturation phases of development. Direction is much more important to the small child than size, proximity, continuity, and distance. According to Woltmann, rapid differentiation of form, maturing of the motor apparatus, and the capacity for object representation take place between the fourth and seventh years, or about the time the child enters school. In school the child is taught formalized social concepts, learns to inhibit his motor impulses, is instructed to copy forms with definite meanings, such as, the letters of the alphabet; and at the same time he is introduced to reading, which is the complicated function of not only learning to

recognize each letter but also presents the problem of combining form with phonetics. It is at this stage, according to Woltmann, that Wertheimer's Gestalt principles acquire validity.

Bender states that

> There is an innate tendency to experience gestalten (Schilder) not only as wholes which are greater than their parts (Wertheimer, Koffka, Kohler) but in the state of becoming (Eddington) which integrates the configuration not only in space but in time. Furthermore, in the act of perceiving the gestalt the individual contributes to the configuration. The final gestalt is, therefore, composed of the original pattern in space (visual pattern), the temporal factor of becoming and the personal-sensory-motor factor. The resulting gestalt is also more than the sum of all these factors. There is a tendency not only to perceive gestalten but to complete gestalten and to reorganize them in accordance with principles biologically determined by the sensory motor pattern of action. This pattern of action may be expected to vary in different maturation or growth levels and in pathological states organically or functionally determined (7, p. 5).

On the basis of her findings Bender attempted to standardize her material as a performance test for children. She found no valid criteria in young children below the age of four. Up to that age the small child usually produces scribbles. It is true that the Goodenough-Draw-A-Man Test starts with a basic mental age of three years, but really good attempts to draw a man seldom occur below the four year level (20). Bender's standardization of gestalt maturation and function covers ages four to eleven. Bender, therefore, points out that the test is not valid for normal individuals whose mental age is above the eleven year level. This is in

agreement with the Goodenough drawing scale which likewise ceases to assume validity above this level.

Accordingly, then, in view of the conceptions presented above, if the Pascal and Suttell assumptions hold at the adult level, would they likewise have valid application to children? This question has broad implications since the functional significance of the motor maturity factor must be determined in children, whereas, in adults, it is not encountered since all the Bender designs are satisfactorily reproduced at the age of eleven years.

Problem

Pascal and Suttell contend, as was stated above, that three factors are involved in the reproduction of the Bender designs: (1) perception, (2) interpretation, and (3) motor reproduction (37, p. 6). They assign differences in Bender Gestalt reproduction to "interpretative factors" and assume that the ability to perceive and to execute the figures is given. Kleinman (29) checked this assumption using normal and schizophrenic adults and assigned deviant performance in the reproduction of the figures to interpretation and, thereby, supported the contention of Pascal and Suttell.

It is the purpose of the present investigation, using samples of normal and disturbed first grade boys of average intelligence, to examine the validity of assigning deviant performance in Bender Gestalt reproduction to "interpretative

factors." The study will also contribute information about the maturation process. If, in the execution of the designs, disturbed subjects are sharply differentiated from normals, and if it can be demonstrated that the two groups are comparable in performance in the perceptual and motor phases, then the assumption of assigning deviant performance in Bender Gestalt reproduction to "interpretative factors" would hold.

Hypotheses to be Tested

Since several questions have arisen in relation to the general problem, it will be convenient to consider as three separate hypotheses the general hypothesis that differences in Bender Gestalt reproduction exhibited by normal and disturbed children are assignable to "interpretative factors."

Hypothesis One. Disturbed and normal children differ significantly in copying four selected geometric figures.

a. They differ significantly in copying a cross.

b. They differ significantly in copying a square.

c. They differ significantly in copying a vertical diamond.

d. They differ significantly in copying a horizontal diamond.

Hypothesis Two. Disturbed and normal children differ significantly in discrimination inthe perceptual phase of the Bender Gestalt.

Hypothesis Three. Disturbed and normal children differ significantly in their reproductions of the Bender Gestalt designs.

CHAPTER II

EXPERIMENTAL PROCEDURES

At this point in a dissertation it is customary to devote some discussion to the selection of the subjects used in the experiment. However, certain advantages in clarity of the experimental approach may be gained by discussing the procedures concerning the motor and perceptual phases of the experiment at this time. The terms "motor phase," "perceptual phase," and "interpretative phase" used in this thesis are ones of convenience of classification, but they designate, nevertheless, three aspects of the total act of reproducing the Bender Gestalt designs as postulated by Pascal and Suttell (37).

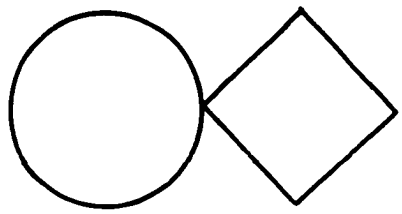
The Bender Gestalt-Motor Test (7) consists of nine geometric figures printed on four-inch by six-inch white cards. Originally, these figures were part of Wertheimer's classical "Studies in the Theory of Gestalt Psychology" (48). In the present investigation the nine figures were presented to each subject together with four additional designs, namely, a cross, a square, a vertical diamond, and a horizontal diamond. The latter four selected figures were reproduced

in actual size for use from the Stanford Binet Intelligence Scale--Form L (46). The Bender Gestalt-Motor Test designs are shown in Figure 1 and the simple geometric forms in Figure 2.

The subject was asked to reproduce (copy) each of the total of thirteen figures on individual four-inch by six-inch white cards. The administration, except for the use of individual cards for reproduction, followed the standard Bender Gestalt administration procedure. The directions are simply: "I have here some cards with very simple designs on them. I want you to copy these designs. Draw what you see. Draw your design on this white card." Additional instructions given the subject stated that the drawing of the designs was to familiarize him with some designs he would be looking at later. The subject was then given a single white card and a freshly sharpened pencil and instructed to go ahead and make his drawing. When the subject completed copying the design, the stimulus design card and the reproduction were turned face down and the subject was given another white card and another freshly sharpened pencil. He was instructed to copy the next figure. This procedure was followed for all thirteen designs.

Motor Phase

The use of the four simple figures, namely, cross, square, vertical diamond, and horizontal diamond, was based



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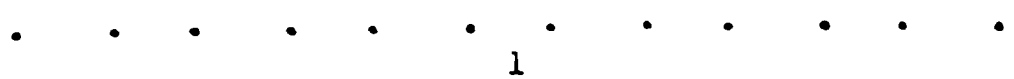

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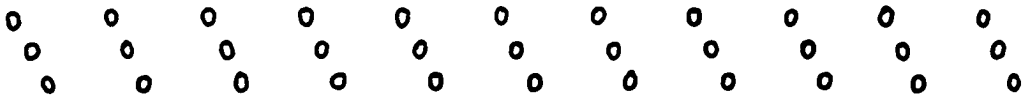

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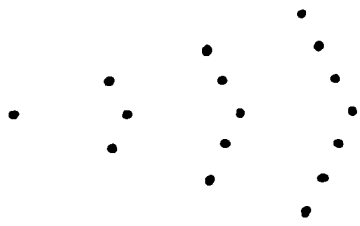

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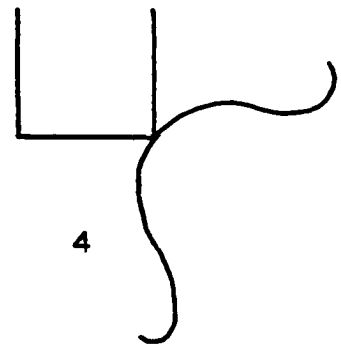

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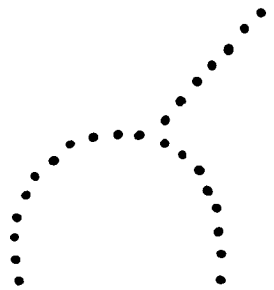
Figure 1.--Bender Gestalt-Motor Test Figures.



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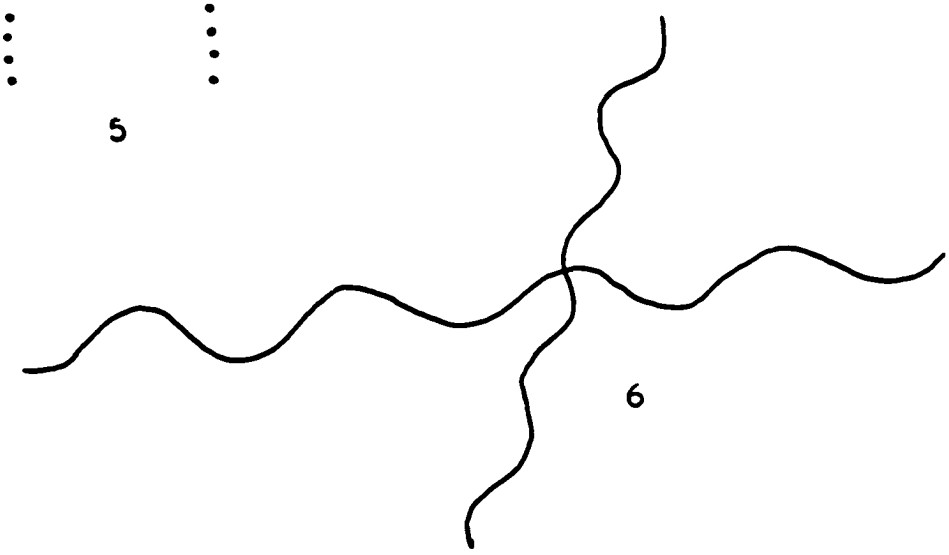

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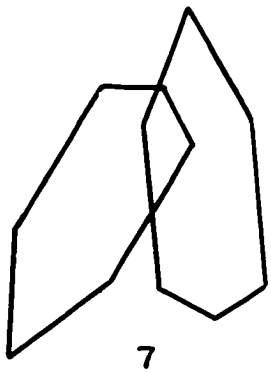

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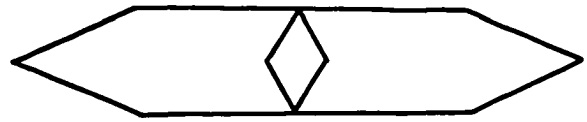

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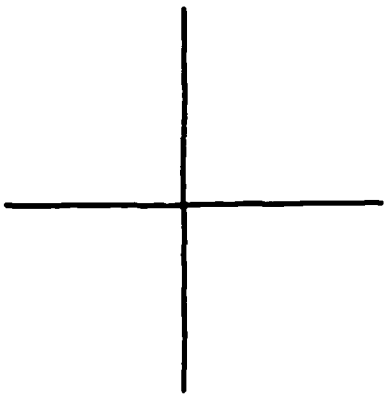
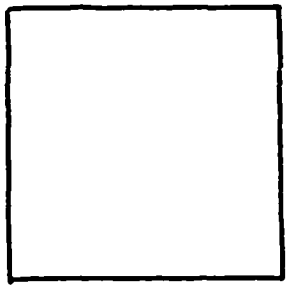
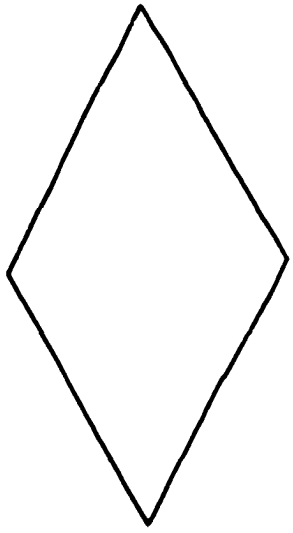
Figure 1.--Bender Gestalt-Motor Test Figures (Cont'd).



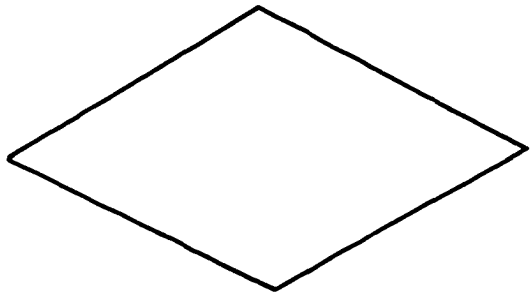
Cross



Square



Vertical Diamond



Horizontal Diamond

Figure 2.--Simple Geometric Figures.

on their widely accepted validity as measures of motor development. In view of their acceptance as valid measures of motor development, they were used for comparison purposes in the motor phase of the Bender Gestalt for the subject groupings. The paragraphs below will make these remarks more meaningful.

Gesell and his associates have shown that copying simple geometric figures is related to differences in development among children (16, 17). Lowder in his recent study of perceptual ability and school achievement has shown that the four figures noted above represent a continuum of copying difficulty (33). Like Gesell, Lowder suggests that the figures also represent levels of motor performance maturity (16). Gesell et al. were able to demonstrate from the results of their studies of the motor development of children that children, when required to copy simple geometrical forms, tend to prefer different motoric movement patterns at different age levels (17). This motoric movement pattern was termed "directionality" (16). For example, in drawing a cross four-year-old children will draw the vertical line "up" more often than will five-year-olds (16, p. 100). The latter prefer to draw the vertical line "down." The ability of children to perform the motor task of copying simple geometrical figures has been demonstrated to be related to the maturity level of children age-wise; thus, successful performance on the simple figures noted above is related to

developmental differences as expressed in age terms. These developmental differences may be highlighted by comparative descriptions of motor behavior of children ages four, five, and six on the cross, square, and diamond. Gesell et al. comment as follows:

> The Cross. At 4 years he copies, but errs on one trial. The lines may be broken or at an angle. At 5 years he copies, but the length is greater than the breadth, or the breadth greater than the length. The lines are rarely broken or at an angle. At 6 years he draws a good copy, correctly proportioned.
>
> The Square. At 4 years the child draws a circle or draws one side straight and completes with a circle like a capital D. Usually one corner is inadequately drawn. Children who do succeed draw four lines, meeting at the corners. At 5 years the child draws three corners adequately. Corners may not be sharp but defined and rounded. The 6-year-old draws a square with sharp corers.
>
> The Diamond. At 5 years the child draws an elongated shape, cannot make the points but indicates them by crosslines, indentations, or by circular bulges. At 6 years he copies the form (16, p. 104).

From these descriptions it may be discerned, then, for example, that the diamond is beyond the motor maturity level of the four-year-old and the five-year-old is able to reproduce an inaccurate copy.

Pascal and Suttell (37) state that motor ability is one of the given factors involved in the copying of the Bender Gestalt designs, when assigning differences in reproduction to "interpretative factors." Speaking parenthetically, copying, in the sense intended, implies the duplication of an original and as close resemblance to it as is possible. However, in view of the overwhelming evidence concerning

variation in development among children, and in view of some evidence suggestive of motoric differences between well-adjusted and poorly-adjusted children (28), the assumption of no difference in motor performance maturity between the two groups of subjects used in this current study does not appear justified. By utilizing the four simple geometric figures, namely, cross, square, vertical diamond, and horizontal diamond, which represent levels of copying difficulty (33) and which yet remain at least within the theoretical limits of the average grade school child's ability to reproduce, comparative analyses then may be made between the selected subject groupings of this study, normal and disturbed first grade boys, to check the validity of the Pascal and Suttell assumption.

In order to assign any obtained difference in the reproduction of the Bender designs by the subject groupings to "interpretative factors," as proposed by Pascal and Suttell, it is essential that the assumption concerning motor performance maturity be investigated.

Perceptual Phase

Following the administration of the Bender designs, together with the cross, square, vertical diamond, and horizontal diamond, the subject was then presented a series of Bender stimulus cards and asked to "Choose the one which is the same as the one you were shown to copy; choose the one

which is just like the one you were shown to copy."

The series of stimulus cards for each Bender design included a replica of the regular Bender card and three replicas of Bender drawings given by six year old children, each with a greater degree of distortion than the regular Bender design. The three replicas also differed from each other in degree of distortion. All designs of all sets of stimulus figures were reproduced on four-inch by six-inch white cards. The reproductions were drawn so that line width, inking, and other construction characteristics were mechanically equal. (The reader may refer to Appendix A for these figures.)

Each set of four stimulus cards for each Bender design was mounted on gray cardboard 1/16 inch thick, 25 inches long, and 10 inches wide. The cards were spaced approximately ¼ inch apart, and they were covered with clear plastic sheeting to eliminate finger marking and smudging of the figures during the experiment. Thus, there were nine stimulus sets of four figures. The order of arrangement of the stimulus cards of each series of four cards was determined by the "Table of Random Numbers" (15). Table 1 shows the order of arrangement of the stimulus cards as mounted on the gray cardboard. The position of the reader of this thesis is the same position occupied by the subject when viewing the designs. The numbers represent the degree of distortion of the individual design from the regular Bender card.

Thus, card number four is the one expressing the greatest degree of distortion. Each set of four figures for each Bender design was presented singly to the subject, and he was asked to make his choice of the design originally shown him to copy.

Table 1

Bender Replica Card Arrangement

Bender Design	Replica Card Position			
A	4	3	1	2
1	3	1	4	2
2	2	1	3	4
3	4	3	2	1
4	2	4	3	1
5	1	3	2	4
6	3	2	1	4
7	1	2	4	3
8	4	1	3	2

The perceptual phase study required a technique which would be easily understood by the subjects. Accordingly, a procedure similar to the "Pictorial Likenesses and Differences" test (Year VI level) of the Stanford Binet Intelligence Scale--Form L (46) was chosen. The "Pictorial Likenesses and Differences" test requires the child to point to the one picture that is ". . . not the same as the others" (46, p. 90). Success on this test depends not so much on language comprehension as on the ability to make

discriminating reactions at a perceptual level. Terman and Merrill note that, ". . . dependence on language comprehension has been minimized by a procedure that makes use of both same and alike in the instructions . . ." (46, p. 214). These authors state in conclusion that, "Thus, the problem involves mainly the visual perception of similarities and differences pictorially presented" (46, p. 214).

The ability to make discriminative responses in the presence of an object is an early aspect of perceptual development which precedes the ability to react adaptively in the absence of the object (46). Terman and Merrill note that responses to similarities and differences ". . . on both the perceptual and ideational level develop earlier than the ability to verbalize such distinctions" (46, p. 228). Successful discriminative response depends not only upon the ability to make a discriminative reaction but also upon the ability of the child to keep in mind a directing idea. The maintenance of the directing idea requires continued repetition of instructions with each presentation of the various stimuli.

Pascal and Suttell state that there can be no doubt that the individual is able to see the Bender designs as they are pictorially represented. Although child psychology has given relatively little emphasis to perception, studies appearing from time to time indicate that perceptions of

children tend to be vague and inaccurate when compared with adult standards (2, 24). Attention to major details of the stimulus, together with increasing accuracy, is noted with increments in age development. In elementary school children perceptual accuracy seems related to the adjustment of the pupil (25, 30). Thus, on the basis of available evidence, differences in discriminative behavior might be expected between normal and disturbed children.

Data available in the area of visual discrimination by children suggests, then, that the task should be one requiring only gross accuracy. The task should not require the child to make discriminations which involve nuances of detail. Accordingly, figures other than the replica of the original Bender Card were selected so as to be visibly different not only from the original Bender Card but from each other as well. Thus, the task for the child involved the visual discrimination of similarities and differences pictorially presented.

This part of the experimental design permitted the testing of the second assumption of Pascal and Suttell that normal and disturbed children do not differ in visual discrimination behavior in the perceptual phase of the Bender Gestalt.

Interpretative Phase

For some time the Bender Gestalt-Motor Test has been

used without adequate objective scoring criteria. However, Pascal and Suttell (37) presented their scoring scheme in 1951, and it has received further validation with adults since then (11, 13, 43). Pascal and Suttell (37) and Goldberg (19) have demonstrated that the scoring standards can be applied to the Bender reproductions of children as well. Goldberg (19) found that the Pascal and Suttell scoring criteria significantly differentiated the Bender reproductions of normal upper grade school children from those of schizophrenic and retarded children of comparable age.

The Pascal and Suttell scheme has scoring standards for only eight of the nine figures; design "A" is omitted. There is a total of ninety-nine scorable deviations for the eight designs. (The reader is referred to Appendix B for inspection of scorable deviations for the various designs.) Scores are accumulated by designs, plus the scores which have to do with the test as a whole, termed "configuration scores," from which a final raw score is obtained. The total raw score is then translated into a standard (Z) score. In the current study the "configuration score" was not used since the Bender designs were individually reproduced on single white cards. Furthermore, since the standard (Z) score conversion tables are not available in the Pascal and Suttell manual for younger age groups, the raw score was used. Pascal and Suttell have utilized the raw score in their studies

of the Bender reproductions of children (37, p. 42). In the present study the raw score consists of accumulated scorable deviations for the total of eight designs.

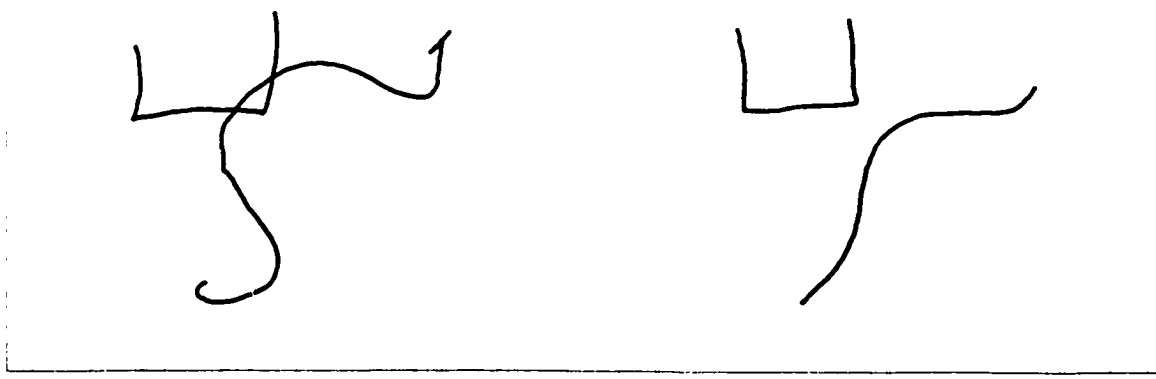
In addition to the use of the Pascal and Suttell manual (37), in this study, a transparent plastic ruler, a protractor, and a magnifying glass were employed when necessary to check on questionable angular rotation or fine tremor.

Pascal and Suttell make the following statements with regard to the application of their scoring system:

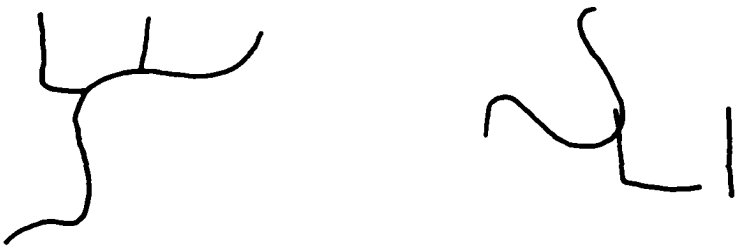
> The scoring system is practical. It is not, however, as we have stated, entirely objective or rigidly accurate in measurement. It is most certainly not foolproof. Training, therefore, is essential. It is necessary to understand what is meant by each deviation. It is necessary to study the manual thoroughly and to work through the sample records before attempting to use the scoring system in practice. Investigation has shown that thorough study of the manual leads to reasonable reliability in scoring when score sheets are used (37, pp. 12-13).

Several examples of Design 4 selected from the Pascal and Suttell manual will clarify the scoring procedures.

> Curve and square overlapping and not joined. Score 8. Where the peak of the curve is separated by ¼ inch or more, from the adjacent corner of the square, or where the curve overlaps the adjacent corner by 1/8 inch or more, the item is scored (37, p. 138).



Distortion. Score 8. This deviation is rarely encountered; to score the item the reproduction should be a marked distortion of the stimulus (37, p. 143).



The present investigation consists of three phases. The first considers the implications of motor maturity exhibited by normal and disturbed children. The second phase considers the implications of the sensory process of perceiving the Bender designs as they are pictorially represented. The third phase is concerned with assigning differences in performance on the Bender designs to "interpretative factors." Accordingly, then, some means must be used which will bring out whatever differences in Bender reproduction that may obtain between the subject groupings. If groups perform similarly in the motor and perceptual phases, then differences in reproduction of the Bender designs that emerge between normal and disturbed children would be assignable to "interpretative factors." The interpretative phase of the study, then, is concerned with determining whether normal and disturbed children differ in their reproductions of the Bender designs. The results of this phase of the investigation will have implications for the validity of the Bender

Gestalt Test, but test validity is not a primary consideration.

Selection of Subjects

The Population

A description of the general school setting from which the subjects were chosen, and the manner in which the disturbed subjects were first encountered, seems essential if the definition of the normal and disturbed groups is to be fully understood.

For the past six years the Oklahoma City Public Schools have had a child guidance clinic as one of its services to pupils and patrons. The Division of Child Guidance is one of the major divisions of the Department of Pupil Services and was designed specifically to aid the individual child adjust to the demands of his school and social setting. It is primarily concerned with children who are best described as emotionally disturbed to the extent that they stand out as behavior problems, or as being odd or different from their classmates, and who, because of their emotional difficulties, are unable to make full use of their school program. However, many other kinds of problems come to the attention of the Division of Child Guidance which could not be properly classified as emotional problems, such as, for example, mental deficiency, auditory defects, visual impair-

ment, cardiopathic involvements, neurological anomalies, and speech disorders.

The staff of the Division of Child Guidance consists of three clinical psychologists, one educational psychologist specializing in special education and psychology, one consulting school physician, and eleven visiting counselors (social case workers). The members of the staff receive a large number of referrals from the visiting counselors who have been contacted by the principal, teacher, or counselor of the school in which the child is enrolled. Referrals also come from many private and community sources. When a child is referred the parents are interviewed by the visiting counselor assigned to the school. The results of this interview, together with school adjustment information, are then submitted to the Division of Child Guidance with a request for psychological services. The child is scheduled for diagnostic evaluation.

The school population from which a referral may come includes over 54,000 children enrolled in any one of seventy-nine elementary, five junior high, and eleven high schools. Figure 3 shows by percentage the relationship between type of school and number of referrals. Figure 4 shows by percentage the relationship between grade level in the elementary schools and number of referrals. The referrals, of course, come from all social strata, varying from the socially deprived to the socially elite.

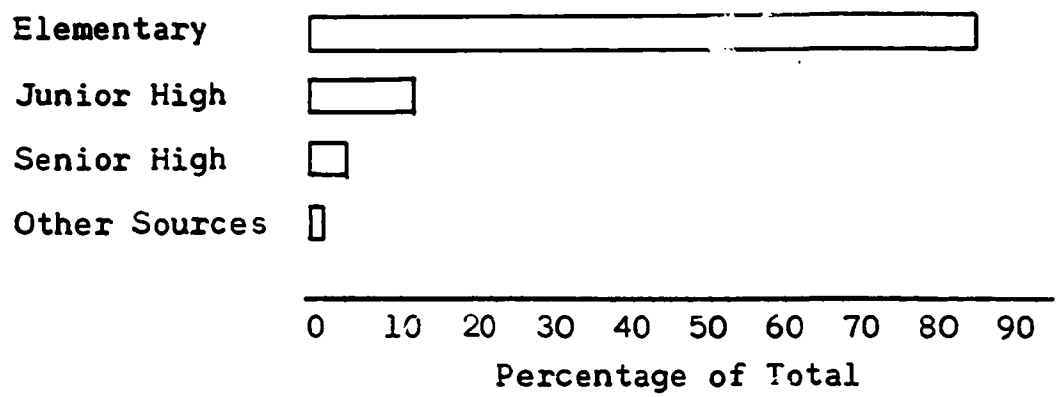


Figure 3.--Number of Referrals in Relation to School Level.

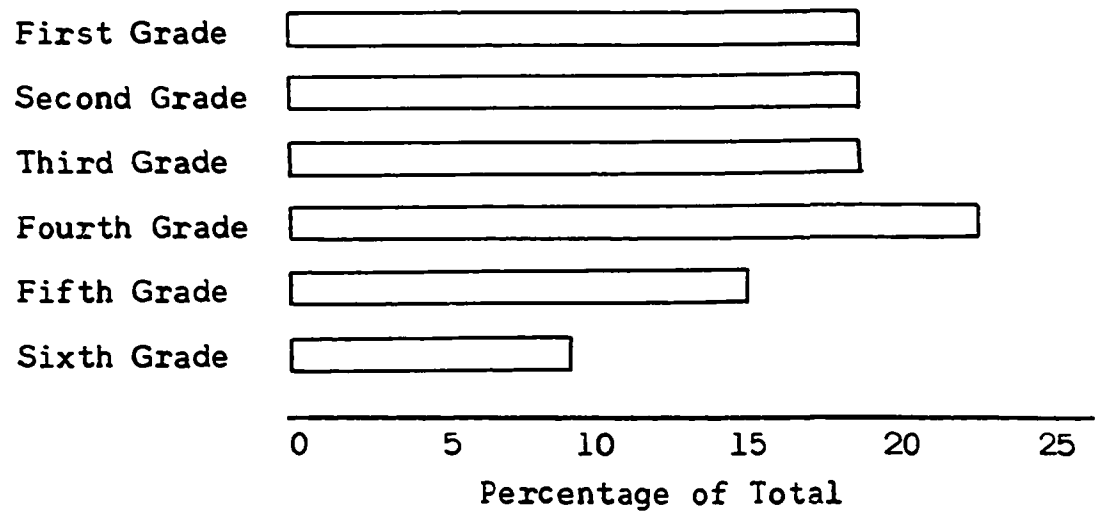


Figure 4.--Number of Referrals in Relation to Grade Level in the Elementary Schools.

Disturbed Group. The subjects comprising the disturbed group were selected from those elementary white children attending the first grade who had been referred to the Division of Child Guidance specifically as a result of

personality disturbance and subsequent inability to cope with the social, personal, and academic demands of their classroom setting. Of the total of 106 first grade boys referred to the Division of Child Guidance, forty-two white boys, or forty percent of the population, were determined to exhibit maladjustments primarily related to emotional conflicts and disturbances. The clinical population of white boys fell into the categories presented in Figure 5. These percentages approximate those reported in other sources (34).

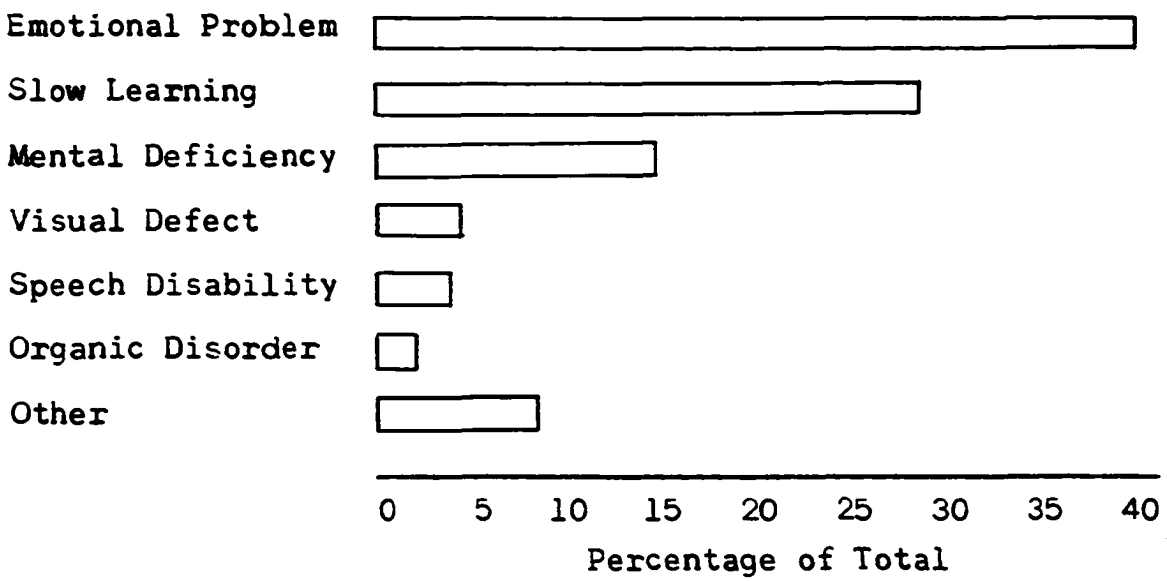


Figure 5.--Types of Problems Referred to the Division of Child Guidance: Elementary School First Grade Boys. N = 106.

While it is recognized that the term "emotionally disturbed" is a broadly inclusive one, it refers to those children who are best described as emotionally disturbed to the extent that they stand out as behavior problems, or as

being odd or different from their classmates, and who, because of their emotional difficulties, are unable to make full use of the school program. The subjects of the disturbed group were restricted to those children who are pitifully ill-equipped to handle failure and frustration, and who characteristically react with rage, disappointment, withdrawal, or sullennes.. They have confused desires for object relationships with others in their world and often interpret mild reprimands or limitations to their behavior as evidence of intense rejection on the part of adults. The severity of their difficulties has brought them to the attention of school officials and has resulted in their being referred for psychological evaluation. The children considered eligible for inclusion in the disturbed group were those who had been given a clinical diagnosis of emotional disturbance. They were children who had been found unable to relate satisfactorily to their childhood living environment.

Definition of the emotionally disturbed child is difficult for the reasons noted by McCandless (34). He states that,

> Practically speaking, socially and emotionally maladjusted or disturbed children are typically defined in terms of action: a child is emotionally disturbed to the degree that he concerns some responsible person or persons (parents, school administrators, social workers, law enforcement workers) sufficiently that a form of official action is taken about him.
>
> It is to be anticipated and hoped that diagnosis and classification of disturbed children will eventually be on a scientific rather than expediency basis. But as

> yet, the science of personality description is so little advanced, . . ., that the 'action definition' given above is the only possible one (34, p. 274).

McCandless notes the following characteristics as often typical of disturbed children (34):

1. Cruelty, bullying, hurting others
2. Hostile, destructive, aggressive
3. Bed wetting
4. Persistent fears, nightmares, daydreaming
5. Tics and other neuropathic mannerisms
6. Difficulties with teachers and other adults
7. Behavior problems
8. Feels that other children do not like him, tease him, pick on him
9. Dislikes school and/or teacher
10. Almost total lack of warm and satisfying relationships; lack of sustaining relationship and identification with either parent.

Thus, the following criteria were utilized in evaluating the children as to suitability for inclusion in the disturbed group.

1. Enrollment in the first grade of the public elementary schools
2. A referral to the Division of Child Guidance
3. A clinical diagnosis as emotionally disturbed
4. Within the average range of intelligence; I.Q. 90-110
5. Within the age range of 6 years and 8 months to 7 years and 8 months
6. Has not been retained in either kindergarten or first grade
7. Free of brain injury, convulsions, cerebral palsy, and other physical handicaps

The final disturbed population consisted of a total of twenty-five boys.

The following case is presented for the purpose of illustrating the dynamic importance of the child's manifest behavior and his subsequent response to his living environment. This case illustrates, too, the numerous factors which condemn the child to the clinical population of disturbed children who relate unsuccessfully to persons and events in their environment.

> Bobby, age seven, enrolled in the first grade, is failing to respond effectively to school and does not seem interested in school. He spends most of his day in a reverie and seems lost in his dreams. At home, his mother is at a loss to know how to handle his emotional outbursts and temper tantrums.
>
> Bobby is an adopted child who came to live with his adoptive parents when he was three years old. After raising several sons, the parents had another child and decided that they should adopt a baby to grow up with their own son. Bobby was impossible to handle when they took him home, and the parents resorted to harsh and somewhat cruel methods to deal with the child's hostility and unhappiness. Both parents have tended to punish Bobby too harshly and too frequently. During toilet training Bobby failed to respond to the mother's efforts and she forced him to eat his feces. After this he did not have bowel movements regularly and even now has a great deal of difficulty with constipation.
>
> The mother has always believed that Bobby was a lazy child, and she has, therefore, tried to force him to conform to certain high standards. She has been constantly alarmed and disconcerted with Bobby's refusal to behave in socially acceptable ways, and no method of punishment seems to have any effect on him. Once during a church meeting his mother corrected him and Bobby screamed and screamed until the mother threatened to flush him down the toilet.
>
> The father is very busy with his professional activities, and the relationship between Bobby and his father seems quite superficial.
>
> Bobby's response to the Wechsler Intelligence Scale for Children indicates that he is a child of average ability (I.Q. 104). His test response was somewhat sporadic, and he frequently devaluated his efforts even though he successfully solved the given problem. Even

though praised and reassured, Bobby did not seem to be convinced that his response was really acceptable.

Personality tests and devices indicate that Bobby interprets his world as punitive and rejecting, harshly demanding of him, and rather completely unrewarding. He is convinced in his own mind that he can never fully behave exactly as adults wish. The most notable deviation about Bobby's behavior concerned his rather complete inability to relate satisfactorily to his living environment and to respond appropriately to its demands.

This case reveals, somewhat dramatically, how the various pathological influences brought about the relationship and behavior difficulties observed in this boy and how failure in the home setting led to failure in the school and community setting.

Each case in the disturbed group is unique, but they do have the one common quality which defines them as a discrete behavioral universe, and that is the dramatic expression of their inability to relate successfully to the social world in which they find themselves.

Normal Group. The subjects of the normal group were selected as being representative of polar opposites in manifest behavior to the group of disturbed children. As most clinicians working with children have observed, when something or someone interests or facinates a child, he can hardly restrain himself from bringing the adult who happens to be on the scene into the process of involvement. If a child is to be motivated by friendly adult behavior, he must have developed a real need for adult love ". . . and must be

able to recognize them as basically fun-loving, even at times when they temporarily interfere in fun" (42, p. 24). These, then, are the essential qualities in the child's ability to relate to adults and to other persons in his living environment.

In co-operation with the examining clinician, the children included in the normal group were selected by visiting counselors, teachers, and principals of the schools in which the children were enrolled. Selection was made according to the following criteria:

1. Enrollment in the first grade of the public elementary schools
2. Never referred to any clinic or agency for psychological evaluation because of emotionally disturbed adjustment
3. Within the average range of intelligence; I.Q. 90-110
4. Within the age range of 6 years and 8 months to 7 years and 8 months
5. Has never been retained in kindergarten or first grade
6. Free of brain injury, convulsions, cerebral palsy, and other physical handicaps
7. Spontaneous and outgoing
8. Relates well to peers and adults
9. Effective and productive in the classroom
10. Well liked by other children
11. Has good relationship with own parents
12. Few or no neuropathic mannerisms, tics, compulsions, fears

13. Cooperative and reasonably conforming

14. Relatively consistent and stable in behavior

15. Reading and other achievement at or near expectancy level

Table 2

Age and I.Q. Data for Matched Subjects

Normal			Disturbed		
Subject	C.A. (mths)	I.Q.	Subject	C.A. (mths)	I.Q.
AO	86	105	P	88	104
M	90	100	AB	89	98
X	83	101	AW	82	101
AF	85	107	B	84	107
AG	87	103	E	89	104
A	81	100	K	81	100
C	85	102	AR	84	103
G	82	95	AQ	82	96
T	83	98	AA	83	99
AC	82	95	AM	82	96
AD	81	100	I	81	99
F	80	101	V	80	104
AJ	84	93	AV	84	91
AK	83	101	D	83	104
AT	83	101	R	82	105
AU	83	90	Q	82	92
O	90	93	AI	87	94
Y	85	95	AX	85	92
J	87	107	Z	90	105
H	88	92	AE	87	96
AS	84	100	AL	82	98
L	89	101	AH	88	95
U	88	109	S	91	106
W	86	108	AN	82	107
AP	86	105	N	81	107
Mean	84.84	100.08		84.36	100.12
S.D.	2.77	5.11		3.15	5.04

The normal and disturbed groups were equated for age, sex, and intelligence; in this procedure the subjects were matched as closely as possible. The results of matching for age and I.Q. are shown in Table 2. The intelligence levels of the normal subjects ranged in I.Q. from 90 to 109, while the intelligence levels of the disturbed subjects ranged in I.Q. from 91 to 107. The ages of the normal subjects ranged from six years and eight months to seven years and six months, while the disturbed subjects ranged in age from six years and eight months to seven years and seven months. Similarities in the composition of the two groups can be appreciated by inspection of Table 2, but Table 3 provides summary

Table 3

Composition of the Normal and Disturbed Groups

Item	Group	
	Normal	Disturbed
Sex	Male	Male
Number	25	25
Chronological Age		
Range	6 yrs. 8 mos. to 7 yrs. 6 mos.	6 yrs. 8 mos. to 7 yrs. 7 mos.
Mean	84.84 mos.	84.36 mos.
S.D.	2.77	3.15
Intelligence		
Range	90-109	91-107
Mean	100.08	100.12
S.D.	5.11	5.04

information about the nature and similarity of the normal and disturbed groups. Furthermore, the F test (15, p. 164) for homogeneity of variance for age and for I.Q. was found in both instances to be less than the value significant at the five per cent level. Accordingly, the assumption of homogeneity of variance is justified.

Thus, the final groups consisted of twenty-five normal boys and twenty-five disturbed boys matched for age, school grade placement, and intelligence.

Summary

Twenty-five normal and twenty-five disturbed first grade boys of average intelligence were exposed to identical experimental conditions. They were required to reproduce (copy) four selected simple geometric figures which varied in difficulty level, namely, a cross, a square, a vertical diamond, and a horizontal diamond, together with all nine of the geometric figures of the Bender Gestalt-Motor Test (7). The figures were individually reproduced on single four-inch by six-inch white cards. Following the administration of the simple figures and the Bender Gestalt designs, the subjects were presented with nine sets of stimulus figures, each consisting of four designs mounted on gray cardboard. The four designs included a replica of the regular Bender design and three replicas of Bender drawings reproduced by six year old children. The three replicas reproduced by six year olds

varied in distortion from each other and from the replica of the regular Bender design. On presentation of each set of stimulus figures, the subject was asked to "Choose the one which is the same as the one you were shown to copy; choose the one which is just like the one you were shown to copy." Selections were recorded on a four-inch by six-inch white card.

Analysis of the Data

In order to ascertain whether group differences occurred as hypothesized, it was necessary to translate the data into several different scores or measures, depending upon the specific hypothesis to be tested. The five per cent level of significance was set as the value required for acceptance of the various hypotheses.

Since the first hypothesis is concerned with subject performance on the four simple geometric figures, the first step in the breakdown of the data involved the translation of performance on these figures into passing and failing scores according to the following criteria.

1. Cross: Straight lines approximately the same length; crossed near the center; lines at approximately 90 degree angles.
2. Square: Four well defined angles; no "ears" at corners; lines relatively straight; well proportioned; not rectangular.
3. Diamond: Four well defined angles; no "ears" at corners; correct shape; not square or "kite-shaped."

Prior to the scoring of the simple figures the normal and disturbed subjects were randomly assigned letter designations to obscure their identity. Their reproductions of the simple figures were, in turn, coded with the letter designations. The designs were then arranged in alphabetical order and scored according to the criteria listed above by three clinical psychologists, including the author. Agreement between scorers was determined and was found to range from eighty-four per cent to eighty-seven per cent; average scorer agreement was eighty-six per cent. The results of scoring the simple figures is shown in Table 4.

Since the variables involved in this analysis, that is, diagnosis and motor performance, fell into dichotomous categories, the Chi square (χ^2) technique was judged to be appropriate for the analysis of these data. Grouping was at a gross behavior level in terms of passing or failing the designs. The degree of independence between diagnosis (normal and disturbed) and motor performance on the simple figures was evaluated for each of the four simple geometric figures to determine which of them differentiated the two groups. Since the four simple figures represent levels of copying difficulty and are likewise measures of motor maturity, significant differences in performance on these figures by normal and disturbed children would place in an untenable position the postulate by Pascal and Suttell (37) that deviations in performance on the Bender Gestalt Test are not

Table 4

Scores on the Simple Geometric Figures

by the Normal and Disturbed Subjects

Normal					Disturbed				
Subject	Cr	Sq	VD	HD	Subject	Cr	Sq	VD	HD*
A	+	+	?	-	B	+	-	?	-
C	+	-	-	-	D	+	-	-	-
F	-	?	?	-	E	-	-	?	-
G	+	+	-	-	I	?	+	-	-
H	+	?	+	+	K	+	-	-	-
J	+	-	?	?	N	-	-	+	-
L	-	?	?	+	P	-	-	-	-
M	+	-	+	-	Q	+	+	-	-
O	+	+	+	+	R	+	+	+	-
T	+	+	?	+	S	?	?	+	-
U	+	+	+	?	V	?	-	-	-
W	+	+	+	+	Z	+	-	+	?
X	+	?	+	-	AA	?	-	?	-
Y	?	-	-	?	AB	+	?	?	-
AC	+	-	-	-	AE	+	+	?	+
AD	+	+	-	?	AH	+	-	+	-
AF	+	+	?	-	AI	+	+	+	?
AG	+	?	+	-	AL	+	+	-	-
AJ	-	-	-	-	AM	+	-	-	-
AK	+	-	+	+	AN	+	-	+	?
AO	-	?	+	-	AQ	+	+	-	-
AP	+	-	?	?	AR	?	-	-	-
AS	?	?	+	?	AV	+	+	+	+
AT	?	-	+	-	AW	?	-	-	-
AU	?	+	+	-	AX	?	-	?	-

*Abbreviations

Cr--Cross

Sq--Square

VD--Vertical Diamond

HD--Horizontal Diamond

attributable to motor factors ". . . in individuals of normal intelligence without demonstrable brain damage . . ." (37, p. 9).

Thus, a total of 50 reproductions was given by the normal and disturbed groups for each of the four simple geometric figures, resulting in a combined total of 200 reproductions. Each individual reproduction was scored as passed or failed by three clinical psychologists and tabulated according to this scheme. For those subjects about whose reproduction the scorers disagreed, a "questionable agreement" (?) score was assigned (see Table 4). The most reasonable solution to the dilemma raised by the disagreement among the scorers with regard to the $\underline{X}^2$ analysis involved assignment of one-half of the number to the passed group and one-half to the failed group; for example, if the scorers disagreed on the performance of four subjects on the square, two of the subjects were assigned a passing score and two were assigned a failing score.

The discrimination scores for the test of the second hypothesis consist of the errors which the subjects made in identifying the replica of the original Bender stimulus card they were shown to copy. The replica cards of the Bender Test had been arranged according to the table of random numbers. The replica of the original Bender card occupied the ordinal positions 3 2 2 4 4 1 3 1 2 sequentially within the

nine four-card series of stimulus figures (see page 20 for the table of arrangement of the four stimulus cards). It was a simple matter to determine those figures correctly identified by the subjects. Since the question under consideration involved whether or not the subjects could correctly identify the original Bender stimulus card shown them to copy, when it was included in a series of reproductions obtained from six year old children, the test of the discrimination hypothesis required that the subjects be grouped at a gross behavior level in terms of those who made errors and those who did not. Consequently, the degree of independence between diagnosis (normal and disturbed) and discrimination in the perceptual phase of the Bender Gestalt was evaluated by calculating the probability (P) value for the obtained matrix by the direct method. A significant difference in discriminative behavior between the normal and disturbed subjects would place in an untenable position the second postulate by Pascal and Suttell (37) that deviant performance on the Bender Gestalt-Motor Test is not attributable to an inability to perceive the designs.

The third hypothesis is concerned with whether normal and disturbed children differ in their reproductions of the Bender Gestalt designs. Consistent with the treatment of the four simple geometric figures, the identity of the subjects' Bender reproductions were obscured by assigning them

letter designations. Arranging the designs in alphabetical order, they were scored according to the Pascal and Suttell criteria for scorable deviations (37). Ordinarily the raw scores derived from the Pascal and Suttell scoring of the Bender designs are converted to standard (Z) scores for comparative analysis, but since Pascal and Suttell do not present Z score conversion tables for the age group used in the present study, raw scores were utilized in the analysis of deviations in performance between subject groupings. Tables 5 and 6 present the Bender Gestalt raw score data for the subjects; Table 5 shows the scores for the matched subjects and Table 6 the array and range of raw scores made by the two groups. (The reader may wish to refer to pages 22-24 and Appendix B for more detailed information on scoring.) Reliability of examiner scoring was determined by computing a product moment correlation coefficient between examiner scores and criteria scores on protocols provided by Pascal and Suttell (37, pp. 216-220; pp. 251-272). This calculation resulted in an r greater than the .90 level of reliability recommended by Pascal and Suttell (37, p. 15). On the basis of the calculated level of reliability the analysis of performance on the Bender Gestalt by normal and disturbed subjects was carried out. Accordingly, the analysis of variance technique was used. This statistical method permitted the determination of group and design differences as well as interaction between these two factors.

The data from this study are on file at the Department of Pupil Services, Board of Education, Oklahoma City Public Schools.

Table 5

Bender Gestalt Raw Scores

for Matched Subjects

Normal		Disturbed	
Subject	Score	Subject	Score
AO	113	P	197
M	95	AB	115
X	70	AW	153
AF	68	B	117
AG	61	E	116
A	132	K	176
C	68	AR	132
G	82	AQ	120
T	64	AA	141
AC	79	AM	90
AD	118	I	112
F	115	V	141
AJ	97	AV	96
AK	61	D	115
AT	75	R	118
AU	90	Q	170
O	69	AI	115
Y	73	AX	138
J	85	Z	130
H	91	AE	87
AS	91	AL	104
L	46	AH	95
U	55	S	88
W	121	AN	120
AP	153	N	130

Table 6

Bender Gestalt Raw Scores for Normal and Disturbed Subjects

Normal	Disturbed
46	87
55	88
61	90
61	95
64	96
68	104
68	112
69	115
70	115
73	115
75	116
79	117
82	118
85	120
90	120
91	130
91	130
95	132
97	138
113	141
115	141
118	153
121	170
132	176
153	197
Mean 86.88	124.84
S.D. 25.70	27.02

CHAPTER III

RESULTS

The results will be presented for convenience of discussion under the following three headings: (1) Motor Phase, (2) Perceptual Phase, and (3) Interpretative Phase.

Motor Phase

For the purpose of determining whether differences in motor performance maturity exist between the normal and disturbed groups, their performance on the four simple selected geometric figures, that is, cross, square, vertical diamond, and horizontal diamond, was analyzed by applying the $\underline{X}^2$ test of independence to the data. The results of this analysis are presented in Table 7. If groups differing in personal and social behavior and adjustment differ significantly in copying ability, that is, motor performance maturity, then this difference should be revealed when they are called upon to reproduce geometric figures which differ in degree of difficulty. However, as an inspection of Table 7 will readily reveal, no such differences were found. The small differences which occurred would seem to be the result

Table 7

Performance on the Four Simple Geometric Figures by the Normal and Disturbed Subjects: Chi Square

	Figures							
	Cross		Square		Vertical Diamond		Horizontal Diamond	
	+	-	+	-	+	-	+	-
N*	19	6	13	12	16	9	9	16
D	19	6	9	16	11	14	4	21
$\underline{X}^{2}$**	.000		1.300		2.012		2.600	

*N = Normal Male Subjects; D = Disturbed Male Subjects.

**$\underline{X}^{2}$ value significant at the five per cent level for one degree of freedom is 3.841.

of chance fluctuations in sampling. It is interesting to note the responses of the groups to the horizontal diamond. The large number of subjects of both groups who failed this design would suggest that it fails at the upper limit of their ability to reproduce it satisfactorily. Lowder (33), in his doctoral research, found the horizontal diamond to be the most difficult figure for first grade children to reproduce.

The obtained results are consistent with the hypothesis that no difference exists between the normal and disturbed subjects in copying the cross, square, vertical

diamond, and horizontal diamond. One may conclude, therefore, that the only difference which occurs in the area of motor performance maturity between the groups is due to chance.

Perceptual Phase

To test Hypothesis Two concerning discrimination in the perceptual phase of the Bender Gestalt it was only necessary to determine which subjects made errors in identifying the replica of the original Bender stimulus cards and which ones did not make errors. Having determined the number of subjects who fell into the error and non-error cells for the normal and disturbed groups, discrimination behavior was analyzed by calculating the probability (P) value for the obtained matrix by the direct method. The results of this analysis are presented in Table 8.

Table 8

Discrimination of the Bender Gestalt Replica Designs by the Normal and Disturbed Subjects: Direct Probability Method

Group	Error	Non-Error
Normal	12	13
Disturbed	19	6
		$\underline{P}$ = .079

If groups differing in personal and social behavior and adjustment differ significantly in discriminative ability, that is, the ability to perceive the Bender Gestalt designs as they are pictorially represented (see Figure 1), then this difference should be revealed when the normal and disturbed subjects are required to identify the replicas of the Bender stimulus cards they were shown to copy. Inspection of Table 8 reveals that the normal and disturbed subjects do not differ significantly in discrimination of the replica Bender designs. The probability value obtained failed to meet the confidence test level required for the acceptance of Hypothesis Two. This finding agrees with the Pascal and Suttell postulate concerning the ability of the subject to perceive the Bender designs as they are pictorially represented. This finding in relation to the lack of support by this study of the motor ability postulate strengthens the position of Pascal and Suttell concerning those factors which are not involved in the total act of reproducing the Bender Gestalt designs.

Indeed, then, the obtained results are consistent with the hypothesis that no difference exists between the normal and disturbed subjects in discriminative ability in the perceptual phase of the Bender Gestalt.

Interpretative Phase

The interpretative phase is concerned with determining

whether differences in Bender reproduction occur between normal and disturbed children. Any difference which obtains between the normal and disturbed groups would be, by the postulates advanced by Pascal and Suttell (37), assignable to "interpretative factors" which obtrude between ability to see and to reproduce the designs.

Hypothesis Three states that, "Disturbed and normal children differ significantly in their reproductions of the Bender Gestalt designs." For the purpose of determining whether the hypothesized difference obtained between the normal and disturbed boys, the analysis of variance technique was applied to the raw score data derived from the scoring of the Bender Gestalt reproductions by the Pascal and Suttell criteria for deviations. The results of this analysis are presented in Table 9. The method of analysis is based on the fact that the subjects were matched. Inspection of this table reveals that the normal and disturbed boys differ significantly in their reproductions of the Bender Gestalt designs in terms of scorable deviations. It will be noted, too, that the designs (De) differ significantly among each other. These findings, in conjunction with the lack of significant interaction between designs (De) and diagnosis (Di), suggest that although the designs vary in difficulty, the variation is about the same for both the normal and the disturbed subjects. However, the disturbed group exhibited significantly more scorable deviations.

Table 9

Performance on the Bender Gestalt by the Normal and Disturbed Subjects: Analysis of Variance

Variance Source	df	Sum of Squares	Variance	F	P
Total	399	23147.38	.....		
Pairs (Ps)	24	2961.19	123.38		
Diagnosis (Di)	1	2251.50	2251.50	27.07	.001*
Designs (De)	7	2351.00	335.86	7.51	.001**
Ps x Di	24	1996.26	83.18		
Ps x De	168	7511.69	44.71		
Di x De	7	155.04	22.15		
Ps x Di x De	168	5920.70	35.24		

*F for 1/24 df at the one per cent level is 7.82.

**F for 7/168 df at the one per cent level is 2.75.

Although the F-test reveals that design differences exist, it does not indicate which ones differ significantly from others. These differences may be discovered by application of the t-test to the data.

Table 10 presents the various design means. Table 11 presents the results of the twenty-eight t comparisons between designs. The various t values were determined by using the standard t formula. For these comparisons a minimum t value of 1.985 was determined necessary to significantly differentiate between designs at the five per cent level. Thus, designs 4, 5, 6, and 7 were found to differ significantly from each other, while designs 1, 2, and 8 were found

Table 10

Bender Gestalt Design Means

N = 50

Design	Mean
1	12.52
2	13.96
3	10.72
4	12.34
5	9.00
6	16.80
7	15.56
8	14.94

Table 11

t Comparisons between Bender Gestalt Designs: *t* Values*

Designs	Designs							
	1	2	3	4	5	6	7	8
1		.770	1.085	.105	2.120	2.533	1.583	1.329
2			2.439	1.174	3.701	2.073	.969	.641
3				1.495	1.740	5.827	3.468	3.387
4					3.009	3.912	2.190	1.955
5						7.290	4.652	4.677
6							.861	1.431
7								.390
8								

*t value must exceed 1.985 to be significant at the five per cent level of confidence.

to differ from each other only according to chance fluctuations. Inspection of Table 11 will clarify the various *t* comparisons.

The differences between the groups for designs were determined by applying the *t*-test to the data. Table 12 reveals the results of the eight *t* comparisons. For these comparisons a minimum *t* value of 2.010 was determined necessary to significantly differentiate between the groups at the five per cent level. Inspection of Table 12 reveals the magnitude of scorable deviations in performance by the groups on the various designs and the *t* values. Scorable deviations favor the disturbed group, but of the eight designs, design

Table 12

Design Means for the Normal and Disturbed Subjects: *t* Values

Design	Normals	Disturbed	Difference	*t* Value*
1	9.40	15.64	6.24	2.189
2	10.36	17.56	7.20	3.582
3	8.76	12.72	3.96	3.118
4	10.52	14.16	3.63	2.297
5	7.36	10.64	3.28	2.360
6	14.60	19.00	4.40	3.056
7	13.28	17.84	4.56	1.957
8	12.60	17.28	4.68	2.376

*t value to be significant at the five per cent level must exceed 2.010.

seven failed to differentiate the two groups. Further inspection of Table 12 indicates that both groups exhibited the greatest number of deviations on design six and the fewest on design five. On the other hand, the disturbed group reproduced designs one and two with significantly more scorable deviations, when compared with the normals on these designs, than on other designs.

Furthermore, the mean Bender score of the normal group was calculated to be 86.88, a score which closely approximates the mean Bender score for a similar group of normal subjects used by Pascal and Suttell in their standardization studies (Mean = 91.00) (37, p. 43).

In view of the results obtained, the hypothesis that significant differences exist between reproductions of the Bender Gestalt designs by normal and disturbed children, as defined in this study, can be accepted with confidence. It can be concluded that the differences which occur between the two groups do not result from chance fluctuations in sampling.

The results of this phase of the study give support to the formulations of Bender (7) and Pascal and Suttell (37) that differences in Bender reproduction may be assigned directly to "interpretative factors." A more complete discussion of results follows in the next chapter.

CHAPTER IV

DISCUSSION OF RESULTS

The purpose of this thesis as stated at the outset was to examine several assumptions concerning factors involved in the reproduction of the Bender Gestalt-Motor Test designs (7). Pascal and Suttell postulate that three factors are involved in the reproduction of the Bender Gestalt: (1) sensory perception, (2) interpretation, and (3) motor reproduction. They assign differences in Bender Gestalt reproduction to "interpretative factors" which obtrude between sensory perception and motor reproduction. They contend that the ability to perceive the designs and the ability to reproduce them play only an incidental role in the reproduction of the designs ". . . in individuals of normal intelligence without demonstrable brain damage . . ." (37, p. 9). Differences, then, become a matter of what Pascal and Suttell term an "attitude," that is, what the designs and the task mean to the individual in light of his past experience. By assuming that deviations in response have their basis in deviations in the total responding organism, the given stimulating constellation of geometric forms may be used in more

or less similar situations to study the gestalt function in various pathologically integrated conditions. In this scheme, then, deviant performance on the Bender Gestalt-Motor Test is assigned to "interpretative factors" (37).

In general, the results of this study support the hypothesis that differences in Bender Gestalt reproduction between normal and disturbed children are assignable to "interpretative factors."

In view of the several factors under consideration, the general hypothesis was considered, for convenience of presentation and discussion, as three related hypotheses, namely: (1) Disturbed and normal children differ significantly in copying four simple geometric figures; a cross, a square, a vertical diamond, and a horizontal diamond. (These four figures have been determined to represent levels of copying difficulty (33); they were utilized as a measure of motor performance maturity (16) and, thus, were used to determine the tenability of the motor phase assumption of the Bender Gestalt.) (2) Disturbed and normal children differ significantly in discrimination in the perceptual phase of the Bender Gestalt. (3) Disturbed and normal children differ significantly in their reproductions of the Bender Gestalt designs. These three hypotheses were related to three facets of test response on the Bender Gestalt-Motor Test which would seem to be capable of differentiating between normal and disturbed children.

The findings fail to support the hypothesis concerning differences in motor performance maturity in disturbed and normal subjects. Generally speaking, the differences found between the two groups for the four simple geometric figures can be attributed to chance. Scoring for directionality of lines for both groups for the four simple geometric figures likewise failed to differentiate the two groups significantly by the $\underline{X}^2$ technique. Typically, both groups drew the vertical line of the cross "down" and the horizontal line to the "right." On the square both groups drew the vertical lines "both down" or "one up-one down;" similarly, the horizontal lines of the square were either drawn "both right" or "one right-one left." Not a single subject drew the vertical lines "up" or the horizontal lines of the square to the "left." The preferred approach in ascendency frequency-wise for both groups on the square was to draw the vertical lines "one up-one down" and the horizontal lines "one right-one left." However, both groups exhibited a wide variety of copying patterns on the vertical and horizontal diamonds. The normals produced fourteen variations and the disturbed subjects fifteen. Scoring both diamonds for directionality of lines into categories designated clockwise motion, counter-clockwise motion, and clockwise--counter-clockwise motion and applying the $\underline{X}^2$ technique to a 2 x 3 table resulted in only chance differences between the normal and disturbed subjects.

Thus, as far as the motor phase is concerned, the assumption of no difference in motor performance maturity between the normal and disturbed subjects seems to be clearly supported. Basic data from the scoring of the reproductions of the simple geometric figures failed to differentiate the two groups. It can be stated, then, that differences in reproduction of geometric forms must be due to factors other than the motor capacity required to reproduce them. Hypothesis One may be rejected with confidence.

Consistent with the formulations of Pascal and Suttell (37) no significant difference was found to exist between the normal and disturbed subjects in the perceptual phase of the Bender Gestalt. The evidence indicates that the normal and disturbed boys perceived the Bender Gestalt designs similarly. The normal and disturbed boys exhibited a somewhat similar ability to discriminate between designs. The Bender geometric figures would seem to be as constant at the sensory level for the subjects used in this study as they are for adults (29). In view of the perceptual phase finding, Hypothesis Two may be rejected.

The hypothesis regarding differences in reproduction of the Bender designs by normal and disturbed subjects was confirmed by the results obtained by applying the analysis of variance technique to scored deviations in response. While both groups scored deviation patterns larger than those

usually seen in adults, the magnitude of scorable deviations consistently favored the disturbed subjects.

In understanding the difference found between the normal and disturbed boys Pascal and Suttell (37) suggest that deviations in performance may be assigned to "interpretative factors." Like Bender (7), they consider impairment of the gestalt function to be related to the integrative capacity of the organism, the ego. In their scoring scheme Pascal and Suttell (37) consider high scoring records to be indicative of little ego strength; ". . . ego strength lies on a continuum from very low to very high B-G scores (37, p. 9). Redl and Wineman (42), Ausubel (3), Bettelheim (9), and others (1, 26) consider the emotionally disturbed child to reveal by his symptomatic behavior a defect in ego development. Redl and Wineman make the following statement:

> Yet the children who hate cannot establish adequate relations to future experience and are pitifully ill-prepared to cope with the implications of failure without primitive rage and disappointment, and with success without grandiosity and irritating bragging (42, p. 24).

Redl and Wineman conclude that disturbed children have extremely weak, distorted, and confused wishes for object relationships with adults and often interpret necessary limitations to their behavior and mild reprimands as deep rejection on the part of the adult.

If we reconsider Bender's contention (7) that test response is based upon the integrated state of the organism,

then deviations in Bender performance would reflect the subject's attitude toward reality. This enabling capacity of the organism, i.e., to respond adequately and appropriately to stimuli in the enrivonment, is referred to as a function of the ego (1). Redl and Wineman (42) suggest that the breakdown of controls results in disorganization and maladjustment in personality. They indicate that urges, impulses, strivings, desires, needs which seem to push in the direction of gratification, goal attainment, or expression are held in check by the "control system" (41, p. 59). Redl and Wineman define "control system" as,

> . . . those parts of the personality which have the function and the power to decide just which of a given number of desires or strivings will or will not be permitted to reach the level of behavioral action, and in which form (41, p. 59).

When one child hits another over the head with a stick, some indication of the child's "control system" is evidenced. What way the child's "control system" may vary depends, in part at least, upon his reality perception, that is his feelings for what is fair and decent. The child's perception of reality is largely phenomenological. A child who perceives the world of reality as largely hostile, punitive, and rejecting may respond with large amounts of destructive behavior. The part of his personality which is supposed to screen and check his impulses before they are permitted open action may be deficient or not functioning at all. The internal

factors--external factors paradigm determining perception and behavior is well established in psychology. Schonbar (45) found this paradigm application in situations of high structure and objectivity. Rubenstein (44) found in his study of the relationship between personality and perception that the strength of internal factors in perception increase with impaired personality adjustment. The selective function of the "control system" not only tests reality but tests the techniques and their reality-relatedness by which the child tries to bring about his adjustment.

At the beginning of this thesis specific reference was made to Bender's notion that the stimulating constellation of Bender Gestalt designs could be used to study the Gestalt function in various pathologically integrated conditions by assuming that deviations in response have their basis in deviations in the total responding organism. Pascal and Suttell (37) assume that greater deviations from the stimuli could be found in those persons in whom the attitude toward reality is most disturbed, and they assigned the deviations to "interpretative factors." Subsequently, a significant difference was found to exist between the normal and disturbed children in the interpretative phase of the present study, thus confirming the postulate advanced by Pascal and Suttell (37). Hypothesis Three, therefore, may be accepted with confidence.

Before concluding this section a note must be made about the use of the Bender Gestalt test as a clinical instrument. On the basis of the findings discussed above, the Bender test, together with the Pascal and Suttell scoring criteria, would appear quite useful in differentiating normal from disturbed or maladjusted children of normal intelligence. However, it must be mentioned that the use of only raw scores derived from scorable deviations does not permit a more refined measure of identification diagnostically, as the Pascal and Suttell system does for adults. The data of Table 6 suggests the use of a cutoff raw score of 100; that is it would appear possible to identify correctly maladjusted children of normal intelligence with about eighty per cent accuracy, if their scores exceeded this value. As a screening device a shortened form of the Bender Gestalt Test would include designs 2, 3, and 6.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of the present study has been to examine several assumptions concerning the reproduction of the Bender Gestalt Test designs using samples of normal and disturbed children enrolled in the public schools of Oklahoma City. Theoretically, Pascal and Suttell (37) postulate three factors essential to the reproduction of the Bender Gestalt designs, namely, sensory perception, interpretation, and motor reproduction. These authors maintain that deviant performance on the Bender figures is a function of "interpretative factors" which obtrude between the ability to perceive the figures and the motor ability involved to reproduce them. Pascal and Suttell believe that what is being measured by the Bender Gestalt-Motor Test when used with individuals of normal intelligence, free of demonstrable brain damage, is some factor other than the ability to perceive the figures and the ability to reproduce them. Deviations in response are assumed to have their basis in deviations in the total responding organism. Accordingly, the stimulating constellation of Bender designs may be used to study the gestalt

function in various pathologically integrated conditions. Greater deviations from the stimuli would be expected in those persons in whom the attitude toward reality is most disturbed. The deviations obtained would be assigned to "interpretative factors." To test the general hypothesis that differences in Bender Gestalt reproduction exhibited by normal and disturbed children are related to the interpretative phase of the Bender Gestalt, three separate hypotheses were formulated: (1) Disturbed and normal children differ significantly in ability to copy four selected geometric figures; (2) Disturbed and normal children differ significantly in discrimination in the perceptual phase of the Bender Gestalt; and (3) Disturbed and normal children differ significantly in their reproductions of the Bender Gestalt designs.

Twenty-five first grade boys of average intelligence were selected from a clinical population of children referred to the Division of Child Guidance of the Oklahoma City Public Schools for psychological study. These twenty-five boys were matched for age and I.Q. with another group of twenty-five first grade boys determined to be normal in adjustment and achievement in school.

Both the normal and disturbed subjects were exposed to the same experimental conditions. Each group was required to copy four selected geometrical figures, namely, a cross,

a square, a vertical diamond, and a horizontal diamond. These four figures represented levels of copying difficulty and were utilized as a measure of motor performance maturity. Together with the four selected figures, the subjects were also required to copy the nine geometrical figures of the Bender Gestalt-Motor Test individually on separate four-inch by six-inch white cards, each time using a freshly sharpened pencil. Following the administration of the four selected figures together with the Bender designs, the subjects were shown nine sets of stimulus figures, one set for each of the individual Bender designs. Each set of Bender stimulus figures included a replica of the original Bender design and three replicas of designs obtained from six year old children; each of the three replicas varied in degree of distortion from the replica of the original Bender design and from each other. Upon presentation of each set of four stimulus figures, the subject was asked to "Choose the one which is just like the one you were shown to copy; choose the one which is the same as the one you were shown to copy." During the instructional period prior to reproducing the designs the subjects were told that copying the figures would help them look at some figures to be presented later. The four stimulus figures for each Bender design had been arranged in a series on gray cardboard according to the table of random numbers.

Analysis of the data by the various techniques confirmed the general hypothesis derived from the Pascal and Suttell formulations (37). In first grade boys of average intelligence, deviant performance may be directly assigned to "interpretative factors."

Pascal and Suttell postulate that deviant performance on the Bender Gestalt is not related to the motor ability involved to reproduce the figures in individuals of normal intelligence and free of demonstrable brain damage. When accuracy of reproduction of the four selected geometrical figures was analyzed, Hypothesis One was rejected inasmuch as no significant difference was found to exist in motor performance maturity between the normal and disturbed subjects.

The perceptual phase finding was consistent with the Pascal and Suttell (37) postulate that no difference exists between the normal and disturbed subjects in discriminative behavior. The normal and disturbed subjects showed a somewhat similar ability to discriminate between designs. In addition, the finding in the perceptual phase is consistent with the findings of Kleinman's study of Normal and disturbed adults (29). Kleinman ruled out the perceptual aspect and assigned differences in performance on the Bender designs to the interpretative function.

Analysis of performance on the Bender reproductions

revealed a significant difference to exist between the normal and disturbed boys. Having demonstrated that the normal group and disturbed group are similar in both motor ability required to reproduce the designs and in discriminative ability, we may assume, with Pascal and Suttell, that deviant performance in the reproduction of the Bender designs may be assigned directly to "interpretative factors."

A study of this kind which proposes to test differences between two diagnostic groups also yields data regarding the validity of the differentiating instrument. In the current use of the Bender Gestalt, though the validity of the test was not under consideration, the sharpness with which the disturbed boys were differentiated from the normals provides confirmatory evidence for its clinical utility. This finding gains additional strength when the test is viewed as a rather facile way of gaining clinical insights through a task which children seem to enjoy doing. However, the utilization of raw scores does not permit the use of the more refined technique for clinical identification suggested by Pascal and Suttell (37, pp. 34-36). The results of this study suggest that scores ranging above 100 would seem capable of differentiating the normal from the disturbed (patient) subjects at an eighty per cent accuracy level. Ostensibly, then, the clinician would need to exercise judicious care in using the Bender test with children since they

tend to be high scorers. Normal children could be identified as false positives, that is, the Bender patterns of normal children could be identified as quite deviant but still be within the limits of normalcy.

Thus, in view of the findings, the following conclusions seem warranted.

1. Disturbed and normal first grade boys of average intelligence do not differ significantly in copying ability.

2. Disturbed and normal first grade boys of average intelligence do not differ significantly in discrimination in the perceptual phase of the Bender Gestalt.

3. Disturbed and normal first grade boys of average intelligence differ significantly in their reproductions of the Bender Gestalt designs.

4. Deviant performance on the Bender Gestalt designs may be assigned to "interpretative factors."

5. The clinical utility of the test with young children seems confirmed. The test is capable of differentiating between normal and disturbed first grade boys when certain modifications of the Pascal and Suttell (37) scoring scheme are employed. A shortened form of the Bender Gestalt-Motor Test for screening young children would include designs 2, 3, and 6.

Implications for Research

A number of provocative ideas for further study

almost always arise out of an exploratory study of this kind. Perhaps one way of attacking the maturation factor which seems inherent in the reproduction of the Bender Gestalt designs at different ages would be to repeat this study, not with another clinical group, although this could be done, but, instead, with the diagnostic groups of this study at different age levels. In this way it would be possible to isolate differences between the two diagnostic groups as well as relate these differences to age differences as a measure of maturation.

Another area of possible profitable study would involve a more detailed analysis of the drawing behavior of children on the Bender Gestalt designs. While the scoring of directionality of lines on the four simple geometric figures revealed no difference to exist, directionality of lines may be a differentiating maturational factor heretofore suggested but not utilized in the scoring of the Bender Gestalt Test (39).

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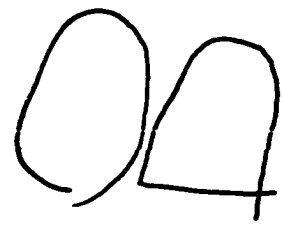
APPENDIX A

PERCEPTUAL PHASE DESIGNS

Bender Gestalt Design A



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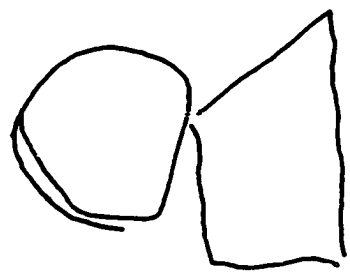

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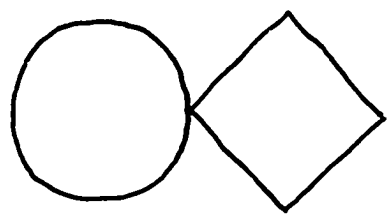

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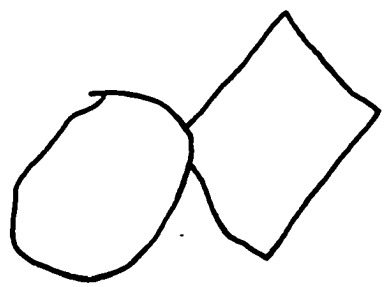

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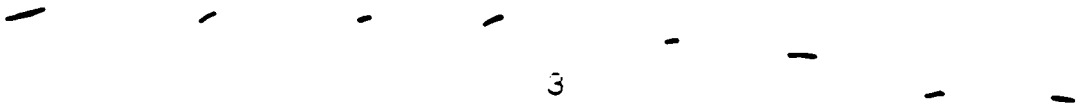
Bender Gestalt Design 1



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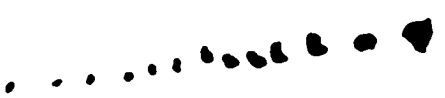
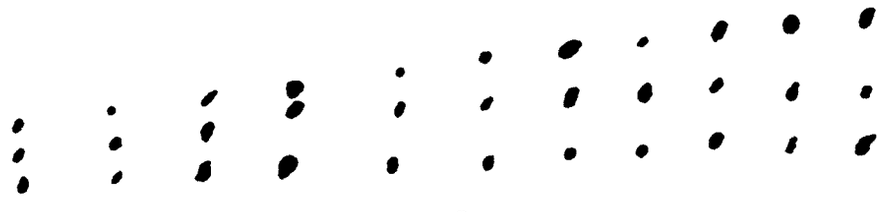
1

4



2

Bender Gestalt Design 2



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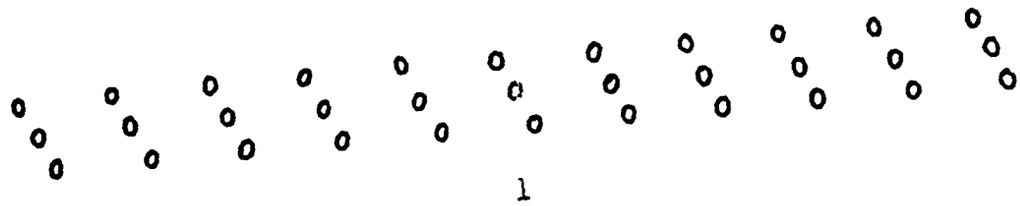

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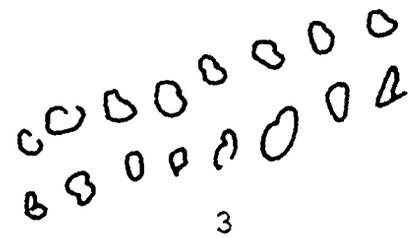

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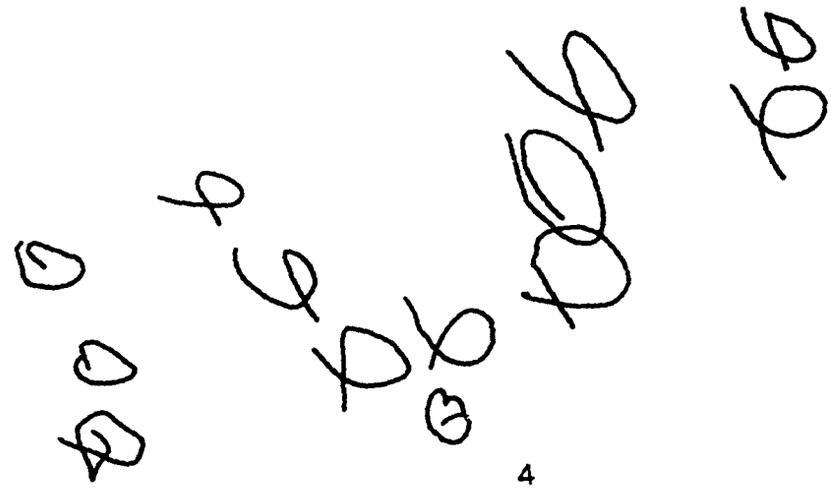

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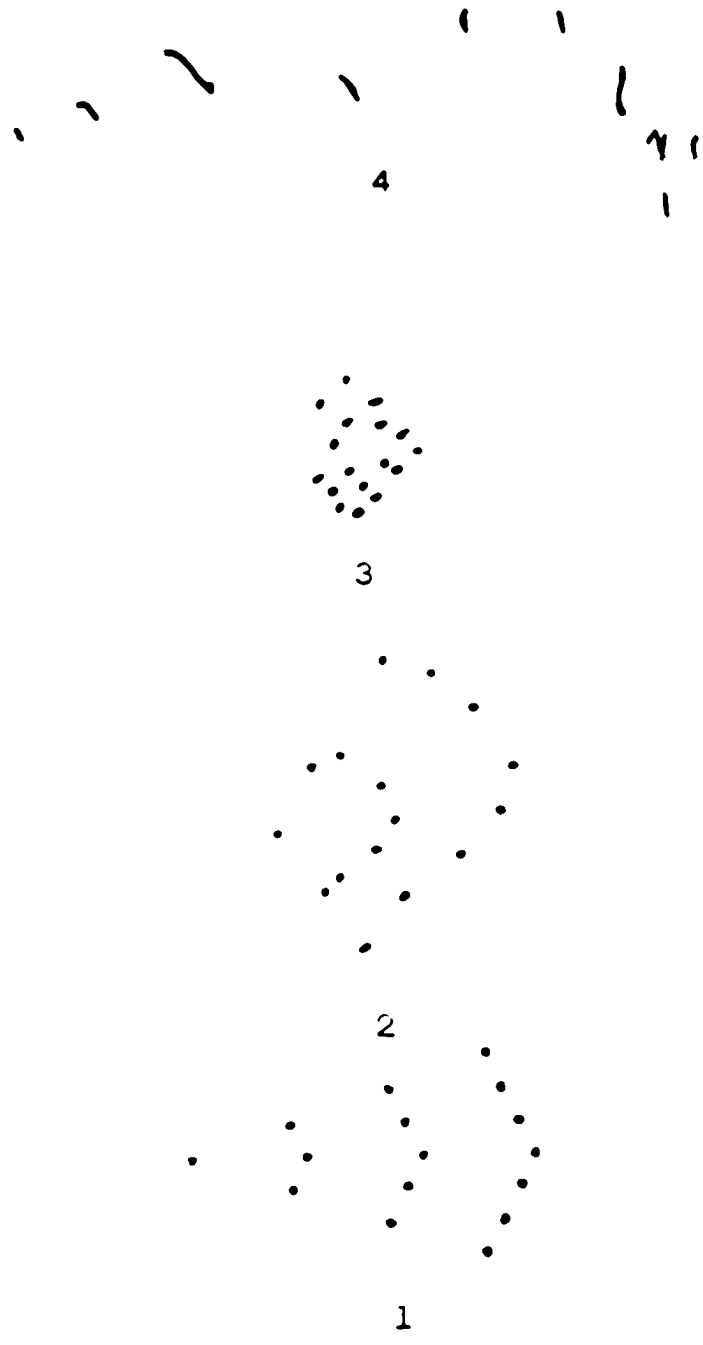
Bender Gestalt Design 3



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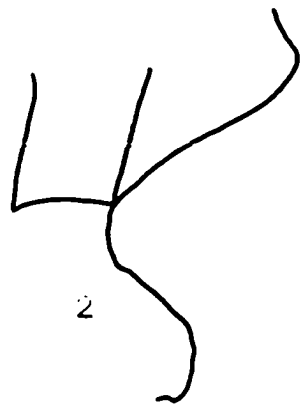

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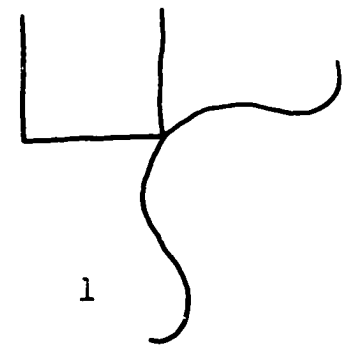

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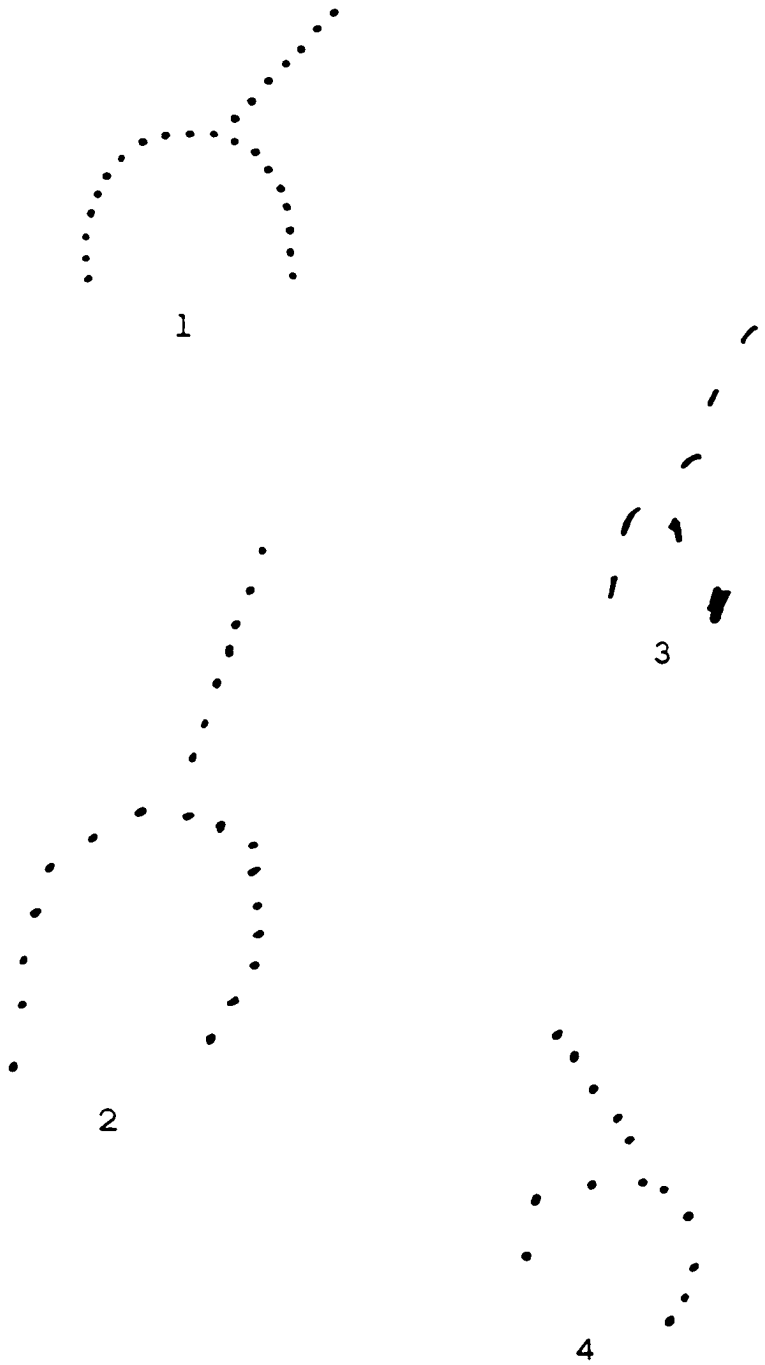

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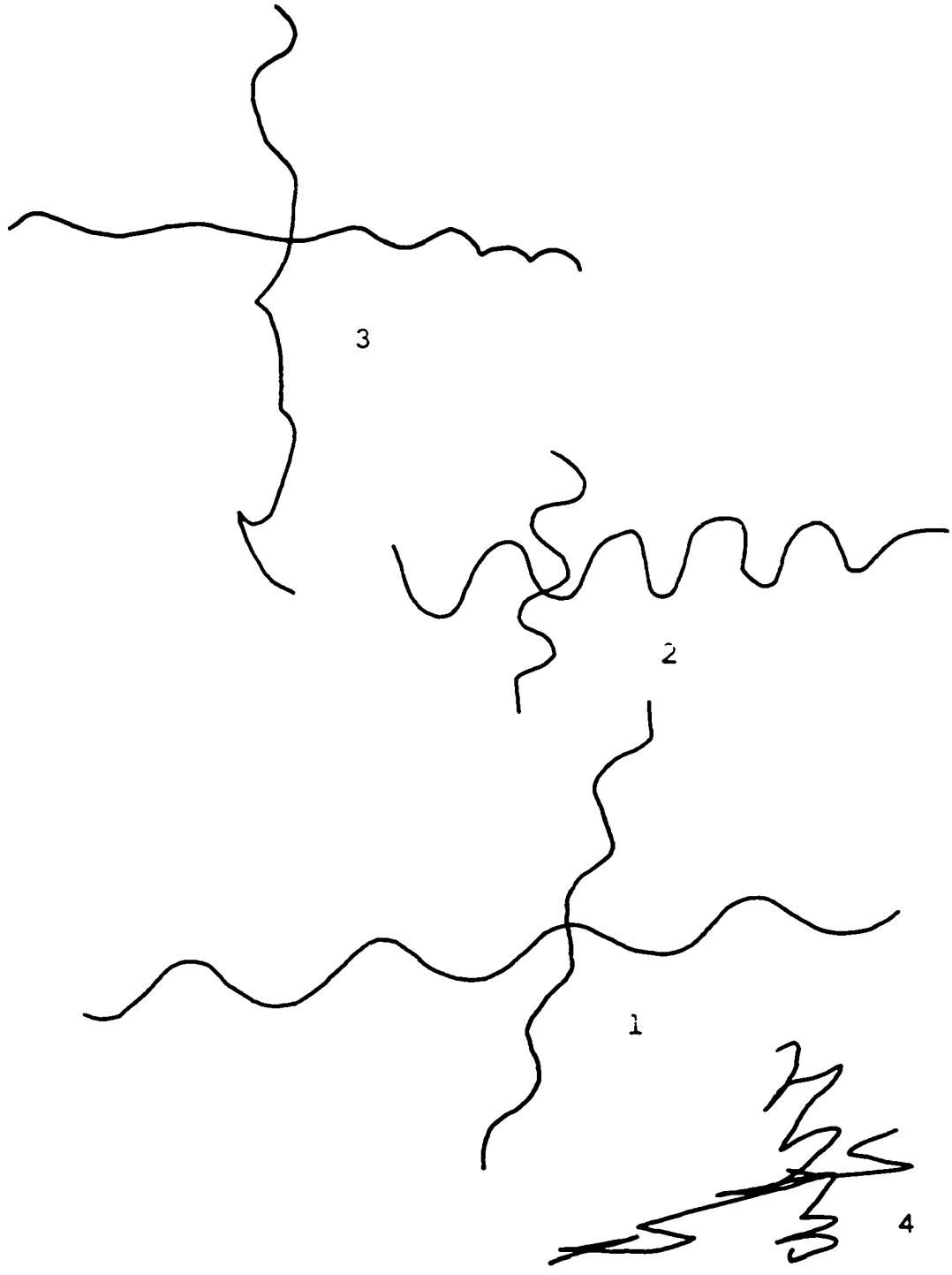

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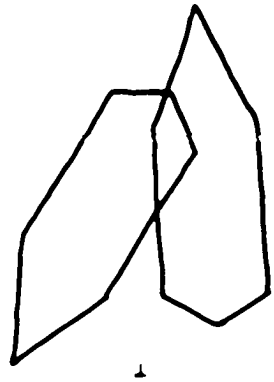

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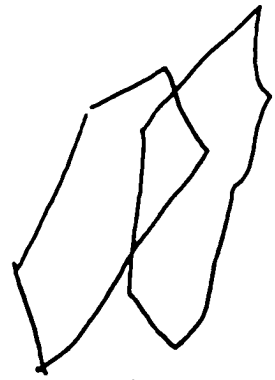

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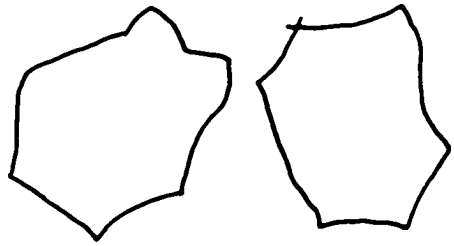

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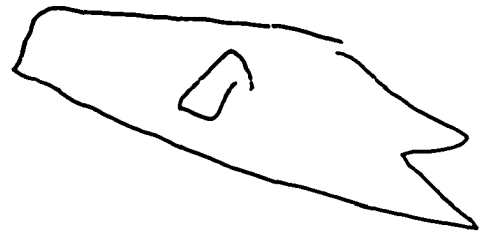
Bender Gestalt Design 8



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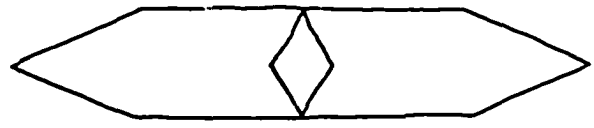

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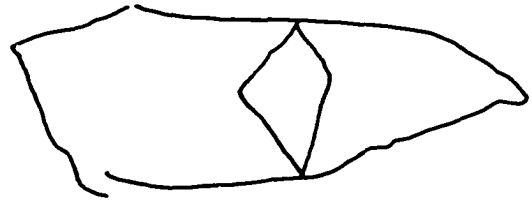

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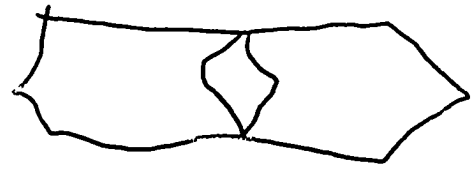

2

APPENDIX B

BENDER GESTALT SCORE SHEET

Date .....

SCORE SHEET—BENDER-GESTALT TEST

Name ..... Age ..... Sex .....

Education ..... I.Q. ..... Diagnosis .....

DESIGN 1		*DESIGN 4*		*DESIGN 7*	
1. Wavy line (2)	.....	1. Asym. Crv. (3)	.....	1. Ends no. join. (8)	.....
2. Dot, dash, cir. (3)	.....	2. Break crv. (4)	.....	2. Angles ext. (3)	.....
3. Dashes (2)	.....	3. Crv. not center. (1)	.....	3. Angles miss. (3)	.....
4. Circles (8)	.....	4. Curls (4)	.....	4. Ext. scat. (3)	.....
5. No. dots (2) each	.....	5. Not joined (8)	.....	5. Dbl. line (1 ea.)	.....
6. Dbl. row (8)	.....	6. Crv. rotation (3)	.....	6. Tremor (4)	.....
7. Workover (2)	.....	7. Touch-up (8)	.....	7. Distortion (8 ea.)	.....
8. Sec. attempt (3 ea.)	.....	8. Tremor (4)	.....	8. Guide lines (2)	.....
9. Rotation (8)	.....	9. Distortion (8)	.....	9. Sec. attempt (3 ea.)	.....
10. Des. miss. (8)	.....	10. Guide lines (2)	.....	10. Rotation (8)	.....
Design Total	.....	11. Sec. attempt (3 ea.)	.....	11. Des. miss. (8)	.....
		12. Rotation (8)	.....	Design Total	.....
		13. Des. miss. (8)	.....		
		Design Total	.....		

DESIGN 2		*DESIGN 5*		*DESIGN 8*	
1. Wavy line (2)	.....	1. Asymmetry (3)	.....	1. Ends no. join. (8)	.....
2. Dash or dots (3)	.....	2. Dot, dash, cir. (3)	.....	2. Angles ext. (3)	.....
3. Shape cir. (3)	.....	3. Dashes (2)	.....	3. Angles miss. (3)	.....
4. Cir. miss., ext. (3)	.....	4. Circles (8)	.....	4. Ext. scat. (3)	.....
5. Cir. touch. (5)	.....	5. Ext. join. dot (2)	.....	5. Dbl. line (1 ea.)	.....
6. Dev. slant (3)	.....	6. Ext. rotation (3)	.....	6. Tremor (4)	.....
7. No. col. (2 ea.)	.....	7. No. dots (2)	.....	7. Distortion (8 ea.)	.....
8. Fig. on 2 lines (8)	.....	8. Distortion (8)	.....	8. Guide lines (2)	.....
9. Guide lines (2)	.....	9. Guide lines (2)	.....	9. Workover (2)	.....
10. Workover (2)	.....	10. Workover (2)	.....	10. Sec. attempt (3 ea.)	.....
11. Sec. attempt (3 ea.)	.....	11. Sec. attempt (3 ea.)	.....	11. Rotation (8)	.....
12. Rotation (8)	.....	12. Rotation (8)	.....	12. Des. miss. (8)	.....
13. Des. miss. (8)	.....	13. Des. miss. (8)	.....	Design Total	.....
Design Total	.....	Design Total	.....		

DESIGN 3		*DESIGN 6*		*CONFIG. DESIGN*	
1. Asymmetry (3)	.....	1. Asymmetry (3)	.....	1. Place. Des. A. (2)	.....
2. Dot, dash, cir. (3)	.....	2. Angles (2)	.....	2. Overlap (2 ea.)	.....
3. Dashes (2)	.....	3. Pt. crossing (2 ea.)	.....	3. Compression (3)	.....
4. Circles (8)	.....	4. Crv. extra (8)	.....	4. Lines drawn (8)	.....
5. No. dots (2)	.....	5. Dbl. line (1 ea.)	.....	5. Order (2)	.....
6. Extra row (8)	.....	6. Touch-up (8)	.....	6. No order (8)	.....
7. Blunting (8)	.....	7. Tremor (4)	.....	7. Rel. size (8)	.....
8. Distortion (8)	.....	8. Distortion (8)	.....	Total	.....
9. Guide lines (2)	.....	9. Guide lines (2)	.....	*DESIGN TOTALS*	
10. Workover (2)	.....	10. Workover (2)	.....	1. ..... 5.	
11. Sec. attempt (3 ea.)	.....	11. Sec. attempt (3 ea.)	.....	2. ..... 6.	
12. Rotation (8)	.....	12. Rotation (8)	.....	3. ..... 7.	
13. Des. miss. (8)	.....	13. Des. miss. (8)	.....	4. ..... 8.	
Design Total	.....	Design Total	.....	Config.	

Total Raw Score ..... Standard Score .....