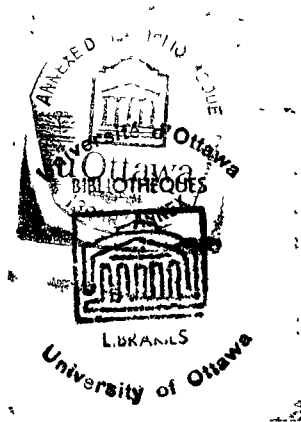


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THE CONNOTATIVE MEANINGS OF STRAIGHT -  
AND CURVED-LINE GRAPHIC FORMS

by Yang Tso Lin

Thesis presented to the Faculty of  
Psychology and Education of the  
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fulfillment of the requirements  
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## CURRICULUM STUDIORUM

Yang Tso Lin was born April 21, 1933, in Macau. He received the Bachelor of Arts degree in Psychology from the University of Saskatchewan, in 1959. He received the Master of Arts degree in Clinical Psychology from Dalhousie University, in 1961. The title of his thesis was Indices of Anxiety in Human-Figure Drawings.

## TABLE OF CONTENTS

Chapter	page
INTRODUCTION. . . . .	vii
I.- REVIEW OF THE LITERATURE. . . . .	1
1. The Phenomenon of Naming	1
2. Expressive and Physiognomic Perception	3
3. Linear Representations of Feeling States	8
4. Stimulus Value of the <u>Bender-Gestalt Test</u> Figures	10
5. Sexual and Cultural Symbolism	18
6. The <u>Differential Diagnostic Technique</u>	23
7. Summary and General Hypothesis	32
II.- THE EXPERIMENTAL DESIGN . . . . .	35
1. The Experimental Stimuli	35
2. Measurement by the <u>Semantic Differential</u>	38
3. Statistical Procedures	40
4. Specific Hypotheses	43
5. Experimental Procedure	44
III.- PRESENTATION AND DISCUSSION OF RESULTS. . . . .	47
1. Test-Retest Reliability	47
2. Analyses of the Relationships Among the Line Drawings and the Word Concepts	49
3. Discussion of the Results	59
SUMMARY AND CONCLUSIONS . . . . .	66
BIBLIOGRAPHY . . . . .	69
 Appendix	
1. A TYPICAL TEST BOOKLET. . . . .	71
2. ABSTRACT OF <u>The Connotative Meanings of Straight-         and Curved-Line Graphic Forms</u> . . . . .	72

## LIST OF TABLES

Table	page
I.- Probability of Obtaining Given Deviations from Test to Retest on Factor Scored Items for the Average Subject. . . . .	48
II.- Distance Measures (D) Relating the Eight Line Drawings (Figures 1 through 8) and the Two Word Concepts H and P (Hostility and Passivity) . . . .	50
III.- Comparisons of the Distances Between Straight-Line Drawings and Concept H ( $D_{SH}$ ) and the Distances Between Curved-Line Drawings and Concept H ( $D_{CH}$ ) .	53
IV.- Comparisons of the Distances Between Curved-Line Drawings and Concept P ( $D_{CP}$ ) and the Distances Between Straight-Line Drawings and Concept P ( $D_{SP}$ ). . . . .	54
V.- z Values Obtained from Frequency Tabulations of Greater Distances Resulting from Comparisons of Straight- and Curved-Line Drawings in Relation to Concept H for 70 Subjects. . . . .	57
VI.- z Values Obtained from Frequency Tabulations of Greater Distances Resulting from Comparisons of Straight- and Curved-Line Drawings in Relation to Concept P for 70 Subjects. . . . .	58

## LIST OF FIGURES

Figure	page
1.- The Experimental Line Drawings Reproduced in 1/2 of Actual Size. . . . .	37
2.- Drawings of Three-Dimensional Model Constructed from Distance Measures for Variables S (straight-line figures), C (curved-line figures), H (Hostility) and P (Passivity) . . .	51

## INTRODUCTION

It has long been recognized by theorists in the field of cognition, that the meaning or representational value of the stimulus forms the basis of the cognitive process. We always perceive "something", whether it be an object or a certain gesture presented by another person. The observer can recognize the object or the gesture insofar as the object is meaningful to him or the particular gesture represents for him a certain feeling state in the other person.

In the field of clinical psychology, the use of the various so-called projective techniques is based on the assumption that when a subject is presented with a number of ambiguous stimuli and is then invited to respond to them, the responses presumably represent his efforts at formulating his percepts of the ambiguous stimuli with meaningfulness related to his own needs and drives. Whereas the nature of the responses to these ambiguous stimuli are assumed to reflect the idiosyncratic reactions of the individual, it has also been observed that certain ambiguous stimuli can illicit responses which show considerable agreement within a group of individuals. In order to facilitate clinical interpretation of the projective data, various hypotheses have been offered regarding the representational values of the ambiguous stimuli. With reference to those ambiguous stimuli in the form of abstract geometric line drawings, hypotheses

concerning their representational values by virtue of their formal or structural characteristics have also been proposed. Psychoanalytic theorists have suggested that certain graphic line forms may be symbolically related to the concepts of masculinity and femininity, but experimental investigations regarding these designations have produced essentially inconclusive findings. The present study proposes to investigate the hypothesis postulated as the rationale of a projective drawing technique, the Differential Diagnostic Technique,<sup>1,2</sup> which relates hostile connotations to straight-line graphic figures and passive connotations to curved-line graphic figures.

The first chapter will be a review of the literature. It will consider the phenomenon of naming, the nature of the meanings which may be attributed to graphic line drawings, the theoretical background of the Differential Diagnostic Technique, and the general hypothesis for this study.

The second chapter outlines the experimental design. It includes: (1) a description of the experimental stimuli; (2) a description of the measuring instrument; (3) the

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1 Harold J. Breen, The Differential Diagnostic Technique as a Measure of Hostility, unpublished doctoral thesis presented to Department of Psychology, University of Western Ontario, London, 1953, x-68 p.

2 Sidney L. North, Some Studies in Personality Classification Using a Visual-Motor Psychological Technique, unpublished Master's thesis presented to Department of Psychology, University of Western Ontario, London, 1950, iii-140 p.

statistical procedures used in analysing the data; (4) the specific hypotheses tested; and (5) the experimental procedures.

The experimental results are presented and discussed in the third chapter. This chapter is followed by a summary of the experimental results and a statement of the resultant conclusions.

## CHAPTER I

### REVIEW OF THE LITERATURE

This chapter will first relate the phenomenon of the subjects' attribution of names and meanings to abstract graphic figures as observed in visual form perception experiments and in studies of physiognomic perception. Subsequent sections present existing research investigating the nature of the meanings which may be attributed to graphic figures composed of straight lines as opposite to those composed of curved lines. This will be followed by an exposition of the rationale and theory of a new projective drawing test. The final section will conclude to a statement of the general hypothesis that will be investigated in the present research.

#### 1. The Phenomenon of Naming.

In 1932, Bartlett<sup>1</sup> conducted a series of experiments on perception, imagery and remembering with tachistoscopic presentation of abstract graphic figures. The subjects were required to reproduce the stimulus figures and to comment on their reproductions. It was found that the subjects frequently attributed names to these abstract shapes. For the

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<sup>1</sup> F.C. Bartlett, Remembering, A Study in Experimental and Social Psychology, London, Cambridge, 1932, x-317 p.

simpler stimuli, the names were given immediately and unreflectively. For the more complex stimuli, the subjects tended to search for analogical material, and when it was found, the stimulus was named as before. The analogy was usually related to the shape of the figure or the disposition of its line structure. Bartlett contended that in the process of naming, the presented visual pattern seemed at once to "fit into" or to match some preformed scheme or setting. He called the process of connecting a given pattern with some setting or scheme, "effort after meaning".<sup>2</sup> The conditions which give rise to this phenomenon were not studied, but Bartlett considered it as essential and present in all human cognitive reactions.

Bartlett's studies serve to illustrate that material such as abstract graphic line drawings which have not been exploited for the function of formal symbolic representation may be utilized to indicate and depict objects or events, or, in other words, be attributed with meaning due to certain inherent formal and structural characteristics in these abstract graphic shapes and patterns.

Experiments pertaining to the study of representational qualities in abstract graphic shapes and patterns may be found in the areas of expressive and physiognomic perception, the stimulus value of the Bender-Gestalt test figures

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<sup>2</sup> Ibid., p. 42.

and, sexual and cultural symbolism. Expressive and physiognomic perception implies that the visual forms have qualities which express characteristics attributed to persons. This is demonstrated by the subjects' description of the stimulus figure or by matching the stimulus figures to adjectives commonly assigned to people. The stimulus value of the Bender-Gestalt test figures are studied in terms of the subjects' denotative or connotative associations to the stimulus figures. Sexual and cultural symbolism have been studied by matching a simple line drawing of a particular shape to words commonly associated to either the male or the female gender.

The following sections will present a review of the representative studies in each area, and will be followed by an exposition of the rationale and theory of a new projective drawing test.

## 2. Expressive and Physiognomic Perception.

The term "physiognomic" as introduced by Warner<sup>3</sup> designated a mode of cognition in which inanimate objects may be perceived as expressing a life-like feeling state, in the same manner as we experience a physiognomy, or the facial expressions, gestures or other expressive acts of living

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<sup>3</sup> Heins Werner, Comparative Psychology of Mental Development, Revised and Republished, New York, International Universities, 1948, xii-564 p.

organisms. Werner and Kaplan<sup>4</sup> point out that simple line patterns are frequently perceived physiognomically rather than in terms of their geometric and physical qualities. They cited an experiment by Krauss<sup>5</sup> in which subjects were asked to draw lines to accord with a certain emotional content. Another group of subjects was given the task of choosing lines to match the emotional content of certain given words, such as "outburst of rage", "melancholy", "sadness", etc. The results showed greater than seventy per cent agreement among his 242 subjects. Furthermore, the subjects when reporting on the way their linear production represented the words, characteristically made little or no mention of the geometric-physical properties of the line patterns but rather focused directly on physiognomic dynamic characteristics of the line patterns, describing them in such terms as "severe and firmly closed", "jumping and dancing", "helplessly sinking", etc. Werner and Kaplan conclude that line patterns, when apprehended as expressive symbols, are constituted by physiognomic characteristics such as "vigor", "grace", etc. rather than the geometric-physical features of angularity, curvilinearity, etc. Krauss' experiment also indicated that geometrically similar forms often are physiognomically different, and

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<sup>4</sup> Heinz Werner and Bernard Kaplan, Symbol Formation, New York, Wiley, 1963, xiii-530 p.

<sup>5</sup> Ibid., p. 338.

physiognomically similar forms may also be different geometrically. In other words, it was found that geometrically similar patterns have been used to designate quite different referents, and the same referent may be attributed with dissimilar graphic representations even by the same individual. These conclusions seem to suggest that the expressive and physiognomic properties do not bear a direct relationship to the geometric-physical features of the line pattern. However, despite the apparent labile and ambiguous nature of the representational qualities of the line pattern, it has been shown that certain relations do exist between particular referents. This is demonstrated by the consensual nature of the responses given by a number of individuals for certain particular referents. Consensus may be present either with regard to productions, that is, the presence of certain generic similarities in the features of linear patterns produced by a group of individuals for a given referent, and, with regard to comprehension, that is, the ability of a large group of individuals to recognize the referent of a line pattern produced by someone else. Regarding the consensus in reproduction, Scheerer and Lyons<sup>6</sup> had seventy-four college students draw single lines which the subjects felt were adequate

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<sup>6</sup> Martin Scheerer and Joseph Lyons, "Line Drawings and Matching Responses to Words", Journal of Personality, Vol. 25, No. 3, March 1957, p. 251-273.

representations for a group of word-meanings. Afterwards, the subjects were asked to rate their own drawings in terms of six variables which the authors considered would measure physiognomic qualities. The variables are: design, shape, patterning, dominant direction, pressure, and closure. Scheerer and Lyons' findings indicate congruity among the productions of subjects for each of the eight experimental words; for any word, the subjects agreed on at least three or more of the variables at better than the one per cent level of probability. The degree of consensus in comprehension is even higher when the forced-choice method is used. In another of their studies, Scheerer and Lyons<sup>7</sup> presented 109 subjects with three word-meanings, "gold" "silver" "iron" and three line drawings originally produced to represent them. The subjects were asked to match the words with their original line pairs. A perfect matching was made by forty-three per cent of the subjects ( $P < .01$ ), eighty-five per cent of the subjects correctly matched at least one line with its original corresponding word pair.

These findings then, indicate that subjects may to a great extent, be in agreement in choosing certain nonconventional line patterns rather than others for the representation of certain specified referents. They also show that certain

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<sup>7</sup> Ibid.

measurable stimulus variables, such as those used by Scheerer and Lyons, can be used to measure the physiognomic qualities of line patterns.

Werner and Kaplan<sup>8</sup> outlined several factors which may influence the degree of consensus and one of these factors is the context within which the referents are provided, and with regard to which they must be apprehended. For instance, in Scheerer and Lyons' study of the matching of the three line patterns with "silver" "gold" "iron", the fact that a context of "metal" was shared by the subjects appears to have been an important condition for the relatively high degree of consensus. In view of this remark, it seems also likely that within the proper context, the relationship between certain stimulus variables in a line drawing and certain specific referents can be investigated.

Studies such as those of Krauss and Scheerer and Lyons have offered evidence that line drawings may in general represent referents in terms of objects, feeling states, events, etc. However, since the present research aims at investigating the relationship between certain specific line drawings and the word concepts of "hostility" and "passivity", the following section will review some of the findings regarding the relationship between line drawings and concepts

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<sup>8</sup> Werner and Kaplan, Op. Cit., p. 348-350.

of feeling states among studies in expressive and physiognomic perception.

### 3. Linear Representations of Feeling States.

Poffenberger and Barrows<sup>9</sup> undertook a study in which five hundred subjects were asked to look at eighteen printed lines, and then to choose from a list of words, one which best described how each line made them feel. Curves were most frequently associated with words such as "sad", "lazy", "weak", "gentle", "quiet", and "peaceful", while angles were more frequently associated with words such as "agitating", "furious", and "powerful". Lundholm<sup>10</sup> asked her subjects to represent graphically forty-eight adjectives which she groups into thirteen synonym clusters; one group comprised the adjectives "sad" "melancholy" "doleful", another "merry" "gay" "jolly", and still another group the words "hard" "cruel" "harsh" and so on. The line patterns were examined in terms of "objective" dimensions such as shape (whether angular, curved or mixed angular and curved), and direction (whether horizontal, up, or down). The subjects were in

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<sup>9</sup> A.T. Poffenberger and A.E. Barrows, "The Feeling Value of Lines", Journal of Applied Psychology, Vol. 8, No. 2, June 1924, p. 187-205.

<sup>10</sup> Helge Lundholm, "The Affective Tone of Lines", Psychological Review, Vol. 28, No. 1, January 1921, p. 43-60.

considerable agreement in using predominantly curved-downward line patterns to express ideas of "sadness", curved-nondownward (horizontal and upward) patterns to represent ideas of "gaiety"; angular zig-zag patterns for ideas of "fury" "hostility". Further evidence also came from the introspective remarks of her subjects, for example, one subject remarked:

Sharp angles imply the idea of pain, pricking pain, spitefulness, incongruity, instability, moodiness. Angles even imply sharpness and sudden transition, brusqueness, caustic feeling, quick temper, ugliness. Curves imply gradual transition, the more subtle emotions, prettiness, lack of much strength, smoothness.<sup>11</sup>

Lundholm concludes that angles tended to express hard, painful, unpleasant, sometimes aggressive and hostile feelings, while curves expressed soft, pleasant, indolent, and passive feelings.

Analagous findings are reported by Krauss.<sup>12</sup> His group of 242 subjects were asked to match eight referents to eight drawings previously drawn. Ninety-two per cent of the subjects were in agreement in matching the words "rage" to a drawing with jagged vertical short strokes.

Studies such as those of Roffenberger and Barrows, Lundholm, and Krauss tend to indicate that there may be a

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<sup>11</sup> Ibid., p. 53.

<sup>12</sup> Werner and Kaplan, Op. Cit., p. 348.

relationship between the drawings of straight angular figures and the feeling state of hostility (and related tendencies) on the one hand, and the drawings of curvilinear figures and passive feelings (and related tendencies) on the other.

The studies in expressive and physiognomic perception have dealt mainly with line patterns which are simple in structure and their stimulus variables such as the angularity and curvilinearity, size and directions or orientation of the lines. The variable of specific shape or configuration has received little attention from researchers in this area. The following section will therefore review some of the findings on the representational value of linear abstract shapes and patterns with certain specific geometric features. These will include studies of the representational value of the Bender-Gestalt test figures and the studies in sexual and cultural symbolism.

#### 4. Stimulus Value of the Bender-Gestalt<sup>13</sup> Test Figures.

As its name implies, the Bender-Gestalt test has its theoretical background in classical Gestalt theory. Various studies in Gestalt psychology have formulated the assumption that mature and healthy perception consists of the integration

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<sup>13</sup> Laretta Bender, "A Visual-Motor Gestalt Test and Its Clinical Use", American Orthopsychiatric Association, Research Monographs, No. 3, 1938, New York, vi-176 p.

of a triad of factors: (1) the innate tendency of organisms to organize perceptual data as it is affected by (2) temporal factors and (3) maturational level. In accordance with this fundamental gestalt principle, Bender, in 1938, adopted nine geometric figures as originally used by Wertheimer and investigated the manner in which these gestalten may be experienced in various clinical syndromes based on the assumption that in certain pathologic conditions a change has taken place in the maturational development of the perceptual processes which leads to the tendency to perceive forms in a more primitive manner.

Bender is of the opinion that this test is useful only in determining whether or not visual-motor disturbances have taken place and attributes little or no value to it as a projective test. Nevertheless, she also states that certain Gestalt forms could take on symbolic representation of an individual's unsatisfied infantile drives.<sup>14</sup> Subsequent interest in the adequacy of the Bender-Gestalt test as a clinical test for the studying of behavior other than the visual-motor function has led to the development of the Revised Bender-Gestalt Test by Hutt.<sup>15</sup> The new test was proposed as

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<sup>14</sup> Ibid., p. 157.

<sup>15</sup> Max L. Hutt and Gerald L. Briskin, The Clinical Use of the Revised Bender-Gestalt Test, New York, Grune and Stratton, 1960, vii-165 p.

a projective instrument and interpretative methods were formulated in terms of the basic theory of projection.

The extension of the Bender-Gestalt test to the area of personality study had led on the one hand to several attempts to establish quantitative scoring methods,<sup>16,17</sup> and on the other hand, to a number of studies which are designed to investigate the nature of the perceptions, affective associations, or meanings attributed to the figures by the subjects. It is assumed that, in order to understand the subject's test behavior, it is necessary first to comprehend the representational value of the symbol to which he is responding.

In 1952, Sucek and Klopfer<sup>18</sup> asked forty-eight subjects to give verbal associations to tachistoscopic presentations of the Bender-Gestalt test figures. The subjects' responses were scored according to twelve categories which include simple descriptions, statement of feelings, abstract descriptions, etc. The authors did not report on any

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16 F.Y. Billingslea, "The Bender-Gestalt: An Objective Scoring Method and Validating Data", Journal of Clinical Psychology, Vol. 4, No. 1, January 1948, p. 1-27.

17 G.R. Pascal and B.J. Sutton, The Bender Gestalt Test. Quantification and Validity for Adults, New York, Grune and Stratton, 1951, v-274 p.

18 R.F. Sucek and W.G. Klopfer, "Interpretation of the Bender-Gestalt Test: the Associative Value of the Figures", American Journal of Orthopsychiatry, Vol. 22, No. 1, January 1952, p. 62-75.

relationship between particular shape or geometric qualities of the figures and particular nature of the associations, although they suggested that the figures do have relatively consistent stimulus values to permit the formulation of tentative interpretive hypotheses. The significance of the stimulus values of the figures in their study are difficult to ascertain since the hypotheses were formulated from the common tendencies of a number of referents with considerable divergent contents. Thus, the adequacy of using the methods of verbal associations or denotative designations by the subjects in this type of experiment may be questioned in view of the findings in expressive and physiognomic perception. These show that in responding to ambiguous stimuli without the knowledge of some predefined context, the subjects' responses may reflect an indefinite number and variety of referents which may not fit into any available scoring categories, and the conveying of reactions will be necessarily determined by the verbal ability and quantity the subject deemed adequate for the task.

Hammer<sup>19</sup> made specific tests of Suczek and Klopfer's<sup>20</sup> hypotheses which dealt with the psychosexual values of certain Bender-Gestalt figures, attempting to isolate indices of

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19 E.F. Hammer, "An Experimental Study of Symbolism on the Bender-Gestalt", Journal of Projective Techniques, Vol. 18, No. 3, September 1954, p. 335-345.

20 Suczek and Klopfer, Op. Cit., p. 62-75.

phallic sensitization, castration feelings and reactions to castration feelings. The experimental group was composed of twenty men who were to undergo surgical sterilization, and twenty men who were to undergo surgery other than sterilization served as the control group. The subjects reproduced the Bender-Gestalt figures on the day of surgery and the protocols were evaluated by two judges for distortions. Hammer found support for Saxeck and Klopfer's hypotheses in his data. He was also able to isolate test factors that were significant in distinguishing the experimental group from the control group. The majority of these factors involved distortions of the elongated elements of the Bender-Gestalt figures. Hammer concludes from his results that elongated objects such as points and extensions (figure 5) are susceptible to being utilized as "phallic symbols" reflecting feelings such as "compensatory virility strivings", and circular objects (figure A) may be employed as "vaginal symbols" and served as reflections of feelings of "psychosexual insecurity", "femininity in the male subjects", and "impotence", etc. However, he also suggests the possibility that the distortions of the elongated figures may simply reflect feelings of aggression in reaction to the impending operation. Since the purpose of his study was aimed at psychosexuality, it is expected that the results would be interpreted mainly in terms of psychosexual reactions. Therefore, it seems also possible

that Hammer's findings regarding the symbolic value of the elongated and curvilinear figures in the Bender-Gestalt test may be interpreted in terms of broader psychological concepts with psychosexuality as one of its facets.

The stimulus values of the Bender-Gestalt test figures have been investigated by recent studies using the Semantic Differential<sup>21</sup> as a method for measuring the "meaning" of the figures. In 1952, Osgood<sup>22</sup> suggested that the connotative meaning of a stimulus might be specified by rating it on several rating scales each defined by a pair of bipolar adjectives. Ratings of a stimulus on a series of such scales may be represented by a profile which can be considered as a kind of "profile of meaning" of that stimulus. A number of studies cited by Osgood<sup>23</sup> have demonstrated that the Semantic Differential can be applied to a variety of stimuli in the different perceptual media. McMurray's<sup>24</sup> study showed that the scales of the Semantic Differential are sensitive to visual line drawings as well as words, and the profile of meanings on the

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21 Charles E. Osgood, George J. Suci and Percy H. Tannenbaum, The Measurement of Meaning, Urbana, University of Illinois, 1957, 342 p.

22 Charles E. Osgood, "The Nature and Measurement of Meaning", Psychological Bulletin, Vol. 49, No. 3, May 1952, p. 197-237.

23 Osgood, et al., Op. Cit.

24 G.A. Murray, "A Study of 'Fittingness' of Signs to Words by Means of the Semantic Differential", Journal of Experimental Psychology, Vol. 56, No. 4, October 1958, p. 310-312.

same series of scale obtained from a line drawing and a word concept may be compared in terms of the degree of similarity.

With the nine Bender-Gestalt figures as the stimulus figures, Toler<sup>25</sup> asked his subjects to rate each figure on a 20-scale form of the Semantic Differential. The results showed considerable consensus in the connotative associations given to the figures by the group of forty-one male and twenty-seven female college students with the mean number of scales which showed consensus to be 8.8. The group consensus thus justified the formulation of specific connotative meanings to each of the figures. The results further indicated considerable variability in the extent to which the various figures lent themselves to categorization. Furthermore, there were no sex differences in the meanings attributed to the figures.

Whereas Toler was interested in the meaning of the Bender-Gestalt figures, a study was undertaken by Guertin and Davis<sup>26</sup> to investigate the explicit degrees of similarity of meaning in the Bender-Gestalt figures, and also in the component parts of these figures, rather than the actual nature

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25 Alexander Toler, "The 'Meaning' of Bender-Gestalt Test Designs: A Study in the Use of the Semantic Differential", Journal of Projective Techniques, Vol. 24, No. 4, December 1960, p. 433-438.

26 W.H. Guertin and H.C. Davis, "Similarities in Meanings of Elements and Figures of the Bender-Gestalt", Journal of Projective Techniques, Vol. 27, No. 1, 1963, p. 68-72.

of the underlying meanings. In their study, thirty male subjects were required to rate the nine Bender-Gestalt figures plus twenty-one elements of the figures on a 19-scale form of the Semantic Differential. The data were subjected to factor analyses and led the authors to conclude that (1) combination of simple elements into complex figures does not produce stimuli with greatly enhanced meaning, (2) Bender-Gestalt figures do not provide sufficient replication of stimuli with similar meanings to produce reliable diagnostic hypotheses about cases, and (3) rectilinear and curvilinear features are disclosed by factor analyses but they are not unitary. These findings are pertinent in pointing out the stimulus nature of the Bender-Gestalt test figures. In a critical review of the value of the Bender-Gestalt test as a clinical test, Breen<sup>27</sup> pointed out that the Bender-Gestalt test figures were originally adopted by Bender solely for the purpose of sampling the subjects' visual-motor behavior. Any representational value which the figures may have would be accidental rather than inherent in the principles of their original selections. It was also noted that rectilinear and curvilinear features are combined in some of the figures which may render the

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<sup>27</sup> Harold J. Breen, "A Critical Review of the Bender Visual-Motor Gestalt Test and Its Possible Clinical Application", Psychological Services Newsletter, Department of Veterans' Affairs, No. 4, January, 1949, cited by S.L. North, in unpublished test manual for the Differential Diagnostic Technique, 1962, p. 2.

stimulus values to be ambiguous and inconsistent should these line features be relevant variables for the stimulus value of the figures. (Some relevancy of the rectilinear and curvilinear features of the figures have been demonstrated by Guertin and Davis.<sup>28</sup>) Thus it seems likely that the combination of rectilinear and curvilinear features in some of the Bender-Gestalt figures may be instrumental in causing the inconsistency in meanings attributed to the different figures and the elements of the figures as well as the low factorial loadings of the rectilinear and curvilinear features of the figures.

These studies with the Bender-Gestalt test figures have been instructive in demonstrating the usefulness of the Semantic Differential as a measuring instrument for the connotative associations given to abstract line drawings. There was also some suggested evidence on the relationship between particular shapes of lines and the stimulus value of the figure.

##### 5. Sexual and Cultural Symbolism.

Another area which deals with the representational value of abstract line drawings of a particular shape is that of the studies in sexual and cultural symbolism. According

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<sup>28</sup> Ibid.

to Freud<sup>29</sup> the dream symbols derive their meanings from their similarity in form to the male and female genitalia. Following from this hypothesis, in ambiguous line drawings, straight, elongated, angular and pointed features have been considered as masculine; and curved, containing features have been considered as feminine. The terms "sexual and cultural symbolism" have been used interchangeably by some researchers who have adhered to Freud's contention that the symbolic meaning is inherent in the structure of the object itself and thus, at least by implication, transcends cultural differences. Although Freud's theory forms the basis of assumptions frequently made in the interpretation of dreams, projective test responses, and artistic productions, recent studies have presented conflicting evidence concerning its validity.

Starer<sup>30</sup> presented ten cards containing ambiguous drawings to 112 psychiatric patients and thirty nurses who were seen individually. Five figures were elongated or pointed and five were rounded and containing. The subjects matched the drawings with five masculine and five feminine christian names. The results showed significant agreement in the matching of masculine names to the straight line figures

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<sup>29</sup> Sigmund Freud, A General Introduction to Psychoanalysis, New York, Garden City, 1943, p. 137-142.

<sup>30</sup> Emanuel Starer, "Cultural Symbolism: A Validity Study", Journal of Consulting Psychology, Vol. 19, No. 6, December 1955, p. 453-455.

and the feminine names to the curved line figures. Glatter and Hauch<sup>31</sup> used much less complex drawings, some of which were simple lines, or a collection of lines. The subjects consisted of seventy-two psychiatric hospital aides and attendants who were seen individually. Forty figures were presented to each subject who was required to state whether the drawing was masculine or feminine. A significant level of agreement was obtained on fourteen figures. Other similar studies such as that by Jones<sup>32</sup> in which the subjects were to identify the drawings as male or female in personality have yielded results which seem to support Freud's hypothesis. However, the experimental procedures in most of these studies have involved some variations of matching or classifying the stimulus figures with a masculine and feminine designation. The validity of these studies to test Freud's hypothesis on symbolism may be criticized on the ground that the subject is consciously aware that the experimenter expects him to designate the figures as having either male or female characteristics. Therefore this method would not be in accord with Freud's contention which considered symbolism

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<sup>31</sup> Andrew M. Glatter and Paul Hauch, "Sexual Symbolism in Line Qualities", Journal of Clinical Psychology, Vol. 14, No. 2, April 1958, p. 168-169.

<sup>32</sup> Austin Jones, "Sexual Symbolism and the Variable of Sex and Personality Integration", Journal of Abnormal and Social Psychology, Vol. 53, No. 2, September 1956, p. 187-190.

to be an unconscious process. Levy<sup>33</sup> points out that this method may be subjected to conscious control or defensive behavior by the subjects. In his validation study of the Freudian hypothesis, the experimental procedure involves a simple matching task and a learning situation, both of which involved male and female names and abstract line drawings conforming structurally to either the male or female symbols as described by other workers in this area. In the first part of the experiment, subjects were asked to match the names to the figures and the second part involved a pair associate learning task representing essentially a test of positive and negative transfer effects. The results of both parts of the experiment failed to yield supportive evidence for the hypothesis.

Schonbar and Davitz<sup>34</sup> introduced the cultural meaning of symbols as a major variable. Their subjects were shown drawings of objects which could be classified as male or female according to Freudian theory or to cultural use. The stimuli were classified into four categories: (A) those with Freudian sexual designations but low in cultural sexual meaning (i.e. snail, fish), (B) those for which Freudian

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<sup>33</sup> L.H. Levy, "Sexual Symbolism, a Validity Study", Journal of Consulting Psychology, Vol. 18, No. 1, 1954, p. 43-45.

<sup>34</sup> R.A. Schonbar and J.R. Davitz, "The Connotative Meaning of Sexual Symbols", Journal of Consulting Psychology, Vol. 24, No. 6, December 1960, p. 483-487.

designation and cultural association were in agreement (i.e. purse, gun), (C) those for which Freudian and cultural designations were in conflict (i.e. needle, drum), and (D) those which had neither Freudian nor cultural sexual meanings (i.e. book, table). The subjects were required to classify the stimuli as male or female and also to give connotative associations to the objects by the Semantic Differential. The latter method was used in consideration of the important role of the connotative or "feeling tone" aspect of the symbol. The results from both the denotative classifying and connotative association methods suggested that where culture was not a variable, sexual designation did not differ from chance; where culture was a factor, it was culture rather than form which determined the sexual meaning of the objects. Results similar to those of Schonbar and Davitz were found by Barker<sup>35</sup> whose results, obtained from young adults and children subjects, also showed that age was not a variable.

The experimental findings on the determination of sexual symbolism by cultural factors would seem to indicate that straight-line and curved-line figures may serve as sexual symbols only by virtue of cultural influences rather than due to the inherent characteristics of their shapes.

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<sup>35</sup> Elizabeth Barker, The Perception of Sexual Symbolism, unpublished doctoral thesis presented to Department of Psychology, Columbia University, New York, 1957, (no page), cited by Schonbar and Davitz, Op. Cit.

A projective drawing technique known as the Differential Diagnostic Technique which uses stimulus figures with presumably specific representational qualities has been developed. A description of the development and rationale of this technique will be presented in the following section.

#### 6. The Differential Diagnostic Technique.

The Differential Diagnostic Technique, a visual-motor projective drawing technique, was developed by H.J. Breen<sup>36</sup> and S.L. North<sup>37</sup>. It had its origin in psychoanalytic theory and the work of M.H. Erickson<sup>38</sup> that involved the experimental use of hypnosis and the systematic analysis of automatic drawing behavior. Erickson's experiments demonstrated that everyday behavior such as spontaneous drawings, automatic drawing and writing, and other dissociated motor behavior often, cryptically and literally, symbolically parallel the deepest unconscious conflicts. By utilizing the principles emphasized by Erickson, Breen and North devised a technique as an attempt

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36 Harold J. Breen, The Differential Diagnostic Technique as a Measure of Hostility, unpublished doctoral thesis presented to Department of Psychology, University of Western Ontario, London, 1953, x-68 p.

37 Sidney L. North, Some Studies in Personality Classification Using a Visual-Motor Psychological Technique, unpublished Master's thesis presented to Department of Psychology, University of Western Ontario, London, 1950, 111-140 p.

38 M.H. Erickson, "The Experimental Demonstration of Unconscious Mentation by Automatic Writing", Psychoanalytic Quarterly, Vol. 6, No. 4, October 1937, p. 513-529.

to systematically sample the subjects' non-verbal visual-motor behavior through the medium of drawing which presumably would reflect deep-seated emotional reactions to symbolically meaningful material. The test materials consisted of geometric indian-ink figures selected in accordance with psychoanalytic theory of sexual symbolism. Four test cards consisted of "masculine" figures constructed of jagged, angular and straight lines. Four other test cards contained symmetrical, curvilinear, undulating, presumably "feminine" figures. A third set of four cards contained figures constructed using combinations of straight and curved lines.

In performing the Differential Diagnostic Technique, the subject makes free hand copies of several geometrical shapes, combining these according to certain principles. In scoring the subject's protocol, twenty-six scoring factors were used to indicate the ways that the subject could demonstrate efforts to control his performance or show an inability to maintain control.

It was reasoned that scoring factors indicating correctness in the subjects' drawings assumed not only perceptual motor adequacy, but also underlying emotional control. On the other hand, incorrectness was assumed to indicate perceptual motor inadequacy as well as underlying emotional loss of control. By following these principles, it was possible to score each of the four-figure test areas for emotional control

and for emotional loss of control. Subtracting the control from the loss of control score provided a control index for each area. It was assumed that the control index indicated the amount of control the subject had exerted unconsciously over his masculine and feminine sex drives. (As will be pointed out presently, these specific sexual labels proved to be inadequate ways of describing what these test areas measure.) Breen and North surmised that according to Freud, paranoid psychoses were forms of overcompensated hostility manifested as delusions which serve to prevent the patients' becoming aware of a repressed passive homosexual tendency. In his writings concerning the interpretation of dreams, Freud<sup>38</sup> had further suggested that many of the apparently meaningless aspects of dreams were in reality disguised methods of symbolically expressing sexual needs.

If these hypotheses were valid, it seems likely that if paranoid patients were asked to draw a number of symbols (which according to Freudian theory symbolize masculine or feminine drives) they would respond to the male and female symbols in a differential fashion. Since the repression of passive feminine tendencies results in overcompensated hostility projected in the form of delusions (according to Freudian

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<sup>38</sup> Sigmund Freud, The Interpretation of Dreams, Translated and Edited by James Strachey, New York, Basic Books, 1955, xxxii-692 p.

theory), it would be expected that the female symbols would be drawn in a more careful, accurate and controlled way than the male symbols. In the latter instance, careless and inaccurate drawings with signs of poor control would be expected. Significant results were obtained in experimental studies by North<sup>39</sup> demonstrating that the subjects who were clinically diagnosed as cases of paranoia and paranoid schizophrenia did tend to obtain scores indicating caution, control and accuracy in the drawings of the curvilinear figures. In comparison, their drawings of the straight line angular figures tended to be done carelessly, inaccurately, and in uncontrolled ways. These results appeared at first to support Freud's theory concerning the etiology of paranoid disorders. However, in these same studies a number of records of psychopathic personalities were also collected and which were very similar to those obtained by the paranoid patients. If the results obtained with the paranoid patients were thought to support the theory that repressed passive homosexuality is the underlying cause of paranoia, it might be supposed that such factors might also play an important role in the development of psychopathic reactions. However, psychoanalytic theory does not seem to ascribe any considerable degree of importance to the role of homosexuality in the case of psychopathic

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39 North, Op. Cit.

reaction. In these cases, Freud explained their antisocial behavior as stemming from intense guilt feelings. The hypothesis of specific and invariable sexual symbolism in the test materials and in the primacy of the role of sexual dynamics in the paranoid and psychopathic personalities was found to be even less tenable when male and female patients' tests were compared. If latent homosexuality and reaction formation type of hostility were essentially the etiology of these disorders, then males and females would be expected to manifest these patterns very differently in their test results. No such differences were found in comparing male and female paranoids, or, in comparing male and female psychopathic personalities.

As an alternative explanation, the authors proposed that while the paranoid and psychopathic conditions seem to differ in the manner in which their difficulties are expressed symptomatically, they seem to be similar with respect to the nature of the common problem with which they attempt to deal. These individuals seem to be unable to accept or express adequately their strong need for affection, support and dependency, or they may never have developed such needs. On the contrary, if present, they seem to repress these needs, and overact to or compensate for them. In so doing, they appear to defend themselves from having to accept or express these tendencies by reacting in a chronically hostile and

aggressive manner. The paranoid person seems to project his hostility into the environment with resulting delusions of persecution and grandeur, while the psychopath acts out his hostility in the form of antisocial behavior. In addition to passive homosexuality, Freud emphasized the importance of the paranoid's overcompensated hatred and hostility, his means of dealing with intense feelings of passiveness, love and tenderness. In describing the personality of the psychopath, Saul has emphasized that

[...] usually out of the inner unhappiness, and insecurity, they harbour a rage and hostility which only too readily outwardly seeks means of expression toward other person; in cruelty to family, children and even in criminality and war.<sup>40</sup>

Saul further notes that these individuals are basically "weak, dependent, immature unrealistic persons". Saul has suggested that "passive homosexuality in both men and women is often a direct expression of infantile, passive dependent, receptive, submissive tendencies".<sup>41</sup> Breen and North thus suggested that the similarity in the Differential Diagnostic Technique test performance between the paranoids and psychopaths may be symptomatically different means of expressing passive dependent and affectional needs. Homosexuality therefore, might appear

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<sup>40</sup> L. Saul, Emotional Maturity, Philadelphia, J.P. Lippincott, 1947, p. 262, cited by Sidney L. North, The Diagnostic Efficiency of a Drawing Technique, unpublished doctoral thesis presented to Department of Psychology, University of Western Ontario, London, 1953, p. 54.

<sup>41</sup> Ibid.

to be one of the means of expressing these needs, particularly in the case of paranoid reaction.

In light of their experimental findings, Breen and North proposed that in the Differential Diagnostic Technique, the previously designated "male" figures might reflect hostile, aggressive tendencies, whereas the "female" figures might reflect passive-dependent and affectional needs.

The validity of the Differential Diagnostic Technique as a measurement of hostility has been investigated by a number of studies. Breen<sup>42</sup> used 270 students and found significant correlations between the Differential Index of control (comparing performance on straight-line figures with performance on curvilinear figures) of the Differential Diagnostic Technique and other indices of hostility in the form of clinical rating of subjects' hostility; subjects' verbal associations of hostility given in response to the drawings, and sociometric rankings. The results showed that subjects who are rated by clinicians as being very hostile, had a low sociometric status (less liked by more people), and whose verbal associations to their own completed drawings contained a high degree of hostility also tended to have obtained high Differential Indices on the drawing test similar to those obtained from the paranoid and psychopathic patients

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<sup>42</sup> Breen, Op. Cit., 111-140 p.

found in hospital. Even though it was recognized by Breen that the results may be questionable on the grounds that he has obtained low test-retest reliability [ $r=.65$  for which  $r(p=.01)=.31$ ] and also on the validity of the criterion measures, yet the fact that significant correlation coefficients were obtained would serve to indicate that certain relationships do exist between the performance on the Differential Diagnostic Technique and the validity criteria used. Breen's findings also suggest that in the normal samples these are counterparts of the test results obtained from the studies of clinical cases.

The validity of the Differential Diagnostic Technique has been studied through its ability to differentiate various criterion groups on the basis of differential treatment of straight- and curved-line figures of the Differential Diagnostic Technique, as revealed by the Differential Index of control. In a study concerning emotionally disturbed children, Weininger and North<sup>43</sup> compared the results of fifteen emotionally disturbed children with that of fifteen "normal" children, showing a significant separation. A significant separation was also obtained between the parents of the children in the two groups.

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<sup>43</sup> O. Weininger and S.L. North, "A Report of Some Preliminary Research into the Etiology and Treatment of Emotionally Disturbed Children", research paper presented to and sponsored by the Ontario Association for Emotionally Disturbed Children, (no place), 1961, (no pagination), quoted by S.L. North, in unpublished test manual for the Differential Diagnostic Technique, 1962, p. 11.

In a study with 239 psychiatric patients, North<sup>44</sup> demonstrated that performance on the Differential Diagnostic Technique did not differentiate patients who have been diagnosed as paranoid schizophrenics and psychopathic personalities but these two groups of patients may be significantly differentiated from those who have been diagnosed in other psychiatric classifications. The results were interpreted by North as supportive evidence for the hypothesis that performances on the straight and curvilinear stimulus figures of the Differential Diagnostic Technique reveal the psychodynamics of hostility and passivity underlying the psychopathology of paranoid schizophrenia and psychopathic personality.

These validity studies on the Differential Diagnostic Technique have basically involved the experimental procedure of investigating the relationships between the Differential Index and various assumed manifestations of the constructs of "hostility" and "passivity". The Differential Index is derived from a list of scoring factors which have been selected by the authors to represent the various ways that a particular person could respond to each particular test figure. The selection of these scoring factors was by clinical intuitive method and no experimental evidence was offered by

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<sup>44</sup> Sidney L. North, The Diagnostic Efficiency of a Drawing Technique, unpublished doctoral thesis presented to Department of Psychology, University of Western Ontario, London, 1953, viii-86 p.

the authors as the basis for these particular scoring factors to be adopted. To the knowledge of this writer, the validity of the Differential Diagnostic Technique scoring factors has not been subjected to experimental investigation. Therefore the validity studies on the Differential Diagnostic Technique with the Differential Index derived from these scoring factors as the dependent variable can be questioned on this ground.

#### 7. Summary and General Hypothesis.

In summary, the phenomenon of naming or attributing meaning to abstract or geometric line drawings rather than perceiving them only in terms of their geometric and physical features has been demonstrated by Bartlett and the studies in physiognomic perception. The latter have further shown that feeling states and events as well as objects may be represented by graphic line drawings with significant agreement among groups of individuals. There is suggestive evidence from studies of physiognomic perception that the feelings of hostility may be related to drawings consisting of straight and angular lines and the feelings of passivity may be related to drawings consisting of curved lines.

Studies with the Bender-Gestalt test figures have suggested that each of them may be perceived as having relatively consistent meaning. However, the determining effects of the variables of rectilinearity and curvilinearity were

uncertain, probably due to the arbitrary combinations of straight and curved line features in these test figures.

The studies in the area of sexual and cultural symbolism have demonstrated that the stimulus variables of rectilinearity and curvilinearity in line drawings can produce significantly different responses, but have shown conflicting evidence pertaining to the hypothesis that elongated objects or straight and angular line drawings are inherently masculine symbols, and round and containing objects or curved line drawings are inherently feminine symbols.

Further evidence against the hypothesis which holds that rectilinear and curvilinear line drawings are sexual symbols was indicated in the studies with the Differential Diagnostic Technique by Breen and North. Instead, they proposed that straight-line drawings may be representative of hostile feelings and curved-line drawings the feelings of passivity. Validity studies in terms of the efficiency of the Differential Diagnostic Technique as a measurement of hostility and passivity have yielded generally supportive results.

The present study proposes to investigate the adequacy of the hypothesis which relates hostile connotations to straight-line graphic figures and passive connotations to curved-line graphic figures. The general research hypothesis may be stated as follows: Graphic figures composed of

straight lines have connotative meanings related to the concept "Hostility", and those composed of curved lines have connotative meanings related to the concept "Passivity".

## CHAPTER II

### THE EXPERIMENTAL DESIGN

This chapter presents the procedures employed to test the general hypothesis derived from the preceding review of the literature. The first section of this chapter will consider the experimental stimuli to be used in this study. The second section will describe the Semantic Differential<sup>1</sup> as a measuring technique, and the statistical procedures employed. This will be followed by the formulation of the specific hypothesis and the concluding section will outline the subjects and the testing procedures.

#### 1. The Experimental Stimuli.

The experimental stimuli used in the present study include eight graphic line drawings and two stimulus words. The eight graphic line drawings were adopted from the test figures developed by Breen<sup>2</sup> and North<sup>3</sup> for the Differential

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1 Charles E. Osgood, George J. Suci and Percy H. Tannenbaum, The Measurement of Meaning, Urbana, University of Illinois, 1957, 342 p.

2 Harold J. Breen, The Differential Diagnostic Technique as a Measure of Hostility, unpublished doctoral thesis presented to Department of Psychology, University of Western Ontario, London, 1953, x-68 p.

3 Sidney L. North, Some Studies in Personality Classification Using a Visual-Motor Psychological Technique, unpublished Master's thesis presented to Department of Psychology, University of Western Ontario, London, 1950, 111-140 p.

Diagnostic Technique and represent the finished products by the subjects' accurate performance according to specific test instructions to rearrange and reproduce the given test figures. These eight test figures have the characteristics that four of them (figures 1, 3, 5, 7) consist only of straight solid or dotted line features and the other four (figures 2, 4, 6, 8) consist only of circular or semi-circular line features as illustrated in Figure 1.

The two stimulus words are "Hostility" and "Passivity". The concept of "Hostility" has been operationally defined by the authors of the Differential Diagnostic Technique as "The desire to inflict injury on other people or animals, either through direct destruction or by more subtle means of causing discomfort",<sup>4</sup> and similarly "Passivity" has been defined as "The desire to be compliant, obedient and submissive to the demands of other people".<sup>5</sup> However, for the present research, these two words are presented to the subjects as single word concepts without definition.

The experimental stimuli were presented to the subjects by mimeographic reproductions with each stimulus figure appearing individually on each page of the test booklet together with the Semantic Differential scales.

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<sup>4</sup> Breen, Op. Cit., p. 29.

<sup>5</sup> Ibid.

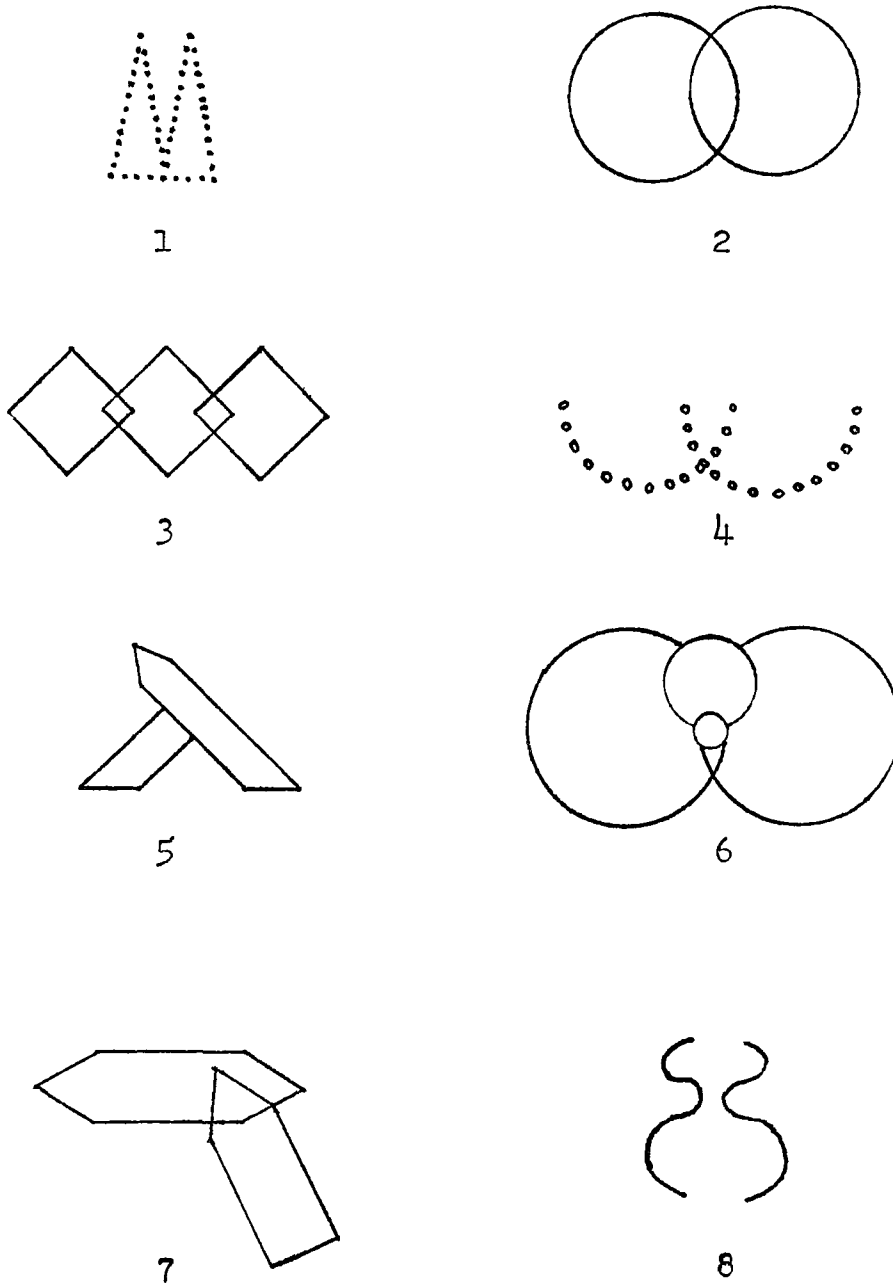


Figure 1.- The Experimental Line Drawings Reproduced in 1/2 of Actual Size.

## 2. Measurement by the Semantic Differential.<sup>6</sup>

The Semantic Differential as a measuring technique for the connotative meaning of a stimulus is based on the theoretical construct derived from learning theory defining meaning as a representational mediation process elicited by a sign. According to this theoretical construct, the meaning of a sign may be represented by a point in a semantic space which is multi-dimensional and Euclidian in character. This semantic space is represented by a number of semantic scales each of which is defined by a pair of polar (opposite in meaning) adjectives and representing a straight line function that passes through the origin of this space. Factor analytic studies reported by the authors have revealed the major factors representing the main dimensions of this semantic space. The three dominant factors which account for about sixty-five per cent of the total variance are named by the authors as the Evaluative, Potency and Activity factors.

When a subject judges a stimulus against a series of scales, each judgment along the gradations or scale units separating the bipolar adjectives represents a selection among a set of given alternatives and serves to localize the stimulus as a point in the semantic space. Difference in the meaning between two stimuli is then merely a function of the differences

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<sup>6</sup> Osgood, et al., Op. Cit.

in their respective allocations within the same space, i.e. it is a function of the multi-dimensional distance between the two points.

In the present study, the Semantic Differential serves as the measuring instrument of the dependent variables. The subjects' ratings of the individual independent variables on identical sets of Semantic Differential scales enable comparisons to be made on the dependent variables. The relative distances between the points designating each of the experimental stimuli in the semantic space are defined by the particular dimensions or factor scales.

In regard to the selection of scales, the authors have pointed out that there are no standard scales which must be administered. They suggest that the selection should be directed by such criteria as factorial composition when known, relevance to the concepts being judged, and the semantic stability of the particular scales. They also suggest the use of several closely related scales to represent each factor, assuming that the derived average score would be more representative and reliable than scores on the individual scales. This average score is referred to as the factor score.

For the present study, in accordance with the criteria suggested by the authors, twelve scales were selected from the Thesaurus study to represent the three main factors. There was no evidence, however, that any particular scale

would be better than another for rating the particular line drawings and word concepts in this study. The scales chosen were those reported by Osgood et. al. to be the most heavily loaded and also least likely to be denotative for the word concepts to be rated. From the Evaluative factor, kind-cruel, affectionate-hateful, safe-dangerous, pursuing-avoiding, were selected. The Potency factor was represented by hard-soft, severe-lenient, tough-fragile, and masculine-feminine. The scales representing the Activity factor were exciting-calming, moving-still, fast-slow, and tensed-relaxed. This selection is generally representative of those scales commonly used by other studies involving the Semantic Differential.

The reliability of the Semantic Differential scales has been reported to be fairly high. The authors report the probability of a change of greater than 1.50 units on the average factor score to be less than 0.05 on the retest of ten concepts rated on ten scales by 112 subjects. This index of reliability has been found consistently by the authors in a number of studies.

### 3. Statistical Procedures.

Following from the discussions defining the meaning of a sign or a concept for a subject or a group as a point in a multi-dimensional space, the similarity or difference between two concepts becomes the function of the multi-dimensional

distance between the two points. Because of this, the data in the present study will be treated with the D- Statistics suggested by the authors of the Semantic Differential for the measurement of distances in the semantic space. This may be represented by the generalized Distance Formula of solid geometry:

$$D_{ie} = \sqrt{\sum_j d_{ie}^2}$$

where  $D_{ie}$  is the linear distance between the points in the semantic space representing concepts  $i$  and  $e$ , and  $d_{ie}$  is the algebraic difference between the coordinates of  $i$  and  $e$  on the same dimension or factor  $j$ . Summation is over the factor scores.

The basic "score" obtained from the Semantic Differential data is the digit value of 1 through 7 assigned to the alternatives of a seven-step scale. This corresponds to a subject's check-mark with which he indicates his judgment of a particular concept against a particular scale. These scores are averaged within the factors to yield the factor scores. The factor scores serve as the units of measurement for the Distance Formula to calculate the distances between the concepts being judged.

For the evaluation of the reliability of measurement with the Semantic Differential, the authors suggest the method in terms of score reproducibility. Therefore, in the

present study, the test-retest reliability was studied by obtaining the absolute deviation of each subject on each pair of test-retest factor scores. The number of instances of each size deviations was tabulated to yield the percentage of responses given each deviation. The reliability indices were then expressed in terms of probability limits.

In the present study, the probability of factor score deviations was established by assigning two randomly paired duplicate pages of a straight-line drawing and a curved-line drawing at the end of each test booklet which provided a test-retest rating for two line drawings on each scale. Each subject, therefore, rated the twelve scales for the eight line drawings and the two words plus two duplicated line drawings. Only the ratings on the eight experimental line drawings and the two words were used for the computation of distances; the scores on the duplicate pages were used solely for the study of reliability.

For the estimation of statistically significant differences of the distances between the line drawings and the words, the authors have suggested the use of non-parametric tests. This is due to the fact that the distribution of the distances is not known and cannot be demonstrated to be normal in shape. In this study, the "sign test" of Dixon and

Mood<sup>7</sup> was used. Each subject's  $D_{ab}$  and  $D_{ac}$  are treated as ordinary scores and the experimenter then determines whether or not the AB and AC values could have been samples from the same population.

The accepted level of confidence for all statistical evaluations in this study is the five per cent level.

#### 4. Specific Hypotheses.

It has been postulated that the straight-line figures are more similar in connotative meanings to the concept "Hostility" and the curved-line figures are more similar in connotative meanings to the concept "Passivity". With the Semantic Differential as the measuring instrument, the similarities and differences of the meanings between the line drawings and the word concepts would be expressed in terms of the relative distances between them. The specific hypotheses, stated in the null form may be as follows:

1. There is no significant difference between the distances from any of the straight-line figures to the concept "Hostility" and the distances from any of the curved-line figures to the concept "Hostility" when

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7. W. J. Dixon and A. M. Mood, "The Statistical Sign Test", Journal of American Statistical Association, Vol. 41, (no number), 1946, p. 557-566, cited by Allen L. Edwards, Statistical Methods for the Behavioral Sciences, New York, Rinehart, 1958, p. 288-290.

the distances have been derived from the scores of twelve scales of the Semantic Differential.

2. There is no significant difference between the distances from any of the straight-line figures to the concept "Passivity" and the distances from any of the curved-line figures to the concept "Passivity" when the distances have been derived from the scores of twelve scales of the Semantic Differential.

#### 5. Experimental Procedure.

a) Subjects.- The seventy-four subjects who took part in this experiment were students of the Faculty of Psychology and Education, University of Ottawa. The test was administered to the seventy-four subjects as a single group. Four booklets were discarded due to incompleteness or errors such as checking more than once on an individual scale. The total number of subjects who completed their booklets in accordance with the test instructions was then seventy, of which there were 48 men and 22 women. The ages of the subjects ranged from twenty years to fifty-seven years with a mean of 34.2 years. All of the subjects knew enough English to be enrolled in university post-graduate courses given in English.

b) Administration.- Each subject received a test booklet. A typical booklet appears in Appendix 1. It contains

a face sheet for the subject's name, age, sex, language, education and vocation. The second and third pages contain instructions similar to those given by the authors of the Semantic Differential. The examiner read them aloud to the subjects and illustrated the description of the rating categories on the blackboard. The remainder of the booklet contains the line drawings and the word concepts to be rated on the twelve Semantic Differential scales. Blank pages have been inserted to provide more clarity for the experimental figures or words being rated. The experimental pages contain the eight line drawings followed by the word concepts. Two duplicate pages of line drawings appear at the end of each booklet for the purpose of test-retest reliability. The sequence of the scales was the same on each page with the scales representing the different factors intermixed. The polarities of five of the scales were reversed to control for possible preferences of position to be checked by the subject. The eight experimental line drawings are arranged in succession and a variable sequence was achieved by applying the Latin-square method. The two pages each with the words "Hostility" and "Passivity" follow the eight experimental line drawings with no change in sequence. The last two pages containing a straight-line drawing and a curved-line drawing are selected by consecutive pairings of the two kinds of line drawings. They were attached to a booklet under the condition that

neither of these duplicate line drawings should be the same as that appearing on the page immediately prior to the page with the word concept "Hostility".

This chapter has outlined the experimental and dependent variables, the research hypotheses and the experimental procedures employed in testing these hypotheses. The findings of this experiment will be presented in the following chapter.

## CHAPTER III

### PRESENTATION AND DISCUSSION OF RESULTS

This chapter will present the results of the statistical analyses of the data derived from this experiment. The three sections will cover the test-retest reliability, the analyses of the relationships among the line drawings and the word concepts, and a discussion of the obtained results.

#### 1. Test-retest Reliability.

The reliability for this study was established by the test-retest method. Each subject was presented with a test booklet, the last two pages of which were duplicates of two experimental line drawings. The subject's rerating of these two line drawings provided two pairs of retest ratings for each of the twelve scales. By averaging the deviations over the four scales representing each of the three factors, a separate deviation factor score for each factor on each rerating was obtained. The empirical probability of deviation of each size was then computed. The seventy subjects produced a total of 417 deviation factor scores with 139 in each of the three factors. In Table I, the percentage of responses giving each deviation size (in per cent) and associated probability limits ( $p$ ) are given.

Table I.-

Probability of Obtaining Given Deviations from Test to Retest  
on Factor Scored Items for the Average Subject.<sup>a</sup>

Absolute Deviations	E		P		A		All Factors	
	%	p	%	p	%	p	%	p
0	22.3	.997	20.1	.995	15.8	.995	19.4	.994
.25	26.6	.774	31.6	.794	25.8	.837	28.0	.800
.50	27.3	.508	12.2	.478	18.7	.579	19.4	.520
.75	7.9	.235	15.8	.356	12.2	.392	11.9	.326
1.00	5.7	.156	7.1	.198	11.5	.270	8.2	.207
1.25	4.3	.099	4.3	.127	5.0	.155	4.5	.125
1.50	2.1	.056	1.4	.084	2.8	.105	2.1	.080
1.75	0.7	.035	2.8	.070	3.5	.077	2.4	.059
2.00	0.0	.028	2.1	.042	1.4	.042	1.2	.035
2.25	2.1	.028	0.0	.021	2.1	.028	1.4	.023
2.50	0.7	.007	0.0	.021	0.0	.007	0.2	.009
>2.50	0.0	.000	2.1	.021	0.7	.007	0.7	.007

<sup>a</sup> 139 pairs in each factor.

The results indicate that changes in factor score of more than 1.50 for the Evaluative factor, more than 1.75 for the Potency factor and the Activity factor as well as all factors combined are significant at the five per cent level.

## 2. Analyses of the Relationships Among the Line Drawings and the Word Concepts.

The distances or similarity relations between each and every other line drawing and word concept were calculated by applying the Distance Formula to the factor scores. Table II presents the matrix of mean distances by the seventy subjects for the eight line drawings (figures 1 through 8) and the two word concepts H and P (Hostility and Passivity). This matrix represents the semantic structure of the line drawings and the word concepts as defined by the three factors (Evaluative, Potency and Activity) representing the three dimensions of this semantic space. The values in this D-matrix can be plotted in a solid, three dimensional space as a concrete model of the subjects' conceptual structure. A graphic representation of the solid model for the data of the D-matrix is shown in Figure 2 with a scale of  $1\frac{1}{4}$  inches equals a D of 1.00 unit. For the sake of simple illustration, the data have been simplified such that in every instance of distance relation involving either the straight-line drawings or the curved-line drawings, the mean of the four distances in that category of line drawings was used. The spheres serve to designate the



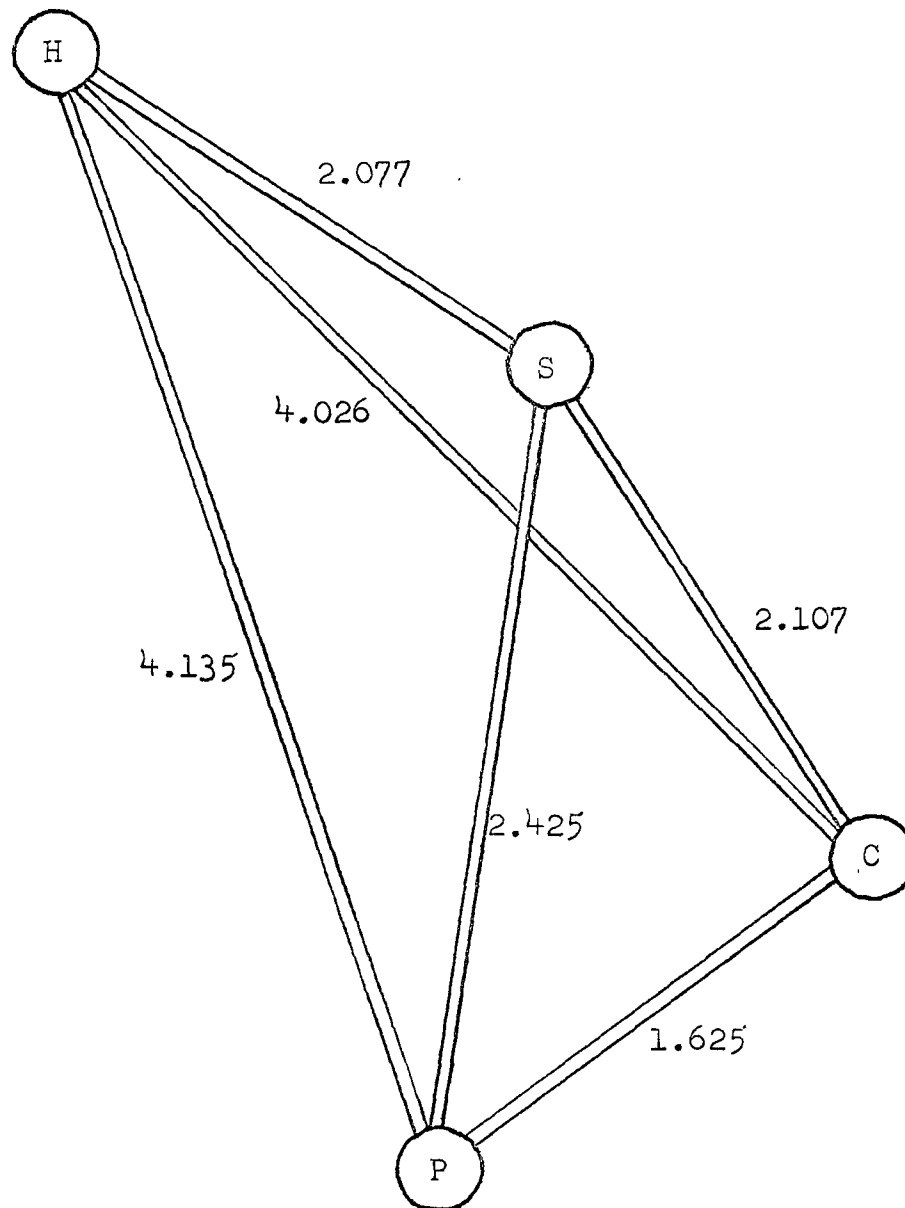


Figure 2.- Drawing of Three-Dimensional Model Constructed from Distance Measures for Variables S (straight-line figures), C (curved-line figures), H (Hostility) and P (Passivity).

approximate locations of the individual variables but not the actual patterns of dispersion among members in the particular variable.

The model serves to provide an objective picture of subjective meaning states within the subjects showing the relative distances and arrangements of the line drawings and the word concepts. It does not, however, provide any information additional to that already available in the D-matrix.

The following section will present the analyses of those distance relationships which are directly relevant to the problem of this study.

From the data in the D-matrix, the distances from each of the straight-line figures (figures 1, 3, 5, 7) to the concept H were compared with those from each of the curved-line figures (figures 2, 4, 6, 8) to the concept H as shown in Table III. Similarly, Table IV shows comparisons of the distances from each of the curved-line figures to the concept P with those from each of the straight-line figures to the concept P. These results show consistent directions in the differences between the distances, i.e. the distances between each of the straight-line figures and the concept H were all smaller than any of the distances between each of the curved-line figures and concept H. Similarly, the distances between each of the curved-line figures and the concept P were all smaller than any of the distances between each of the straight-line figures and the concept P.

Table III.-

Comparisons of the Distances Between Straight-Line Drawings and Concept H ( $D_{SH}$ ) and the Distances Between Curved-Line Drawings and Concept H ( $D_{CH}$ ).

Pairings	$D_{SH}$	$D_{CH}$	$D_{SH} - D_{CH}$
1H - 2H	2.556	4.058	-1.502
1H - 4H	2.556	4.241	-1.685
1H - 6H	2.556	3.614	-1.058
1H - 8H	2.556	4.149	-1.593
3H - 2H	2.723	4.058	-1.502
3H - 4H	2.723	4.241	-1.518
3H - 6H	2.723	3.614	-.891
3H - 8H	2.723	4.149	-1.426
5H - 2H	1.469	4.058	-2.589
5H - 4H	1.469	4.241	-2.772
5H - 6H	1.469	3.614	-2.145
5H - 8H	1.469	4.149	-2.680
7H - 2H	1.743	4.058	-2.315
7H - 4H	1.743	4.241	-2.498
7H - 6H	1.743	3.614	-1.871
7H - 8H	1.743	4.149	-2.406

Table IV.-

Comparisons of the Distances Between Curved-Line Drawings and Concept P ( $D_{CP}$ ) and the Distances Between Straight-Line Drawings and Concept P ( $D_{SP}$ ).

Pairings	$D_{CP}$	$D_{SP}$	$D_{CP} - D_{SP}$
2P - 1P	1.701	2.040	- .339
2P - 3P	1.701	2.199	- .498
2P - 5P	1.701	2.246	- .545
2P - 7P	1.701	2.826	-1.125
4P - 1P	1.713	2.040	- .327
4P - 3P	1.713	2.199	- .486
4P - 5P	1.713	2.246	- .533
4P - 7P	1.713	2.826	-1.113
6P - 1P	1.552	2.040	- .488
6P - 3P	1.552	2.199	- .647
6P - 5P	1.552	2.246	- .694
6P - 7P	1.552	2.826	-1.274
8P - 1P	1.818	2.040	- .222
8P - 3P	1.818	2.199	- .381
8P - 5P	1.818	2.246	- .428
8P - 7P	1.818	2.826	-1.008

The significance estimates of the differences between the distances were evaluated by the "sign test" in terms of the binomial distribution  $(p+q)^n$ , where  $p$  is equal to .5 and  $q$  is equal to .5 and  $n$  is equal to the number of pairs of observations. In the present case,  $n$  would be equal to 70; the mean  $M$ , and the standard deviation  $\sigma$  of the binomial distribution would then be

$$n = (70) (.5) = 35$$

$$\sigma = \sqrt{(70) (.5) (.5)} = 4.183$$

Then the frequency of occurrence of one particular distance being greater than another in paired observations across subjects may be expressed as a relative deviate or standard score  $z$  by finding

$$z = \frac{X - M}{\sigma}$$

where  $X$  is the observed frequency of the greater distance in a paired observation by the seventy subjects. The correction for continuity was applied before the calculation of  $z$ . For a confidence limit set at the five per cent level, the null hypothesis would be rejected if the obtained value of  $z$  is equal to or greater than 1.96.

The  $z$  values obtained from comparing the distances from each of the straight-line figures to the concept  $H$  and those from each of the curved-line figures to the concept  $H$

are given in Table V. Table VI gives the  $z$  values obtained from comparing the distances between each of the curved-line figures and the concept P with those from each of the straight-line figures to the concept P.

The results showed that all of the sixteen pairings in Table V were significant beyond the accepted level of confidence. It may be noted that all of these  $z$  values are also beyond the one per cent level of confidence which is determined by a  $z$  value of 2.58. Table VI shows that fourteen out of the sixteen pairings did reach the accepted five per cent level of confidence, with ten among these fourteen pairings being significant at the one per cent level. The two pairings which did not reach the required level of confidence in Table VI were the comparison of distances between figure 6 and the concept P with that between figure 1 and the concept P, and the comparison of distances between figure 6 and the concept P with that between figure 3 and the concept P. Even then, the  $z$  value of 1.79 obtained from both of these two pairings did approach the required level of confidence ( $z = 1.96$ ) and, as indicated by the frequency tabulations, was in the predicted direction.

With regard to the relationships among and between the straight-line figures and the curved-line figures, the results from Tables V and VI have shown that relative to the concept H, all the distances from the straight-line figures

Table V.-

**z Values Obtained from Frequency Tabulations of Greater Distances Resulting from Comparisons of Straight- and Curved-Line Drawings in Relation to Concept H for 70 Subjects.**

Pairings	Frequency		z
	$D_{SH} > D_{CH}$	$D_{CH} > D_{SH}$	
1H - 2H	16	54	4.43
1H - 4H	16	54	4.43
1H - 6H	18	52	3.95
1H - 8H	15	55	4.67
3H - 2H	20	50	3.47
3H - 4H	14	56	4.90
3H - 6H	22	48	2.99
3H - 8H	18	52	3.95
5H - 2H	8	62	6.34
5H - 4H	9	61	6.10
5H - 6H	14	56	4.90
5H - 8H	9	61	6.10
7H - 2H	10	60	5.86
7H - 4H	5	65	7.06
7H - 6H	13	57	5.14
7H - 8H	6	64	6.82

Table VI.-

$z$  Values Obtained from Frequency Tabulations of Greater Distances Resulting from Comparisons of Straight- and Curved-Line Drawings in Relation to Concept P for 70 Subjects.

Pairings	Frequency		$z$
	$D_{CP} > D_{SP}$	$D_{SP} > D_{CP}$	
2P - 1P	23	47	2.75
2P - 3P	24	46	2.51
2P - 5P	19	51	3.71
2P - 7P	14	56	4.90
4P - 1P	25	45	2.27
4P - 3P	25	45	2.27
4P - 5P	16	54	4.43
4P - 7P	20	50	3.47
6P - 1P	27	43	1.79
6P - 3P	27	43	1.79
6P - 5P	19	51	3.71
6P - 7P	21	49	3.23
8P - 1P	23	47	2.75
8P - 3P	26	44	2.03
8P - 5P	20	50	3.47
8P - 7P	20	50	3.47

were significantly smaller than those from the curved-line figures; and similarly, relative to the concept P, the majority of the distances from the curved-line figures were significantly smaller than those from the straight-line figures. Therefore, it would seem logical to imply that the four straight-line figures and the four curved-line figures formed two distinct conceptual groups. There is further suggestion of this in the fact that members in each group appear to have smaller distances or similarity relationships among each other than with members of another group as evidenced in Table II.

The results of the experiment having been presented, the following section of this report will proceed with a discussion of these findings.

### 3. Discussion of the Results.

It has been hypothesized that straight-line drawings are more similar in connotative meanings to the concept "Hostility", and curved-line drawings are more similar in connotative meanings to the concept "Passivity". In the presentation of the results, it was shown by means of the distance or similarity relations of the Semantic Differential that the word concept "Hostility" did have significant degree of similarity to the straight-line drawings rather than to the curved-line drawings. Likewise, the word concept "Passivity" also showed significant degree of similarity to most of the

curved-line drawings rather than to the straight-line drawings. Among the latter set of comparison situations, two pairings of distances approached but did not reach the required level of significance. Since the distances involved in these two situations had otherwise yielded significant differences in all other comparison situations, and the drawings with the same category of line structure have appeared to be more similar in their conceptual meanings, therefore, no definite explanation can be offered to account for these two incidences other than postulating the possibility of relatively low inter-subject agreement on the scoring of these particular line drawings (figures 1, 3 and 6).

The authors of the Semantic Differential<sup>1</sup> report that according to the results of their reliability studies, a change of 1.50 scale units in factor scores has generally been found to represent a significant change or difference in meaning at the five per cent level. The test-retest scores for this experiment however, showed slightly greater deviations, with a change of 1.75 scale units in factor scores being significant at the five per cent level. Since the factor score deviation in this experiment exceeded the reported value only by .25 of a scale unit, it still seems to be reasonably

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<sup>1</sup> Charles E. Osgood, George J. Suci and Percy H. Tannenbaum, The Measurement of Meaning, Urbana, University of Illinois, 1957, p. 328.

acceptable. However, some speculations will be made in regard to the findings of this inconsistency.

A retrospect of the experimental procedure effecting the test-retest situation shows that the subjects were required first to rate the eight experimental line drawings, and then to rate the two word concepts prior to rerating two of the line drawings. This procedure suggests the possibility of the subjects' having knowledge of the word concepts becoming an extraneous variable with the capacity of inducing changes in their subsequent rerating behavior.

The authors of the Semantic Differential have formulated a general principle regarding the interaction of cognitive events known as the "Principle of Congruity".<sup>2</sup> Essentially, this principle states that along each semantic dimension, whenever two events are related by an assertion, they modify each other in proportion to their relative intensities, yielding changes in meaning or resolutions into new combined meanings that are predictable according to specific principles of relationships. In the context of the rationale of the Semantic Differential, semantic dimension refers to that which is defined by a specific factor, and "intensity" is assumed to be coordinate with the extremeness of judgment in the measurement space. Assertion may be conceived as that variable which

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<sup>2</sup> Ibid., p. 199-216.

instigates the interaction between the cognitive events. It functions in various forms, one of which serves to associate the events of independent meaning states. This principle is essentially analogous to those others concerning the nature of the cognitive processes such as the effects of "perceptual set" or conditioned learning in perceptual tasks. These principles are similar in the respect that they are all dealing with the modification in mediation processes as a result of "experience" in cognitive interaction.

The possible effect of the "Principle of Congruity" in the design of this experiment could therefore account for the relatively low reliability obtained. Nevertheless, since the experimental line drawings were all rated prior to the word concepts or the presumed occurrence of congruity, therefore it seems that the ratings on these line drawings should represent their independent and "true" meanings. However, it is noted that these speculations remain to be verified experimentally, as the possibility exists that the obtained lower reliability could be due to the effect of other variables. For instance, it remains to be shown, whether or not similar results can be obtained by using other Semantic Differential scales.

Since the results of this experiment have suggested the specific similarity relationships between the eight test figures of the Differential Diagnostic Technique and the

concepts of "Hostility" and "Passivity" as proposed by Breen<sup>3</sup> and North,<sup>4</sup> it may be considered as contributory to the construct validity of the rationale for that projective drawing technique. The results also suggest that straight versus curved line structures in graphic line drawings may be determining variables capable of effecting different conceptual meanings. Some supportive evidence for this generalization may be found in a study by McCallum<sup>5</sup> which shows that straight or curved line features in simple lines are different variables measurable by the Semantic Differential. McCallum also obtained his results from a sample of the same population as the present experiment, that is, students of the Faculty of Psychology and Education, University of Ottawa. Whereas the validity of this generalization needs to be verified by experiments using line drawings other than those employed in this study, in general, the present results are consistent with previous research findings such as those suggested by

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<sup>3</sup> Harold J. Breen, The Differential Diagnostic Technique as a Measure of Hostility, unpublished doctoral thesis presented to Department of Psychology, University of Western Ontario, London, 1953, x-68 p.

<sup>4</sup> Sidney L. North, Some Studies in Personality Classification Using a Visual-Motor Psychological Technique, unpublished Master's thesis presented to Department of Psychology, University of Western Ontario, London, 1950, iii-140 p.

<sup>5</sup> J.W. McCallum, The Effects of Shape and Orientation on the Stimulus Value of Lines, unpublished doctoral thesis presented to the School of Psychology and Education, University of Ottawa, Ontario, 1961, xi-106 p.

Bartlett<sup>6</sup> that abstract graphic line drawings can be attributed with conceptual meanings. Agreement is also found between the present findings and the studies of physiognomic perception as represented by the work of Lundholm<sup>7</sup> suggesting the similarity relationships between the drawings of straight angular figures and the feeling states of hostility on the one hand, and the drawings of curvilinear figures and passive feelings on the other. Whereas the studies in physiognomic perception have dealt with line patterns which are essentially simple in structure, the present experiment serves to demonstrate that analogous results may also be found in line drawings with relatively complex configurations. Implications can also be made from the present findings to those studies concerning the representational value of line drawings with certain specific geometric features such as those of the Bender-Gestalt figures and the studies in sexual and cultural symbolism. For instance, by showing that straight and curved line structures could be determining variables, it therefore supports the notion that the Bender-Gestalt figures do not provide enough consistency in their representational values for the test to be useful as a projective test. In regard to the studies of sexual and

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<sup>6</sup> F.C. Bartlett, Remembering, A Study in Experimental and Social Psychology, London, Cambridge, 1932, x-317 p.

<sup>7</sup> Helge Lundholm, "The Affective Tone of Lines", Psychological Review, Vol. 28, No. 1, January 1921, p. 43-60.

cultural symbolism, the use of the Semantic Differential in the present experiment as the measuring instrument of conceptual meanings for various stimuli has suggested its advantage in providing control over the factor of "set". The absence of such control has been one of the main criticisms of the methodology of these studies.

As to why the relationships between the straight- and curved-line drawings and the word concepts of "Hostility" and "Passivity" occur in these specific directions, possible explanation may be found among the studies in "physiognomic perception". Theorists in this area have formulated an organismic theory of a dynamic correspondence between the perceived structure of the stimulus and the motor and affective attitudes of the person. It is possible that, in the framework of the "organismic theory", further research may provide better understanding to the findings of the present experiment and refinement of the rationale of the Differential Diagnostic Technique.

## SUMMARY AND CONCLUSIONS

The purpose of the present research was to investigate the relationships between the conceptual meanings or representational values of graphic line drawings and the feeling states of "Hostility" and "Passivity". Seventy students of the Faculty of Psychology and Education served as subjects for this experiment. The experimental variables consisted of two word concepts "Hostility" and "Passivity" and eight of the test figures of the Differential Diagnostic Technique with the characteristics that four were composed of straight lines or dots only and the other four of curved lines or circles only. The dependent variables for all subjects and all test figures were the scores on a twelve-scale form of the Semantic Differential. These scores were transformed to yield measurement in terms of distance relationships between the experimental variables.

The hypotheses stated in the null form were as follows:

1. There is no significant difference between the distances from any of the straight-line figures to the concept "Hostility" and the distances from any of the curved-line figures to the concept "Hostility" when the distances have been derived from the scores of twelve scales of the Semantic Differential.
2. There is no significant difference between the distances from any of the straight-line figures to the concept

"Passivity" and the distances from any of the curved-line figures to the concept "Passivity" when the distances have been derived from the scores of twelve scales of the Semantic Differential.

Each of the specific hypotheses represented sixteen distance relations between the line drawings and the particular word concept involved.

The results on test-retest reliability obtained in this study were found to be lower than those reported by the authors of the Semantic Differential and postulations regarding this discrepancy were offered in terms of the "Principle of Congruity".

Statistical analyses of the experimental results using the "sign test" indicated significant differences in every comparison situation represented by the first hypothesis. Among the sixteen comparison situations represented by the second hypothesis, two failed to reach the required level of significance.

In consideration of the results showing all of the relative similarity relationships among the line drawings and the word concepts, the following conclusions were made:

1. In terms of connotative meaning, straight-line drawings are more similar to the concept "Hostility" than are curved-line drawings.

2. In terms of connotative meaning, curved-line drawings are more similar to the concept "Passivity" than are straight-line drawings.

These conclusions were considered as supportive of the construct validity of the Differential Diagnostic Technique. They further suggested that straight versus curved line features in graphic line drawings may be determining variables capable of effecting different conceptual meanings measurable by the Semantic Differential. However, it was recognized that this generalization should be verified with similar investigations involving graphic line drawings of different configurations than those used in the present experiment.

## BIBLIOGRAPHY

Breen, Harold J., The Differential Diagnostic Technique as a Measure of Hostility, unpublished doctoral thesis presented to the Department of Psychology, University of Western Ontario, London, 1953, x-68 p.

This research presents a validity study of the Differential Diagnostic Technique, a projective drawing technique developed by the writer in collaboration with S.L. North. By using criteria such as the subjects' verbal projection of hostile feelings and sociometric ratings, the author shows with his results that the Differential Diagnostic Technique serves as a measure of hostility in "normal" subjects such as previous findings showed with psychiatric patients. This research also presents certain refinements in the design of some of the test figures. The experimental line drawings used in the present study were adapted from among the test figures of the Differential Diagnostic Technique.

North, Sidney, L., Some Studies in Personality Classification Using a Visual-Motor Psychological Technique, unpublished Master's thesis presented to the Department of Psychology, University of Western Ontario, London, 1950, 111-140 p.

The basic theoretical background, administration and scoring procedures of the Differential Diagnostic Technique are contained in this study. The writer outlines the postulation that straight-line drawings may be representative of hostile feelings and curved-line drawings of passive feelings. This postulation forms the basis of the research hypothesis investigated in the present study.

Osgood, Charles E., George J. Suci and Percy H. Tannenbaum, The Measurement of Meaning, Urbana, University of Illinois, 1957, 342 p.

Within the general framework of learning theory, the authors have formulated a theory of psychological meaning, conceiving the meaning of a sign as a representational mediation process. They then demonstrate how their theory of meaning can be coordinated with the actual operations of measurement, i.e. the Semantic Differential. Considerable research evidence and suggestions are given by the authors regarding the various areas of research in which the Semantic Differential may be used. In the present study, besides being used as the measuring instrument, the Semantic Differential with its theoretical implications also serves to illuminate possible inherent flaws in the design of the experiment.

Werner, Heinz and Bernard Kaplan, Symbol Formation, New York, Wiley, 1963, 530 p.

The authors base their investigations on the premise that language is used for representation and that an essential part of linguistic representation is to establish analogies of form between the symbol and the object to be represented. With this premise, they set out to show the numerous ways by which the symbolizer establishes semantic correspondences under various conditions of developmental differentiation.

A detailed review and discussions of the studies related to "physiognomic perception" are presented in this book.

APPENDIX 1

A TYPICAL TEST BOOKLET

**APPENDIX 1**

NAME \_\_\_\_\_ CIRCLE Male or Female  
SURNAME CHRISTIAN NAMES Single or Married

DATE OF BIRTH: \_\_\_\_\_ AGE \_\_\_\_\_  
Day Month Year Year Month

BIRTHPLACE: \_\_\_\_\_  
Place Province or State Country

LANGUAGE: \_\_\_\_\_  
Native Others you fluently use

EDUCATION: \_\_\_\_\_  
Grade or degree completed Institution Date





























APPENDIX 2

ABSTRACT OF

The Connotative Meanings of Straight-  
and Curved-Line Graphic Forms

## APPENDIX 2

### ABSTRACT OF

#### The Connotative Meanings of Straight- and Curved-Line Graphic Forms<sup>1</sup>

Existing research has suggested that certain abstract graphic line drawings may function as symbolic representations of objects or feeling states by virtue of certain inherent formal or structural characteristics in these line drawings. A hypothesis relating hostile connotations to straight-line graphic figures and passive connotations to curved-line figures has been formulated as the rationale for a projective drawing technique known as the Differential Diagnostic Technique. The purpose of the present experiment was to investigate the relationships between the connotative meanings of graphic line drawings and the concepts of "Hostility" and "Passivity". Past research has also suggested that the connotative meanings of graphic line drawings could be measured by the Semantic Differential scales.

The experimental variables consisted of two word concepts, "Hostility" and "Passivity", four straight-line drawings and four curved-line drawings adopted from the Differential

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<sup>1</sup> Yang Tso Lin, doctoral thesis presented to the Faculty of Psychology and Education of the University of Ottawa, Ontario, 1966, ix-73 p.

Diagnostic Technique. Each experimental stimulus was presented on a page with a representative sample of Semantic Differential scales.

The experimental group consisted of seventy Psychology-Education students. The similarity relationships among the line drawings and the word concepts were investigated. From the statistical analyses by the "sign test", it was concluded that in terms of connotative associations, as measured by the Semantic Differential,

1. straight-line drawings are more similar to the concept "Hostility" than are curved-line drawings, and
2. curved-line drawings are more similar to the concept "Passivity" than are straight-line drawings.