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Food-related responses on an inkblot test as a function of experimentally induced set and time without food.

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FOOD-RELATED RESPONSES ON AN INKBLOT TEST
AS A FUNCTION OF EXPERIMENTALLY INDUCED
SET AND TIME WITHOUT FOOD



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Alan R. Clarke

R414

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Studies, discussions, and experiments on the nature of the relationship between need states, particularly hunger, and perception and association are numerous, but there is a decided lack of agreement as to the nature of this relationship. An initial experiment in which the hunger drive was manipulated by varying the number of hours since the last meal was conducted by Sanford (12). In his first study he tested the subjects before and after meals. In his second study (13) he kept a record of the number of hours that had elapsed since the last meal for the control group, and instructed the experimental group to fast for 24 hours. He studied the effects of the subjects' abstinence from food on their performance in word association tests, completion of food-related drawings, and chain association tasks. In both studies Sanford found a positive relationship between the amount of food-deprivation and the frequency of food-related responses. The acceleration of the curves, however, was negative, and fell off as food-deprivation was increased to 24 hours. Sanford's interpretation of these results indicated two possibilities: the negative acceleration might merely have been the result of the effect of the normal food cycle upon the subjects' perception, or the subjects might have tended to suppress the expression of a sufficiently disturbing need. Sanford stressed his belief that there are important individual differences in such suppression.

Levine, Chein, and Murphy (9) investigated the effect of food deprivation on perceptual behavior. The subjects were tested using 40 chromatic and 40 achromatic pictures, some involving food, and some irrelevant to food. All of them were considered ambiguous in that they were viewed through a ground glass screen. The number of

food-related responses to the chromatic cards increased at 3 hours of deprivation, but decreased beyond 3 hours. The food-related responses to the achromatic cards increased at 3 and 6 hours of deprivation, but then decreased. The conclusion by the authors, that ambiguity favors realistic responses when deprivation is sufficiently great, is questionable, in that it was based on the a posteriori assumption that the achromatic cards were more ambiguous than the chromatic.

McClelland and Atkinson (10), using as subjects 108 Navy personnel, projected blank images and smudges on a screen with varying amounts of hints as to what they might be. In three of the projections the experimenter urged the subjects to name objects, in two of them to name what instrumental acts were occurring on the screen, in two of them what the subject's subjective feeling was, in two of them to name places associated with eating. Three were presented with no hints. The main result was that as hunger increased from 1 to 4 to 16 hours, the number of food-related responses increased in a negatively accelerated manner. Food-related responses to smudges, however, were less frequent than to blank screen conditions. Responses which were labelled by the authors as "instrumental" (knives, plates, etc.) showed the greatest increase in frequency as compared with "goal-object" responses (hamburger, chicken leg, etc.) Another of the results was that the greater the structuring of the task, the greater was the frequency of food-related responses, and this result was characteristic of all groups. In a second study on the projective expression of needs, Atkinson and McClelland (1) studied the relation-

ship of hunger up to 16 hours to responses to the Thematic Apperception Test. They found that as food deprivation increased, there was no overall increase in the number of subjects reporting food imagery. There was an increase, however, in food-deprivation themes, need for food, and activity which was successful in overcoming obstacles to food procurement, but not in obtaining food.

Epstein and Smith (5) have done a study in which they compared a one-hour and a four-hour group on food-related responses to a specially constructed test of thematic apperception. The results showed that the four-hour group relative to the one-hour group gave stronger food-related responses to pictures low in food-related cues, and weaker food-related responses to pictures high in food-related cues.

In a study by Wispé (15) subjects were deprived of food for 0, 10, and 24 hours, and presented a word association list of 24 words, matched for commonness and need-relevance. The subjects gave increasing total food and water responses up to the 16th hour, and then these responses decreased. The number of responses pertaining to activities instrumental to need satisfaction increased most, while names of need satisfiers decreased. Here again a negative acceleration of food responses as a function of time without food was observed.

The last of the more pertinent studies was an investigation by Kjenaas and Brozek (7) of changes in personality during a protracted period of semi-starvation. Observation of the subjects during the semi-starvation period indicated that the majority of them were preoccupied with thoughts and events related to food; yet the results of testing with the Rorschach and the Rosenzweig Picture Frustration

Test were negative. The responses of the experimental group could be differentiated from those of the control group only by the unusual nature of the food responses made by the experimental group on a word association test.

In a study by Taylor (14) an experimental group was asked to abstain from one meal, and was tested under 9 hours of deprivation. Their performance in a task involving visual duration thresholds was compared with the performance of a control group. Taylor's results indicated that the amount of deprivation used bore no relationship to food-related responses.

The majority of the studies (9,12,13,15) agree that there is a negative acceleration of food-related responses with increasing food-deprivation. One study on prolonged hunger (7) and another on slight hunger (14) fail to find any evidence for a relationship between hunger and food-related responses.

Statement of the Problem

Past studies on need and perception, especially those concerned with hunger, have seldom utilized any control for experimentally induced set. In one study Taylor (14) found that set effects, in general, comprised an important variable in influencing the responses. It is apparent that requiring a subject to abstain from food for the purpose of placing him in an experimental group, a procedure followed in many studies, carries with it the implication that the study is food-related. Consequently it becomes necessary to control for experimental set if the effects of time without food are to be investigated. In the present study, which investigates the relationship between time without food, and food-related responses on the Rorschach,

the effect of experimentally induced set was controlled and evaluated.

Taylor's study (14) has also questioned whether 4 hours of food deprivation is a sufficient interval to produce a significant difference in responses between an experimental and a control group. The case of a 4 hour group in studies of this type has the advantage that no instructions to abstain need be employed, thereby avoiding set effects. The present study, with its 4 hour deprivation period is designed to provide further information on this question.

Finally, it was considered appropriate to investigate different types of food-related responses in the present study. McClelland and Atkinson (10) found that instrumental responses functioned in a different manner than object responses, and it is conceivable that other classes of response may have differential effects, as well. Therefore the groups of the present study were compared on the basis of the various types of responses described below.

Experimental Method

The subjects for the present study were 120 male undergraduate students, chosen from fraternities and introductory psychology courses. Insofar as it was possible, an equal number of fraternity members and psychology students were placed in each group; however, due to the lack of availability of a sufficient number of other individuals who volunteered to miss meals, the 16 hour deprivation group was comprised entirely of fraternity members. Group A had eaten within one hour of being tested. Assurance that they had eaten no earlier was gained (a) by testing all Group A subjects at 1 p.m., immediately after their scheduled lunch hour, and (b) by administering a questionnaire which obtained information pertaining

to the time of the subjects' last meal. In addition, the questionnaire elicited information on snacks between meals, and the conscious holding back of food-related responses. This questionnaire, a copy of which may be found in the appendix, was administered to all subjects. If, on the basis of the answers to the questionnaire, an individual did not meet the criterion of his particular group, he was dropped from the experiment. On this basis three prospective subjects were disqualified.

Group B was comprised of subjects that had eaten no less than 4 hours before entering the experiment. Testing was begun at 4 p.m., 4 hours after their scheduled noon meal. The subjects in Groups A and B were given no information concerning the nature of the study. The only information given them was in the form of the instructions for the Group Rorschach Test (6), and instructions to encircle the location of their percepts on location charts provided for that purpose. The location chart and the instructions may be found in the appendix.

Group C had not eaten for at least 16 hours before entering the experiment. The volunteers for this group were called together for a meeting at their fraternity house two evenings prior to the day of the experiment, and instructed to eat nothing after the evening meal of the day immediately preceding the day of testing. The information which was given them, in addition to the instructions for the Group Rorschach was as follows:

It is thought that the imagination of an individual may be affected by conditions of fatigue, hunger, extreme temperatures, and other physiological states. This is one of a series of experiments designed to investigate the effects of these conditions on imagination.

The possibility of introducing some sort of food set in this group was recognized, since they had been given the above information, and had been required not to eat anything from the time of the previous day's evening meal until after they were tested at 4 p.m. the following day. In order to control for the food set, Group D was included.

Group D was tested under the same conditions as Group A, except that they were given instructions identical to those given to Group C, the group that had been asked to abstain from meals for 16 hours. Group D, therefore, was not food-deprived, but having been given the same food-set instructions as Group C, provided a measure of the effect of those instructions.

The stimulus material consisted of 20 inkblots, 10 from the Rorschach set, and 10 from the parallel Behn-Rorschach set (2). The Behn blots were added in order to increase reliability by obtaining a greater number of food-related responses than might have been produced had only the 10 Rorschach cards been used. All of the blots were mounted in 2x2 slide form, and presented to the subjects by projecting them on a screen. The projector was set up for all groups so that the size of the image on the screen was 4½x4 feet. The blots from the two sets were presented in alternation, i.e., Rorschach I, Behn II, Rorschach III, Behn IV.....Behn X. No lights were used during the presentation as the illumination from the projector provided ample light for the subjects to record their responses. Each ink blot was presented for two minutes. The subjects were instructed to give 3 responses to each blot, or, in the event that this was not possible, to attempt to make up any deficit on the subsequent blots.

These instructions were designed to insure that the total number of responses would be approximately 60 per subject. Any subject who did not give 60 responses was dropped from the experiment, this being the case for 3 of the subjects. These were replaced by subjects with the appropriate degree of deprivation.

Responses to the inkblots were scored according to the following categories:

1. Total food imagery: the total number of food-related responses.
2. Popular: food responses which were given by two or more subjects in the total sample.
3. Unique: food responses which were given by no more than one subject.
4. Human: food-related responses involving human beings (e.g., a man eating an apple).
5. Animal: food-related responses involving animals (e.g., bears eating).
6. Activity: responses involving animals or humans in food-related activity. This category is further divided into instrumental and goal activity responses.
 - (a) Goal activity: responses involving humans or animals engaged in actual food consumption (e.g., girls eating ice cream).
 - (b) Instrumental activity: responses involving humans or animals engaged in preparing or procuring food (e.g., men hunting).
7. Object: responses pertaining to food with no activity involved. This category is further divided into instrumental and goal object responses.
 - (a) Instrumental object: an object which is used in the preparation of food or the procurement of food (e.g., knife, fork).

(b) Goal object: the name of a food, (e.g., fried egg, raw meat).

8. Food-related anatomy: any response the central idea of which involved the mouth or stomach.

Results

All differences between groups to be reported here were evaluated by Chi-square analysis. The responses for each scoring category were tallied in a pooled frequency distribution, and the score closest to the median was used as the breaking point. The data for all comparisons were evaluated by 2x2 contingency tables in which the number of subjects in each group above and below the breaking point were compared. Yates' correction for continuity was used throughout. It was decided to eliminate from consideration any scoring category for which there was an incidence of less than five individuals in the total sample, and on this basis the Human, Animal, and Instrumental activity categories were omitted from the analysis.

In analyzing the data it was necessary, initially, to determine whether being in one experimental group or another had any significant effect upon suspicion that the study was food-related. Significant differences in this analysis would determine whether experimentally induced set might be an important variable to control. Secondly, it was necessary to determine whether suspicion that the study was food-related actually influenced food-related responses to a significant degree. Thirdly, it was necessary to determine whether experimentally induced set had an effect, apart from arousing suspicion of the nature of the study. Significant differences in this analysis would indicate that knowledge about the nature of the study had an effect on responses, even though the subjects were not consciously aware of it. Until these analyses had been accomplished it was not feasible to compare groups

of different levels of deprivation who at the same time differed in set effects. These initial analyses are presented under the sub-headings of "The Influence of Experimentally Induced Set Upon Suspicion of the Nature of the Study", "The Influence of Suspicion that the Study was Food-related upon Food-related Responses", and "The Effect of Experimentally Induced Set upon Food-related Responses". Upon completion of these analyses the appropriate major comparisons of the study could be made. These are presented under the sub-headings of "Effect of Time without Food upon Food-related Responses", and "Effect of Time without Food upon Food-related Responses When There is no Suspicion of the Nature of the Study."

The Influence of Experimentally Induced Set upon Suspicion of the Nature of the Study. Question 1 of the questionnaire was designed to determine the extent to which each subject suspected the nature of the study. In order to determine the effect of the experimental conditions on such suspicion, the responses for this question were compared for selected groups. This was done by comparing those who endorsed choice (a), "no idea", with those who endorsed choice (b), (c), or (d), indicating at least some idea about the nature of the study (see appendix). Table 1 presents the number of subjects in each experimental group who fell in the "suspicious" and "unsuspicious" categories. Surprisingly no statistically significant difference was found between Groups D and A, the control groups who were and were not, respectively, given information as to the nature of the study, although the difference was in the expected direction. When Group C, the 16 hour group, was compared with Group D, the 1 hour group, both of which had received information, a Chi-square value of 11.88 (.01 level) was obtained, indicating that the

Table 1

Number of Individuals Who Indicated Suspicion
of Nature of Study in Relation
to Experimental Conditions

<u>Group</u>	<u>Condition</u>	<u>Suspicious</u>	<u>Unsuspectious</u>
A	1 Hr. Deprivation No Information	15	15
D	1 Hr. Deprivation Information	18	12
B	4 Hrs. Deprivation No Information	10	20
C	16 Hrs. Deprivation Information	29	1

same information as to the nature of the study had a greater effect upon suspecting its nature in subjects who had abstained from eating than in subjects who had not abstained. No significant difference was found between the 1 hour group (A), and the 4 hour group (B), neither of which had been given information concerning the nature of the study. It may be concluded that the experimental conditions influenced suspicion about the nature of the study when instructions were reinforced by self-imposed abstinence.

The Influence of Suspicion that the Study was Food-related upon Food-related Responses. In order to investigate whether suspicion of the nature of the study had an effect upon food-related responses, without confounding suspicion with time without food, the subjects in each experimental group were divided into those who indicated they had some idea of the nature of the study, and those who had no idea. This was not possible for Group C where only one subject indicated he had no idea of the nature of the study. Consequently the division for this group was made on the basis of whether there was an exact or an approximate idea, by comparing those subjects who chose (a), (b), or (c), with those who chose (d). Choices (a), (b), and (c) would indicate that the subject had only an approximate idea of the nature of the study, whereas choice (d) indicated an exact idea. Table 2 summarizes the comparisons made within these groups. None of the Chi-square values approached significance, indicating that an individual's subjective estimation of his knowledge pertaining to the nature of the study had no significant effect upon his response tendencies. Since none of the comparisons resulted in significant difference, it was decided to combine Groups A, B, and D, thereby increasing the number

Table 2

Within Group Comparisons of Pd-related Responses by Ss
 Who Did and Did Not Have an Idea About the Nature of the Study
 (Figures in table represent No. of Ss above and below breaking point)

	<u>Total Pd. Imagery</u>		<u>Inst. Obj.</u>		<u>Total Goal Obj.</u>		<u>Pop. Goal Obj.</u>		<u>Unique Goal Obj.</u>		
	<u>No Idea</u>	<u>Idea</u>	<u>No Idea</u>	<u>Idea</u>	<u>No Idea</u>	<u>Idea</u>	<u>No Idea</u>	<u>Idea</u>	<u>No Idea</u>	<u>Idea</u>	
Group A	Above	6	5	6	3	7	5	4	3	4	4
	Below	9	10	9	12	8	10	11	12	11	11
Group B	Above	11	9	4	5	14	8	13	5	11	5
	Below	9	1	16	5	6	2	7	5	9	5
Group C*	Above	8	8	6	7	8	13	7	8	6	9
	Below	6	8	8	9	6	3	7	8	8	7
Group D	Above	7	10	5	6	10	15	8	11	5	9
	Below	5	8	7	12	2	3	4	7	7	9
Groups A, B, & D	Above	24	24	15	14	31	28	25	19	20	18
	Below	23	19	32	29	16	15	22	24	27	25

*In Group C, comparisons are between Ss with an exact and an approximate idea of the nature of the study.

of subjects involved in the comparisons. Still no significant relationship occurred between the number of subjects who gave food responses and whether they suspected the nature of the study.

The Effect of Experimentally Induced Set upon Food-related Responses. Although it was found that suspicion as to the nature of the study had no significant effect upon the number of food-related responses, it is possible that experimentally induced set exerted an effect apart from arousing conscious suspicion of the nature of the study, i.e., the effect of set may have been operating at a sub-threshold level of awareness. In order to determine whether information produced an effect on food-related responses, the 1 hour control group which had been given information on the nature of the study was compared with the 1 hour control group which had not been given such information. The subjects above and below the pooled median for each score were compared using the Chi-square analysis already described. Table 3 presents the frequencies used in the comparisons. Although no differences were found for total food imagery, significant differences occurred in two other categories. The number of subjects in Group D, the 1 hour control group with information, that gave more than one goal object response, significantly exceeded those in Group A, the 1 hour control group with no information; the Chi-square value for this comparison was 10.15, significant at beyond the .01 level. The same relationship held for popular goal object responses ($\chi^2=8.22$, sig. at beyond the .01 level). There was a similar but non-significant tendency for unique goal object responses. It may be concluded that experimentally induced set, apart from conscious suspicion, has an influence upon certain types of food-related responses.

Table 3

Number of Subjects Above Breaking Point
on Rorschach Content Scores. N=30 in all Groups.

RORSCHACH SCORE	BREAKING POINT	GROUP A 1 HOUR <u>NO INFO.</u>	GROUP D 1 HOUR <u>INFO.</u>	GROUP B 4 HOURS <u>NO INFO.</u>	GROUP C 16 HOURS <u>INFO.</u>
Total Food Imagery	1-2	11	17	20	16
Goal Object	0-1	12	25	22	21
Instrumental Object	0-1	8	11	9	13
Goal Activity	0-1	6	5	7	1
Popular Goal Object	0-1	7	19	18	15
Unique Goal Object	0-1	8	14	16	15
Food-related Anatomy	0-1	1	4	7	6

Food-related Responses as a Function of Experimental Group

Effect of Time without Food upon Food-related Responses. The comparisons that would be indicated for determining the effect of time without food upon food-related responses would be between Groups A, B, and C, the 1, 4, and 16 hour deprivation groups, if the effects of experimentally induced set were unimportant. The finding that set had significant effects upon food-related responses posed a problem in comparing Group B the 4 hour group that had not been given an instructional set, with Group C, the 16 hour group that had been. Although this comparison was made (see Table 3) and the 16 hour group was found to give significantly fewer goal activity responses than the 4 hour group, ($\chi^2=5.19$, .05 level), it was not possible to determine to what extent the results were due to set, drive level, or their interaction.

The 1 hour group with information (Group D) and the 16 hour group with information (Group C) present a more logical comparison, although the data in Table 1 gives reason to suspect that the effect of information reinforced by 1 hour of hunger may not be the same as that reinforced by 16 hours of hunger. The frequencies used for the comparison of these two groups are presented in Table 3. No significant differences were found, although there is a tendency for the 16 hour group to give fewer goal activity responses ($\chi^2=1.66$, .25 level).

The "purest" of the comparisons in regard to the effect of time without food is between Groups A and B (see Table 3), in that neither of these groups received information regarding the nature of the study. Group B gave a significantly greater number of responses in the categories Total Food Imagery ($\chi^2=4.27$, .05 level), Goal Object ($\chi^2=5.49$, .05 level), Popular Goal Object ($\chi^2=6.86$, .01 level) and

anatomy responses ($\chi^2=5.19$, .05 level). There was a tendency for Group B to exceed Group A in every other category, as well.

It may be concluded that time without food influences food-related responses apart from instructional set effects.

Effect of Time without Food upon Food-related Responses When There is no Suspicion of the Nature of the Study. Despite the lack of significance in the section which compared number of food-related responses as a function of suspicion of the nature of the study, as an added precaution in view of the tendencies indicated in that section, it was decided to investigate the effect of time without food upon food-related responses using only subjects who indicated that they had no suspicion about the nature of the study. It was necessary to omit Group C from these comparisons since only one subject in that group claimed to have no suspicion of the nature of the study. The data from these comparisons appear in Table 4.

Group A vs. Group D. Group D, the 1 hour control group with information, tended to give more total goal objects, ($\chi^2=2.47$, .10 level), and popular goal objects ($\chi^2=2.90$, .10 level) than Group A, the control group with no information, although these tendencies did not approach significance (see Table 4). These tendencies reflect identical relationships in the comparisons made between all subjects in the same experimental groups (see Table 3), so that the lack of significance in the comparisons under consideration can be accounted for by the decrease in the number of subjects used.

Group A vs. Group B. Group B, the 4 hour group, tended to give more total goal objects, ($\chi^2=1.11$, .50 level), popular goal objects, ($\chi^2=3.66$, .10 level), and unique goal objects, ($\chi^2=1.80$, .25 level),

Table 4

Number of Subjects Above Breaking Point on Rorschach
Content Scores, Using Only Subjects
Who Had No Idea of Nature of the Study.

<u>RORSCHACH SCORE</u>	<u>BREAKING POINT</u>	<u>N=15 GROUP A 1 HOUR</u>	<u>N=12 GROUP D 1 HOUR</u>	<u>N=20 GROUP B 4 HOURS</u>	<u>N=27 GROUPS A&D 1 HOUR</u>
Total Food Imagery	1-2	6	7	11	13
Instrumental Objects	0-1	5	5	4	10
Total Goal Objects	0-1	7	10	14	17
Popular Goal Objects	0-1	4	8	13	12
Unique Goal Objects	0-1	4	5	11	9

Note- Neither Group A nor Group B was given informa-
tion concerning the nature of the study. Group
D was given information in their instructions.

as compared with Group A, the 1 hour control group (see Table 4). These non-significant differences correspond to the significant differences in the same categories when all subjects in Groups A and B were compared (see Table 3).

Groups A and D vs. Group B. Since there was no significant difference between Groups A and D, the control groups, and since these two groups were equally deprived, their data were combined, and compared with Group B, the 4 hour group (see Table 4). This increase in the number of subjects used in the comparison should increase the reliability of the results. Here, again, there were no significant differences, although the 4 hour group (B) tended to give more popular, ($\chi^2=1.22$, .50 level) and unique goal object ($\chi^2=1.42$, .25 level) responses than Groups A and D combined.

Discussion

Experimentally Induced Set. It was found that experimentally induced set is an important variable in influencing food-related responses. This finding is in agreement with Taylor's (14) results. It was also found that set induced by instructions has a greater effect upon suspicion of the nature of the study for 16 hours of deprivation than for 1 hour. Unfortunately, it was impossible in the present study to separate the effects of drive and set upon food-related responses for these two groups. The conclusion which appears to be warranted, however, is that as long as abstinence is required of an experimental group, as it has been in all previous studies investigating more than 4 hours of hunger (1, 7, 9, 10, 12, 13, 15), the negative acceleration reported may have been due to the influence of experimentally induced set, rather than time without food.

Effects of Time without Food. Taylor (14) has questioned whether a 4 hour deprived group differs sufficiently from a 1 hour deprived group to give a different number of food-related responses. The present study supports the view that 4 hours of hunger produces significant differences when there is no reason to suspect the nature of the study. The difference in results between this study and Taylor's may be due to the fact that her response measure involved perceptual recognition thresholds for words, whereas the present study involved associations to ambiguous stimuli. Lazarus (8), however, using a task similar to Taylor's, obtained significant differences between 1 and 4 hours of hunger, so that no definite conclusion, at present, can be reached about the effect of 4 hours of hunger upon selective perceptual threshold.

Type of Response

It was found that certain responses measure the several groups better than others. The indication is that, at least at low levels of drive strength, goal-object responses are better predictors of a need than instrumental object responses. This finding is in the opposite direction from McClelland and Atkinson's (10) findings. This disagreement may be based upon the fact that different stimuli were used in this study and the studies of McClelland and Atkinson, and that in Atkinson and McClelland's study instructional set effects were not considered.

That goal-object responses were better indicators of need states than goal-activity responses may be a result of the consideration that object responses, as they were scored in the present study, tended to be more directly food-related than activity responses.

Further Considerations

During the course of the present study, several methodological difficulties became apparent. It is possible that the questionnaire,

in that it presented choices, may have suggested responses to the subjects which might not have occurred to them otherwise. Possibly an open-ended question about suspicion of the nature of the study would have given more accurate results.

It was necessary to choose subjects from fraternities to comprise the 16 hour group, in order to obtain subjects that would cooperate in abstaining from meals. Consequently, a constant error may have entered, in that it was not possible to randomize the subjects in the treatments.

Summary

The purpose of the present study was to investigate the effects of experimentally induced set and time without food on food-related responses to an inkblot test. One hundred and twenty male undergraduate students served as subjects. These were equally divided into a 1 hour, a 4 hour, and a 16 hour hungry group, with an additional 1 hour control group to ascertain the effects of experimentally induced set. Each group was shown 20 inkblot slides, and asked to give 3 responses to each. The groups were compared on the number of responses in each of several Rorschach scoring categories. The major conclusions of the study were:

(1) Experimentally induced set caused a significant increase in food-related responses, and, as such, should be taken into account in further studies of this type.

(2) A four hour group gave more of certain types of responses than a one hour group, when neither group had been given an instructional food set. This supports the notion that 4 hours of hunger is sufficient to produce significant effects in food-related responses.

(3) Certain types of food-related responses differentiated hunger groups more effectively than others.

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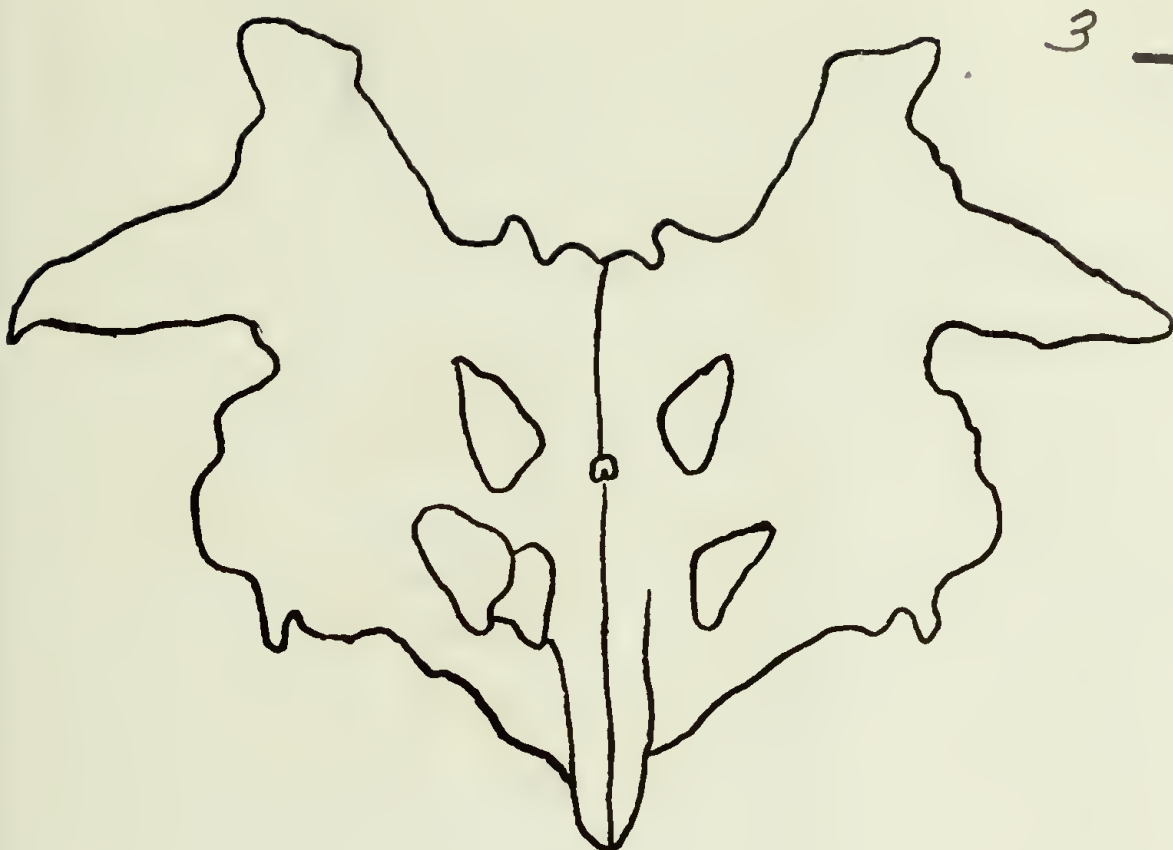
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APPENDIX A
LOCATION CHARTS

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3

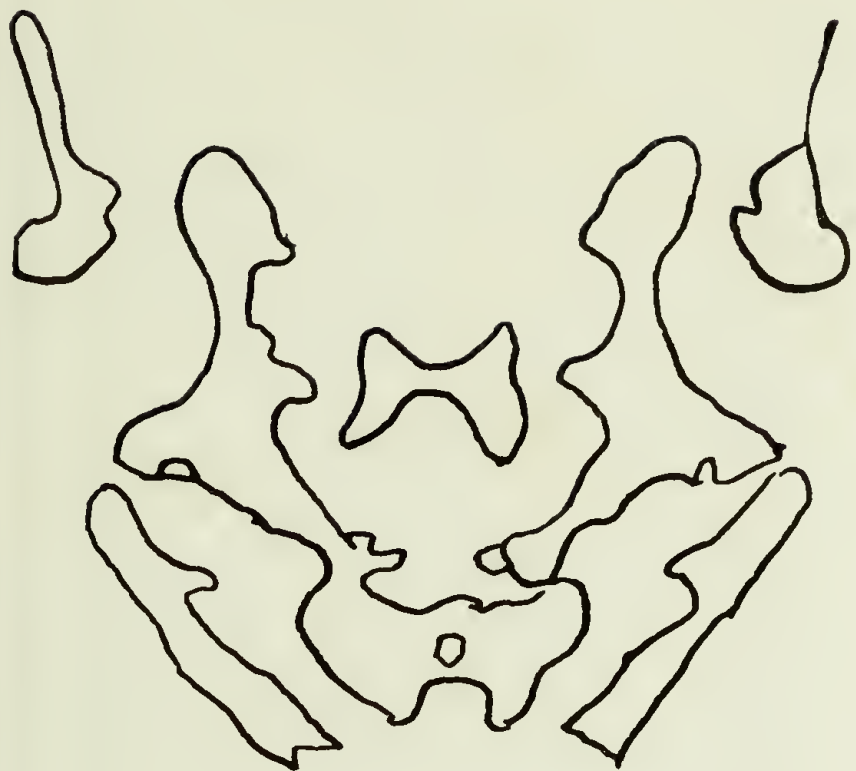


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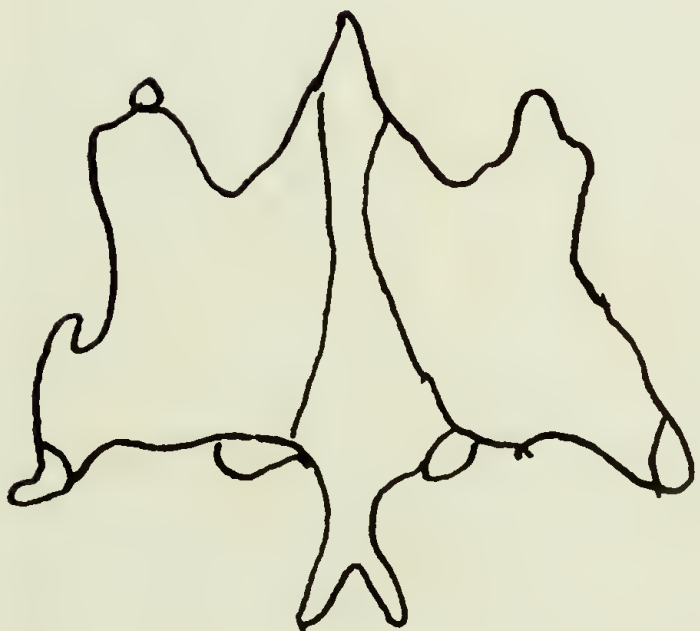
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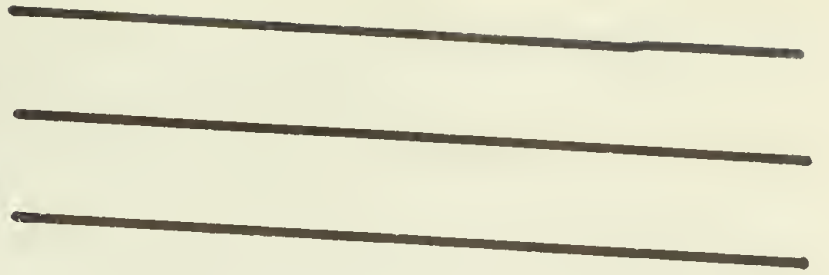
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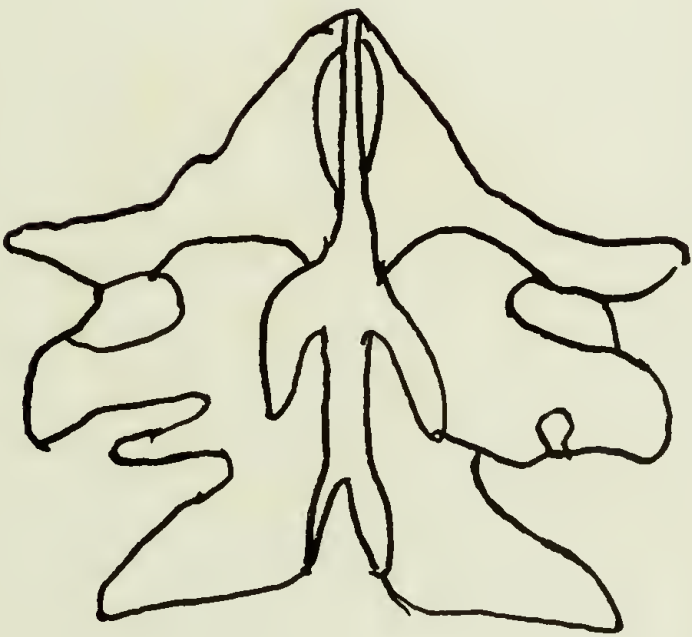
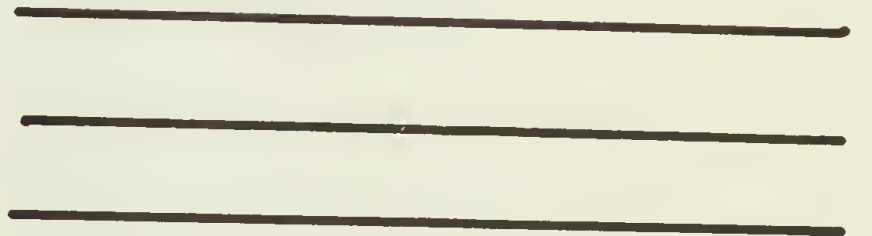
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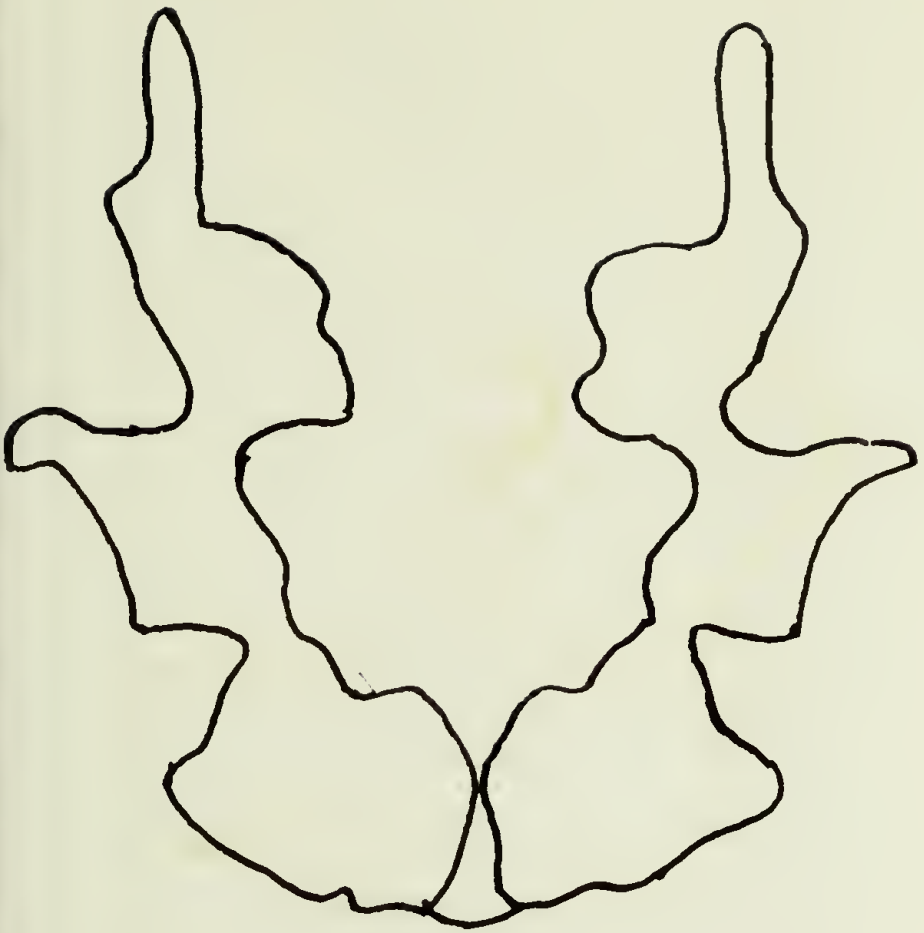
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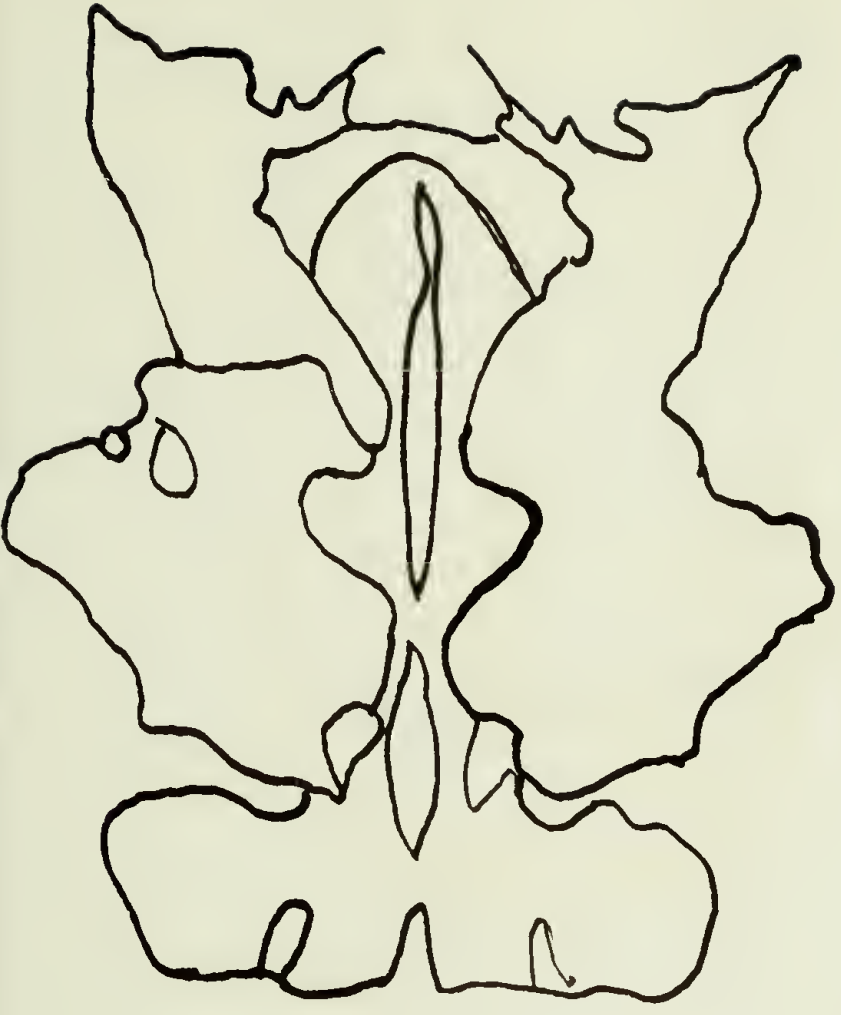
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- 3 _____

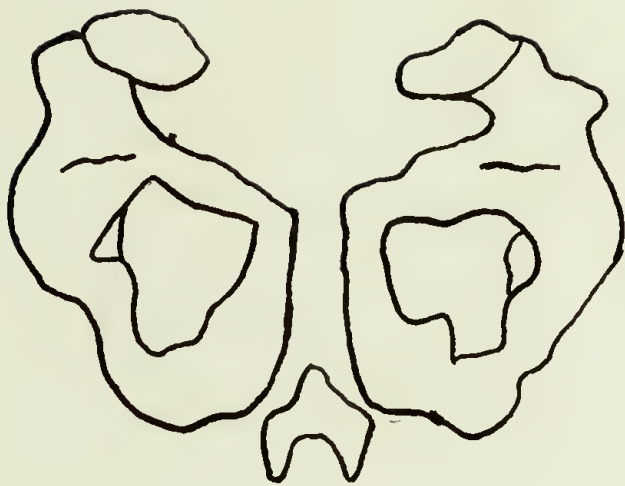
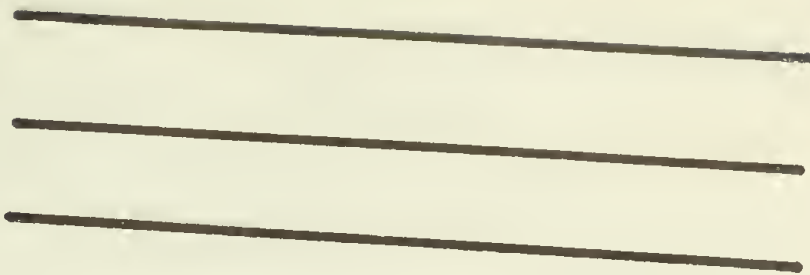


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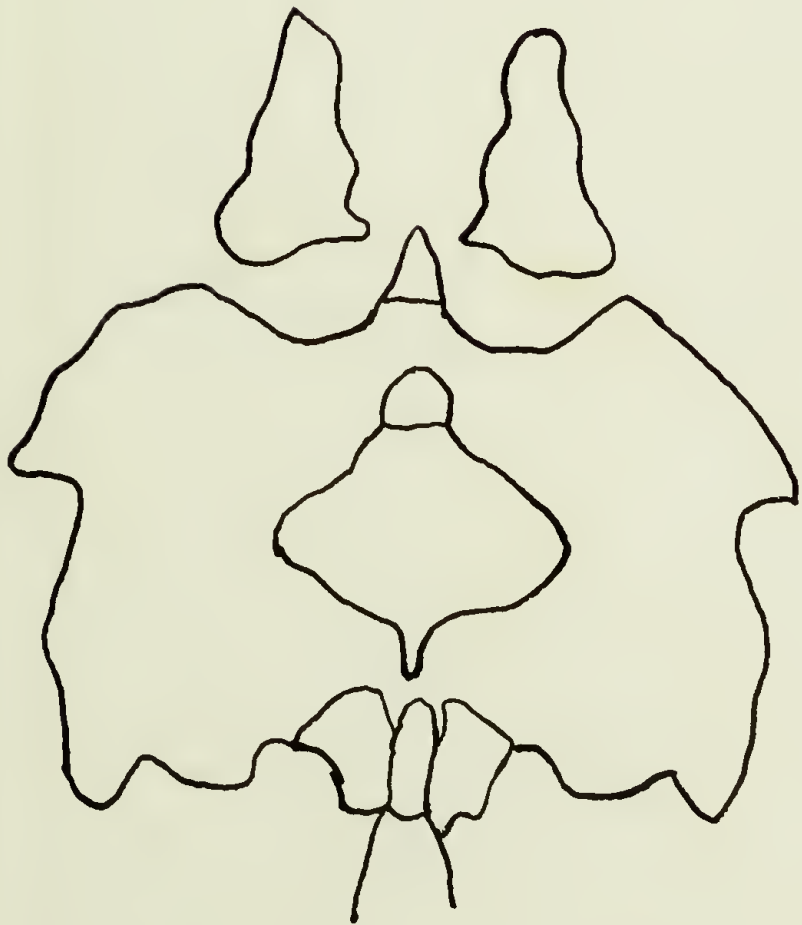
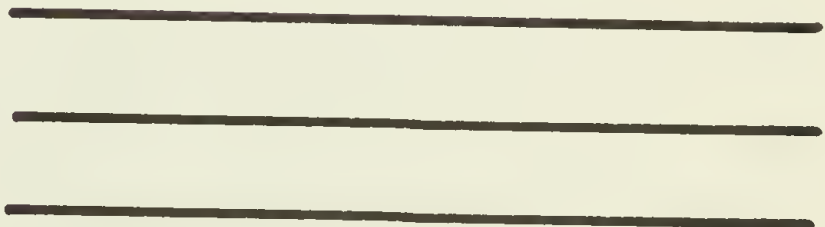
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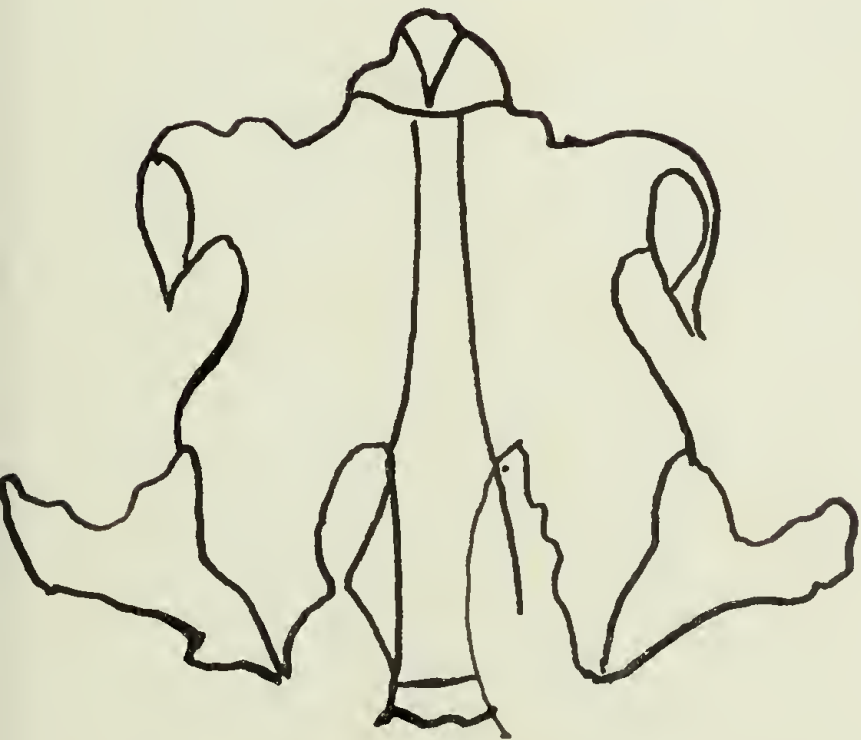
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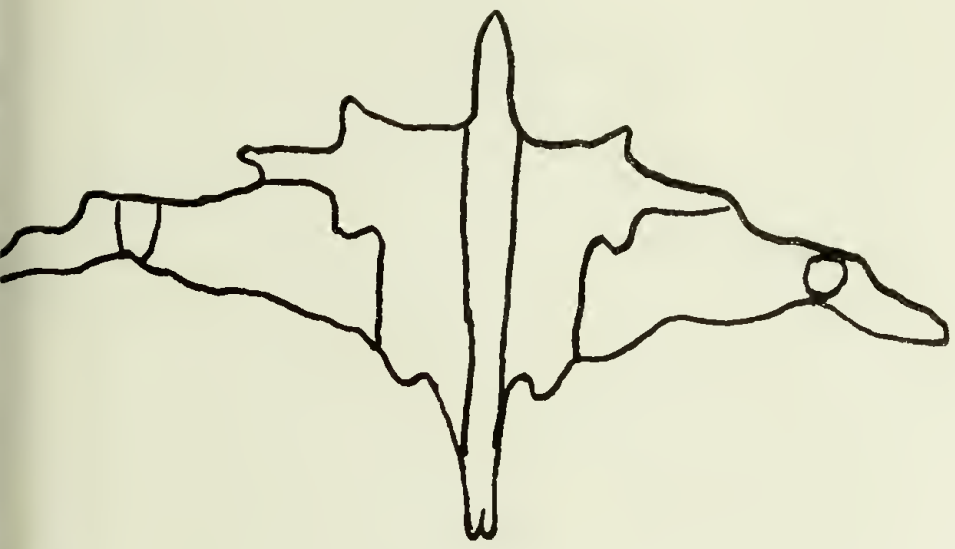
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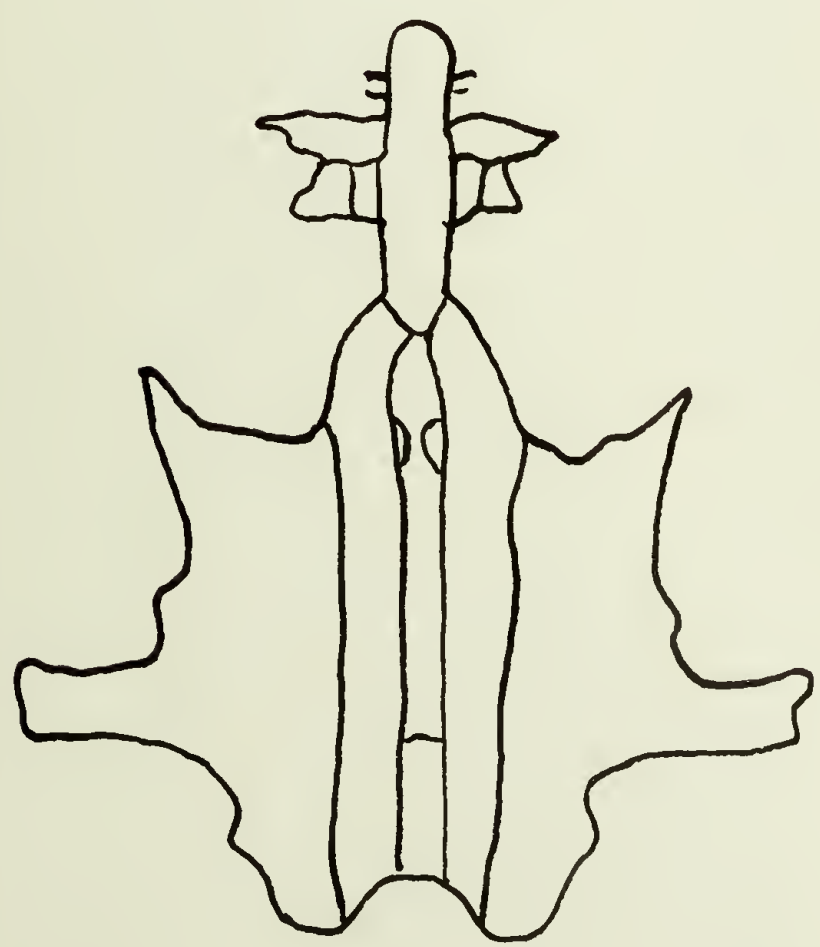
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- 33 7

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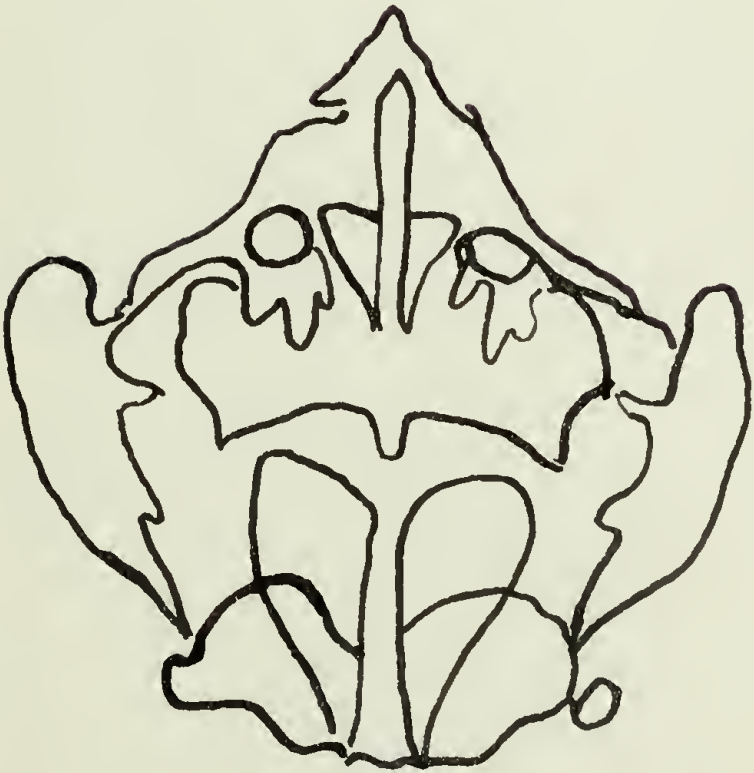
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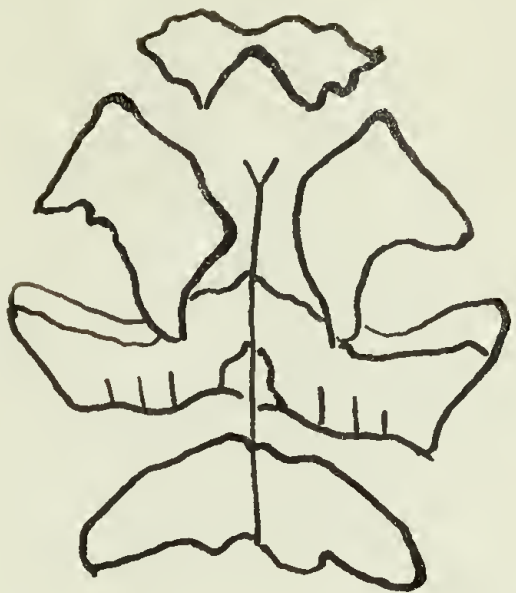


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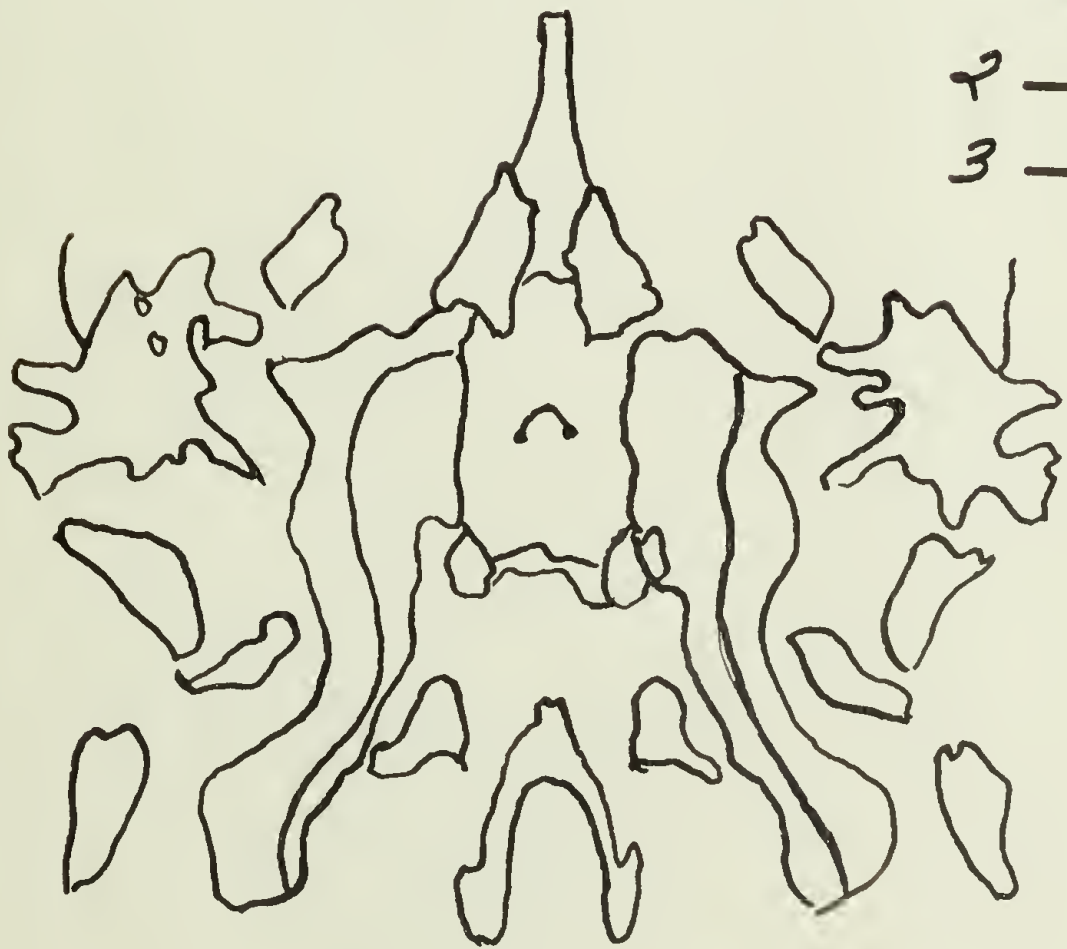
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3



APPENDIX B
INSTRUCTIONS

NAME _____

DATE _____

TIME _____

You will see on the screen 20 inkblot pictures.

Your task is to write down what these inkblots, or any parts of them, resemble or look like to you.

You will see each inkblot for 2 minutes.

You are asked to try to give three answers to each inkblot. Please enter them in the space provided for the answers, or elsewhere in the allotted space for each blot if you do not have room in the space provided. Number each answer 1, 2, or 3.

Indicate where you saw each answer by encircling the part of the blot reproduction in the booklet, and number the location so that it corresponds with the answer to which it pertains.

Do not be disturbed if the light is not very bright while you are looking at the inkblots and writing the answers--handwriting is not important.

When the first slide is on the screen, open this booklet, and record your answers and their locations.

APPENDIX C
QUESTIONNAIRE

QUESTIONNAIRE

- (1) What was your impression of the purpose of this study?
- (a) No idea.
 - (b) To determine how hunger influences the accuracy of a person's responses, i.e., how well the responses match the blot?
 - (c) To determine how hunger influences the imagination, i.e., the richness and variety of responses?
 - (d) To determine how hunger influences the content of one's responses, i.e., whether hungry people give more food responses?
- (2) At what time did you have your last meal? _____
- (3) Have you had anything to eat (i.e., coffee, snack, etc.) since your last meal? Yes _____ No _____
- (4) If yes, what was it, _____, and at what time did you eat it? _____
- (5) Indicate how hungry you feel at the present moment by placing a check mark to the left of the appropriate statement.
- (a) Not hungry at all (the thought of eating has absolutely no appeal to me at the moment).
 - (b) Slightly hungry (would eat something very good, but the thought of food in general is not appealing at the moment).
 - (c) Fairly hungry (the thought of food is somewhat appealing at the moment, and could enjoy something good).
 - (d) Hungry (the thought of food is appealing at the moment, and even something ordinary would be welcome).
 - (e) Very hungry (can't wait to eat something; almost anything would taste good).
- (6) It was necessary to attempt to mislead you regarding the aims of this study. The actual purpose was to determine whether hunger would influence responses given to the ink blot test. For example, would hungry people give actual food responses (chicken leg, fried egg) or just food-related responses (fork, plate), or both? In order to analyze the data we have to know whether you were aware of holding back certain food-related responses which occurred to you. Please check the most appropriate statement below:
- (a) I was not aware of withholding any food-related responses.
 - (b) I was aware of withholding some food-related responses.
- (7) If you checked (b) answer the following:
- (a) Approximate number of food-related responses withheld.
 - (b) List any food-related responses that you withheld which you can recall.
 - (c) The point in the test situation at which you first withheld a food-related response was:
 - (1) The very first time you thought of a food response.
 - (2) After you had given one or two food responses.
 - (3) After you had given several food responses.

APPENDIX D

SCORED DATA ARRANGED ON BASIS OF STIMULUS CARDS
AND RESPONSES BY GROUPS TO EACH.

CARD	RESPONSE	SCORE	SUBJECTS WHO GAVE RESPONSE		
			GROUP D	GROUP A	GROUP E
				GROUP C	
rschach I	Stem of a fruit (D6)	G Obj Amb	1		
	Torn napkin (Dd26)	Inst Obj	1		
	Snake's mouth (D1)	Fd Anat		1	
	Pear (D3)	G Obj Ed		1	
	Sides of beef (D2)	G Obj Amb			1
rschach II	Knives (D4)	Inst Obj	1		
	Steaks (D2)	G Obj Amb		1	
	Sides of beef (D2)	G Obj Amb			1
	Tail of broiled lobster (D3)	G Obj Ed			1
	Lima beans (D2)	G Obj Amb	1		1
rschach III	Woman cooking over pot (D1)	H Inst Act			4
	Dead pheasant (D4)	G Obj Amb		1	
	Kettle (D4)	Inst obj		1	5
	Stove (D4)	Inst Obj	1		
	Stomach (D2)	Fd Anat			2
	French waiters (D1)	H Inst Act	1	2	
	Lamb chops (D2)	G Obj Amb	2		1
	Mixing bowl (D4)	Inst Obj		1	
	A table (D4)	Inst Obj	1		
	Meat hanging up (D2)	G Obj Amb	1		1

Worschach III (cont)

Witches mixing brew (D1)	H Inst Act		1	
Waitress (D1)	H Inst Act		1	
Chicken legs (D2)	G Obj Amb	1	1	
Leg of lamb (D2)	G Obj Amb		1	
Pork chops (D3)	G Obj Amb		2	
An insect mouth (D4)	Fd anat		1	
Grocery baskets (D4)	Inst Obj	1		

Worschach IV

Fruit of a cactus (D1)	G Obj Ed		1	
Bowl of food (D3)	G Obj Ed	1		
Half of a pear (D3)	G Obj Ed		1	
Chicken legs (D10)	G Obj Amb	1		
Cooking utensil (D?)	Inst Obj		1	
Pot-bellied stove (D1)	Inst Obj	1		
Stomach (D3)	Fd Anat	1		
Candy cane (D4)	G Obj Ed			1

Worschach V

Leg of beef (D1)	G Obj Amb		1	
Chicken leg (D10)	G Obj Amb	1	1	
Leg of lamb (D9)	G Obj Amb		1	
Hot dog (D6)	G Obj Ed		1	
Bird's beak (D9)	Fd Anat		1	
Mouth of an alligator (D7)	Fd Anat		1	

CARD	RESPONSE	SCORE	SUBJECTS WHO GIVE RESPONSE		
			GROUP D	GROUP A	GROUP B
Rorschach V	Steer killed and dressed (D7)	G Obj NEd			1
Rorschach VI	Skinned fish (D5)	G Obj Amb	1		
	Eggs (D10)	G Obj Amb	1		
	Rolling pin (D6)	Inst Obj	1		
	Lips of a man (D5)	Fd Anat			1
	Watermelon (D6)	Fd Obj Ed			1
	Lima beans (D11)	G Obj Amb			1
	Can opener (D6)	Inst Obj			1
Rorschach VII	Dipper (D3)	Inst Obj	1		
	Pork chops (D3)	G Obj Amb			2
	Pieces of steak (D10)	G Obj Ed			1
	Kettle (D2)	Inst Obj			1
	Pot (D3)	Inst Obj	1		
	Roast beef (D10)	G Obj Ed			1
	Broken cookie (D?)	G Obj Ed			1
	Pot-bellied stove (D1)	Inst Obj	1		
	Stomach (D3)	Fd Anat			1
	Cotton candy (D3)	G Obj Ed			1
	Dish (Ds7)	Inst Obj			1
	A feeding bird (D1)	An G Act	1		
	Sides of beef (D10)	G Obj NEd			1

CARD	RESPONSE	SUBJECTS WHO GIVE RESPONSE			
		GROUP D	GROUP A	GROUP B	GROUP C
SCORE					
Rorschach VII	Mouth (Dd25)	1			
	Opened can (D3)			1	
	Stomach (Dd28)			1	
	Leg of lamb (D1)			1	
	Veal cutlet (D10)			1	
Rorschach VIII	Slice of salmon meat (D6)	1			
	2 chops (D1)			1	
	Loaf of bread (D5)	2	1	1	
	Ravioli (D5)			1	
	Mouth of animal (D3)			1	
	Bowie knife (Dd22)	3	1		
	Steak (D2)			1	
	Orange sherbet (D6)			1	
	Head of lettuce (D5)	1			2
	Fudge (D5)		1		
	Slice of orange (D7)	1			
	Cabbage (D6)			1	
	Hamburger (D6)			1	
	Linguisa (D5)	1			
	Tin can (D5)				1
	Type of roast (D2)				1
	A chop (D6)				1

Rorschach IX	Chicken bone (D7)	G Obj NEd				1			
	Slice of ham (D6)	G Obj Ed	1			1			
	Apples (D6)	G Obj Ed	2		1	2			1
	Tomatoes (D6)	G Obj Ed			1				1
	Steak (D6)	G Obj Amb	2			2			
	Marshmallow (D7)	G Obj Ed	1						
	Carrots (D3)	G Obj Ed	1		1				1
	Celery (D5)	G Obj Ed			1				
	Beets (D6)	G Obj Amb							2
	A mouth (Dd25)	Fd Anat	1						
	Raw meat (D6)	G Obj NEd	1						1
	Potatoes (D6)	G Obj Amb							
	Bunch of cherries (D6)	G Obj Ed					1		
	An egg (Ds8)	G Obj NEd					1		
	Head of lettuce (D1)	G Obj Ed					1		
	Onions (D6)	G Obj Ed	1						
	Core of apple (Dds23)	G Obj NEd							
	Lobster meat (D3)	G Obj Ed							1
Rorschach X	Wishbone (D3)	Wishbone	10		4			5	11
	Fried egg (D2)	G Obj Ed	8		4			6	6
	Carrots (D13)	G Obj Ed							1
	Potatoes (D13)	G Obj Amb			1				

CARD	RESPONSE	SCORE	SUBJECTS WHO GIVE RESPONSE		
			GROUP A	GROUP B	GROUP C
Rorschach X	Pot-bellied stove (D14)	Inst Obj	1		
	Inside of watermelon (D9)	G Obj Ed		1	
	Children eating lollipops (D9)	H G Act			
	Cherries (D3)	G Obj	1		
Behn I	Snakes eating (D10)	An G Act	1		1
	Piece of steak (D9)	G Obj Amb		1	1
	Potatoes (Mid-lat 1/3)	G Obj Amb		1	1
	Small steaks (Upper proj)	G Obj Amb		1	1
Behn II	Eggbeater (Upper red)	Inst Obj	1		
	Mouth w/o teeth (Upper red)	Fd Anat	1	2	1
	Broiled lobsters (Lower red)	G Obj Ed	1	1	
	Jello pudding (lower red)	G Obj Ed			1
Behn III	Lunch whistle (Upper red)	Inst Obj	1		
	Ice cream cone (Center red)	G Obj Ed		1	
	Apple (Center red)	G Obj Ed	1		
	Orange juice (Center red)	G Obj Ed		1	
Behn IV	Shrimp (lower red)	G Obj Amb			1
	Trout catching flies (C.red)	An G Act	2	1	
	Steak (center red)	G Obj Amb		1	
	Empty stomach (Lat. space)	Fd Anat			1
Behn IV	Table legs (Center black)	Inst Obj	1		2
	Fried chicken (W)	G Obj Ed		1	

CARD	RESPONSE	SCORE	SUBJECTS WHO GIVE RESPONSE		
			GROUP A	GROUP B	GROUP C
Behn V	Loaf of bread (Center black)	G Obj Ed		1	
	Pecan nuts (Center black)	G Obj Ed	1		
	Man eating (Center 1/3)	H G Act	1		
	Turnip (W)	G Obj Amb	1		
	Chicken legs (Lower projs)	G Obj Amb		1	
	Flue of stove (Center black)	Inst Obj	1		
	Hot dogs (Center black)	G Obj Ed		1	
	Artichokes (Lat. projs)	G Obj Ed			1
	Pear (Lateral tip)	G Obj Ed			1
	Bird's beak (Lower projs)	Fd Anat			1
Behn VI	Piece of steak (Lower lat. 1/2)G Obj Amb				1
	Nutcracker (W)	Inst Obj			1
Behn VII	Mouth of a man (Upper c. projs) Fd Anat				2
	A sherbet dish (W)	Inst Obj	1		
	Ice cream sundae (W)	G Obj Ed	1		
	A pot (W)	Inst Obj		1	
	Cover for a pot (C. lower D)	Inst Obj			1
Behn VIII	Pumpkin (W)	G Obj Amb	1		
	Coffee pots (Upper gray)	Inst Obj	1		
	Egg yolks (Center yellow)	G Obj Ed			1
	Pig after slaughter (Lower tan)	G Obj NEd			1

VANDU RESPONSE SCORE SUBJECTS WHO GIVE RESPONSE GROUP D GROUP A GROUP B GROUP C

Behn VIII	Salt-pepper shaker(Upper gray)	Inst Obj				1
	Roast pig (lower tan)	G Obj Ed	1			
	Small steaks (lower tan)	G Obj Amb				1
Behn IX	Scrambled eggs(lower brown)	G Obj Ed	1			
	Chopstick (Center line)	Inst Obj			1	
	Pimentos (Lower brown)	G Obj Ed	1			
	Roast beef (Center brown)	G Obj Ed				1
	Tomato(Upper center)	G Obj Ed	1			
	Pickle fork (Center line)	Inst Obj	1			
	Coffee table (Blue)	Inst Obj				1
	Chicken (Center brown)	G Obj Ed				1
Behn X	Meat (Lateral red)	G Obj Amb			1	
	Peanuts (Lower center brown)	G Obj Ed				1
	Potatoes (Lower center brown)	G Obj Amb			2	
	Carrots (Center orange)	G Obj Ed			1	
	Bears eating lunch (Upper V)	An G Act			1	
	A pear (Upper lateral brown)	G Obj Ed				1
	Mouth of a fish (Center orange)	Fd Anat				1

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A. R. C.

Approved by:

Seymour Epstein

Donald W. Rogers

C. E. West

Thesis Committee

Date: May 1, 1957

