1961

Awareness of texture in responses to tactile stimuli and in the Rorschach texture response

Ellen Anne Strommen
The University of Montana

AWARENESS OF TEXTURE IN RESPONSES TO TACTILE STIMULI AND IN THE RORSCHACH TEXTURE REPONSE

BY

ELLEN ANNE STROMMEN

B. A. Montana State University, 1958

Presented in partial fulfillment
of the requirements for the degree of

Master of Arts

MONTANA STATE UNIVERSITY

1961

Approved by:

Bert R Sappenfield
Chairman, Board of
Examiners

Frank C. Arbuckle
Dean, Graduate School

DEC 1 4 1961
Date

ACKNOWLEDGMENTS

The author would like to formally express her gratitude and appreciation to the following persons:

Dr. Bert R. Sappenfield, for his invaluable aid and encouragement as both thesis director and major advisor.

Dr. Robert B. Ammons, for his cooperation in making his introductory psychology honors class available for this study, for his aid in preparation of the apparatus, and for his interest, criticisms, and advice, which have been most helpful.

Miss Sheilia Lowney, Miss Sonia Tetlie, and Mr. Walter Lonner for their cooperation in acting as judges for this study.

TABLE OF CONTENTS

I. STATEMENT OF THE PROBLEM

Subjects (Ss) to whom the Rorschach test is administered usually give at least one or two texture (c) responses, that is, responses in which texture characteristics are verbalized (Klopfer, et al, 1956). Since the Rorschach cards themselves are two-dimensional and tactually uniform, S makes his response on the basis of what he sees in these cards, that is, on the basis of visual stimuli. Yet the tactile response itself requires no vision, stimulation being received through skin receptors; it involves actual contact with and differentiation of surfaces having varying tactile characteristics, involving some element of three-dimensionality, however limited. Were all surfaces completely two-dimensional, the world would be uniformly smooth; texture would cease to be a relevant descriptive dimension of experience. The occurrence of the Rorschach texture response suggests that tactile and visual characteristics of stimuli are very closely associated with one another, such associations ultimately becoming sufficiently strong to

permit visual stimulation alone to elicit the texture response in the absence of adequate tactile stimulation.

What factors might produce individual variations in texture responses to the Rorschach test? One possible answer is that there are variations in Ss' awareness of textures in the world around them. A hypothetical individual who completely lacked awareness of textures could hardly be expected to have formed associations between the visual and tactile properties of objects. On the other hand, a person highly aware of, and responsive to, textures might be expected to have formed a large number of such associations. Following this line of reasoning, the present study was designed to test the general hypothesis that a dimension of awareness of textures, varying from individual to individual, does exist, and that production of Rorschach texture responses is to some extent a function (and measure) of awareness of textures.

Associations produced in response to unseen tactile stimulation could be hypothesized to be related to awareness of textures for similar reasons. Just as a tactually non-aware person would fail to form associations between tactile stimuli and the visual cues accompanying them, so

he would fail to form associations between experience of tactile sensations and the visual characteristics of the objects producing these sensations; while the person highly aware of textures might be expected to have formed not only strong associations between corresponding tactile and visual characteristics of objects, but also a variety of experiential associations to given tactile stimuli. Both the visual and the experiential types of association would be predicted to vary with the level of awareness of textures of the individual producing them. If this be the case, scores based upon a tally of number of associations produced to a given set of unseen tactile stimuli would be predicted to correlate positively with production of texture responses to the Rorschach; and the existence of such a relationship might be interpreted as confirming the basic assumption of a dimension of awareness of textures.

This statement of the predicted relationship between Rorschach texture score and awareness of texture is of course considerably oversimplified. Recognizing this fact, an attempt was made to consider some other variables which might influence this relationship, with the intention of incorporating into the design of the experiment additional

hypotheses which might lead to some clarification of the roles played by these variables.

One such variable which might be expected to influence an S's awareness of textures would be the affect which he associates with textures. Given two Ss whose basic level of tactile awareness is comparable, but one of whom had come to associate tactile experience in general with pleasant experiences while the other had not, it might be predicted that the first would tend to respond more readily to textures than would the second. On the other hand, a third S who had developed unpleasant associations to textures might be predicted to produce fewer responses than either of the first two, either because he had come to avoid tactile experience and was thus less familiar with textures, or because his unpleasant associations with textures had acted as an inhibitor to his response production. A rough index of this variable might be obtained by having Ss judge tactile stimuli as pleasant or unpleasant.

Another variable relevant to awareness of textures might be ability to discriminate between textures. Although individual differences in physiological capacity for sensing textures doubtless exist, it may be that Ss are sufficiently

homogeneous in physiological sensitivity, or that thresholds necessary for the development of awareness of textures as postulated in this study are sufficiently low, to permit development of such awareness in all individuals. On the other hand, Ss having greater ability to discriminate between gradations of a given type of tactile stimulus could also be predicted to show greater awareness of texture as indicated by associations produced to tactile stimuli or by number of Rorschach texture responses given, on the grounds that their greater sensitivity permits them a wider and more varied range of tactile experience.

Sex of S may also be a variable relevant to awareness of textures. It is possible that physiological sensor differences exist between men and women--although, if so, these differences may be sufficiently small as to have little or no influence on tactile awareness, for reasons similar to those given above regarding physiological sensitivity in general. Aside from possible physiological differences, however, men and women may respond differently to textures on the basis of attitudes culturally permitted them or expected of them. For example, such expectations might permit women to make texturally based responses which are not permitted

to men, thus increasing the probability of texture responses among women. Conversely, expression of awareness of textures might be culturally inhibited in one sex group, thus diminishing the likelihood of texture responses from members of that group. Which direction such cultural sex differences might take would be hard to say; for example, observation suggests that women are more concerned with textures of fabrics such as are found in clothing, but also that many men may be highly aware of textures associated with finishes of objects such as are produced in woodshops, etc.

S's willingness to verbalize responses once he has formulated them may also influence Rorschach texture response and production of associations to tactile stimuli as indicators of awareness of texture (see Gordon, 1959). Both affect associated with textures and possible cultural sex differences may influence willingness to verbalize responses as well as influencing awareness of textures itself; in fact, it is very possible that some part of the influence of these factors in a study such as this one may occur through variations in willingness to verbalize resulting from them.

Many studies have been reported relating to the Rorschach texture response. However, nearly all of these studies have

approached the texture response from the point of view of the interpretive hypotheses attached to this response, rather than from the point of view of the response as a perceptual phenomenon. A study by Ainsworth and Kuethe (1959) seems most directly relevant to the present study. Attempting to explore the assumption that shading on the Rorschach evokes a "contact sensation", Ainsworth and Kuethe hypothesized that the response to texture on the Rorschach should be related to the way in which an S responds to the textured qualities of objects in everyday life. To test this hypothesis, a texture sorting test was devised which was intended to incorporate the following variables of the formulation of the Rorschach shading response: "(a) the ability to discriminate differences in shading; (b) the interpretation of a visual stimulus complex in terms of a tactual concept; (c) the formation of a texture concept, in terms of the integration of features of blot contour and shading, indicating that the person not only perceives texture,but uses the variable of texture as a basis for organizing his experience in conceptual terms; and (d) spontaneous verbalization that shading was a determinant of the concept." Their results generally confirmed their hypothesis for hospitalized Ss but not for

normals.

The central hypothesis of the present study was likewise concerned with the relationship between the way in which a person responds to Rorschach shading and the way in which he responds to the textured qualities of tangible objects in everyday life. However, the approach in this study emphasized the assumption that there is a basic awareness of texture which may vary in strength from individual to individual, that Rorschach texture responses may be considered one measure or indicator of such awareness, and that other measures of response to textured qualities of objects will of necessity be related to Rorschach texture responses if the assumption itself is valid. In this study, no attempt was made to prepare a task which would reproduce the characteristics of the Rorschach texture response; visual cues were eliminated from the tactile tests, and formulation of a texture concept was not required.

In summary, the specific hypotheses tested in this study included the following:

1. Productivity of associations to unseen tactile stimuli is positively related to productivity of Rorschach texture responses.

2. Ss having predominantly pleasant associations to tactile stimuli will differ significantly in production of texture responses from Ss having predominantly unpleasant or neutral associations.

3. Scores on a test of tactile discrimination are positively related to production of Rorschach texture responses.

4. Male and female Ss will differ significantly in responding to tactile stimuli.

II. PROCEDURE

Apparatus. For the purposes of this study, a measure of tactile sensitivity eliciting responses based solely on tactile stimulation was desired. The apparatus used in the tactile tests should be arranged so as to eliminate visual cues to S, so as to provide as little extraneous tactile stimulation as possible, and so as to hold the element of extraneous stimulation constant. In addition, this apparatus should be comfortable for S and should permit the experimenter (E) to have a clear view of S at all times. A modification and enlargement of the Stoelting mirror-drawing apparatus was selected as best fulfilling these requirements. (See Fig. 1.) The apparatus was constructed of 3/8" plywood and finished with black enamel.

The tactile stimuli were mounted on a 5" x 5" x 3/8" wooden block to which a 3/4" wooden edge frame was attached. The edge frames were also finished with smooth black enamel. Stimuli were presented by placing the prepared blocks in the frame provided for that purpose on the apparatus baseboard.

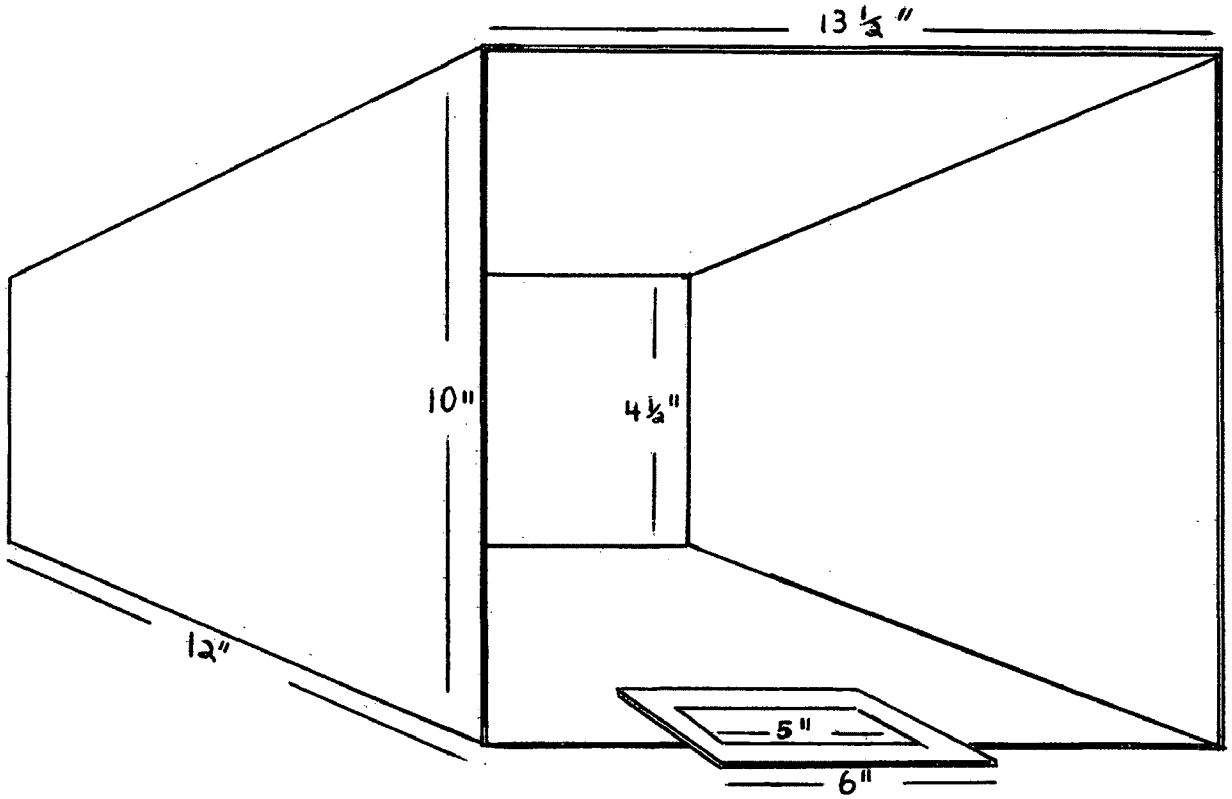

FIGURE 1

TACTILE TEST APPARATUS

The tactile stimuli themselves were selected to fulfill the following requirements: durability; suitability to the manner of preparation (mounting on wooden blocks); absence of characteristics which might modify the condition of S's receptors (as coating with powder); and stability of characteristics (wet substances dry out).

The stimuli for the association test included the following:

raffia mat section	cowhide
plastic glass	screening
steel wool	rubber mat
sponge rubber	fleece (wool, artificial)
heavy wool fabric	balloon rubber over sawdust

These stimuli were selected from a total of 15 which had been tried out on the basis of responses of 10 pilot Ss.

For the discrimination test, the criterion of availability of several gradations of a readily obtainable substance was added to the list of requirements. The following substances were selected: (1) four samples of unfinished leather selected from a total of 10 possibilities on the basis of judges' ratings of similarity; (2) four similarly selected samples of paper, 20# Cascade Superwhite bond, 16# Cascade Superwhite bond, 16# leader bond, and 6# manifold

paper; and (3) 3/0, 4/0, 5/0, and 6/0 - weight sandpaper.

Subjects. As previously stated (see Chapter I), willingness to verbalize concepts is one factor which is recognized as influencing obtained verbal responses in tests such as those being used in this study. Assuming that one element in obtaining verbalizations is ability to verbalize, and assuming, further, that ability to verbalize is related to scores obtained on tests of intelligence and of verbal skills, some limited (if unfortunately unspecifiable) restriction of variability of responses due to verbalization alone might be achieved through pre-selection of Ss on the basis of scores on tests of intelligence and verbal skills. In addition, there is some evidence that production of texture responses to the Rorschach tends to increase as the total of all Rorschach responses increases, a productivity function (see Wittenborn, 1950). To the extent that the assumptions stated above are valid, variability in number of obtained Rorschach texture responses should be maximized by selecting Ss from the upper extremes of distributions of scores on verbal tests. The extension of variable range resulting from such selection would increase the probability of detecting existing relationships statistically. Since the purpose of this study was to

determine whether predicted relationships occur rather than to specify their nature throughout a range of possible responses, such pre-selection was justifiable.

College entrance examination scores were available for most introductory psychology students. Primary weight in selection was given the California Capacity Questionnaire Language scores. In addition, consistency of this score with the Non-language score from the same test was considered, and other verbal scores were checked. CCQ scores were available for all Ss selected; other verbal scores available included the Cooperative English Test Total Reading percentile, American College Tests Expression percentile, and the College Qualification Test Verbal percentile. S's status as to transfer or non-transfer student on entrance and as to freshman or upperclassman determined which specific scores were available for him. Descriptive information for the selected group in reference to these scores is given in Table 1.

Of the total N of 54 Ss, 28 were members of an honors section in introductory psychology. The remainder were selected from 5 other classes of introductory psychology students.

Method. Standard procedure was followed in individual administration of the Rorschach test, following the recommendations

Table 1. Percentile range and median percentile scores of 54 participating introductory psychology students on five verbal tests

	Male			Females		
Test	N	Range	Median	N	Range	Median
California Capacity - Language	27	95-99	98	27	91-99	97
Cal. Cap.-- Non-Language	27	50-99	92	27	40-95	80
Cooperative Englins Total Reading	14	30-99	80	21	38-99	68
American College Tests Expression	11	27-97	78	18	14-97	88
Coll. Qual. Test Verbal	12	50-99	90	10	15-99	60

of Klopfer et al (1956). The Rorschach protocols were scored for texture only, again following the analysis of Klopfer. Protocols were independently scored by two judges, one of whom (E) was a psychology graduate student, and the other of whom was a practicing clinical psychologist at Montana State Hospital. When the two judges disagreed as to the occurrence or non-occurrence of a texture response, the response was eliminated from subsequent analysis. Where disagreement as

to the category of texture response occurred (see discussion of index 3 below), the scoring of the second judge was used because of her greater experience in working with the Rorschach.

Three indices based on Rorschach texture scores were used. The major hypothesis of this study required only that an index based on total frequency of texture responses be available. However, Rorschach theorists have suggested that the role which texture plays in the formation of the concept (whether main or secondary) may require different interpretations which might be reflected by differential weighting. More relevant to this study is the fact that main and additional scores may represent differing degrees of awareness of texture as reflected in the Rorschach test. Ainsworth and Kuethe (1959) made use of an index which weighted texture responses according to the nature of the response, on the basis of clinical impression of differential interpretative significance. For comparative purposes, their index was also included in the present study.

The three indices selected for use thus included the following: (1) Σ Fc + cF, which represents simple unweighted productivity of texture responses; (2) an index which accorded main and additional scores different weights by scoring

Σ Fc + cF with main scores = 2 and additionals = 1; and (3) the Ainsworth and Kuethe index which is based on the following weightings:

Main Scores

Soft texture	6
Rough texture, smooth texture, three-dimensional carved or modelled surfaces	4
Transparency, achromatic representation of chromatic color, and use of shading to give a differentiated pattern	2

Additional Scores

One-half the value assigned to main scores of similar nature.

Two estimates of reliability of Rorschach scores were obtained. The first, involving percentage agreement between two independent scorers, showed 82.3% agreement as to occurrence of texture responses, and 77.6% agreement as to category of response for index 3.

Since computations were to be based on ranks of Ss on each index, three sets of scores for each index were obtained and ranked. The first set was based on the original scoring of judge 1; the second was based on the original scoring of judge 2; and the third represented scores as they would be

used in further computations. These three sets of scores were intercorrelated using Spearman's rank-order correlation r_s; results are reported in Table 2. The values of r_s reported in Table 2 indicate a satisfactory level of interjudge reliability.

Table 2. Spearman rank-order intercorrelations (r_s) between comparative ranks of 54 introductory psychology students on three indices of Rorschach texture response, as determined from original scorings of two independent judges and from pooled values used in further computations

Index of Rorschach Texture	Judges 1 and 2	Judge 1 and Pooled	Judge 2 and Pooled
1	.91	.93	.95
2	.91	.93	.95
3	.91	.93	.94

In administering the tactile sensitivity test, S and E were seated on opposite sides of the apparatus with the narrow aperture of the apparatus near S. The following instructions were given:

> "Now, I'm going to put some things into this box. I want you to feel each one, and then tell me what it

> reminds you of--anything and everything that it makes you think of. Do you have any questions?"

The ten association stimuli were then presented, all responses being recorded. The order of the ten stimuli was the same for all Ss; order was determined by numbering the stimuli from one to ten, then referring to a table of random numbers. When S had finished responding to each stimulus, E asked, "What does that make you feel like?" and then, "Is it pleasant or unpleasant?", again recording responses.

When all association stimuli were presented, E said:

> "Now we're going to do something different. I have some samples of different kinds of paper. What I'm going to do is put them in the box for you to feel in sets of two. In each case, I want you to feel the first one; then when I give you the second, feel it and tell me whether it is the same or different from the first one. There will be quite a few different pairs. Now sometimes I will give you the same one twice; other times, the second one will be different from the first. So be sure to feel them very carefully, so you can tell me whether they're the same or different. Do you have any questions?"

When presentation of the paper samples was completed, E said, "Now we'll do the same thing again, only this time we'll be using leather samples." Similar instructions prefaced the final set of sandpaper samples.

Reference stimuli were presented for 5 seconds, interstimulus interval being approximately one second. To determine

the order of presentation of the discrimination stimuli, which was the same for all Ss, the samples in each set were numbered from one to four. A table was prepared having four numbered rows; within each row, the reference number was paired in sequence with each other number and twice with itself. Each combination was numbered, the second self-pairing being given the number five. Using a table of random numbers, the sequence of pairs was determined separately for each row. Determination of presentation order within each pair (reference-comparison or comparison-reference) was made by randomly assigning one of the two conditions to the first appearance of each combination, then reversing the order for the second appearance of the pair. The same order table was used for all sets of stimuli. E attempted at all times to keep stimuli out of sight, and to avoid arm movements which might serve as a cue to correct response.

Association productivity (TA) was estimated by tallying total associations to the ten association stimuli. Three judges (E and two other psychology graduate students) tallied total associations independently, basing judgments on a series of previously developed criteria which were discussed by the judges prior to actual scoring. These criteria are presented in

Appendix A. Ss' ranks based on the original tallies of each judge were intercorrelated, with results as shown in Table 3. To determine working indices, agreement of two of the three judges as to number of responses to a given stimulus was required; where none of the three judges agreed, final scores were settled by discussion.

Table 3. Agreement among 3 independent judges in ranking 54 Ss on number of associations produced in response to unseen textures, using Spearman's rank-order correlation r_s

Judges	r_s
1 and 2	.84
1 and 3	.90
2 and 3	.87

To determine affect associated with the tactile stimuli, a weight of 3 was assigned to judgments of pleasant, 2 to neutral judgments, and 1 to judgments of unpleasant. The sum of these values for all stimuli was used as pleasantness-unpleasantness index (PU). Where S had not given a judgment of pleasant or unpleasant, or was not sure, a value of two was assigned; where two opposing judgments were made to the same stimulus, the first judgment was scored.

Total errors on the discrimination test was used as the discrimination score (TD).

Raw scores of all Ss on all indices are presented in Appendix B.

Table 4. Score ranges, median scores, and modal scores of 54 introductory psychology students on three indices of response to unseen textures and three indices of Rorschach texture response (c)

Index	Range	Median	Mode
Association	12-65	23	19 and 20
Discrimination	5-25	13	13
Pleasantness-unpleasantness	17-29	21	21
Rorschach texture index 1	0-17	2	1
Rorschach texture index 2	0-29	3	1
Rorschach texture index 3	0-44	6	2

Table 4 presents ranges, medians, and modal scores for all Ss on each index.

Experimental design. Ss were assigned separately by sex groups to one of two experimental conditions: Condition

A, in which the tactile tests preceded the Rorschach; and Condition B, in which Rorschach administration preceded tactile tests. Simple counterbalanced order was used in assigning Ss to conditions. Minimum interval between testing sessions was one day, maximum interval six days.

Upon completion of the final testing session, S was given a questionnaire to be filled out and returned. A sample of the questionnaire is included in Appendix C.

Statistical analysis. Siegel (1956) warns that standard parametric statistical procedures are not appropriate for data in an ordinal scale. Scores of Ss on the Rorschach test may be ordered into an ordinal scale but not into an interval scale; the same holds true for the other measures obtained in this study. Accordingly, nonparametric statistics were used in analyzing the data obtained in this study.

When differences between scores of two groups were to be tested, the Mann-Whitney U test or Wilcoxon's T was applied, as appropriate. Spearman's rank correlation r_s was used in estimating degree of relationship between indices. Kendall's partial rank correlation $tau_{xy.z}$ was also used.

The .05 level of significance was required of statistical tests for accepting or rejecting hypotheses in this study. All values reported were corrected for ties, using the appropriate corrections (Seigel, 1956).

III. RESULTS

Scores on all indices were first compared, using the Mann-Whitney U test, to determine whether significant differences existed between sex groups within conditions, or between conditions within sex groups. None of these differences, as reported in Table 5, was found to be significant at the level required in this study (.05).

Accordingly, tests of significance were then computed for combined sex groups by conditions and for combined conditions by sex groups. As indicated in Table 6, Ss in condition A (tactile tests first) produced significantly more associations on the tactile productivity test than did Ss in condition B; no other differences were found to be significant. On the basis of these results, further analyses for all indices except the association test were computed using combined sexes and conditions; analyses involving the association test were done by conditions A and B separately.

To determine whether Rorschach texture responses varied according to S's judgments of the pleasantness or unpleasantness

Table 5. Values of U obtained for comparisons of sex groups within conditions A and B, and conditions A and B within sex groups, for three indices based on Rorschach texture response and for three indices based on responses to unseen textures.

Index	A M-F $n_1=n_2=13$	B M-F $n_1=n_2=14$	M A-B $n_1=13$ $n_2=14$	F A-B $n_1=13$ $n_2=14$
Tactile Associations	82.5 M > F	67.5 F > M	55 A > B	65.5 A > B
Tactile Discrimination	72.5 M > F	68.5 M > F	90.5 B > A	65.5 A > B
Pleasantness-Unpleas.	78 M > F	85.5 M > F	74 B > A	65.5 B > A
Rorschach Texture 1	70 M > F	97.5 M > F	81.5 A > B	91 B > A
Rorschach Texture 2	66 M > F	90 M > F	80 B > A	90.5 B > A
Rorschach Texture 3	71 M > F	86.5 M > F	89.5 B > A	86 B > A

Table 6. Values of U obtained in comparing scores on three Rorschach texture indices and three indices based on response to unseen tactile stimuli by conditions A and B for combined sex groups and by sex groups for combined conditions.

	M - F n_1= 26, n_2= 28 M_U= 364 σ_U= 57.76			A - B n_1= n_2= 27 M_U= 364.5 σ_U= 57.80		
Test	U	$\sigma_U$ties	z	U	$\sigma_U$ties	z
Tactile Associations	426.5 F > M	57.76	1.07	494.0 A > B	57.64	2.26*
Tactile Discrimination	434.5 M > F	57.55	1.22	396.5 B > A	57.43	.57
Pleasantness-Unpleas.	398.0 M > F	57.40	.58	451.0 B > A	57.29	1.52
Rorschach Texture 1	401.5 M > F	56.80	.65	385.5 B > A	56.89	.38
Rorschach Texture 2	418.5 M > F	57.40	.96	387.0 B > A	57.29	.40
Rorschach Texture 3	417.5 M > F	57.64	.92	392.5 A > B	57.52	.50

*Significant at .05 level of confidence

of tactile stimuli (hypothesis 3), scores of high and low thirds of the total group as ranked according to the P-U index were compared using the Mann-Whitney U test. The results of this comparison, together with the comparison of each of these groups with the medium group, are presented in Table 7. The high and low affect groups did not differ significantly from each other in production of Rorschach texture responses, nor did either of these groups differ

Table 7. Values of U obtained in comparing High, Low, and Medium affect groups (Pleasantness-Unpleasantness test) for production of Rorschach texture response, as estimated by three indices of Rorschach texture.

Rorschach Texture Index	H - L $n_H = n_L = 18$	H - M $n_H = n_M = 18$	L - M $n_L = n_M = 18$
1	133.0 L > H	152.0 H > M	119.5 L > M
2	136.5 L > H	133.5 H > M	109.0+ L > M
3	152.0 L > H	141.0 H > M	124.0 L > M

+Significant at .10 level of confidence

significantly from the medium affect group. However, it is interesting to notice that the groups consistently differ in

the order of low > high > medium; the low group is not only more different from the medium group than from the high group, but also produces a greater number of Rorschach texture responses than either of the other two groups.

Values of r_s obtained for scores on the tactile discrimination test and the three indices of Rorschach texture response are presented in Table 8. None of these correlations

Table 8. Spearman's rank-order intercorrelations of scores on three indices of Rorschach texture response and three indices based on response to unseen tactile stimuli for 54 introductory psychology students.

	Association test Cond. A N = 26	Association test Cond. B N = 28	TD	P-U	R-1	R-2
Tactile Discrimination	-.10	.20				
Pleasantness-Unpleas.	.10	-.17	.03			
Rorschach Texture 1	.60**	.57**	.06	-.07		
Rorschach Texture 2	.60**	.49**	.02	-.05	.97**	
Rorschach Texture 3	.64**	.44**	.01	.00	.94**	.97**

**Significant at the .01 level of confidence.

was significantly different from zero; as measured by this test, tactile discrimination was not related to production of Rorschach texture responses. However, the measure employed in this study was very limited. It may be that individual differences in actual physiological sensitivity to texture are sufficiently small that they do not influence awareness of texture; it may also be that this test simply was not sufficiently discriminating to reflect the differences which do exist.

Values of r_s found in relating association scores and Rorschach texture scores by conditions separately are also reported in Table 8. All correlations between these two sets of indices were found to be significant beyond the .01 level of confidence, thus confirming the major hypothesis of this study.

Since it is probable that Rorschach texture responses tend to increase as total response to the Rorschach increases, it is possible to argue that production of texture responses is, in part at least, a function of productivity, or willingness of S to give responses in a test situation. Such a productivity factor, if operative, would more than likely also affect number of responses to a test such as the association

test, probably in much the same manner as it would affect the Rorschach. No independent index of verbal productivity as such was available. However, if this relationship exists, total number of responses to the Rorschach test might be considered an approximate indicator of simple productivity as exhibited by Ss. If so, an additional analyses testing the relationship between association test scores and texture responses with total Rorschach responses held constant might clarify the role played by verbal productivity in producing these results.

Total Rorschach responses were tallied for all Ss and tested for differences between sexes and conditions. U tests revealed no significant differences. Intercorrelations of total responses, 3 Rorschach texture indices, and associations to tactile stimuli were computed using Kendall's rank correlation tau, with results as reported in Table 9. It is interesting that Rorschach total responses appear to be more closely related to associations to tactile stimuli than to the indices of Rorschach texture response. The variations found in correlation values obtained for Rorschach response total with the three indices of Rorschach texture might be due to the weighting procedures followed in obtaining

Table 9. Values of Kendall's tau obtained in correlating three indices of Rorschach texture, total Rorschach responses, and associations to tactile stimuli by two conditions. All values corrected for ties.

	Association test		Total Rorschach	
	Cond.A N = 26	Cond.B N = 28	Cond.A N = 26	Cond.B N = 28
Rorschach Texture Index				
1	.46**	.46**	.37**	.20**
2	.45**	.35**	.32**	.13**
3	.47**	.32**	.27**	.10*
Rorschach Total	.41**	.37**		

* Significant at the .05 level of confidence
** Significant at the .01 level of confidence

these index values, since the weightings may introduce or emphasize elements not necessarily related to productivity. Unfortunately, no test of the significance of differences between obtained values of tau is available; it would be interesting to know whether any of the observed differences reported in Table 9 did reach the level of significance required in this study. The reported values were all

significantly different from zero. To the extent that Rorschach total response measures productivity, some portion of the variance of both Rorschach texture scores and association scores can be accounted for on the basis of productivity.

Using the values of tau reported in Table 9, Kendall's partial rank correlation $tau_{xy.z}$ was computed to estimate the correlation between associations and Rorschach texture scores with total Rorschach responses held constant. Results are reported in Table 10. No test of the significance

Table 10. Estimated correlation between associations to unseen tactile stimuli and three indices of Rorschach texture response with total Rorschach responses held constant, using Kendall's $tau_{xy.z}$. All values corrected for ties.

Association Test	Rorschach Texture Indices 1	2	3
Condition A N = 26	.37	.37	.41
Condition B N = 28	.42	.33	.30

of this statistic is available. However, the obtained values suggest that there is certainly at least a strong tendency for association to texture and Rorschach texture

scores to covary even when total Rorschach responses are controlled; the relationship between these two types of texture response is apparently not solely a function of productivity.

Additional intercorrelations reported in Table 8 include those between the three tactile test indices and those between the three indices of Rorschach texture response. Values of r_s obtained between the various tactile test indices were not found to be significantly different from zero.

As might be expected, the three indices of Rorschach texture response proved to be highly related to one another. The obtained values suggest that Ss would not be expected to differ significantly in scores on the 3 indices. As a check, Wilcoxon's T was used to test the difference between scores obtained on the three Rorschach indices, with results as reported in Table 11. None of the obtained differences was found to be significant.

Responses of Ss obtained from questionnaires and from written reports on this experiment are summarized briefly in Appendix D.

Table 11. Values of Wilcoxon's T obtained in comparing scores of subjects on Rorschach texture indices 1 and 2, 1 and 3, and 2 and 3 by sex groups within conditions, conditions within sex groups, sex groups for combined conditions, and conditions for combined sex groups. All values corrected for ties.

Group	Rorschach texture indices compared					
	1 and 2		1 and 3		2 and 3	
	T	N	T	N	T	N
Females-A	6.0	7	27	10	21	9
Males-A	17.0	9	5	4	12	8
Females--B	24.5	11	27	10	6.5	6
Males--B	44	13	39	13	30	12
Females-A+B	101.5	20	120	22	76	18
Males-A+B	100.0	25	118	23	129.5	25
A-M+F	94	20	114.5	23	123	22
B--M+F	118.0	23	73.5	18	126	22

IV. DISCUSSION

For groups similar to those tested in this study, awareness of texture does not vary significantly according to sex of S. Both analyses of differences between male and female groups, and analyses based on tactile discrimination scores, suggest that physiological sensor differences between Ss may be too fine to be detected by the measures used in this study, or that they may be relatively homogeneous in relation to the development of awareness of textures. These results also imply that for these groups and others similar to them, socially defined attitudes toward expressing responses to textures do not produce differences between the responses of the two sex groups.

Two points may be relevant to this discussion of findings. The first of these is that all Ss tested in this study were selected on the basis of high scores on tests of intelligence and of verbal skills; and as one approaches the upper extremes of distributions of intelligence, differences between male and female Ss tend to become less clear-cut, i.e., males

tend to exhibit more "feminine" attitudes and interest characteristics. The second point is that within a testing situation such as that employed in this study, Ss in either sex group may tend to set aside inhibiting attitudes and respond more freely because they have been instructed to do so. It would be interesting to obtain Ss' ratings of a variety of textures as "masculine" or "feminine". Responses of male and female groups to these pre-rated textures might then be compared for Ss selected over the entire intelligence continuum and at selected points of the continuum.

Although none of the relationships obtained with the pleasantness-unpleasantness index proved to be significant, the general tendencies observed in these data provide some interesting material upon which to speculate. The P-U index itself was extremely crude; the following points indicate some of its major weaknesses. (1) Considerably greater differentiation between Ss, as well as more accurate reflection of the actual affect associated with the textures, might have been possible had Ss been asked to rate affect associated with given stimuli on a scale of 1 to 9, or 1 to 5. Many Ss exhibited no particular affect in relation to the stimuli; others responded very strongly to one or two.

Some seemed to exhibit more definite affective reactions to tactile stimuli in general than did others. These differences were not reflected by the index used in this study. (2) Judgments of pleasantness-unpleasantness were very difficult for some Ss to make. Some of the reasons given included absence of affective response to the stimuli, and uncertainty as to the type of response desired. More information about what Ss were responding to when they answered this question would have been desirable, and might have been included in a questionnaire or incorporated into the test session in the form of a brief interview following completion of the tactile tests. (3) No pre-selection of stimuli was made in reference to a pleasantness-unpleasantness dimension, other than ascertaining in a pilot study that pilot Ss' responses did vary. The information contained in Table 4 suggests that included stimuli were restricted in the unpleasantness dimension. Ten neutral judgments would have yielded a score of 20; scores ranged from 17 to 29 with a median of 21.5. A much wider variety of stimuli might be tested for affect associations on several dimensions. An index based on such information concerning the elicitation values of different categories of stimuli, as well as mean

or standard S response values of these stimuli, would be considerably more informative than an index such as that used in this study. (4) The exclusion of many categories of tactile experience by the requirements set up arbitrarily for this test also limited the value of this index. (5) Finally, the lack of adequate reliability data on this index must be considered in evaluating the results obtained on the basis of it. This caution applies not only to the pleasantness-unpleasantness index, but to all the indices used in this study.

In view of the several limitations of the P-U index, the tendencies observed for low, high, and medium groups to differ in that order in production of Rorschach textures perhaps deserves a second look. The weakness of the P-U index may be so great that this tendency is an artifact produced by unknown factors. On the other hand, a relationship may exist between the P-U index and the Rorschach indices which is sufficiently strong to permit even such a gross estimate as that used in this study to detect some differences; further research pertaining to this variable might reveal significant relationships. If these results are meaningful, affect apparently does influence awareness

of textures in that both high and low affect groups tend to be more aware of textures as indicated by Rorschach texture responses; although in this case one might also expect significant relationships to be found between the P-U index and associations to textures. It may be that affect represents the influence of factors which would focus S's attention more to textures, thus causing him to be more ready to recognize and respond to them. If so, the apparent discrepancy of results could be due in part to the fact that the association test forces response to textures, whereas the Rorschach permits Ss to select texture as a basis for responding. The Rorschach would thus reflect the influence of such an attention-focusing factor, whereas the association test would not. The greater production of Rorschach texture by the low affect group than by the high affect group might in this case suggest that negative affect associated with textures is a stronger attention-focusser than is positive affect. This seems reasonable; it behooves a person who abhors certain textures to be sufficiently conscious of all textures in order to avoid effectively those which he dislikes, whereas responding positively to textures in general would not necessarily necessitate or elicit such

differentiation.

The tactile discrimination test used in this study was also severely limited. As previously mentioned, only four values of each of three stimuli were used. The arbitrary limitations set by the apparatus used in this study limited the available stimulus possibilities; also, a considerably larger number of trials would probably be necessary in order to detect inter-S differences reliably (though the larger part of the tactile test session was spent in administering the discrimination test, even in this limited form). Other modes of stimulus presentation might be more effective in detecting differences and might also be less restrictive. The failure of scores on the TD index to correlate significantly with either the Rorschach texture indices or the TA index may have been due to this ineffectiveness of measurement; or, as previously stated, other factors than sensory capacity may be the primary determinants of awareness of texture.

The positive relationship found between association scores and production of Rorschach texture responses supports the assumption of the existence of a dimension of awareness of texture, of which both associations to textures and

Rorschach texture response are indicators. That these results were probably not due to verbal productivity alone was evidenced by values of $tau_{xy.z}$ obtained between associations to tactile stimuli and Rorschach texture, with total Rorschach responses held constant. In evaluating these results, one should remember that many of the criticisms leveled against the other tactile indices pertain as well to this one, e.g., restriction of stimuli by the demands of the apparatus, restriction of mode of response, absence of information concerning the effectiveness of selected stimuli in eliciting desired responses, and lack of reliability data. In addition, Ss were a very highly selected group.

The strong relationship between tactile and visual modes of perception, recognized as basic to the production of the Rorschach texture response (see Chapter I), is further attested to by the positive relationship found to exist between associations to non-visual tactile stimulation and the occurrence of visual Rorschach texture response. Interestingly enough, some Ss responded to the tactile stimuli by verbalizing concepts not necessarily texture-related and for which vision alone would have been the adequate stimulus, i. e. "that feels as though it would be pretty", "that feels red"

(or gold, or brown, etc.). One S based discrimination judgments on matching or non-matching visual "patterns" projected from textures. Another S reported that seeing the room about him had inhibited his responses to tactile stimuli, and suggested blindfolding Ss during administration of the tactile tests to permit freer responding. The occurrence of such "visual sensations" in response to the tactile stimulation might be interpreted as supporting Klopfer's assumption of a "contact sensation" in response to visual stimuli, assuming the relationship is symmetrical (Klopfer, et al, 1956). Apparently the two modes of responses are so highly interrelated as to be largely inseparable. The relationship is of course complicated by the fact that the visual response mode is the more general of the two--in all but blind Ss, any texture response could be accompanied by visual stimulation, whereas visual stimuli are not necessarily accompanied by tactile stimulation. Further investigation of the interrelationships of these perceptual modes should be productive.

From his assumption of the evocation of a "contact sensation" Klopfer (1956) goes on to assume that this sensation evokes a need for basic emotional security in the

individual, bringing out the prevailing emotional response to this need in the life of the individual as an influence on the conceptual use of the shading stimuli. This study provides no direct information relevant to these further assumptions. However, since awareness of textures apparently accounts for at least part of the variability in production of the texture response, further investigation of the awareness of texture dimension and its personality correlates should provide valuable information relevant to the interpretative significance of the texture response.

Ainsworth and Kuethe, in the study mentioned earlier (1959), found general support for the hypothesis that "sensitivity to texture is a generalized characteristic of the individual, manifesting itself in his responses both to the Rorschach ink blots and to real objects" among hospitalized patients but not among non-hospitalized male Ss. The results of this study, on the other hand, confirm a similar hypothesis for non-hospitalized Ss of both sexes but provide no information relating to hospitalized Ss. The apparent discrepancy between the results of the two studies for non-hospitalized Ss can probably be accounted for on the basis of the differences in method of testing the hypotheses, as

described in an earlier section of this report. Differences in subject selection techniques may also have contributed to the discrepancies in findings, since Ainsworth and Kuethe's non-hospitalized Ss were 34 male university students in an introductory psychology course, with no further selection criteria mentioned. A replication of the present study using hospitalized Ss would provide interesting comparisons both with Ainsworth and Kuethe's finding for hospitalized Ss and with the results of this study for non-hospitalized Ss.

Some of the work being done in the area of cognitive controls (typical individual patterns of perception, memory, and thinking) may be applicable to the study of awareness of texture as a variable producing the Rorschach texture response. For example, the cognitive control "scanning" is described as active searching of the perceptual or memory field, with resulting greater awareness not only of stimuli relevant to the scanner's intentions but of other stimuli as well. (See Gardner, 1959). E's impression, confirmed somewhat by verbalizations of some Ss in questionnaires and post-session conversations, was that responses to textures tended to be much less clear-cut than responses to visual

stimuli, as though tactile responses were a secondary or peripheral mode of perception as compared to vision. Consideration of the relative efficiencies of the two perceptual modes makes this seem reasonable. Vision appears to be the more efficient basis for responding to the world, since it permits recognition not only of texture but of form and color, since it does not require physical contact, and since it can transcend distance. If the tactile response is indeed secondary to vision, and if the scanning control applies across perceptual modes as well as within a given mode, one might predict that scanners would be more aware of textures than would non-scanners, and thus would produce more Rorschach texture responses than would non-scanners.

It would be interesting, too, to investigate the hypothesis that awareness of texture is but one aspect of a general responsiveness, or tendency to be aware of a variety of types of stimuli in the environment, and that this responsiveness varies in degree from individual to individual. For example, a highly responsive individual might, in addition to being aware of textures, be more highly aware of colors and nuances in hues than would the less responsive individual. On this assumption, a series of hypotheses might

be formulated pertaining to Rorschach responses other than texture; these would deal both with the production of the responses themselves and with the relationships between the perceptual factors producing various categories of responses. Investigation of such hypotheses would bear no direct relationship to the traditional interpretative hypothesis associated with categories of Rorschach responses; it would nonetheless be of value in supplementing the body of tested information pertaining to factors relevant to the production of such responses.

V. SUMMARY

This study was designed to test the general hypothesis that Rorschach texture responses, and other types of texture responses as well, are in part a function, or measure, of a dimension of awareness of texture which varies from individual to individual. Specifically, it was predicted that productivity of associations to tactile stimuli is positively related to productivity of Rorschach texture responses. In addition, it was predicted (1) that Ss having predominantly pleasant associations to tactile stimuli will differ significantly in production of texture responses from Ss having predominantly unpleasant or neutral associations; (2) that scores on a test of tactile discrimination are positively related to production of Rorschach texture responses; and (3) that male and female Ss will differ significantly in responding to tactile stimuli.

Fifty-four introductory psychology students selected on the basis of high scores on tests of verbal ability were tested with the Rorschach and with a test of responses to

unseen tactile stimuli, including associations to such stimuli, judgments of their pleasantness or unpleasantness, and judgments as to whether samples of an unseen tactile stimulus were the same or different. No significant sex differences were found for any index, nor did production of Rorschach texture responses vary with tactile discrimination as tested in this study. Ss tested with the tactile tests preceding the Rorschach test produced significantly more associations to tactile stimuli than did Ss to whom the Rorschach was administered first. No significant differences in Rorschach texture responses were found between high, medium, and low groups on the pleasantness-unpleasantness index; however, the tendency of these groups to fall in the order low > high > medium may indicate the probability of a relationship worthy of further investigation.

Associations to tactile stimuli and Rorschach texture productivity correlated positively, confirming the major hypothesis of the study. Total Rorschach responses were found to correlate positively with both types of texture responses, suggesting that the observed relationship is in part a function of verbal productivity. However, values of $tau_{xy \cdot z}$ obtained between Rorschach texture responses and

associations to texture with total Rorschach responses held constant indicate that verbal productivity alone does not account for the obtained results.

Weaknesses of the tactile tests used were pointed out, and some suggestions for additional research were made.

This study pertains only indirectly to traditional interpretative hypotheses associated with the Rorschach texture response, although the results appear to provide some support for Klopfer's assumption of the occurrence of a "contact sensation" in responding to the Rorschach test. However, additional studies of the factors involved in producing Rorschach responses would be of considerable value in providing information upon which evaluation of interpretive hypotheses might be based.

REFERENCES

Ainsworth, Mary D., and Kuethe, James L. Texture responses in the Rorschach and in a sorting test. J. Proj. Tech., 1959, 23, 391-402.

Gardner, R. W., Holzman, P. S., Klein, G. S., Linton, H. B., and Spence, D. P. Cognitive control: a study of individual consistencies in cognitive behavior. Psychol. Issues, 1959, 1(4).

Gordon, J. E. Rorschach responses as verbal behavior. J. Proj. Tech., 1959, 23, 426-428.

Klopfer, B., Ainsworth, Mary D., Klopfer, W. G., and Holt, R. R. Developments in the Rorschach technique, vol. 1. Technique and theory. Yonkers on Hudson: World Book, 1954.

Siegel, S. Nonparametric statistics in the behavioral sciences. N. Y.: McGraw-Hill, 1956.

Wittenborn, J. R. A factor analysis of Rorschach scoring categories. J. Cons. Psych., 1950, 14, 261-267.

APPENDIX A

Instructions to tactile test judges

Read these instructions carefully before beginning. If you have any questions, or if the criteria are not clear, do not go on until you have discussed the problem with me.

The question you will be answering in judging these protocols is, "How many different responses or associations did this subject give for this particular stimulus?" In general, the associations are clearly separated, and you will simply count the number and enter it in the appropriate place on the data sheets provided. For the cases where separation is not clear, the following criteria may be helpful.

1. What is wanted is the number of discrete associations produced.

a) If a subject verbalizes the same response more than once, it is counted only once.

b) Two similar or approximately equivalent associations will be counted as one association. "A wool coat or a wool jacket" would be considered as a single association. The manner or verbalization may help sometimes in judging whether or not the subject differentiates between his responses or considers them about the same.

2. Generalizations and examples.

a) If S gives several examples and then gives a generalization that includes them all, the examples are counted but the generalization is not (provided, of course, that the examples are discrete responses). Example: "A furry doll. A teddy bear. Stuffed animals in general." Count 2. (This is very near being a case of 1b above.)

b) If S gives a generalization and then cites cases of it, score only one. Example: "Rubber surface, like in rubber shower mats, drain mats, and things like that."

c) Sometimes S may give a generalization and several other responses which are related but which are according to other criteria separate. These cases are hard to distinguish from 2a and 2b above, and are fairly rare. However, if in some cases you feel that the generalization is

actually a separate response from those following or preceding it, score it separately.

3. More abstract responses such as "It feels dirty", "It feels like it has pretty colors", or "It would have a practical purpose" are counted as associations.

4. Descriptions. Simple descriptions of stimulus characteristics will not be counted. Here again, verbalization may help you to judge. Ss were answering the question, "What does it make you think of, or remind you of?" If they respond, "It is woven", do not score. "Something woven", score 1. Responses such as "It is threatening" are counted; this is not part of enumeration of physical tactile characteristics of the stimulus. The numbered list of stimuli may be a handy reference in deciding whether or not the response pertains only to the physical characteristics.

5. The pleasant-unpleasant judgments are not counted. S may go on to give additional associations after this judgment; these will be counted. Responses to "How does it make you feel?" will be counted, if they qualify as separate associations according to the other criteria. These responses follow F in the protocols.

APPENDIX B

Raw scores of 54 introductory psychology students on 3 indices based on response to unseen tactile stimulation

Group	Tactile test indices			Rorschach texture indices		
	TA	TD	PU	1	2	3
Females, Cond.						
Cond. A						
CCh	34	13	17	5	7	13
BC	25	14	21	2	4	10
CCR	57	18	19	1	1	3
JD	32	18	23	7	9	16
RF	16	14	21	1	1	1
KH	20	13	27	0	0	0
SH	27	6	22	1	1	2
FH	34	13	21	3	4	6
BL	29	12	28	2	3	9
BN	36	12	21	4	5	13
SS	21	15	23	0	0	0
JS	23	19	22	1	2	6
JT	27	13	20	6	8	12
Cond. B						
PA	24	10	21	0	0	0
EB	43	9	22	5	6	12
LB	24	12	20	1	2	2
BB	28	11	21	4	4	9
MC	20	12	23	2	4	10
MD	29	17	22	1	1	1
NH	21	22	22	0	0	0
PK	33	5	21	6	7	13
PL	37	10	25	7	11	27
MM	19	13	22	1	1	1
MO	22	13	29	6	9	17
BP	14	12	24	0	0	0
DR	19	25	24	4	7	12
SR	17	15	25	1	1	1

APPENDIX B

Group	Tactile test indices			Rorschach texture indices		
	TA	TD	PU	1	2	3
Males						
Cond. A						
RA	14	10	21	1	2	2
BB	23	10	24	2	3	9
JB	20	15	19	2	4	10
GB	15	22	24	1	1	2
MBR	63	23	18	6	10	21
PD	38	21	26	1	2	2
HF	17	18	21	1	1	2
CG	44	10	28	6	8	17
DL	37	18	23	17	29	44
UM	21	9	22	1	1	2
BO	33	16	20	6	9	14
DR	33	10	19	2	3	3
DS	35	18	24	5	7	11
Cond. B						
JA	19	20	25	1	2	4
BB	19	11	23	3	5	9
BBO	14	14	24	0	0	0
MBO	20	12	23	4	4	12
LD	17	13	23	2	2	4
BF	12	9	24	1	2	6
DH	27	18	19	3	3	3
DK	65	18	26	4	7	12
CM	22	16	29	2	3	5
FN	19	13	23	1	1	2
DO	27	16	19	4	8	16
GO	13	18	19	2	4	8
GT	26	22	25	4	8	18
DVS	20	11	22	2	2	4

APPENDIX C

Questionnaire

Name:_____Date Filled out:_____

Please answer these questions as soon as possible, while the sessions are fresh in your mind. Be as explicit as you can. If you need more room, write on the back of this sheet, labelling your answers. When you finish, return this questionnaire to Ellen Strommen, JD 210.

1. What relationships do you think there might be between what you have done in the two sessions?

2. Was it relatively easy or hard for you to respond when feeling the test surfaces? How do you account for its being easy or hard?

3. On the "Same-different" test, what factors helped you decide whether surfaces were the same or different, besides their texture? Were there any characteristics that helped you to identify certain surfaces, such as irregularities, sound, etc.?

4. Do you enjoy touching or handling things just because you like the way they feel? Please given an example or two.

5. What kinds of textures do you like? Dislike? Are there any surfaces that you react to very strongly, either positively or negatively, primarily because of the way they feel?

APPENDIX C

6. What are some textures that you find interesting? Uninteresting? What characteristics do these textures have that make them interesting or uninteresting to you?

7. Any other comments?

APPENDIX D

Responses of Ss on Questionnaires and Notebooks

In addition to the questionnaire previously mentioned, reports on this experiment prepared by participating Ss who were members of the honors section of introductory psychology were also made available to E. The following general summary of Ss' responses combines information taken from both sources.

In describing the relationship between the two experimental sessions, Ss fell into two major groups: those who thought the experiment was designed to study modes of perception, either as comparative ability to perceive stimuli presented to differing perceptual receptors, or as comparisons of responses to different types of stimuli; and those who thought the study was concerned with personality processes, either the establishment of the tactile test as a personality indicator or the study of responses to the two tests as determined by or detecting personality characteristics. Other suggested relationships included: study of imagery evoked by two types of stimuli; study of "mental processes"; both tests involved associations, both tests require

concentration; study of the meaning acquired by neutral objects as a result of past experiences.

The majority of Ss stated that the test surfaces were easy to respond to, giving familiarity of stimulus materials as the reason in most cases. Other reasons mentioned included: S had a good imagination and found it easy to form associations; the tests required no complex brainwork; the textures were varied and interesting; S let himself go; irregularities in the test surfaces facilitated responding in the same-different tests. Ss reporting that they found the test hard to respond to generally (though not always) referred to specific portions of the test. Reasons given for finding the testing hard included unfamiliarity of the task; S was afraid he would look silly or foolish; it takes longer to respond to an object by touch than by sight; the stimuli could represent too many things; the paper samples were difficult to discriminate because they were so similar; the fingers became numbed by the sandpaper samples in the same-different test (mentioned by three Ss as a comment on the tactile tests in general); the association stimuli aroused no particular affect, making the pleasant-unpleasant judgment difficult. The few Ss having mixed reactions in general stated

that it was easy to respond at first but that once a concept had been developed it inhibited the formation of other concepts; or that ease of response varied with stimulus familiarity.

Factors aiding Ss in making discriminations between the tactile stimuli included the following: irregularities in the paper and leather samples, sounds associated with the sandpaper and some of the paper, varying coarseness of the sandpaper, detectable irregularities in the blocks beneath the stimulus, irregularities of the inner edge of the attached wooden frame, projected mental images of the reference surface ("light-dark patterns") which must be matched by the comparison surface, the feeling of scraping a fingernail across the stimulus, associations with past experience. One S stated that he looked for irregularities but found none; two specifically stated that sound was not a help; seven stated that they used texture alone in making their judgments. The descriptions of some of the "irregularities" used in making discriminations was rather intriguing, as for example the "nap" or hairs on the leather, the grain or coarseness of the sandpaper, the "fuzz" on the paper. E would be curious to know what Ss mentioning these factors would consider

to be tactile characteristics.

Eight Ss indicated that they do not enjoy touching or handling things just because they like the way they feel; interestingly enough, all eight were male. A quick check of scores showed these eight to be well distributed throughout the score distributions of the various indices. Three Ss sometimes enjoyed handling things for their textures; the remainder stated that they do enjoy handling things, and specified objects primarily in the following categories: soft-furry, soft-smooth, soft-fluffy, smooth-metallic, smooth-nonmetallic, and "things that make me feel pleasant", such as "running over a sandy beach, or running sand through your fingers". The types of textures liked by Ss fell generally in the same categories as those listed above, i.e. soft, smooth, furry, wooley; in addition various Ss also mentioned hard, rough, cold, "bouncy", and textures which provide variety. Disliked textures included wirey or scratchy, sticky, slimy, hard and rough, dirty-feeling, soggy, clammy, cold, harsh-sounding, coarse, spongy, and unsymmetrical textures.

In describing textures found interesting or uninteresting, six Ss felt that the question of interest was irrelevant

to textures; 15 either directly or by implication equated the interesting-uninteresting dimension with the like-dislike dimension. Of other reasons specified, the majority mentioned variability of textures as being the major source of interest, while lack of variability made the texture dull. Other Ss mentioned strange, unfamiliar, or unusual textures as most interesting.

A number of Ss, predominantly males, felt that their responses in both sessions had been inhibited by the proximity of E and by the awareness that all responses were being recorded. They suggested separating S and E with screens or having S speak into a dictaphone. Several male Ss specifically mentioned sex of E (female) as a response inhibitor. Ss also mentioned the following as response-inhibiting factors for the tactile tests: the familiarity of tactile stimuli; the unfamiliarity of tactile stimuli; the austerity of the surroundings in the testing situation; the fact that there were visible surroundings (S mentioning this factor suggested blindfolding Ss in future experiments); uncertainty as to E's reactions and fear of seeming foolish; encountering one stimulus which was found very unpleasant, which inhibited responses to later stimuli; immediate recognition of or

response to a given stimulus, which inhibited further responses to that stimulus.

Other comments made by Ss included the following: directions for the tests were incomplete and not sufficiently explicit; directions were too complete and unnecessarily restricted responses. The tactile discrimination test was very frustrating and, for one S at least, boring. E was too reserved and "secretive" in handling the testing sessions; E's approach was overly informal and personal. Rest pauses should have been used in the tactile test to avoid the "numbing" effect mentioned previously. The urge to identify tactile stimuli was extremely strong, and failure to identify was very frustrating, even though S was aware that identification per se was not the desired response. Affective response to a given stimulus sometimes changed as S continued to touch it, complicating affective judgments. Interesting comparisons might be made and some of the "numbing" effect preferred hand only.