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An Investigation of the Effects of Externally and Intrapsychically Induced Stress on Projective Drawings

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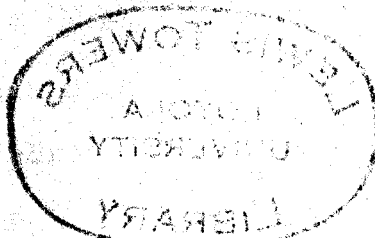


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AN INVESTIGATION OF THE EFFECTS
OF EXTERNALLY AND INTRAPSYCHICALLY
INDUCED STRESS ON PROJECTIVE
DRAWINGS

BY

ROBERT L. DUNCAN



A THESIS SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL
OF LOYOLA UNIVERSITY IN PARTIAL FULFILLMENT
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Vita

Robert L. Duncan was born on August 5, 1935, in Salina, Kansas. He graduated from St. Louis University with a Bachelor of Science degree in August, 1958. He then worked for five years as a child care worker with emotionally disturbed children and for two more years as a teacher of mentally retarded children. In the fall of 1965 he became assistant director and a year later director of the Southwest School for Retarded Children. In January, 1968 he left that position to pursue full-time graduate work in clinical psychology at Loyola.

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An Investigation of the Effects
of Externally and Intrapsychically
Induced Stress on Projective Drawings

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Despite reports of equivocal research findings, the Draw-A-Person Test is the second most frequently used test in clinics throughout the country (Sundberg, 1961). Figure drawing procedures have frequently been employed by clinicians for the assessment of anxiety, particularly through the use of specific signs or impressionistic cues (Buck, 1948; Machover, 1949). Swensen (1957) reviewed ten studies dealing with anxiety and/or conflict indicators and concluded that Machover's hypotheses regarding such indexes were not supported. Handler and Reyher (1965) came to somewhat different conclusions from their review of 51 studies that included 21 indexes of anxiety on the DAP. They found that omission, distortion, detail loss, line pressure increase, heavy line, size increase and decrease, head simplification, and trunk simplification have consistently yielded significant results in the expected direction (increase indicates anxiety). Evidence was less consistent for reinforcement, line discontinuity, light line, vertical imbalance, delineation line absence, and transparency.

In a second review, Swensen (1968) tended to dismiss such structural and formal indexes on the basis of unreliability. And, indeed, one of the major difficulties in DAP research is the lack of a reliable, widely-used scoring system. Recently, however a carefully developed manual for scoring anxiety indexes has been presented by Handler (1967). Such an instrument could serve to correct for the methodological weakness described by Swensen, thereby justifying additional research on structural and formal indexes of anxiety. Furthermore, little has been done to assess the effects of induced anxiety on such indexes in the drawings of young children. It is with this last problem that this paper deals.

General Review of the Literature

A wave of studies concerned specifically with anxiety indexes in the Draw-a-Person began with Hoyt and Baron's study (1959). That study attempted to determine whether various indexes clinically employed by Buck and/or Machover to diagnose anxiety were valid using the Taylor Manifest Anxiety scale (MAS) as a criterion. They utilized a refined scoring manual which provided psychometric measurement of placement, type of line, reinforcement, shading, erasure, size of head, relative size of head to figure, omissions, and proportion (Hoyt, 1955). Their findings with female psychiatric admissions showed placement and size to be significantly related to MAS scores. None of the other characteristics significantly differentiated between the anxious and

nonanxious patients. Mogar (1962) tried unsuccessfully to replicate Hoyt and Baron's study.

Then Handler and Reyher (1964) developed a scale of anxiety indexes which is a modification of both the Hoyt (1955) and the Goldworth (1950) scales. They hypothesized that external stress applied on college students would increase manifestations of anxiety on the DAP. They also hypothesized two sources of these manifestations of anxiety: a) the laboratory stress situation, and b) anxiety producing intrapsychic processes, activated by drawing the human figure. Fifty-seven male college students drew a male, female, and automobile under stress and nonstress conditions. Both hypotheses were supported; 15 and 11 of the 21 indexes significantly differentiated between stress and nonstress conditions for the male and female drawings respectively. Five indexes differentiated in the opposite direction.

Handler and Reyher (1965) reviewed 51 studies of human figure drawings with reference to 21 anxiety indexes. They concluded that on the whole research results seemed to uphold the validity of a number of anxiety indexes. A total of 147 findings were in agreement with traditional interpretation while only 30 findings were significant in the opposite direction, and 78 findings were nonsignificant.

Handler and Reyher (1966) had 96 male college students draw a man, a woman, and an automobile while continuous galvanic skin responses (GSR's) were obtained. A significant difference was

found in the degree of anxiety for the three drawings. The automobile drawing yielded the lowest level of anxiety, and the drawing of the woman the highest level of anxiety. Adaptation differences were found for 7 of the graphic anxiety indexes. Low but significant correlations were found between 10 of the 23 possible graphic indexes and either GSR frequency or conductance.

Handler (1967) presented a scoring manual for anxiety indexes in the DAP, based in part on the work of Hoyt and of Goldworth. He described 20 indexes of anxiety, and suggested alternative scoring procedures for some indexes. The scoring was based on both a 4-point scale and a 2-point scale. Interrater reliabilities ranged from .67 to 1.00. These indexes were based primarily on what Machover (1949) called structural and formal aspects of drawings.

In reviewing research evidence relevant to the validity of structural and formal indexes (which include anxiety indexes), Swensen (1968) stated that because of the low reliabilities of these indicators (varying mostly between .30 and .50) it could be expected that they would not consistently relate significantly to other measures of personality or behavior. In his 1957 survey of the literature he found conflicting evidence cited for such characteristics as size, stance, perspective, and type of lines. He came to much the same conclusion in his 1963 review of the literature. Handler and Reyher (1965) also found conflicting results for such structural characteristics as shading, erasures, size,

placement, and line quality. Since the reliability of these indicators is lower than the reliability of global ratings, the appropriate conclusion would appear to be that these conflicting results are a function of the relative unreliability of these aspects of drawings. However, Handler and Reyher (1964) suggested an alternative explanation, i.e., the conflicting results might very well be explained by differences in the subject's characteristic mode of approach to stress situations - whether he copes with or avoids stress. They cited results from Hammer (1959), Handler (1966) and Mogar (1962) which indicate an inherent danger and fallacy in assigning but a single meaning to the presence of an index of anxiety. They also suggested that the rather puzzling conflicting findings regarding such indexes as shading and erasure may mirror differential reactions to stress. In experiments where stress is particularly strong, or when subjects or patients are under severe anxiety, a withdrawal response might be expected. With subjects whose anxiety is milder, a coping defense (and the presence of these indexes) might be expected. In addition, part of the reason for some of the nonsignificant findings reported may be the differential intersubject response to stress discussed above. Thus, if some subjects cope with anxiety by shading whereas others withdraw and therefore do not shade, the result is very likely to be a neutralizing cancellation effect, which shows up as a statistically nonsignificant finding. Hence it seems premature to dismiss structural and formal signs on the

basis of unreliability.

Another difficulty in assessing the studies using structural and formal indexes is the wide variation in scoring standards from study to study. This is largely because experimenters in this area have not published their scoring methods. Furthermore, most researchers have not even attempted to construct measures that are reasonably quantitative. Fortunately, however, Handler and Reyher (1967) have corrected for this lack of formal publishing scoring criteria by presenting a detailed scoring manual for structural and formal indexes of anxiety. Their scoring is distinctly more quantitative than previous methods. The existence of this manual as well as the mitigating factors previously cited in explanation of the seeming unreliability of structural and formal indexes seem to justify renewed effort in research on such indexes.

Accordingly, this study explored the effects of stress on 11 of the 20 formal indexes of anxiety formulated by Handler (1967). These 11 were chosen either because they evidence better construct validity, and/or because they are comparable across different types of drawings. They are as follows: distortion (D), detail loss (DL), delineation line absense (DLA), erasure (E), heavy line-light line (HL-LL), line discontinuity (LD), omission (O), placement (P), shading (S), size (SZ), and vertical imbalance (VI). Research relevant to these variables is surveyed in the following section.

Review of Specific Variables

Distortion. Distortion has been interpreted as indicating that a subject is suffering a severe emotional upheaval (Hammer, 1958). It is characterized by body parts being drawn out of proportion, parts not connected to the body, and parts drawn in inappropriate areas of the body. Handler and Reyher (1965) and Swensen (1963) found that a majority of the studies investigating this variable reported significant relationships between distortion and other behavioral measures.

Hiler and Nesvig (1965) found distorted figures significantly more frequently drawn by disturbed adolescents than by normal adolescents. Bodwin and Bruck (1960) found that adolescents with low self-concept more often drew distorted figures than adolescents with a high self-concept. Koppitz (1966a, 1966b) found that disturbed children were more likely to draw distorted figures than normal children, and that children who drew poorly integrated figures had lower achievement in the first grade. Handler and Reyher (1964) found that subjects in whom anxiety had been induced were significantly more likely to draw distorted drawings than under nonstressful conditions. Kahn and Jones (1965) found that among subjects being screened for admission to a psychiatric hospital those who drew distorted drawings were more likely to be admitted. Large et al. (1958) found that 55% of a group of institutionalized aged tended to draw distorted figures. Van and Eisen (1962) found that well-adjusted kindergarten

children could be significantly differentiated from poorly adjusted children on the basis of distortions.

However, Bielauskas and Kirkham (1958) found no difference between organic and nonorganic children in drawing distorted drawings. Hoyt and Baron (1958) found no relationship between distortion and Manifest Anxiety scale scores.

The evidence overwhelmingly indicates that distorted drawings differentiate between severely disturbed subjects and other kinds of subjects. And it lends support to the hypothesis that distortion of the drawings is an external manifestation of severe emotional disruption.

Detail Loss. Detail loss is not to be confused with omission which refers to the absence of any essential body area. Detail loss is scored for the presence or absence of any item not scored for omission (e.g., items such as pockets, buttons, fingernails, collar, or tie). It is best scored when two drawing productions from the same individual are being compared.

Handler and Reyher (1965), reviewing studies involving the detail loss index, found significant results in the expected direction (increased detail loss with increasing anxiety) for 11 out of 12 studies. For instance, Anastasi and Foley (1944) reported that drawings showing moderate detail were much more common among normals. Elkisch (1945) found maladjustment to be evidenced in children's drawings that were overly simple. Handler and Reyher (1965), in comparing drawings obtained from college

males under stress and nonstress conditions indicated that significantly more detail loss was present in the stress drawings.

Delineation Line Absence. This index refers to the absence of lines on the body which divide it into various areas (e.g., cuff lines; line indicating belt; line indicating collar). Handler and Reyher (1964) found significantly more DLA in drawings following stress conditions as compared to nonstress conditions; the difference was significant at the .05 level or better for female and auto drawings and just missed significance for the male drawings. The same authors (1965) in reviewing the literature found 4 out of 5 studies supporting delineation line as an anxiety indicator. Handler and Reyher (1966) in another experiment found significant differences between drawings of a male, female, and automobile with the automobile showing least delineation line absence and the woman the most.

Erasure. Erasures are supposed to indicate conflict and anxiety. Swensen (1957) reported nonsignificant results from erasures, but in a later review Swensen (1963) found the significant and nonsignificant studies about evenly divided. Handler and Reyher (1965) in reviewing studies of erasure found 3 in agreement with traditional clinical interpretation, 4 with opposite findings, and 7 with nonsignificant findings. They suggested that the "opposite" results may be explained by the fact that with some subject erasures could represent an adaptive, coping response. And Swensen (1963) indicated that erasures are found mostly in drawings of good quality, and are confounded with the adjustment

variable.

Bodwin and Bruck (1960) found that erasures significantly differentiated adolescents with a high self-concept from those with a low self-concept. Mogar (1962) failed to find erasures related to Manifest Anxiety scale scores in psychiatric patients. Handler and Reyher (1964) found significantly more erasures on the male and female figures drawn by male undergraduates than on the more affectively neutral drawings of an automobile. Handler and Reyher (1966) found erasure consistently negatively correlated with GSR frequency.

Heavy Line - Light Line. This index indicated the heaviness of line overall for a particular drawing. Swensen (1957) reported conflicting findings regarding line quality. In reviewing studies since 1957, Swensen (1968) concluded that findings were conflicting, although more were significant than not. Handler and Reyher (1965) also reviewed studies on line heaviness and reported conflicting findings, but with substantially more significant than insignificant results reported.

Handler and Reyher (1964) observed that under induced stress line heaviness increased. However, Goldstein and Rawn (1957) induced stress in subjects, but found that it had no effect on line pressure. Handler and Reyher (1966) found significant differences for line quality between drawings of an automobile and drawings of a person.

Line Discontinuity. This variable refers to the frequency of

broken lines used in the drawing and to the spaces left between various body parts. Handler and Reyher (1965) found line discontinuity significant in 5 out of 7 studies. Swensen (1968) found significance in 2 out of 4 studies. Bodwin and Bruck (1960) found adolescents with low self-concepts as determined by interview were more likely to draw figures with sketchy lines than subjects with high self-concepts. Exner (1962) found that neurotics and character disorders drew sketchy lines. Handler and Reyher (1964) found significantly greater line discontinuity on stress-condition as compared to nonstress-condition drawings for male figure drawings using a college male population. They obtained no significant differences between stress and nonstress conditions for the drawings of an automobile and a female.

Omission. This index is scored if there is an omission of any essential body area or when the figure is placed so that one or more essential body areas have been cut off by the edge of the paper.

Swensen (1957) did not summarize the results of omissions per se, but Handler and Reyher (1965) reported 22 out of 24 studies indicating significant results for omissions. Swensen (1968) found a majority of studies reporting significant results for omission.

Looking more closely at specific findings: Hammer (1958) found omissions related to using defenses of withdrawal and feelings of emptiness. Koppitz (1966a, 1966b, 1966c) found disturbed

children more likely to omit various items from their drawings than normal children. Handler and Reyher (1964) found male undergraduates were more likely to omit details from their drawings of the male figure when they were subjected to stress. Hiler and Nesvig (1965) found that disturbed adolescents were more likely to omit essential details from their drawings than were normals. Vane and Eisen (1962) found that poorly adjusted kindergarten children were more likely to omit essential body parts from their drawings than were well-adjusted children. Mogar (1962) found a small but positive relationship between scores on the Manifest Anxiety scale and omissions.

On the other hand, Hoyt and Baron (1958) found no significant relationship between omissions and Manifest Anxiety scale scores. McHugh (1966) found no significant differences between normal children and children with conduct disturbances in terms of omissions. Exner (1962) found no differences between normals and patients with diagnosed neuroses or character disorders on omissions and no difference between normal control subjects and subjects undergoing stress in omitting details from their drawings. Bieliauskas and Kirkham (1958) found no increase in omissions among children with organic disorders.

Placement. Placement refers to where the subject places a drawing on the paper. Machover (1949) suggested that placement high on the page indicated optimism while placement low on the page indicated pessimism. Swensen (1957) found that these hypo-

theses concerning placement were not supported. Starr and Marcuse (1959) failed to find it reliable for college students. Hammer and Kaplan (1966) studying 1300 school children did not find that the placement of figure on the page was beyond chance reliability. Handler and Reyher (1965) reported seven studies supporting the hypotheses concerning placement and eight studies either not supporting the hypotheses or producing conflicting evidence. Swensen (1968) found 9 out of 15 studies reporting significant findings.

The work of Dennis (1958) and of Dennis and Raskin (1960) may help to explain these diverse results. They found that the location of the drawing on the page is influenced by handwriting habits. Thus, although the location of the drawings on the page may be related to the personality factors, handwriting habits may obscure these factors.

Two studies suggest that a tendency to place the figure in the upper left is related to anxiety (Handler & Reyher, 1964; Hoyt & Baron, 1958). Handler and Reyher induced experimental anxiety, and confirmed the presence of anxiety with GSP measures, while Hoyt and Baron correlated the DAP with scores on the Manifest Anxiety scale. Mogar (1962) attempted to replicate the Hoyt and Baron study but was not successful, and Exner (1962) failed to find placement significantly affected in subjects in which anxiety was induced.

McHugh (1963a, 1966) reported that Negro children tended to

draw figures farther from the right margin than white children, and children with conduct disturbances tended to draw figures closer to the bottom of the page. Bradfield (1964) found that withdrawn, acting-out, and underachieving children tended to place drawings on the left side. Crippled children (Wysocki & Whitney, 1965) drew at the extremities of the page, while noninstitutionalized aged subjects drew figures closer to the center of the page.

However, Gray and Pepitone (1964) found no relationship between self-esteem and placement; Exner (1962) found no relationship between neurosis and/or character disorder and placement, Craddick (1962) found criminal psychopathy unrelated to placement, and Taylor (1960) failed to find a difference between students and patients in the placement of experimental figures on the page.

Shading. This index involves the use of light lines to accentuate a particular part of the figure drawn. It is most commonly used in drawing the hair and in delineating body contours. Shading has been supposed to be indicative of anxiety. Swensen (1957) reported nonsignificant results. Handler and Reyher (1965) reported equal numbers of studies reporting significant, nonsignificant, and conflicting results. Swensen in his later review (1968) found nonsignificant results predominating, but noted that even though shading may indicate anxiety, the fact that its presence is limited to drawings of good quality confounds it with the adjustment variable. Koppitz (1966) found that children with adjustment problems drew significantly more figures with

shading than did well-adjusted children. Wysocki and Whitney (1965) reported that crippled children shaded more than noncrippled children. Handler and Reyher (1964) found significantly more shading on the drawing of a male by college males than on the drawing of an automobile, which is supposed to be less anxiety arousing.

On the negative side, McHugh (1966) found no difference in shading between normal children and children with conduct disturbances. Hiler and Nesvig (1965) found no difference in shading between normal and disturbed adolescents. Handler and Reyher (1965) reported shading significantly negatively correlated with GSR, supposedly an anxiety indicator. They took this finding to mean that shading might reflect an adaptive and flexible response to task demands rather than anxiety. Graddick, Leipold and Cacasvas (1962) found a significant relationship between shading and anxiety as rated by judges from the drawings, but found no relationship between either shading or the judge's anxiety ratings and scores on the Manifest Anxiety scale.

Size. This dimension is self-explanatory, i.e., it is the height, and in some studies the width of the drawing. Both Machover (1949) and Hammer (1958) asserted that size is related to self-esteem and energy level with high self-esteem subjects drawing larger figures.

In reviewing the literature, Swensen (1957) and Handler and Reyher (1965) both reported conflicting results. Swensen (1968)

summarized as follows:

"... The size of the drawings does seem to reflect self-esteem and probably fantasied self-inflation, but with an inconstancy that is the reflection of the relative lack of reliability of the size of the drawings." (p.30)

Looking more closely at specific studies; Gray and Pepitone (1964) experimentally manipulated self-esteem and found that high self-esteem subjects' drawings covered significantly more area than low self-esteem subjects' drawings. Lakin (1960) reported that the noninstitutionalized aged drew larger and taller figures than the institutionalized aged.

McHugh (1963a) found that Puerto Rican children drew significantly shorter figures than white children, but Negro children did not do so. Koppitz (1966a) found that shy children drew small figures, and Lewinsohn (1964) found that depressed patients also drew small figures.

McHugh (1966) found that children suffering from conduct disturbances did draw larger figures than neurotic children from a mental health clinic. On the other hand Exner (1962) found no relationship between size and diagnosis of character disorder. Resnikoff and Nocholas (1958) found no relationship between size and carefully determined behavioral indications of paranoid pathology. Craddick (1962) found no relationship between size and criminal psychopathy, and Goldstein and Rawn (1957) found no tendency to increase the size of the drawings in subjects affected by experimentally induced aggressiveness.

A variety of other studies found size related to such things as: father being present in the boy's home (Lawton & Sechrest, 1962); presence of brain tumor (Maybry, 1964); mental age (Zuk, 1962); being a well-adjusted child (Koppitz, 1966b).

On the other hand, size has been found to not be related to: diagnostic categories of mental illness or chronicity of illness (Strumpfer, 1963; Strumpfer and Nochols, 1962); school achievement (Shry, 1966) or the seeking of a furlough from a Veterans Administration domiciliary center (Apferdorf et al., 1966).

Vertical Imbalance. This measure refers to the stance taken by the figure, that is, whether the figure is relatively vertical and appears balanced or not. According to Machover (1949), the vertical imbalance indicated perceived instability, with insecure subjects drawing figures that are falling down or floating.

The earlier review by Swensen (1957) found the results of research on stance to be inconclusive. However, Swensen's later review (1968) showed that research performed in the past 10 years had produced more significant than nonsignificant results; this provides support for stance being related to insecurity.

Regarding Machover's hypotheses, Kahn and Jones (1965) found vertical imbalance sufficiently related to judged severity of illness that it could predict admission to a mental hospital. Koppitz (1966a, 1966b) found that imbalance differentiated between normal children and children with behavior problems and that it was significantly related to school achievement. Handler and Reyher

(1966) found vertical imbalance significantly affected by induced anxiety.

The two studies yielding negative results had children as subjects: Bieliauskas and Kirkham (1958) failed to differentiate between normal and disturbed children on the basis of vertical imbalance. And Hiler and Nesvig (1965) failed to distinguish between normal and disturbed adolescents on the basis of imbalance.

Summarizing research studies on the 11 indexes, omission, distortion, detail loss, and to a somewhat lesser extent size increase and decrease, and line discontinuity have consistently yielded significant results in the expected direction (increased omission, distortion, etc., indicated anxiety). The evidence is somewhat less consistent for light line, vertical imbalance and delineation line absence. With regard to shading, erasure, and placement, the evidence is conflicting.

Methodological Considerations

Thus far, in this survey, studies relevant to the reliability and validity of anxiety indexes have been considered. However, methodological developments in DAP research have yet to be reviewed. An important aspect of methodology in assessing anxiety in the DAP is the use of an actual stress situation.

Only a few studies have employed some type of actual stress situation, either natural or laboratory-induced. Cassel et al. (1958) assumed that the examiner had an inhibiting effect upon

the subject, so they had the examiner leave the room while the subject drew. They found more deviant signs were present in drawings obtained while the examiner was absent. Handler and Reyher (1964) found a significant increase in number of indicators of anxiety when the subjects were placed in a stressful situation. Goldstein and Rawn (1957) found an increase in signs of aggression when their subjects, state hospital attendants, were told that they would have to work longer hours without an increase in pay. Exner (1962) found that a group of normals in which fear was induced by puncturing their fingers for a blood sample produced as much shading in their drawings as a group of neurotics. These studies suggest that the induction of anxiety or fear appears to produce a significant change in the figure a subject draws.

Reyher (1959) hypothesized that anxiety indexes in drawings were due to two sources of stress, one being intrapsychic conflict the other being externally induced. However, he noted that it is difficult to determine which source is primarily operative. Reyher proposed that an automobile drawing might be used as a control or base line from which to evaluate the relative contributions of psychodynamic factors and external factors. He hypothesized that the drawing of an automobile is a relatively neutral task of approximately equal difficulty (to DAP) and is therefore less subject to projection than a human figure drawing. Confirmation of this idea was provided by Handler and Reyher

(1964) who found no significant difference in task difficulty based on college males drawings of an automobile and a male. They then determined that under external stress conditions the automobile drawing showed far less anxiety indexes than did either male or female drawings. Handler and Reyher (1966) cited additional support for their hypothesis in that GSR frequency while the subject drew the human figure was significantly greater than for the automobile; they also found significant differences between the three types of drawings on the summed anxiety indicators.

Lair and Trapp (1960) hypothesized that maladjusted subjects would deteriorate more in their drawing of a person compared with their drawing of the house on the House-Tree-Person (H-T-P) than would normal subjects. They found that subjects did produce person drawings that were inferior to their house drawings but found no significant differences between adjusted and maladjusted subjects.

The above studies represent a promising development in attempts to determine the sources of stress. However, the problem consisted with inducing stress require consideration. Levitt (1967) reported that the immediate problem in artificially inducing anxiety is to find a technique that has a reasonable probability of stressing the subject appropriately. He indicated that the two most commonly used methods involve either pain or failure, or threat of pain or failure. While noting that artificial methods of inducing anxiety fail to produce reactions of the

scope and intensity found in naturally occurring situations, he stated that an effect equal to natural stress is not required. All that is needed is to provoke anxiety sufficient to measurably affect his criterion measure. Handler and Reyher (1965) point out yet another difficulty, namely, that it is difficult to find a stress situation which will activate intrapsychic stress to a greater degree than external stress.

Heath (1960) presented the Phrase Association Test (PT) as a promising objective research tool for the measurement of defensive activity in different anxiety arousing areas and for the identification of consistent behavioral indexes which may tentatively be classified into defense types. The PT presents the subject with a series of phrases dealing with a variety of conflictual material covering the areas of aggression, sexuality, dependency, and competition. As these areas suggest, the PT's rationale is derived from psychoanalytic theory of anxiety, and intrapsychic conflict. Heath utilized the Phrase Association Test to induce conflict in order to measure the effect of anxiety on intellectual performance. Mandler et al. (1961) in studying the response to threat utilized the PT to arouse emotional disturbance. They found physiological indexes of emotionality to be significantly related to PT scores. It is possible that the Phrase Association Test could serve as a situation that would activate intrapsychic stress to a greater degree than external stress.

The purpose of this study was to extend the research of Handler and Reyher in order to investigate some of the possibilities

suggested above. It provided both an external stress condition (utilizing a mental arithmetic task) and an internal stress condition (using the Phrase Association Test). It explored the utility of Handler's scoring manual in measuring externally and intrapsychically induced anxiety in the drawings of children.

The hypotheses tested are as follows: (1) the external stress condition increases manifestations of anxiety both in male figure drawings and in automobile drawings; (2) the intrapsychic stress condition increases manifestations of anxiety both in male figure drawings and in automobile drawings; (3) under the external stress condition the automobile drawings show more evidence of anxiety than the figure drawings; (4) under the intrapsychic stress condition the male figure drawings show more evidence of anxiety than the automobile drawings.

Method

Subjects

The subjects for this study were 60 fifth and sixth grade boys from a parochial school in Chicago; all the boys in those grades were included in the study. They were from a middle socio-economic class. These subjects were randomly assigned to three groups. Group A received the external stress condition. Group B received the intrapsychic stress condition. Group C received the control condition. In order to control for history effects the different conditions were administered on a rotating basis.

Measures

All drawings (both of an automobile and of a person) were first coded and then scored for the following 11 anxiety indexes: distortion (D), detail loss (DL), delineation line absence (DLA), erasure (E), heavy line-light line (HL-LL), line discontinuity (LD), omission (O), placement (P), shading (S), size (SZ), and vertical imbalance (VI). The scoring was done according to the scoring manual published by Handler (1967). This manual was designed so that the indexes may be scored either 0, 1, 2, and 3. A score of 0 indicates no anxiety while a score of 3 indicates maximal anxiety. This writer scored all the drawings, but only after they had been coded by an assistant who was unaware of the hypotheses of the study. As an interrater reliability check, a fourth year graduate student in clinical psychology unfamiliar with the study, rated one-third of the drawings. Pearson correlations

with corrections were computed and are shown in Table 1. While these reliability coefficients were not quite high as those reported by Handler (1967), they are adequate, and suggest that the scoring in this study was objective.

Table 1

Anxiety Index Interrater Reliability Coefficients

Anxiety Index	Pearson <u>r</u>
Distortion (D)	.53
Detail Loss (DL)	.63
Delineation Line Absence (DLA)	.74
Erasure (E)	.83
Heavy Line-Light Line (HL-LL)	.58
Line Discontinuity (LD)	.51
Omission (O)	.85
Placement (P)	.86
Shading (S)	.82
Size (SZ)	.89
Vertical Imbalance (VI)	.88

Procedure

Each subject was treated individually. Each received, in the following order: the pretest (human figure and auto drawing), the assigned experimental or control treatment, and the posttest (human figure and auto drawing). Each subject received all of the appropriate treatments in one session which lasted for about 20 minutes. This was followed by questions about his experience of the experimental situation, at which point the experimenter dealt with signs of excessive anxiety.

Both the pretest and the posttest were administered in the manner described by Handler and Reyher (1966), without, however, their experimental conditions. Half of the subjects of each group were asked to draw first an auto and then a human figure; the other half were asked to draw first a human figure and then an auto. This was to control for possible order effects.

The external stress condition, administered to Group A involved five minutes of a mental arithmetic task utilizing the addition and subtraction problems listed by Forney and Hughes (1961). To increase the stress, a loud buzzer was sounded whenever the subject missed a problem. It was also sounded at arbitrarily set intervals to indicate to the subject that he was going "too slow".

The intrapsychic stress condition, administered to Group B, consisted of the Phrase Association Test (PT). The test items and the procedure described by Mandler, Mandler, Kremen and Sholiton (1961) in their Study II were utilized. However, in the

present study, the phrases were shown on 18" x 24" cards rather than on slides and the speed of presentation of phrases was according to each subject's rate. Furthermore, each subject was instructed to "place yourself in the situations" suggested by the phrases. The average time for presenting the PT was 5 minutes. To increase ego-involvement the subjects responses were taped. (This same procedure, except for the "place yourself in the situation" instructions, were administered to Groups A and C, but only following their posttest and question periods. These latter administrations of the PT were part of a pilot study rather than the thesis study proper.)

The control condition consisted of 5 minutes of silent, non-directed reading of some bland, nature-lore booklets while the experimenter "busied himself" with sorting the PT cards.

The over-all design of this experiment is summarized in Table 2.

Table 2
Experimental Design

<u>Group</u>	<u>Pre-Test</u>	<u>External</u> <u>Stress</u>	<u>Internal</u> <u>Stress</u>	<u>Control</u> <u>Cond.</u>	<u>Post-Test</u>	<u>Question</u>	<u>Pilot</u> <u>Test</u>
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	(Person & Auto)				(Person & Auto)		(PT)
A	"	X(Mental Arith.)			"	"	"
B	"		X(PT)		"	"	
C	"			(Neutral Reading)	"	"	"

Results

The first two hypotheses predicted that both external stress and intrapsychic stress treatments would increase manifestations of anxiety on projective drawings. For hypotheses 1 and 2 analysis of covariance for a single-factor experiment (Winer, 1962) was used to investigate the differences between the three groups on the posttest for each of the 11 anxiety indexes. These analyses were done separately for the automobile drawings and for the person drawings.

Table 3 gives the means, standard deviations, and F ratios for the automobile drawings. It is apparent that the first two hypotheses were virtually not supported by the data. Of the 11 indexes only placement (P) showed a significant difference among conditions, with a sharp drop in mean score under the external stress treatment. While this seems to reflect a decrease in anxiety, the discussion section suggests that it actually indicates increased anxiety.

Table 4 gives the means, standard deviations, and F ratios for the male figure drawings. None of these indexes were significant; so this data failed to support the first two hypotheses. However, omission (O) showed a marked though not significant increase under external stress.

Although the data yielded minimal support for these two hypotheses, the significant difference on placement (P) and the marked trend on omission (O) both occurred in response to the

Table 3

Automobile Drawings: Means, Standard Deviations, and F ratios
(N=20 per condition)

	Control Condition				External Condition				Internal Condition				<u>F</u>	<u>p</u>
	Pre		Post		Pre		Post		Pre		Post			
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
D	1.90	.94	2.25	.77	1.65	.73	2.15	.79	1.40	.97	1.90	.94	0.00	>.25
DL	.65	.91	.65	1.06	.40	.86	.30	.71	.45	1.07	.85	1.02	2.10	<.25
DLA	1.35	1.06	1.45	.74	1.35	1.06	1.35	1.06	.90	.89	.80	.93	1.86	<.25
E	.65	1.01	.55	1.07	.50	.86	.20	.50	.50	.87	.35	.65	0.85	>.25
HL-LL	1.25	.83	1.20	.93	.80	.60	.90	.83	1.55	.92	1.40	.86	0.01	>.25
LD	.10	.44	.10	.30	.40	.92	.15	.48	.35	.79	.20	.68	0.00	>.25
O	.60	.80	.65	.79	.45	.67	.60	.73	.35	.57	.35	.57	0.57	>.25
P	1.05	.59	1.30	.71	1.30	.84	.90	.62	1.00	.55	1.15	.65	4.06	<.05
S	.35	.73	.35	.73	.50	.74	.70	1.05	.80	.98	.75	.99	0.55	>.25
SZ	2.40	.66	2.45	.92	2.45	.87	2.00	1.05	2.05	1.02	2.30	.78	1.14	>.25
VI	.50	.59	.35	.48	.65	.73	.60	.66	.65	.57	.35	.48	1.34	>.25

df = 56,2

Table 4

Male Figure Drawings: Means, Standard Deviations, and F Ratios
(N=20 per condition)

	Control Condition				External Condition				Internal Condition				<u>F</u>	<u>p</u>
	Pre		Post		Pre		Post		Pre		Post			
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
D	1.90	.77	2.05	.66	2.10	.77	2.20	.75	1.70	1.05	2.00	.89	0.20	>.25
DL	.20	.40	.35	.79	.35	.66	.05	.16	.55	.87	.10	.44	1.43	>.25
DLA	1.00	.89	1.05	.87	1.6	1.26	1.50	1.25	1.00	1.14	1.10	1.14	0.06	>.25
E	.90	.99	.35	.96	.75	.94	.40	.75	.90	.99	.55	.81	1.32	>.25
HL-LL	1.00	.77	1.00	.71	.65	.48	.70	.84	1.15	.96	1.10	.89	1.06	>.25
LD	.35	.85	.35	.67	.75	1.13	.55	1.02	.40	.80	.40	.66	0.55	>.25
O	1.95	.74	1.50	.91	1.65	1.05	1.85	1.06	1.55	1.07	1.40	1.07	2.82	<.10
P	1.60	1.12	1.35	.91	1.45	1.12	1.25	.94	1.40	.97	1.40	1.18	0.11	>.25
S	.25	.77	.55	.98	.45	.92	.60	.92	.85	1.11	.70	1.01	0.33	>.25
SZ	2.25	1.16	2.15	.35	2.30	1.05	2.55	.81	2.45	.97	2.05	1.02	0.00	>.25
VI	.85	.66	1.20	1.17	.90	.70	1.20	.75	.75	.77	1.20	.93	0.03	>.25

df= 56,2

external stress condition. This suggests that the first hypothesis which predicted increase in anxiety manifestations under external stress received stronger support than did the second hypothesis which proposed intrapsychic stress effects.

The third hypotheses predicted that under external stress the automobile drawings would show more evidence of anxiety than the person drawings would. The fourth hypotheses predicted that under intrapsychic stress the person drawing would show more evidence of anxiety than the automobile drawings would. Using pretest scores as the covariate, an analysis of covariance for a 3 x 2 factorial experiment with repeated measures on the type of drawing (Winer, 1962) was utilized to investigate hypotheses 3 and 4. This statistic yielded three F ratios, one for treatment effects, one for type of drawing effects, and one for interaction of treatments X drawings. Such an analysis was calculated for the 6 anxiety indexes that were considered comparable across types of drawings. Table 5 represents the results of these analyses.

These results showed definite support for the third and fourth hypotheses, inasmuch as they indicated the operation of complex treatment effects differentiating scores on types of drawings. However, the results did not consistently follow the predicted direction of the differences.

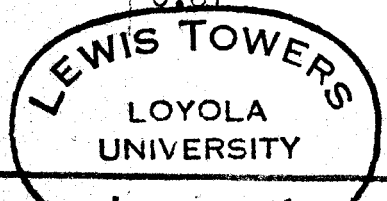
Distortion (D) showed no main effect for treatments and no main effect for type of drawing. The interaction between treatments and drawings was almost significant. Figure 1 shows the

Table 5

Covariance Analysis for Anxiety Indexes
 Comparable across Types of Drawing

Source	df	MS	<u>D</u>		MS	<u>DL</u>		<u>HL-LL</u>		
			F	p		F	p	MS	F	p
<u>Between Subjects</u>										
Treatments	2	0.15	0.28	>.25	1.50	3.02	<.10	0.03	0.03	>.25
Subjects w. Trtmt.	56	0.53			0.49			0.89		
<u>Within Subjects</u>										
Drawings Treatment X	1	0.47	1.33	<.25	6.92	9.39	<.01	0.09	0.41	>.25
Drawings	2	0.95	2.73	<.10	0.47	0.63	>.25	0.17	0.67	>.25
Residual	56	0.34			0.74			0.22		

Source	df	MS	<u>P</u>		MS	<u>SZ</u>		<u>VI</u>		
			F	p		F	p	MS	F	p
<u>Between Subjects</u>										
Treatments	2	0.75	0.78	>.25	0.01	0.01	>.25	0.01	0.06	>.25
Subjects w. Trtmt.	56	0.96			0.58			0.18		
<u>Within Subjects</u>										
Drawings Treatment X	1	0.00	0.00	>.25	0.01	0.01	>.15	0.00	0.60	<.01
Drawings	2	1.00	9.47	<.01	2.51	2.44	=.10	0.55	0.63	>.25
Residual	56	0.11			1.03			0.87		



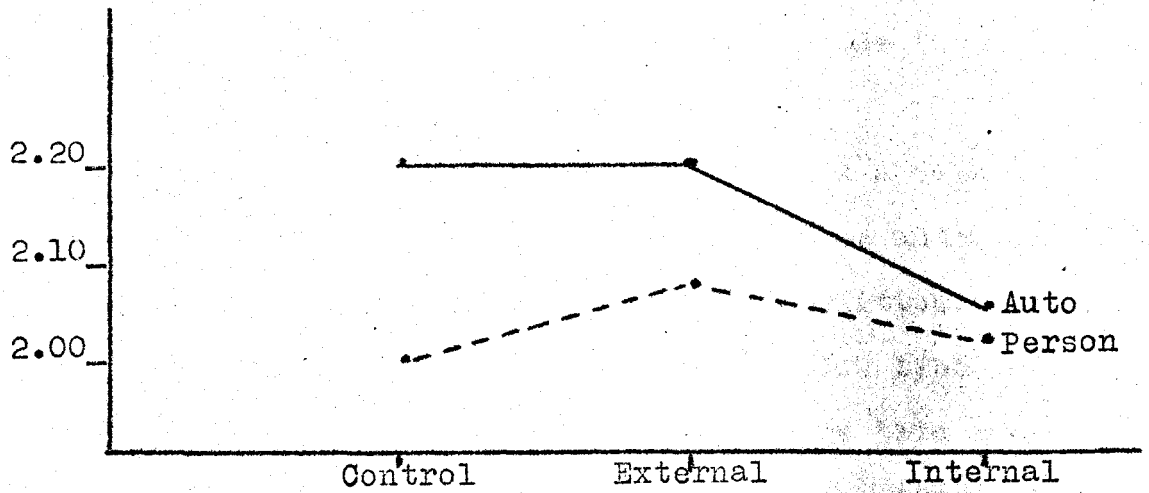


Fig. 1. Plot of Adjusted Means for Distortion (D)

adjusted means for distortion (D), plotting means for each type of drawing by condition. The automobile was consistently although not significantly higher than the person. The anxiety manifestations held steady under the external treatment for the automobile drawing whereas they tended to rise under the same treatment for the person drawing.

Detail loss (DL) approached significance for a main effect for treatments, the primary trend being a drop in the automobile drawing anxiety measure for the external stress condition. Detail loss (DL) was significantly different for the two types of drawings, with the automobile consistently higher on this index. The interaction was not significant. Figure 2 represents these relationships graphically.

Heavy line - light line (HL-LL) showed no significance for either the treatment factor or the drawing factor. The interaction, too, was not significant. Figure 3 shows the relationships for this index. The automobile drawing seemed to be consistently higher than the person drawing, and both drawings tended to drop under the external treatment.

Placement (P) showed a significant interaction effect, but no main effect for either of the two factors, treatments and drawings. A plot of adjusted means, Figure 4, indicated the interaction was disordinal, with the automobile drawing higher than the person drawing on the control condition, and lower than the person drawing on the external condition.

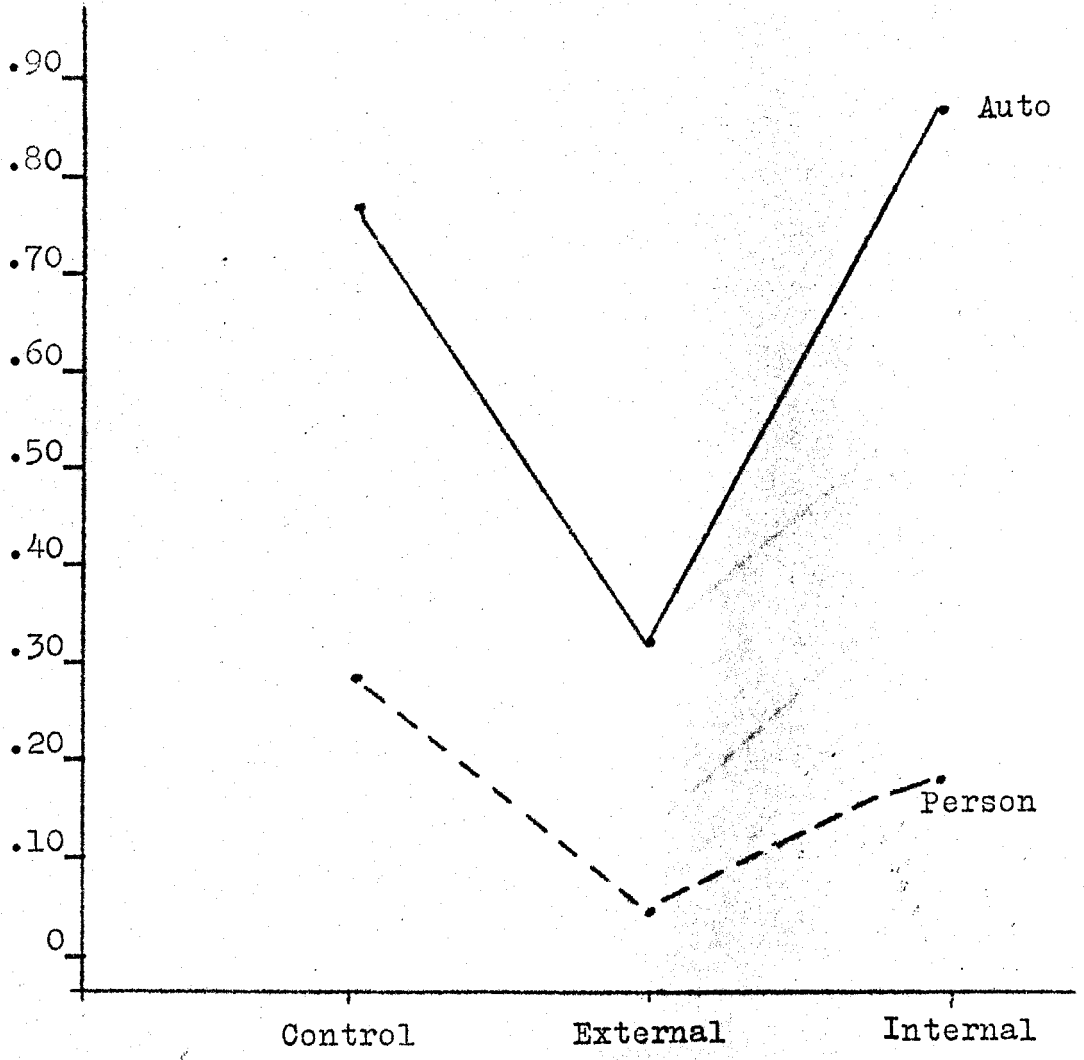


Fig. 2. Plot of Adjusted Means for Detail Loss (DL)

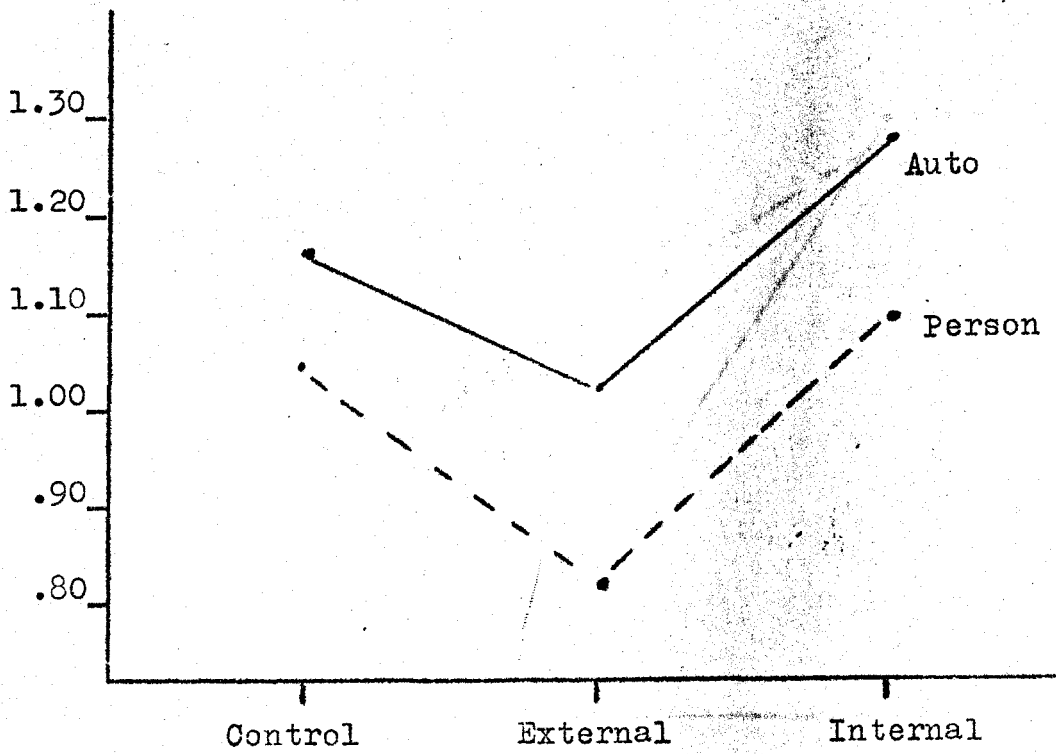


Fig. 3. Plot of Adjusted Means for Heavy Line-Light Line (HL-LL)

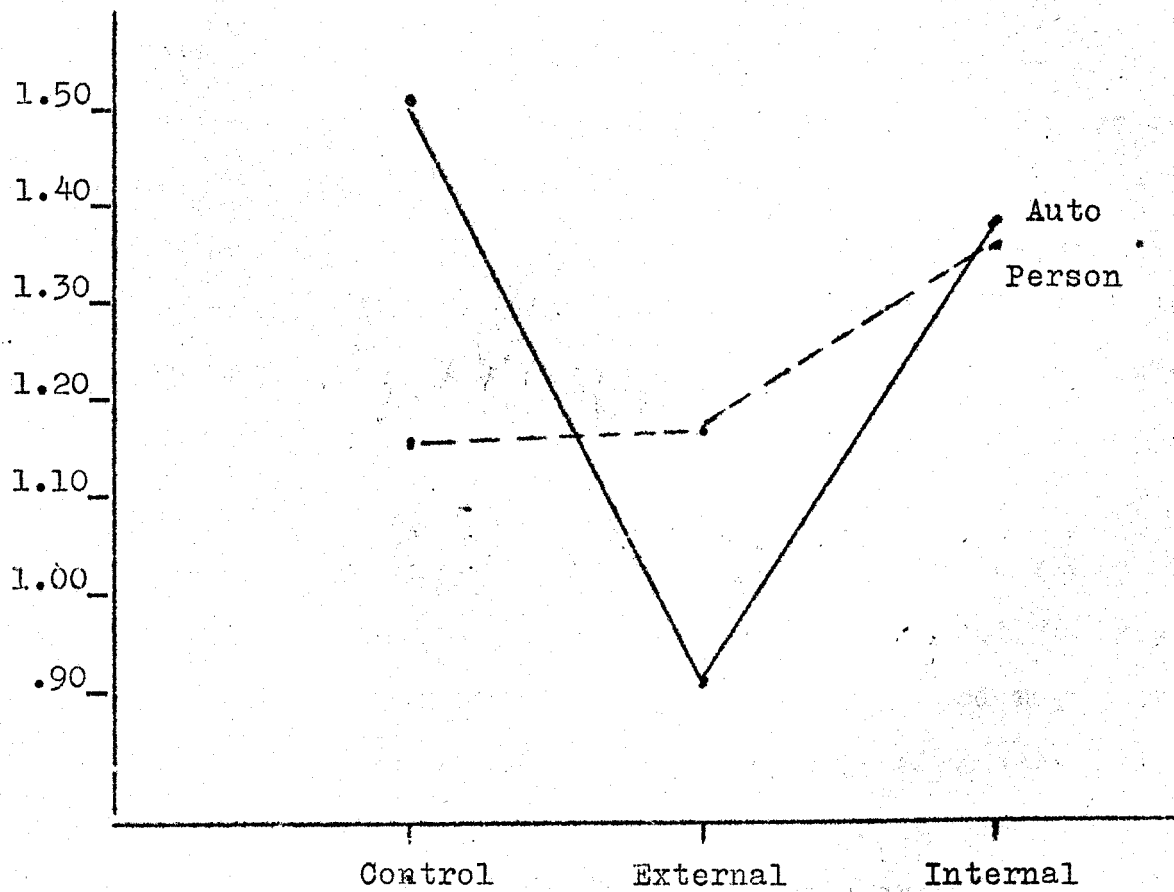


Fig. 4. Plot of Adjusted Means for Placement (P)

Size (SZ) had no significant outcomes although the interaction effect approached significance. Figure 5 gives a plot of this index. There was a marked trend in the person drawing toward increased anxiety manifestations in response to external stress and in the automobile drawing toward lessened anxiety under the same condition.

Vertical imbalance (VI) showed a significant main effect for type of drawing; the other F ratios were not significant. The plot of adjusted means, Figure 6, show the person drawing was consistently more imbalanced than the automobile drawing.

Summarizing the results for these indexes which are comparable across drawings, first most of the treatment effects and the interaction effects occurred under the external treatment. Thus, it appears that only the external treatment was influential, even though the direction of its effects were inconsistent. This outcome suggests that the first hypothesis be rephrased to read: External stress affects anxiety manifestations on projective drawings. Second, the automobile drawings generally showed more anxiety manifestations than the person drawings. Following the prediction of the third hypothesis this could be taken to mean that the primary stress operative in this experiment was external stress. Third, the interaction effects were specific to indexes. The fact that there were interaction effects supports the portion of hypotheses 3 and 4 which predicted differential effects of stress condition on type of drawing, but the specificity of these effects did not support the general prediction of the directions of the difference between drawing types.

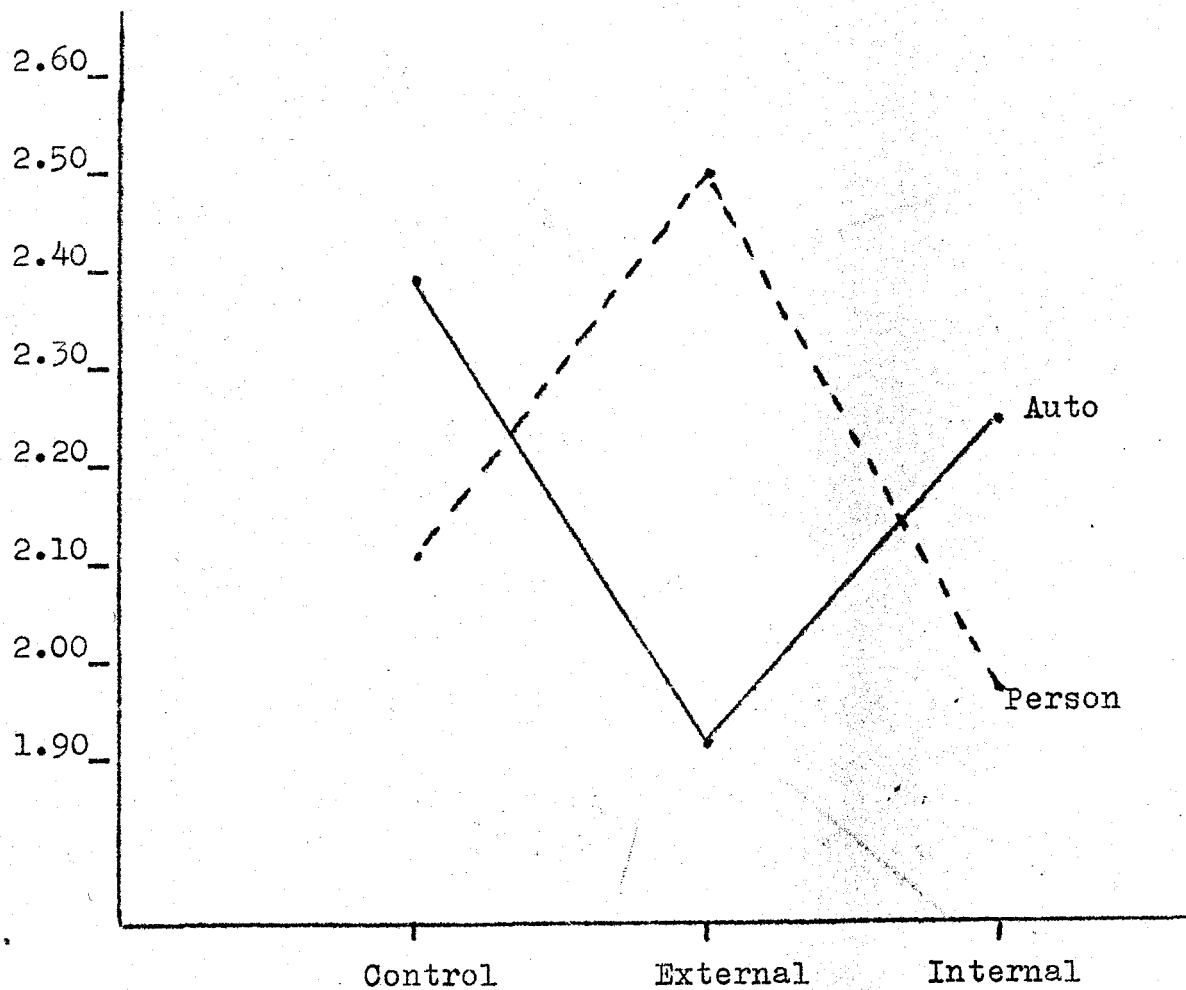


Fig. 5. Plot of Adjusted Means for Size (SZ)

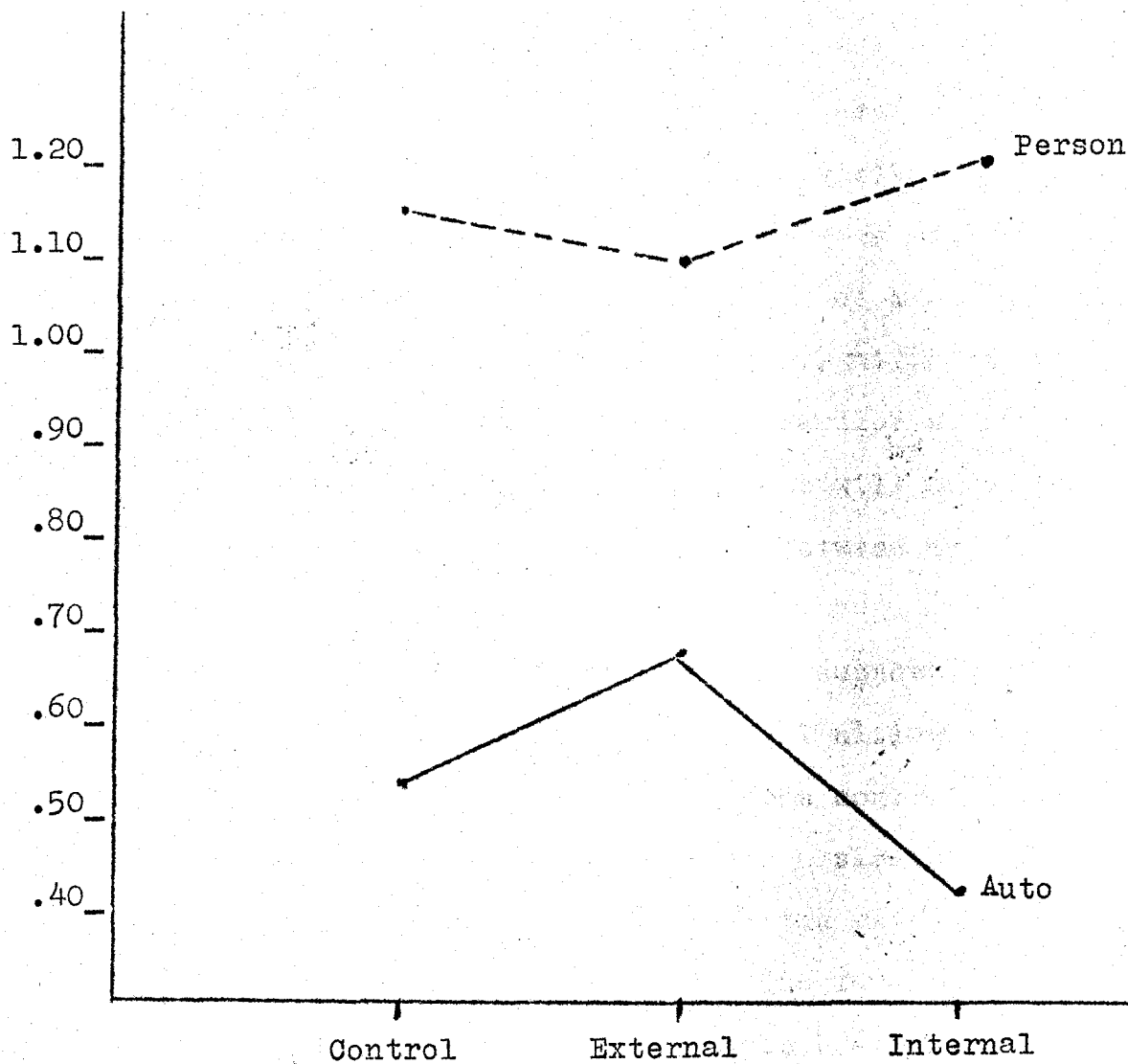


Fig. 6. Plot of Adjusted Means for Vertical Imbalance (VI)

Discussion

In this section the results relevant to the first two hypotheses will be discussed first. These hypotheses predicted that both external stress and intrapsychic stress treatments would increase manifestations of anxiety on projective drawings. Some speculations about the operation of unforeseen variables will then be advanced. Next the third and fourth hypotheses regarding differential effects of stress conditions on type of drawing will be explored in the light of the relatively more significant results obtained concerning them. Comparisons with Handler and Reyher's findings will be made. Finally, some comments will be offered about the specific and complex interactions between indexes, drawing type, conditions, and personal styles.

The first two hypotheses were clearly not supported by the data. Virtually none of the indexes showed significant increase for either of the experimental groups over the control group. Of the eleven indexes only placement (P) showed a significant difference among conditions, and then only for the person drawing. These exceptions will be discussed later. The failure to find general support for these hypotheses may have been due to the operation of several unforeseen variables. First, the anxiety indexes as scored for this study have never before been used with children. Consequently, one can speculate that age-appropriate manifestations of immaturity in these children's drawings might

be indistinguishable from what are scored as anxiety manifestations in adult drawings. Koppitz (1968) reported a strong maturation trend differentiating the drawings of children of age 12 years from those 5 years old. Unfortunately, little data are available which compare the drawings of 12-year-olds with those of adults. However, if immaturity has indeed operated as a confound with anxiety in this study, then the anxiety indexes may not have been sufficiently sensitive to differentiate between the control and treatment groups.

A second confounding variable may have been "experiment anxiety," i.e., anxiety due simply to participation in the study. Such anxiety may have occurred equally across control and experimental conditions and with sufficient intensity to have masked the effects of the formal stress conditions. A question can also be raised as to whether or not the stress techniques used were potent enough to arouse anxiety to the level required for manifestation on projective drawings. Postexperimental questioning indicated that the subjects considered both the external and the intrapsychic treatments to be stressful. Typical responses to questioning about the external treatment were: "I felt I did lousy"; "At first I was shocked when the buzzer went off"; "Felt kinda nervous." Representative responses to questions regarding the intrapsychic condition were: "I was a little nervous" (looked quite embarrassed); "Felt sorta strange..."; "Wasn't what I expected (nervous laugh)--learned a lot toward beating people up."

There were also a number of behavioral manifestations of anxiety during both stress conditions including voice tremors, knee jiggling, and tenseness. The foregoing qualitative data suggest that the stress conditions were sufficient to arouse anxiety manifestations on the drawings. This is in contrast to the qualitative response to the non-stress control condition. For this neutral conditions the subjects' characteristic responses to postexperimental questioning were: "The book on stars was interesting..."; "Not too excited or anything"; "I don't know." There were no significant behavioral manifestations during the neutral reading. Thus the control condition seemed to be qualitatively less stressful than the experimental conditions. Nonetheless, the pretest means shown in Tables 3 and 4 indicate that the non-stress control group subjects were anxious at the start, as were subjects from the other groups.

Summarizing the preceding observations: (a) the experimental treatments seemed to be quite anxiety-producing while the non-stress, control condition seemed to be fairly neutral; therefore, it appears reasonable to expect differences among experimental and control groups on the posttest anxiety indexes. Yet, (b) there were virtually no significant differences among the experimental and control groups on the posttest measures while all groups showed fairly high anxiety on the pretest. This line of reasoning points to the operation of an unexpected variable or variables which masked the effects of the experimental treatments.

Immaturity and/or "experiment anxiety", then, may have been a source of major and unforeseen variation in this study.

Returning to the specific findings on placement (P), which showed a significant reduction in score (i.e., lower anxiety) under the external condition for the automobile drawing. Such a drop was contrary to the prediction. Consideration of the scoring for this index may clarify the unexpected result. The highest scores for anxiety are obtained when the drawing is placed in the upper left hand corner of the page; the lowest scores for anxiety are obtained when the figure is centered on the page. Dennis (1958) presented an explanation that is more consistent with the results obtained in this study. He suggested that handwriting habits lead to common placement of drawings in the upper left-hand corner, and that it is only when anxiety interferes with this habit that the drawings drop to the center or lower. This is precisely what seems to have happened in the present study. The score for omission (O) showed a marked, though not significant trend toward increased anxiety under the external condition for the person drawing. This was in the direction predicted by the first hypothesis.

The third hypothesis predicted that under external stress the automobile drawing would show more evidence of anxiety than would the person drawings. The fourth hypothesis predicted that under the intrapsychic stress condition the person drawings would show more evidence of anxiety than would the automobile drawings. The experimental results provided more support for these hypo-

theses, particularly for the operation of complex treatment effects differentiating score on the automobile drawings from scores on the person drawings. However, the results did not consistently follow the predicted direction of the differences.

The statistical results that are relevant to the third and fourth hypotheses are shown in Table 5. Some of these statistics indicated a main effect for type of drawing; others indicated an interaction effect of treatments by drawings. Both detail loss (DL) and vertical imbalance (VI) showed significant differences for type of drawing averaged across conditions. The automobile drawing was consistently higher than the person drawing on the detail loss (DL) index which suggests that the primary source of stress was external. In contrast the person drawing was significantly higher than the automobile drawing on vertical imbalance (VI) which leads to an opposite conclusion: that the primary stress source was internal. A parsimonious explanation of this incongruity is that the broad-based automobile drawing does not lend itself as readily as the vertical person drawing to imbalance. Stated differently, one could hypothesize that in a comparison between drawings of a person "lying down" and drawings of a person "standing up," one would find significantly less imbalance in the reclining person even under neutral conditions. Findings for the other variables lend more support to the detail loss data which suggested that the source of stress in this study was external and also to the conjecture that the finding of greater vertical imbalance for the person drawing was a scoring artifact.

The statistical results relevant to the differential effects predicted by hypotheses 3 and 4 indicated a significant interaction between treatments and type of drawing. Placement (P) showed such a significant interaction effect while distortion (D) and size (SZ) showed marked, but not quite significant, interaction effects.

For placement (P) the interaction consisted of the markedly greater drop in the automobile score under the external condition compared with the person drawing. The reader may recall that interpretation of this finding based on a habit interference model suggests that the drop in score is indicative of greater anxiety. Following the same line of reasoning, it is apparent that the person drawing showed less anxiety on this index. This interaction provides direct support for the prediction of hypothesis 3 that under the external treatment the automobile drawing would show greater anxiety manifestation than the person drawing. At the same time, the person drawing under the control condition showed more anxiety than the automobile drawing. This finding may be interpreted to mean that in a neutral situation the only possible source is intrapsychic and this kind of anxiety is tapped by the task of drawing a person and not by drawing an automobile.

On the distortion (D) measure, the automobile yielded quite consistently higher anxiety scores across conditions although this was not statistically significant. The more marked interaction effect for distortion (yet still not significant) involved

a tendency for anxiety scores on the automobile drawing to drop in response to treatment conditions while scores on the person rose. These trends are confusing in view of the hypotheses, but they may be a function of the fact that the mean distortion score for each of the drawings in each of the conditions was above 2 on a 0 to 3 point scale. It is likely that the "experiment anxiety" confound mentioned earlier was quite strongly operative on distortion (D), especially in view of the fact that the mean scores for the automobile drawing which was consistently higher on this index a regression to the mean took place. Size (SZ) approached significance for the interaction, with anxiety manifestations rising sharply for the person drawing under the external condition while dropping for the automobile drawing. This is contrary to what was predicted by the hypotheses. Still both drawings had high anxiety scores. Handler and Reyher (1964) interpreted high anxiety scores on both the automobile and person drawings by the same subject as indicating an external source of stress.

Heavy line-light line (HL-LL) showed no main effects for conditions or type of drawing and no significant interaction. Handler and Reyher (1966) suggested that heavy line reflects external stress and that light line represents internal stress. If indeed different sources of stress are indicated by heavy line and light line, then combining them in a single index might lead to each cancelling the others effect. This seems to have been what happened in the present study.

Summarizing the results for those indexes which are compara-

ble across drawings: (a) most of the treatment effects and the interaction effects seemed to be due to the external stress condition; (b) the automobile drawing consistently showed more anxiety manifestations than the person drawing; (c) the interaction effects were specific to indexes.

In comparing the results of this study with those obtained by Handler and Reyher (1964), it is clear that the significant main effect of treatments that they reported with college subjects were not obtained with the present child subjects. Besides the difference in age between these two groups of subjects there were three important differences in methodology: 1) Handler and Reyher used the subjects as their own control rather than employing a separate control group; 2) they obtained the nonstress condition drawings in a group administration; and 3) they stressed their subjects for a longer period before they started the stress condition drawings and they continued stressing them while they were actually drawing. The question arises as to how comparable their two drawing conditions were on variables other than stress. The possibility of the operation of significant experimenter effects during the stress condition seemed great, especially as the experimenter occasionally glanced over the subject's shoulder. Regarding the significant differences between types of drawing, however, the present study seemed to be in more agreement with the Handler and Reyher study. The same may be said of interaction effects, except that the direction of the interactions were not as con-

sistent for the present study.

In retrospect it seems that some of the indexes may simply be poor measures of anxiety, and should be reexamined in terms of more intensive study involving the specific operations which enter into the more promising indexes. It appears clear that no one-to-one relationship exists between any single index and the presence of anxiety in a personality. Anxiety can be expressed in different drawings in different ways by different children or by one child in different situations.

Summary

This investigation explored differential response to external stress and to intrapsychic stress treatments as measured by anxiety indexes on automobile drawings and person drawings. The study was based primarily on the empirical investigations of Handler and Reyher (1964).

Sixty fifth and sixth grade boys were randomly assigned to three groups. Group A received an external stress treatment. Group B received an intrapsychic stress treatment. Group C received a non-stress control treatment. Pretest and posttest drawings of both an automobile and a person were obtained from each subject and scored for 11 anxiety indexes.

The results showed no main effect for treatments, some main effect for type of drawing, and some interaction effects between treatments and type of drawing which were specific to each anxiety index.

The possibility of the operation of confounding variables was discussed. Observations were made about the specific and complex interactions between indexes, drawing type, experimental conditions and personal styles.

References

- Anastasi, Anne & Foley, J. An experimental study of the drawing behavior of adult psychotics in comparison with that of a normal control group. Journal of Experimental Psychology, 1944, 34, 169-194.
- Apfeldorf, M., Randolph, J. J. & Whitman, G. Figure drawing correlates of furlough utilization in an aged institutionalized population. Journal of Projective Techniques, 1966, 30, 467-470.
- Bieliauskas, V. J. & Kirkham, S. An evaluation of the "organic signs" in the H-T-P drawings. Journal of Clinical Psychology, 1958, 14, 50-54.
- Bodwin, R. R., & Bruck, M. The adaptation and validation of the Draw-A-Person test as a measure of self concept. Journal of Clinical Psychology, 1960, 16, 427-429.
- Bradfield, R. H. The predictive validity of children's drawings. California Journal of Educational Research, 1964, 15, 166-174.
- Buck, J. The HTP technique: A qualitative and quantitative scoring manual. Journal of Clinical Psychology, 1948, 4, 317-396.
- Cassel, R. H., Johnson, A., & Burns, W. H. Examiner, ego defense, and the H-T-P Test. Journal of Clinical Psychology, 1958, 14, 157-160.
- Craddick, R. A. Draw-A-Person characteristics of psychopathic prisoners and college students. Perceptual and Motor Skills, 1962, 15, 11-13.
- Dennis, W. Handwriting conventions as determinants of human figure drawing. Journal of Consulting Psychology, 1958, 22, 293-295.
- Dennis, W., & Raskin, E. Further evidence concerning the effect of handwriting habits upon the location of drawings. Journal of Consulting Psychology, 1960, 24, 548-549.
- Elkish, Paula. Children's drawings in a projective technique. Psychological Monographs, 1945, 58, (Whole No.266).
- Exner, J.E. A comparison of the human figure drawings of psychoneurotics, character disturbances, normals and subjects experiencing experimentally induced fear. Journal of Projective Techniques, 1962, 26, 392-397.

- Forney, R.B., & Hughes, F. Delayed auditory effects under an ethanol condition. Journal of Psychology, 1961, 52, 185-192.
- Goldstein, A.P., & Rawn, E. L. The validity of interpretive signs of aggression in the drawing of the human figure. Journal of Clinical Psychology, 1957, 13, 169-171.
- Goldworth, S.A. comparative study of the drawings of a man and a woman done by normal neurotic, schizophrenic and brain-damaged individuals. Unpublished doctoral dissertation, University of Pittsburgh, 1950.
- Gray, D. M., & Pepitone, A. Effect of self-esteem on drawings of the human figure. Journal of Consulting Psychology. 1964, 28, 452-455.
- Hammer, E. F. The clinical application of projective drawings. Springfield, Ill: Charles C. Thomas, 1958.
- Hammer, M., & Kaplan, A. M. The reliability of children's human figure drawings. Journal of Clinical Psychology, 1966, 22 316-319.
- Handler, L. Anxiety indexes in the Draw-a-Person Test: a scoring manual. Journal of Projective Techniques, 1967, 31, 46-57.
- Handler, L., & Reyher, J. The effects of stress on the Draw-A-Person Test. Journal of Consulting Psychology, 1964, 28, 259-264.
- Handler, L., & Reyher, J. Figure drawing anxiety indices: A review of the literature. Journal of Projective Techniques, 1965, 29, 305-313.
- Handler, L., & Reyher, J. Relationship between GSR and anxiety indexes in projective drawings. Journal of Consulting Psychology, 1966, 30, 60-67.
- Heath, D.H. The Phrase Association Test: a research measure of anxiety thresholds and defense type. Journal of General Psychology, 1960, 62, 165-176.
- Hiler, E. W., & Nesvig, D. An evaluation of criteria used by clinicians to infer pathology from figure drawings. Journal of Consulting Psychology, 1965, 29, 520-529.
- Hoyt, T. Same-sex drawings as a measure anxiety in institutionalized women. Unpublished master's thesis. Kent State University, 1955.

- Hoyt, T.E., & Baron, M. R. Anxiety indices in some sex drawings of psychiatric patients with high and low MAS scores. Journal of Consulting Psychology, 1958, 23, 448-452.
- Hoyt, T. & Baron, M. Anxiety indexes on same sex drawings of psychiatric patients with high and low MAS scores. Journal of Consulting Psychology, 1959, 23, 448-452.
- Kahn, M. W., & Jones, N. F. Human Figure drawings as predictors of admission to a psychiatric hospital. Journal of Projective Techniques, 1965, 29, 319-322.
- Koppitz, E. External indicator on human figure drawings and school achievement of first and second graders. Journal of Clinical Psychology, 1966, 22, 481-483. (a)
- Koppitz, E. Emotional indicators on human figure drawings of children: A validation study. Journal of Clinical Psychology, 1966, 22, 313-315. (b)
- Koppitz, E. Emotional indicators on human figure drawings of shy and aggressive children. Journal of Clinical Psychology, 1966, 22, 466-469. (c)
- Koppitz, E. M. Psychological evaluation of children's human figure drawings. New York: Grune & Stratton, Inc., 1968.
- Lair, C. V., & Trapp, E. P. Performance decrement on the H-T-P Test as a function of adjustment level. Journal of Clinical Psychology, 1960, 16, 431.
- Lakin, M. Formal characteristics of human figure drawings by institutionalized and non-institutionalized aged, Journal of Gerontology, 1960, 15, 76-78.
- Levitt, E. The psychology of anxiety. New York: Bobbs-Merrill, Inc., 1967.
- Lewinshohn, P. M. Relationship between height of figure drawings and depression patients. Journal of Consulting Psychology, 1964, 28, 380-381.
- Lorge, I., Tuckman, J., & Dunn, M. B. Human figure drawings by younger and older adults. Journal of Clinical Psychology, 1958, 14, 54-56.
- Machover, K. Personality projection in the drawing of the human figure. Springfield, Ill: Charles C. Thomas, 1949.

- Mandler, G., Mandler, J., Kremen, I., & Sholiton, R. The response to threat: relations among verbal and physiological indices. Psychological Monographs, 1961, 75, no. 9.
- Marby, M. Serial projective drawings in a patient with a malignant brain tumor. Journal of Projective Techniques, 1964, 28, 206-209.
- McHugh, A. H-T-P proportion and perspective in Negr, Puerto Rican, and white children. Journal of Clinical Psychology, 1963, 19, 312-314.
- McHugh, A. Children's figure drawings in neurotic and conduct disturbances. Journal of Clinical Psychology, 1966, 22, 219-221.
- Mogar, R. E. Anxiety indices in human figure drawings. Journal of Consulting Psychology, 1962, 26, 108.
- Reznikoff, M., & Nicholas, A. An evaluation of human figure drawing indicators of paranoid pathology. Journal of Consulting Psychology, 1958, 22, 395-397.
- Reyher, J. Use of figure drawings in differential diagnosis. Paper read at the State Diagnosticians' Conference, Michigan, 1959.
- Strumpfer, D. J. W. The relation of Draw-A-Person Test variables to age and chronicity in psychotic groups. Journal of Clinical Psychology, 1963, 19, 208-211.
- Strumpfer, D. J. W., & Nichols, R. C. A study of some communicable measures for the evaluation of Human Figure Drawings. Journal of Projective Techniques, 1962, 26, 342-353.
- Sundberg, N. The practice of psychological testing in clinical services in the United States. American Psychologist, 1961, 16, 79-83.
- Swensen, C. H. Empirical evaluation of Human Figure Drawings. Psychological Bulletin, 1957, 54, 431-466.
- Swensen, C. H. Empirical evaluation of Human Figure Drawings: 1957-1966. Psychological Bulletin, 1968, 70(1); 20-44.
- Taylor, R. E. Figure location in student and patient samples. Journal of Clinical Psychology, 1960, 16, 169-171.
- Vane, J., & Eisen, V. The Goodenough Draw-A-Man Test and signs of maladjustment in kindergarten children. Journal of Clinical Psychology, 1962, 18, 276-279.

Wysocki, B. A. & Whitney, E. Body image of crippled children as seen in Draw-A-Person Test behavior. Perceptual and Motor Skills, 1965, 21, 499-504.

Zuk, G. H. Relation of mental age to size of figures on the Draw-A-Person Test. Perceptual and Motor Skills, 1962, 14, 410.

APPROVAL SHEET

The Thesis submitted by Robert L. Duncan has been read and approved by members of the Department of Psychology.

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

The Thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

January 17, 1971
Date

Ann E. Skelton
Signature of Advisor