THE EFFECTS OF STRESS ON THE DRAW A PERSON TEST

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ABSTRACT

THE EFFECTS OF STRESS ON THE DRAW A PERSON TEST

by Leonard Handler

External stress was hypothesized to increase manifestations of anxiety on the DAP. The anxiety was hypothesized to be a function, in part, of the symbolic meaning of the figures.

Fifty-seven male college students drew a male, female and automobile (control figure) under stress and nonstress conditions. Both hypotheses were supported; 15 of the 21 anxiety and conflict indices significantly differentiated between the stress and nonstress conditions for the male drawing, 11 for the female drawing, and 5 for the automobile drawing. Five indices significantly differentiated in the opposite direction.

Suggestions were made for the use of the automobile drawing as an aid in checking out clinical hypotheses in a diagnostic evaluation--i.e., the role of drawing skill. The data also offer support for the validity of the projective hypothesis for the DAP.

THE EFFECTS OF STRESS ON THE DRAW A PERSON TEST

By

Leonard Handler

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THE EFFECTS OF STRESS ON THE DRAW A PERSON TEST

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A recent article by Sundberg (1961) reveals that the DAP is the second most frequently used test in hospitals, clinics, and counseling services throughout the country. However, research results leave serious doubts regarding the validity of many hypotheses concerning symbolic representation of traits, tendencies, and conflicts in figure drawings (Swensen, 1957). Despite these doubts, evidence in the individual case frequently points to the test's utility in clinical practice.

The equivocal nature of research results on the DAP is not surprising in light of the comparatively crude investigatory methods that have usually been employed. For example, anxiety indices are often related to questionable external criteria of anxiety. Differences are sought among nosological categories, which are known to be

unreliable and imprecise. Problems also arise in matching subjects, and in dealing with the high degree of intersubject variability in drawing. As Nichols and Strümpfer (1962) point out, "If there are, indeed, aspects of figure drawings which are related to the personality of the person making the drawing, such a relationship is likely to be obscured in any group comparison by the large individual differences in overall quality" (p. 161). Accordingly, an approach which uses the subject as his own control would be improvement in design.

In the course of another research project E observed that anxiety might be easily manipulated in connection with figure drawings. When Ss were attached to a large six channel polygraph, in a soundproofed room, in the presence of E, the drawings seemed to manifest more indices of anxiety, disorganization, and privitivization than in the standard testing situation. E felt these disturbances were a product of the stress produced by the surroundings, and the experimental procedure, as well as reflecting the intrapsychic stress produced by the drawing of the human figure itself.

The above observations led to two hypotheses: 1. Externally induced anxiety increases manifestations of anxiety on figure drawings. 2. There are two sources of

these manifestations of anxiety: a) the laboratory stress situation b) anxiety producing intrapsychic processes, activated by drawing the human figure.

METHOD

Fifty-seven male students, from introductory psychology classes, were tested under stress and nonstress conditions. Twenty-one of the Ss were tested under stress conditions first, while 36 were tested under nonstress conditions first.

Nonstress Procedure

Ss were tested in a group. They were given four sheets of 8-1/2 x 11 unlined paper, and were asked to number the sheets consecutively. Names were omitted until all the drawings were completed, and S did not know that he would later be required to identify himself. Ss were also given four pencils, a separate one to be used on each page, to insure that each drawing was made with a freshly sharpened pencil. Ss were told that except for the series of drawings on the first page, the other three drawings were to be made on separate sheets of paper, one drawing per page. On the first page Ss were requested to draw a series of eight

simple geometric figures, as a warm-up procedure. Following this, Ss drew, in turn, a male, an automobile, and a female.

Stress Procedure

S was ushered into a tiny, dimly lit room. The soundproofing material on the walls, and the double doors gave many Ss the impression of a "padded cell." The room was crowded with apparatus, including a rather large and complicated Grass six channel (Model 5) Polygraph. S was seated in an odd looking chair, with double armrests. E then attached GSR electrodes to the fingers of the nonpreferred hand. A fifteen minute waiting period followed, where S sat quietly and E busied himself manipulating the numerous controls on the polygraph. All six amplifiers were then turned on, and the ink writing oscillograph was set in motion. S appeared quite startled when he observed the record the pen was tracing. The whining, whirring and clicking of the motor and timer, the hum of the bank of amplifiers, and their gleaming red indicator lights all were calculated to increase S's anxiety level. The warm-up procedure used in the nonstress session was repeated, except that now, S wrote his name on the first sheet. He was then asked to draw, in turn, a male, an automobile, and a female.

While S drew, E busied himself operating the polygraph, writing on the chart paper, and occasionally glancing at the drawing over S's shoulder.

Although Ss were not directly asked if they were anxious, many volunteered this information. Others expressed such feelings indirectly. Many Ss hesitated to even enter the room, and almost all Ss remarked "anxiously" about the surroundings and the polygraph. E observed hand tremors, exaggerated swallowing, blushing, and heavy, labored breathing. GSR responses, although not employed here in any controlled manner, were quite massive. The total impression was that the Ss were extremely anxious, because of the vis-à-vis stress situation where S's identity was known, the intimidation in the testing session, and the stress involved in the drawing task itself.

Scoring

All drawings were first coded and were then scored for the 21 anxiety indices, one index at a time. The drawings were scored for degree of presence or absence of each index, using a modified and extended Hoyt-Baron scoring manual (Hoyt, 1955; Hoyt & Baron, 1959). Hoyt and Baron report very small mean differences between two

raters, while Mogar (1962) reports scorer reliabilities ranging from .84 to 1.00.

Score values usually ranging from zero to three were assigned. Several of the indices were instead scored by assigning a plus to the drawing of a pair which showed relatively more of a factor than the other drawing.

Previous research (Bradshaw, 1952; Lehner & Gunderson, 1952) has shown that the test-retest reliability of the indices of the kind noted in this study are high enough for research purposes (the lowest reliability reported was .45, while the highest was .93).

Automobile Drawing

The automobile drawing was included as a control figure; Reyher (1959) has hypothesized that the automobile drawing is a more neutral figure than the drawing of a person, and is therefore less subject to projection than either the male or the female drawing. If the same disturbances occur on the drawings of the human figures and the automobile, the disturbances merely reflect anxiety produced by the task of drawing itself. However, when the disturbances are associated only with the human figures, they are likely to reflect intrapsychic sources of anxiety.

Before the figure could be used, however, the task difficulty had to be compared with the difficulty of drawing a person. Sixty-two male college students were asked to draw a man and an automobile. A counterbalanced procedure was employed. Ss were asked to rate comparatively the automobile drawing as: a) easier, b) more difficult, or c) equally as difficult to draw as the male drawing. A nonsignificant chi square (for independent samples) of .26 was obtained. The results indicated that there was no significant difference in task difficulty between drawing an automobile and drawing a male.

RESULTS

Reliability

Insert Table 1

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Table 1 shows the percent agreement between two raters, scoring 90 drawings for degree of presence of each indicator. The reliabilities, comparable to those reported by Mogar (1962), and by Hoyt & Baron (1959), demonstrate

that the indices may be scored with a high degree of reliability.

Hypothesis One

Hypothesis one was tested by comparing the stress and nonstress drawings of each subject, on each of the indices. A two tailed sign test was used to compare the degree of difference on each of the indices. Table 2 summarizes the results for the male, female, and automobile drawings.

Insert Table 2

about here

Male Drawing. Fifteen of the 21 indices significantly differentiated the stress from the nonstress drawings, for the total sample.

Female Drawing. Eleven of the 21 indices significantly differentiated the stress from the nonstress conditions, for the total sample.

Automobile Drawing. Five out of 18 indices significantly differentiated the stress from the nonstress drawings. For obvious reasons, four of the indices used in the analysis of the other two drawings (head size, head:

body ratio, head simplification, and hair shading) were not applicable for the automobile drawing analysis.

Line pressure, erasure, and loss of detail differentiated on all three drawings. Although shading, hair shading, erasure, reinforcement, placement, and emphasis lines, did differentiat significantly between stress and nonstress drawings, they did so in the direction opposite to that hypothesized by Buck and Machover. There was more shading, hair shading, erasure, reinforcement, emphasis line and placement in the upper left hand corner in the nonstress rather than in the stress drawings. The other significant indices differentiated the stress from the nonstress drawings in the expected direction; they were present more frequently in the stress situation. The results therefore indicate that hypothesis one is supported.

Hypothesis Two

If the role of intrapsychic stress is involved in differing degrees for the three drawings, one would expect significant differences between the stress and nonstress findings for the three drawings. Therefore, hypothesis two was tested by comparing the significance levels for the three drawings, using the Friedman Two-Way Analysis of

Variance test. An $\underline{Xr}^2$ of 11.6 was obtained, significant between the .01 and .001 levels of confidence. The results indicated that the number and degree of significance levels for the three drawings was significantly different. The automobile drawing had the fewest number of significant indices (five), the female drawing, 10, while the male drawing had the most (13). The results therefore seem to support hypothesis two. The automobile drawing, assumed to pose less intrapsychic stress than either the male or female drawings, showed far less change under externally induced stress than did the other two drawings. Individual comparisons were done, using the sign test. The male drawing was significantly different from the automobile drawing ($p \doteq .001$) in number and degree of significance levels. When the female and automobile drawings were compared, the significance level was .006, while the male-female comparison resulted in a p value of .058. These findings also support Reyher's formulations concerning the more neutral nature of the automobile drawing.

DISCUSSION

Hypothesis One

Opposite Findings: shading, hair shading, erasure, reinforcement, and emphasis lines. Such findings are quite surprising, since presence, and not absence of these indices has traditionally been interpreted to denote anxiety and conflict. On the other hand, 11 of the other indices differentiated between the stress and nonstress groups in the expected direction, thereby supporting traditional clinical interpretation. More important, however, is that other experimenters, using hospital populations, have found similar trends in the "opposite" direction for shading, hair shading, erasure, and reinforcement. Table 3 summarizes these findings, along with other research findings (findings which agree with those of the present study, findings in the opposite direction, and nonsignificant findings) for the remainder of the indices.

Insert Table 3

about here

The results of the present study, and other supporting research indicate the need to exercise extreme caution in the interpretation of anxiety or conflict from the presence of shading, hair shading, erasure, or reinforcement. While the presence of these indices may possibly denote anxiety, they may just as frequently represent S's appropriate attempts to make the figures as true to life as possible, to differentiate body areas, and to give the figures more substance. Hammer (1959) notes that some erasure, with subsequent improvement, is a sign of adaptiveness and flexibility. The erasures in the present study seemed to improve rather than distort the figures. Thus, it appears that an absence of shading, hair shading, erasure, reinforcement, and emphasis lines rather than their presence may indicate anxiety or conflict. Similarly, a reported finding that erasure was significantly and positively related to intelligence (Mogar, 1962) suggests that erasure (and probably also shading, reinforcement, and emphasis lines) is a concomitant of general awareness of oneself as he relates to, and yet is separate from his environment. The presence of the above indices (along with the absence of distortion, head and trunk simplification, etc.)

may mean that S meets and reacts to reality situations appropriately.

There may be an impairment of awareness under stress, and a loss of differentiation from the surrounds, which in turn becomes reflected in S's drawings. Such a formulation is consistent with Mogar's findings of a positive relationship between the estimation of head size relative to figure size and both Manifest Anxiety Scale and Rorschach Content Test scores. These findings suggest that "anxiety is a condition which lessens the differentiation between self and environment" (1962, p. 6). As Mogar points out, this is essentially the position of Werner and Wapner (1952; Wapner and Werner, 1958), whose sensory-tonic perceptual theory states that perceptions of one's own body parts and of the "self" tend to be overestimated under conditions which decrease differentiation of self and world. The findings of increased distortion, disturbed vertical balance, lack of body area delineation lines, body and head simplification under stress all tend to support this formulation. Similar results have been reported for changes in figure drawings under LSD, a drug noted for producing disturbances resembling those found in severe ego disturbance.

A number of studies summarized in Table 3 also support the above formulations.

Opposite Findings: placement. The finding that placement upward and to the left was more frequent in the nonstress male drawings is also contrary to traditional clinical interpretation. An explanation for these results is suggested in the work of Dennis (1958), and of Dennis and Raskin (1960). In studies of various linguistic groups, the authors found a significant relationship between the quadrant in which S began to write, and the location of the drawings. Thus, although the location of drawings may be related to anxiety, habit transfer from learning to write in a particular way may account for the placement of nonstress drawings. However, habit transfer does not account for the "movement downward" of the drawings in the stress group. Perhaps the results mirror the disorganizing effects of stress.

Opposite Findings: An Alternative Interpretation. One possible explanation for the lack of shading, erasure, reinforcement, and emphasis lines, as well as for the loss of detail in the stress drawings is that S wanted to escape from the stress situation, and therefore complied minimally. S would not take the time to detail the figure, to erase

and fix the parts that were not drawn well, and so forth. The findings for the automobile drawing cast doubt on this formulation, for although detail loss and erasure were significant for the automobile drawing, the results for shading, reinforcement, and emphasis lines were not significant. In addition, both the stress and nonstress automobile drawings were of high quality, while the male and female stress drawings were generally of poorer quality than the corresponding nonstress drawings. It would appear, then, that while some of the difference can be ascribed to S's desire to quickly leave a threatening situation, this by no means accounts for the total differential results for the three drawings on the remaining indices.

Expected Findings: body simplification and head simplification. Signs of regression were evident in the results obtained for these two indices. Head and body were more frequently drawn in a primitive and schematic manner under stress. Table 3 indicates that similar findings have been reported by other investigators. Decrements in mental age scores on the DAP have been found under conditions of frustration (Seashore & Bavelas, 1942), while regression in mental age scores of young children as a result of stress has also been demonstrated (Barker, Dembo & Lewin, 1941).

Expected Findings: light line, heavy line, and line pressure. The significant findings for line pressure on all three drawings seems to reflect an increase in energy output due to external stress. Similar findings have been reported by Ford (1929), Sherman (1942), and a number of others (summarized in Poffenberger, 1942). The significant finding for heavy line in the female drawing is probably, in part, a reflection of increased work level due to external stress. The significant finding for light line in the male drawing seems to reflect intrapsychic stress; light line did not differentiate between stress and nonstress in either of the other two drawings. Although heavy line did not differentiate between the stress and nonstress male drawings, there was a definite trend in that direction ($p = .09$).

The results suggest that both light and heavy line quality may be indicative of anxiety, but that different processes underlie their presence. It is possible that heavy line quality reflects feelings of external stress, or pressure from without, while light line represents a feeling of stress eminating from with S. Gutman (1952) found that patients who did not improve in psychotherapy tended to draw continuous and reinforced lines, while those who improved tended to draw their figures with a light,

sketchy line. The present interpretation of the differential meaning of heavy and light line is consistent with Gutman's findings; psychotherapists have stated that those who experience anxiety about themselves make better patients, and improve more quickly than those who see their problems as emanating from outside sources. Similarly, Reznikoff and Nichols (1958) found that heavy line significantly differentiated drawings of paranoid schizophrenics from a group of undifferentiated schizophrenics. A paranoid typically views the world about him as the source of his fears.

Expected Direction: size. Under stress, the drawings both increased and decreased in size, depending upon the order of administration of the stress procedure ($p = .02$ for increase, and .02 for decrease). The differential results for size suggest that both increases and decreases in size may indicate anxiety. Thus, Wallach (1960) reports that high anxiety social introverts were more expansive, graphically, than nonanxious social introverts, while social extroverts high in anxiety were more constricted than nonanxious extroverts.

Nonsignificant Findings: transparency. It is not surprising that transparency did not differentiate between the stress and nonstress drawings, since the presence of

transparency has traditionally been said to indicate rather serious reality testing impairment, extremely poor ego defenses, and to be the most pathological form of conflict expression (Machover, 1951). The results would probably be very different with a neurotic or psychotic group placed under stress.

On the whole, the findings of this study are in substantial agreement with past studies on the DAP. A total of 106 findings were in agreement with the results reported here, while only 28 findings were in disagreement, and 46 findings were nonsignificant.

The summarized research in Table 3 indicates that omission, distortion, detail loss, line pressure increase, heavy line, size increase and decrease, head simplification and trunk simplification have consistently yielded results similar to those found in the present study. Evidence is somewhat less consistent for reinforcement, line discontinuity, light line, vertical imbalance, and delineation line absence. With most of these indices, much of the disagreement has been that in some studies the indices do not significantly differentiate anxious from nonanxious Ss. However, at least as many studies report that these indices do differentiate significantly between anxious and nonanxious

Ss, in agreement with the present findings.

With shading, hair shading and erasure the evidence in agreement with the present findings is balanced by a similar number of studies reporting findings in the opposite direction, and a similar number of studies reporting nonsignificant findings. Although such findings do not seem unusual to anyone familiar with DAP research literature, these results are more atypical than they appear at first. The present study found shading, hair shading, and erasure to be present more frequently in the nonstress situation rather than in the stress situation, a finding contrary to Machover and Buck's predictions, and contrary to generally accepted clinical interpretation. A number of other independent research findings are in substantial agreement with these "opposite" results.

The summarized research for placement, head size, head:body ratio, emphasis lines and transparency offer some support for the present findings, but in general, research evidence does not support these findings. Perhaps the discrepancy lies in differences in degree of pathology, as in the findings reported for transparency.

Order Effects

With only one variable (size), and in only one drawing (male), did the order of administration result in statistically significant opposite results for the "stress first" vs the "stress second" administration. When the stress drawing was done first, the nonstress drawings were bigger; when the stress drawing came second, the nonstress drawings were smaller. In each instance the first drawing administration, be it stress or nonstress, resulted in smaller drawings. It was possible, therefore, that what appeared to be differential results due to stress and order might be due, instead, to either a second test administration, or to chance. To determine whether "second administration" was responsible for the differential results another set of drawings was collected from 40 male introductory psychology students, under two nonstress testing conditions, one week apart. The results indicated that there was no difference in size from the first to the second administration ($p = 1$). Thus, the explanation for the order effect probably rests in S's interpretation of the drawing procedure, and in the difference in the degree of familiarity he had with the task. Second administration, per se, was not a

factor in producing the order effect.

Drawing Patterns

Two drawing patterns seemed to emerge under stress conditions--constriction, and expansion. The constricted drawings had lines that were heavier, more even and continuous, despite mechanical breaks in the line where the pencil was lifted from the paper. The lines appeared far less sketchy, the body parts appeared as if they were not quite attached. In addition, there was a decrease in size in the stress drawings, compared with their nonstress counterparts. This pattern seems to reflect increased rigidity and constriction in response to stress. Increased rigidity under stress has been reported by other investigators (Cowen, 1952; Beier, 1951; Ross, 1952; Marquardt, 1948). Rawn (1957) found that omission of essential detail, and intrusion of line (similar to transparency), characterized a rigid group and differentiated it from a flexible one. She explained the results in terms of poor ego boundaries for the rigid.

Pattern two was marked by increased diffusion of body boundaries, and increased vagueness of body parts. Lines were extremely sketchy, and loosely bound together, if at all. The lines were lighter, and the drawings tended to be bigger

than their nonstress counterparts. There was also a third group, composed of Ss who did not show either pattern, and whose drawings changed comparatively little under stress.

The first two patterns roughly correspond to Fisher and Cleveland's (1958) high and low boundary body image groups, respectively, and to Witkin's high and low differentiation groups (Witkin, Dyk, Faterson, Goodenough & Carp, 1962). Witkin and his associates speak of the "Sophistication-of-Body-Concept" scale, which is similar to the following scales used in the present study: distortion, omission, lack of delineation lines, and detail loss. The scale is seen as a continuum, although both extremes are emphasized. The more primitive pattern is likened to hysterical defenses, while the overly structured pattern is associated with defenses often found in obsessive-compulsive personalities. Poorly articulated drawings were positively correlated with global and undifferentiated perception of the field, while drawings that were highly articulated were correlated with an analytical field approach.

Similarly, Kagan (in press) hypothesized that an analytical style represents a cognitive manifestation of impulse control. He found that people who maintain control over impulses more frequently exhibit an analytic cognitive

response than do people who control their impulses to a lesser extent. Kipperman (1963) reports significant differences in use of detail in conceptual organization under stress and nonstress conditions.

Thus, it appears that figure drawings are capable not only of reflecting anxiety and conflict, but are also capable of reflecting S's predominant defensive style, and his typical style of cognitive approach and organization. Similarly, Goldworth (1950) has emphasized that the DAP can be used to determine control, contact with reality, and accuracy of perception, much like F+ is used on the Rorschach.

Moreover, it is not so much the presence of anxiety that should be the clinician's focus of interest, but rather, what is done with the anxiety seems of more importance. Other more important questions concern the extent, strength and effectiveness of S's defenses. Such indices as distortion, body boundary delineation lines, and primitivization of head and body seem to offer more clues to S's level of functioning than the more traditional anxiety indices (shading, erasure and reinforcement).

In addition, the degree of change under stress may also indicate something about the quality of S's defenses. Those whose drawings changed drastically in response to

stress would probably be more unstable than those whose drawings changed only moderately, in appropriate response to an external threat. Those whose drawings showed no change, however, might either be well defended, or perhaps too well defended, and rather rigid. In deciding which of these alternatives is appropriate, it would be helpful to examine the quality of both drawings. Moreover, the automobile drawing can be extremely helpful in sorting out extraneous drawing variables. The procedure follows immediately below, in discussing hypothesis two.

Hypothesis Two

The differential results for the three drawings suggests that the effects of internal stress can be separated from the role of external stress.

Product-Moment correlations were computed for the male and automobile drawings in both stress and nonstress conditions, and for the male drawings in the stress and nonstress situations. The low correlations between the male and automobile drawings (.10 for the stress situation and .20 for the nonstress situation) seems especially significant in light of the marked disparity from the high test-retest reliabilities reported in the literature for

the indices used in this study. Thus, the low correlations seem to indicate the independence of the male and automobile drawings, and reinforce the validity of the differential findings for the two drawings (i.e., the male drawing reflects anxiety, while the automobile drawing does so to a far lesser degree).

The low correlation found for the stress and nonstress male drawing comparison (.14) suggests that perhaps the stress enhances the conflict, making it more obvious and apparent in the stress drawings. Such a formulation seems likely with a non-hospital group, whose concerns and conflicts would tend to be less extreme. That something in addition to the external stress situation is involved seems highly probable from the differential results obtained for the three drawings, and from similar findings on other research comparing anxious and nonanxious groups (Table 3).

The present findings seem to hint, however, that the DAP perhaps is less sensitive to conflict or anxiety under nonstress conditions, with the present method of administration and with less disturbed individuals. A follow-up study with various psychiatric populations seems indicated at this point, especially since it may be argued that college students have relatively minor anxieties and

conflicts. Nevertheless, it seems possible to increase the precision of the DAP, or of the clinician using the test, so that he will be able to make finer and more accurate predictions about a patient. This may perhaps be possible by modifying the administration procedure. For example, a drawing or series of drawings may be obtained as soon as the client enters the testing room, and another series obtained after the client and clinician have had a chance to become acquainted with each other and rapport established. Extreme care would be needed in sorting situational anxiety from pathology, and perhaps at first such an approach should be used only as a research tool.

Thus, erasure, line pressure, detail loss, and perhaps head and body simplification probably reflect the role of external stress more than internal stress, since they were significant for all three drawings.[2] Sorting out these two sources of stress may perhaps be done with the use of the automobile drawing as a more neutral control figure. Those indices that differentiate only in the male

[2]Head and body simplification were scored for the male and female drawings only, and were significant for both of them.

drawing, or in both the male and female drawings probably represent internal conflict. Such an approach allows the clinician to make finer distinctions about a patient's functioning, above and beyond the usual statement that the patient is anxious.

Another important contribution of the automobile control figure is that the clinician can now determine the contribution of drawing style and drawing quality in interpreting DAP records, and can distinguish these factors from more dynamic factors. A control would be especially important here, since it has been demonstrated that clinicians often make judgments more in terms of artistic quality than in any other way (Whitmyre, 1953; Nichols & Strümpfer, 1962). Even though some aspects of style and quality relate very closely to personality factors, a more neutral drawing, used as a control or base rate from which a clinician can generate hypotheses about a patient, becomes vital in sorting fact from artifact.

The Projective Hypothesis

The differential results obtained for the three drawings, plus the fact that the male drawing had the greatest number of indices which significantly differentiated the

stress from the nonstress drawings, constitute evidence for support of the projective hypothesis in figure drawings. Male drawings done by males changed the most under stress, while the reaction to the female drawing was less extreme. The reaction to the automobile drawing was far below the reaction to either of the other two drawings.

The above statement does not imply that the drawing of a male, done by a male, is necessarily a representation of the self. It may very well be that the drawing is that of an idealized self or of a parent. The data suggest, however, that S does project more of his conflicts and anxieties into a same sex drawing than into either an opposite sex drawing or a more neutral drawing of equal task difficulty.

In conclusion, the results of the present study suggest that Ss do reflect the results of external stress in their drawings, and that above and beyond this, under stress the drawings also reflect anxiety stemming from personal conflicts. In addition, the study also indicates that a great deal of diagnostic information can be obtained from the DAP with the use of a control figure of equal task difficulty, as Reyher (1959) has suggested. The data also offers support for the validity of the projective hypothesis for the DAP.

TABLE 1

RELIABILITY OF THE ANXIETY INDICES FOR THE MALE, FEMALE, AND AUTOMOBILE DRAWINGS

Anxiety Indices	Percent Agreement		
	Male	Female	Automobile
Shading	.93	.93	.87
Hair shading	.93	.80	---
Erasure	.87	.87	.87
Reinforcement	.90	.97	.80
Light line	.96	.83	.93
Heavy line	.92	.93	.93
Line pressure (increase)	.98	.92	.87
Line discontinuity[a]	.93	1.00	.73
Emphasis lines	.80	.80	.87
Delineation line absence	.87	.73	.80
Transparency[a]	.93	1.00	1.00
Omission[a]	.97	.87	.73
Vertical imbalance	.67	.73	.87
Detail loss	.93	.87	.80
Distortion[a]	.73	.80	.80
Head simplification	.73	.87	---
Body simplification	.73	.73	.80

Note.--Reliabilities are not reported for size, head size, head:body ratio, and placement, since a ruler and grid were used for measurement on these indices.

[a]Reliability may be spuriously high since presence of this index was relatively rare.

TABLE 2

COMPARISON OF STRESS AND NONSTRESS DRAWINGS

Anxiety Indices	p value Male	Female	Auto	Reference
Findings in the opposite direction:				
(Present in non-stress drawings more frequently)				
Shading	.04	.0001	.07	Machover (1949)
Hair shading	.001	.097	---	Machover (1949)
Erasure	.00006	.00006	.0002	Machover (1949)
Reinforcement	.00006	.057	.13	Machover (1949)
Placement (upper left)	.004	1.00	.13	Buck (1948)
Emphasis lines	.00006	.00006	.13	Machover (1949)
Findings in the expected direction:				
(Present in stress drawings more frequently)				
Size (increase and decrease)	.62[a]	.48	.69	Machover (1949)
Light line	.008	.29	1.00	Machover (1949)
Heavy line	.09	.02	.58	Buck (1948)
Line discontinuity	.008	.36	.75	Caligor (1957)
Line pressure increase	.02	.0001	.00006	Caligor (1957)
Delineation line absence	.058	.004	.02	Witkin et al. (1954)
Omission	.02	.37	.05	Machover (1949)

(Table continued on next page)

TABLE 2 (Continued).

Anxiety Indices	p value Male	Female	Auto	Reference
Vertical imbalance	.001	.002	.62	Caligor (1957)
Detail loss	.00006	.003	.02	Caligor (1957)
Distortion	.001	.01	1.00	Machover (1949)
Head simplification	.001	.0001	---	Goldworth (1950)
Body simplification	.001	.00006	.06	Goldworth (1950)
Nonsignificant findings:				
Head size	.42	1.00	---	Machover (1949)
Head:body ratio	.48	.62	---	Machover (1949)
Transparency	.18	.18	.42	Machover (1951)

[a]Stress first drawings significantly smaller ($p = .02$); stress second drawings significantly larger ($p = .02$).

TABLE 3

FIGURE DRAWING ANXIETY INDICES INVESTIGATED IN THIS STUDY, COMPARED WITH PRIOR FINDINGS

Anxiety Indices	Agreement with Present Findings	Disagreement With Present Findings: Findings in the Opposite Direction	Disagreement With Present Findings: Nonsignificant Findings
Shading	13[a], 14, 18, 43[e]	3, 11, 13[b], 30	6, 20, 29, 35, 40
Hair shading	19	30	29
Erasure	9, 14, 18, 43[e]	3, 22, 44	20, 29, 35
Reinforcement	18, 29, 36[e], 43[e], 45	36	20, 35
Placement	7, 8, 44	3, 9, 20	15, 18, 29, 35, 40, 43[e]
Size (increase and decrease)	3, 4[d], 9, 16, 20[c], 22, 23[c], 24, 25[c], 26[d], 29[c], 36[d], 42	18, 43[e]	35, 40, 44
Head size	20, 29	14, 22, 45	18, 29, 43[e]
Head:body ratio	20	5, 14, 23, 29	
Light line	3, 11, 31, 36		18, 20, 29, 35, 43[e]
Heavy line	3, 34, 36		35
Line pressure (increase)	3, 16, 36[e], 44		

(Table continued on next page)

TABLE 3 (Continued).

Anxiety Indices	Agree	Disagree	Nonsignificant
Line discontinuity	3, 36[e], 44[e]		18, 35, 43[e]
Emphasis lines		3	18, 43[e]
Delineation line absence	45, 46		18, 43[e]
Transparency	35	18, 21, 37, 43[e], 44[e]	
Omission	1, 12, 13, 14, 17, 18, 21, 23, 28, 29, 33, 39 40, 43[e], 44[e], 46	2	20, 35
Vertical imbalance	3, 23		40
Detail loss	2, 3, 5, 10, 12, 21, 28, 36, 46		
Distortion	3, 10, 12, 13, 14, 21, 23, 27, 36, 37, 40, 44[e], 45, 46		20, 29, 32
Head simplification	3, 5, 10, 14, 17, 18, 37, 43[e], 46		35, 44

(Table continued on next page)

TABLE 3 (Continued).

Anxiety Indices	Agree	Disagree	Nonsignificant
Trunk simplification	3, 10, 14, 17 37, 46		32, 35

1. Alexander, in press. 2. Anastasi & Foley, 1944. 3. Berman et al., 1951. 4. Brengelmann, 1955. 5. Brill, 1937. 6. Craddick, 1962. 7. Dennis, 1958. 8. Dennis & Raskin, 1960. 9. Eisen, 1951. 10. Elkish, 1945. 11. Exner, 1962. 12. Fingert, 1939. 13. Fox et. al., 1958. 14. Goldworth, 1950. 15. Goodman & Kotkov, 1953. 16. Gutman, 1952. 17. Hinrichs, 1935. 18. Holzberg & Wexler, 1950. 19. Hoyt, 1955. 20. Hoyt & Baron, 1959. 21. Hozier, 1959. 22. Koppitz, 1960. 23. Koppitz et. al., 1959. 24. Lehner & Gunderson, 1953. 25. Lembke, 1941. 26. Liebert et. al., 1958. 27. Meyer et al., 1955. 28. Modell & Potter, 1949. 29. Mogar, 1962. 30. Morganstern, 1959. 31. Pfister, 1940. 32. Prater, 1950. 33. Rawn, 1957. 34. Reznikoff & Nicholas, 1958. 35. Royal, 1949. 36. Silverstein & Klee, 1958. 37. Springer, 1941. 38. Traube, 1937. 39. Utsugi & Ohtsuki, 1955. 40. Vane & Eisen, 1962. 41. Waehner, 1942. 42. Wallach & Grahm, 1960. 43. Wexler & Holzberg, 1952. 44. Wiggenhorn, 1957. 45. Witkin et. al., 1954. 46. Witkin et. al., 1962.

[a]girls [b]boys [c]smaller only [d]larger only [e]composite score

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