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THE EFFECT OF ANXIETY ON THE PERCEPTION OF SCHIZOPHRENIC PATIENTS

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CHAPTER I

INTRODUCTION AND PROBLEM

Twenty-five per cent of the hospital beds in the United States are occupied by persons having a diagnosis of schizophrenia (19). As a result of this high rate of incidence, workers in many scientific disciplines have applied their energy and tools of research in trying to understand this disorder. Although literally hundreds of articles attest to the time and effort spent in the study of this tremendously complex problem, there is as yet no generally accepted theoretical explanation of schizophrenia (4). At the present time we cannot be sure if schizophrenia is a single disease entity, a group of disease entities, or if it is to be considered a disease entity at all.

Historically the terms "schizophrenia" and "dementia praecox" have been in use for about fifty years. Kraepelin (20) was the first to organize into one diagnostic category the major groups now referred to as the schizophrenic reactions. Kraepelin initially considered the disease as

having its onset during the earlier years of life and as leading to irreversible organic deterioration. As a result he called the disease entity "dementia praecox." Kraepelin's major contribution was the delineation of an area for study through an excellent clinical description. The major limitations of this system were his pessimistic view of prognosis and his concentration on the overt clinical symptomatology to the exclusion of other factors.

Bleuler (5) almost immediately made modifications in this view of dementia praecox. He introduced the term "schizophrenia" and recognized that the onset was not always early and that some patients with the disease did recover. The use of the word "disease" reflects Bleuler's agreement with Kraepelin that the cause of the disorder was to be found in organic pathology. In addition, however, he attempted to understand the puzzling symptoms of schizophrenia as psychological phenomena having their roots in the motivational system of the patient.

During this same period Freud (13) made occasional reference to schizophrenia under the terms "dementia praecox" and "narcissistic neuroses." He concluded that schizophrenic patients had regressed to some early stage of infancy and so effectively withdrawn from the world of reality that they were not suitable for direct psychoanalytic study; therefore, he made no extensive investigation of this problem. There were, however, contemporaries of Freud who did utilize his

concepts to explain what they saw in their psychotic patients. Bleuler, for example, considered schizophrenic blocking to be an extreme form of repression.

It was Jung, however, who made the first full scale effort to understand schizophrenia within the framework of psychoanalysis (2). He attempted to relate the personality structure of the patient to the clinical syndrome, thus giving emphasis to the study of the disorder as a form of psychopathology. He placed this group of patients on a continuum with neurotics and normals, thereby refuting the tendency to see such patients as biologically different from other human beings.

About the same time, in the United States, Meyer also was studying schizophrenia; however, his conclusions were quite different for he felt the disorder was the result of an interaction between a psychobiologically unique individual and his equally unique environment (2). While Kraepelin and Bleuler made extensive cross sectional studies of their patients, Meyer insisted that a longitudinal approach was indicated. In this fashion he placed great emphasis on the psychological development of the schizophrenic and explained pathological functioning in terms of habit formation.

Thus far the development of psychologically oriented theories of schizophrenia have been traced. There have also been many attempts to explain schizophrenia on an organic

basis. Bellak (4) in his comprehensive review of dementia praecox lists six kinds of etiological explanations other than psychological: (a) anatomical, (b) biochemical, (c) endocrine, (d) genetic, (e) infectious, and (f) physiological. Redlich (29), in a later review of these approaches, finds them interesting avenues for more extensive study, but as yet inconclusive. Woolley goes even further and calls them "unfruitful and unproductive" (35, p. 180).

Another major historical development in the evolution of psychological theories of schizophrenia was brought about by Sullivan (34). He concluded that the foundation for schizophrenia was established during infancy and early childhood through pathological parent-child relationships. In this system the child develops an excessive amount of anxiety because he regards himself as a "bad" person. This concept of "badness" is acquired from a non-verbal, empathic recognition of parental rejection and hostility. Since the parents do not give love, the child feels unworthy of love and, therefore, "bad."

Somewhat later Arieti extended Sullivan's description of schizophrenia and defined the disorder as follows:

> Schizophrenia is a specific reaction to an extreme state of anxiety, originating in childhood, and reactivated later in life by psychological factors. The specific reaction consists of the adoption of archaic mental mechanisms, which belong to lower levels of integration. Inasmuch as the result is a regression to, but not an integration at lower levels, a disequilibrium is engendered which causes further regression, at times to

> levels even lower than the one in which certain perceptions are possible (2, p. 384). [In the original text this entire quotation was in italics.]

Arieti is probably the most explicit in defining schizophrenia as a reaction to anxiety; however, other theorists have made reference to the role of anxiety in this disorder. Cameron, for instance, states that schizophrenia develops as a result of the patient's inability to take ". . . successive culturally determined roles when he is under stress" (6, p. 486). Although Cameron tends to approach the problem from the standpoint of external factors in a sociological fashion, he also includes the internal correlates of the outside pressures. For example, "Schizophrenic disorganization and desocialization appears to develop most readily in anxious solitary individuals who are socially immature as well as socially inept" (6, p. 486). Woolley combines internal factors and clinical symptomatology when he defines schizophrenia in its acute form as,

> . . . an intense fear reaction, presented to the observer as either a panic or a state of catatonia which must be considered as equivalent of a panic . . . . Somewhat similar states are seen in situations of serious danger in some individuals, but then the fear appears justified, and the reaction is not considered so abnormal. The patients we are dealing with have these reactions in situations not obviously dangerous to them, and it is not hard to believe that the things feared must be within themselves, rather than outside (36, pp. 180-182).

Thus far the history of schizophrenia had been traced from the general Kraepelinean description through several basic modifications to Arieti's view of schizophrenia

as a reaction to anxiety. Concepts of schizophrenia have changed from that of seeing the disorder as an organic disease to that of some theorists, at least, who see it as a psychological reaction to the environment.

At this point it seems advisable to explore the ways in which "anxiety" has been defined and to survey the research findings which are relevant to the relationship between anxiety and schizophrenia.

Anxiety

Anxiety is a construct which has been defined in a variety of ways. May (25), in his excellent book on anxiety, has summarized many of them. The following definitions of anxiety are extracted from his review: Goldstein: ". . . the subjective experience of the organism in a catastrophic condition" (p. 49). Jung: ". . . the individual's reaction to the invasion of his conscious mind by irrational forces and images from the collective unconscious" (p. 136). Sullivan: "Anxiety . . . arises out of the infant's apprehension of the disapproval of the significant persons in his interpersonal world" (p. 148). May: ". . . the apprehension cued off by a threat to some value which the individual holds essential to his existence as a personality" (p. 191). [In the original text all the above definitions were in italics.] Elsewhere, Hoch has related anxiety and anticipatory fear as being very similar or "even identical in some

instances" (14, p. 108). Mowrer has stated, ". . . anxiety is a learned response, occurring to 'signals' . . . that are premonitory of . . . situations of injury or pain" (26, p. 26).

Throughout these definitions there are common elements which may be extracted and used to define "anxiety" for this study. Implicitly or explicitly these writers suggest that anxiety is subjectively very similar to fear but that it lacks external stimuli. Fear is defined as a reaction to some specific object or person in the outside world. Hyperreactions to objectively real danger would also be defined as anxiety. To complete this working definition, it is necessary to add that anxiety occurs in varying degrees of severity from a nebulous feeling of slight discomfort to an extreme state of panic.

For this study anxiety is defined as being essentially similar to fear but is evoked by internal factors rather than by some external source. While fear is a response to some objectively real danger to the existence of the person, anxiety is a response to a perceived danger to the existence of the person's self-concept.

Having arrived at a working definition of anxiety, it would seem advisable to consider methods of inducing this emotional state in schizophrenic subjects.

Experimental Production of Anxiety

Postman and Bruner (17), in creating a situation of stress, seem to have been successful in arousing anxiety in their subjects. The subjects in the experimental group were presented stimulus material tachistoscopically and then were told their responses were inferior. They then were asked in a stern manner if they were really doing their best in reporting everything they saw. Both the subjects' general behavior and task performances suggested they were experiencing considerable stress. The authors observed that after continued failure under stress-producing circumstances, ". . . perceptual behavior becomes reckless; premature and often nonsensical interpretations of the stimulus are made" (27, p. 322).

There is also good evidence that exposure to a vague stimulus field is a suitable method to induce anxiety in experimental subjects. Sherif and Harvey (32) have concluded from their autokinetic studies of non-schizophrenic subjects that exposure to an ill-defined stimulus field tends to arouse anxiety in the perceiver. Moreover, Sherif (31) concluded from his data that as the structure of the stimulus material decreases, the individual relies more and more on internal motivating factors as determinants of his response.

Abt (1) applied the psychoanalytic explanation of projection as an anxiety reducing mechanism to the responses obtained from projective techniques. When the patient or

subject is presented a Rorschach blot, for example, Abt feels that anxiety is aroused. To reduce the anxiety, the patient imposes structure on the perceptual field. Since structure is relatively low in the blots, Abt considers the response largely a product of the patient's motivational system. With this view of projection in the testing situation, Abt summed up his concept of perception in general as follows:

> I believe that perceptual processes function in such a manner that they permit the individual to maintain a state or level of anxiety for which he has, through learning, acquired an adequate amount of tolerance . . . . It is evidently not the stimulus field itself that catalyzes anxiety. Rather, I think it is the fact that the ambiguous stimulus field demands new behavioral orientation . . . the dynamic process or ordering behavior to a new situational relationship is probably what accounts for an increase in the amount of anxiety the individual experiences (1, pp. 53-54).

Other methods which have been employed for experimentally inducing anxiety in subjects are mild or severe electric shock, unexpected loud noises, manipulation of the time allowed for a task so that the subject is never quite successful, and giving the subject false task norms so that he can never quite perform as he thinks he should.

Of these methods certain ones may be eliminated on humanitarian grounds. In order to induce severe anxiety in schizophrenic subjects, it would be necessary to use experimental situations which might well be disturbing to them. Therefore, presentation of vague stimulus material seemed best suited for this study, even though only mild anxiety is

usually aroused by such an experimental procedure.

Perceptual Organization and the Perceiver

In her study of prejudice Frenkel-Brunswik (12) concluded that the way structure is imposed on vague stimuli is related to the personality of the perceiver. She found that some of her more anxious subjects tended to reduce anxiety by imposing structure more quickly than did the less anxious subjects. She referred to this as "intolerance for ambiguity" and found it to be characteristic of her subjects with high scores on a prejudice scale.

Klein (17) has specifically stated that perceptual thresholds and organizing time are ego functions. By this he meant that sensory as well as perceptual functioning in general serves that individual in a purposive way in organizing his world of experience.

> . . . thresholds, perceptual latency or recognition time, brightness and size consistencies . . . [are] . . . . "tools" or "potentials" which are used in any situation to which he adapts (17, p. 331).

Using a different language, but emphasizing the same point, Postman and Brunner reaffirm this position in these words:

> He learns to eliminate from his perceptual field what is extraneous to him and to encompass what is important even to the extent of occasionally "seeing things that aren't there." In a very real sense perception is a first line of defense against would-be catastrophic situations and a sensitizer to adaptive opportunities (27, p. 314). [Italics mine.]

Previously quoted from the same study by Postman and Bruner was their observation that the perceptual functioning of their subjects became disorganized under stress. Such a disturbance of perceptual functioning (ego functioning) would seem to have a very close similarity to the distorted perceptual functioning often seen in schizophrenia.

Before accepting for use the presentation of vague stimulus material, it is necessary to consider its utility as an experimental tool. Klein and Schlessinger (18) in a study on the relationship between Rorschach responses and apparent movement experiences concluded that tolerance for an unstable perceptual field is a relatively constant feature of one's perceptual functioning. Holtzman and Klein in a study of size judgments concluded, "Patterns of psychophysical response express stable perceptual attitudes and are predictive of personality tendencies" (16, p. 312). It appears that such a technique would be suitably reliable as a research procedure.

Summary

In this survey historical concepts of schizophrenia have been traced from Kraepelin's biological disease entity to Arieti's view of the disorder as a reaction to anxiety. Various definitions of anxiety have been listed and a definition derived for use in this paper. Ways of arousing anxiety experimentally were surveyed and one method was

selected as suitable for use with schizophrenic subjects. Previous workers have found that non-schizophrenic subjects tend to reduce anxiety aroused by a vague stimulus situation by imposing organization on the stimulus field. Other findings suggest that the way in which this organization occurs is closely related to the personality of the perceiver and is a reliable measure of that person's psychological functioning. On these grounds it is thought that a hypothesis concerning the perceptual functioning of schizophrenic subjects may be developed from Arieti's anxiety theory of schizophrenia and subjected to experimental test.

Problem

The purpose of this study, then, is to test the following hypothesis: If schizophrenia is a defense against anxiety or a method of reducing anxiety which results in an increased vulnerability to anxiety, if an unstable perceptual field tends to arouse anxiety, and if one's perceptual or sensory functioning varies so as to maintain a level of anxiety within one's tolerance for ambiguity, then schizophrenic subjects will show stronger attempts to "deny" lack of structure than will non-schizophrenic subjects when presented with a poorly structured perceptual situation.

CHAPTER II

PROCEDURE

As has been stated, the purpose of this study is to test the prediction that schizophrenic subjects will show stronger attempts to "deny" lack of stimulus structure than will non-schizophrenic subjects when presented with a poorly structured perceptual situation.

In order to test this hypothesis several terms need operational definition:

A. Schizophrenic Subjects: Psychotic subjects used in this study had been diagnosed and classified according to the Nomenclature System of the American Psychiatric Association (37). It is recognized that this system has definite limitations, but it is the one used at Central State Griffin Memorial Hospital, which was the source of the psychotic subjects used in this study, and it was not feasible to introduce a new system. "Schizophrenic subjects," then, were defined by their official hospital diagnosis.

B. Unstructured perceptual situation: Two methods were combined to create an unstructured perceptual situation. A photographic slide was projected for 1/25 second on a

screen with the projector out of focus. Successive presentations of the same slide were all at 1/25 second, and the slide was gradually brought to clear focus in regular steps. In this manner the stimulus material changed from an unstructured perceptual situation to a more highly structured one; however, maintaining the exposure speed at 1/25 second prevented the situation from ever becoming fully structured.

C. Denial: Under such experimental conditions it has been observed (8) that normal subjects tend to give responses which reflect a tolerance for ambiguity. Responses of this type are ones in which the subject makes tentative efforts to ascribe meaning to his sensory experience but displays doubt or ambivalence as to exactly what it is he has seen. "Denial," as used in this study, refers to the reduction of avoidance of responses of this type.

Apparatus

A 500 watt T.D.C. slide projector with a 5", F. 3.5 coated lens was used in this study. A shutter was mounted on the front of the projector in such a manner as to allow the stimulus material to be projected for 1/25 second. A scale was inserted under the focusing knob of the projector so that the lens tube might be moved in two mm steps. The starting point for a given series of exposures was with the front lens displaced 40 mm out of focus toward the body of the projector. The projected slide in the full out of focus

condition was 9½" x 14" and in the in-focus condition was 6½" x 9". The screen was plain, white paper 14" x 16¼" mounted on masonite to insure a smooth projection surface. A standard glass beaded screen was not used after preliminary study showed that such a screen was painfully bright under close viewing conditions. The distance from the screen to the slide in the projector was 44½".

Two 35 mm slides were used. One was a Kodachrome transparency of a gothic cathedral and the other an achromatic copy of the first slide. Under the standard conditions of the experimental room, the chromatic slide reflected 25 foot candles at its brightest point. A diaphragm in the shutter was adjusted to balance the light intensity difference between the two slides, the Kodachrome transparency being much brighter. At all times a dim ceiling light in the experimental room was left on. The 500 watt projector bulb was sufficiently strong to allow such a procedure, thereby holding pupilary adaption to light changes to a minimum. The color slide was selected on the basis of a pilot study with non-hospitalized subjects which revealed that this slide elicited a large number of hypothesis testing responses. The color variable was utilized to give two degrees of structure when it was found that the addition of color tended to make it easier for subjects to identify with complete confidence what it was they had seen. In these earlier studies, exposure times of 1/25 and one second were

utilized to achieve the two degrees of structure desired, but the one second exposure was by stop-watch and introduced an irregular experimenter error. When it was found the differences in responses between one second and 1/25 second were approximately that of the differences between colored and achromatic slides, the latter was selected to give higher precision of control.

Subjects

The 48 subjects, 24 men and 24 women, used in this experiment were divided into four groups as follows:

1. State mental hospital patients with a diagnosis of schizophrenic reaction of some sub-type other than paranoid.
2. State mental hospital patients with a diagnosis of schizophrenic reaction, paranoid type.
3. State mental hospital patients with a psychotic diagnosis other than schizophrenia.
4. Non-hospitalized, normal, control group.

No subjects with known organic brain damage were selected. Neurological status was established on the basis of the clinical chart, diagnosis, and consultation with the Chief of Service who evaluated the patients as having essentially negative clinical findings. Organic brain damage can never definitely be ruled out, but this procedure should have eliminated all cases where damage was extensive enough

to affect appreciably the results obtained.

All patients were institutionalized in Central State Griffin Memorial Hospital and were either in the Acute and Intensive Treatment Service or had recently been there. By selecting patients from one area, it was possible to minimize the effect of environmental differences which exist among various wards of the hospital.

Patients were selected first who had no history of somatic treatments (insulin, electric, or metrazol shock). When this group was exhausted those patients who had the least amounts of somatic treatment, and who met all other criteria for selection as subjects (i.e., no evidence of brain damage, psychotic diagnosis, and placement on Acute and Intensive Treatment Service), were used to complete the psychotic groups.

Appendix A gives a detailed description of the subjects' exposure to somatic treatment. These data will be summarized briefly here. The schizophrenic, non-paranoid patients had been hospitalized for a mean of 4.8 months and two of these patients had received somatic treatment. The patients diagnosed as schizophrenic reaction, paranoid type, had been hospitalized for a mean period of 6.8 months and eight had received somatic treatment. The psychotic, non-schizophrenic patients had been hospitalized for a mean of 24.1 months and eight had received somatic treatment. In the schizophrenic, non-paranoid group the following subtypes

were represented: acute undifferentiated - 5, chronic undifferentiated - 3, schizo-affective - 3, catatonic - 1. The psychotic, non-schizophrenic group was composed of subjects diagnosed as follows: Manic-depressive - 6, Involutional psychoses - 4, Psychotic depression - 2. The marked differences between groups in total length of hospitalization was due to the manic-depressive patients who had been repeatedly committed to the hospital. The proportionally large number of patients in the paranoid schizophrenic and psychotic, non-schizophrenic groups having received somatic treatment probably is related to the fact that paranoid and depressed patients are usually considered as good treatment risks for the somatic therapies.

The schizophrenic patients were divided into two groups on the basis of Raush's (28) findings that paranoid patients tended to behave differently from non-paranoid schizophrenics in size constancy judgments. The non-schizophrenic group was included to test the possibility that psychoses in general, and not just schizophrenia, are defenses against anxiety.

The control group was composed of hospital employees who volunteered to serve as subjects for the experiment. No control subject had ever been hospitalized for mental illness or had insulin, electric, or metrazol shock treatment or psychotherapy. Their job titles were as follows: 2 Registered Nurses, 1 receptionist, 1 laboratory technician,

1 dietitian, 1 secretary, 1 occupational therapist, 1 occupational therapy aide, 1 food service employee (cook), 1 publication department employee, 1 photographer, 1 maintenance department employee. These subjects were obtained by requesting department heads to ask for volunteers within their department. One normal subject was eliminated when it was learned that he had been hospitalized for mental illness. The twelfth normal to volunteer was rejected after having been selected to serve as a subject, but prior to exposure to the experimental situation, in a belated attempt to reduce the normal-group mean IQ. This subject was of very superior intelligence and the normal-group mean was considerably above those of the psychotic groups. The thirteenth volunteer was accepted to complete the normal group. The number, mean age, and mean IQ of the subjects are to be found in Table 1.

Experimental Room

One room was used throughout the experiment. It was quite small, containing space for little more than a table, chairs, the subject and the experimenter. The windows were blocked off so that the light was constant with all subjects. This room was located on a wing of the building not used as a ward and distracting noises were at a minimum.

Experimental Treatment

All subjects were approached individually and asked

TABLE 1

Number, Mean Age, and Mean IQ* of Subjects Distributed over Diagnosis, Sex of Subjects, and Color of Slide

		Schiz., Non-Paranoid	Schiz., Paranoid	Psychot., Non-Schiz.	Normal
Men					
Chrom.	n	3	3	3	3
	IQ	101.7	101.7	102.7	114.7
	Age	46.3	42.0	60.7	43.7
Achrom.	n	3	3	3	3
	IQ	88.3	105.0	108.7	111.7
	Age	33.0	36.3	49.7	31.3
Women					
Chrom.	n	3	3	3	3
	IQ	122.0	95.3	92.3	115.3
	Age	39.7	33.0	26.7	33.3
Achrom.	n	3	3	3	3
	IQ	101.8	104.9	103.7	115.1
	Age	36.8	37.2	45.9	35.4
Total	n	12	12	12	12
Mean	IQ	101.8	104.9	103.7	115.1
Mean	Age	36.8	37.2	45.9	35.4

* IQ scores were derived from vocabulary scores on the Wechsler-Bellevue Intelligence Test (form I). The vocabulary score was multiplied by ten and this raw score was converted by tables (35) to an IQ score.

to volunteer for a study of the way people see and understand the world. They were assured the task would reveal nothing about themselves as individuals, but that the results would be meaningful only in the massed data. All patients were told the study had nothing to do with their treatment, diagnosis, or discharge. It was made clear to all subjects that the task was not a psychological test. In the hospital setting both patients and employees are sensitive about psychological examinations, but the above instructions were sufficiently reassuring that very few persons refused to serve as subjects.

All subjects were taken one at a time to the experimental room. They were seated slightly behind and to the right of the projector about five feet from the screen. After being seated and given a chance to look around the room, they were given the following instructions:

> In a moment I'm going to show you something on that screen. When I give you a warning, watch closely because you won't have much time. First, let's take three practice trials to show you what to expect. (Three practice trials were made with a blank slide in the projector.) You see how this works now. In a moment I'll flash it again, but what you see will be somewhat different. There are no rights or wrongs to this because I want to find out what happens. Each time I get ready to flash this, I'll give you a one-second warning so you'll be all ready. Now, I want you to tell me what you see. Remember, watch closely.

The experimenter answered all questions in terms of these instructions or asked the subject to wait until after the series was finished. If during the series of trials,

the subject paused excessively he was reminded, "Tell me what you saw."

The subject's responses were written down by the experimenter, as much as possible, verbatim.

Following the instructions, either the achromatic or chromatic slide of the cathedral was exposed for 1/25 second at 40 mm out of focus. The exposure time was constant, and in 21 trials the slide was brought to in-focus. This series constituted the experimental series.

At the conclusion of the series, the subject was asked to keep secret what he had seen. Behavior of later subjects in both patient and control groups suggested that this request was honored.

Treatment of the Data

After the responses were typed, they were submitted for independent scoring to three judges, one of whom was the experimenter. The other two judges were psychologists and were not personally involved in the study. Any one of several scoring systems could have been used (7, 8, 11, 30, 33), but the method finally developed was borrowed in part from Douglas (8) and modified on the basis of the preliminary studies. The judges scored each response as Level I, Level II, or Level III. Scoring criteria were as follows:

Level I: Reports of sensory experience, e.g., color naming, "a flash of light," or "I don't know what it is."

Level II: Hypothesis testing responses. Responses at this level consisted of tentative identification of the stimulus material, offering alternative possibilities, or emergence of figure from ground responses, e.g. "It might be a church." "It's a church or a mountain." "There's something there more than colors, but I can't tell what it is."

Level III: Responses definitely naming the stimulus material were placed in this category. Accuracy of the response was not considered, e.g. "It's a church." "It's three men."

After the first round of scoring, the protocols were returned to the experimenter. They were compared and all responses upon which there was any disagreement among judges were marked, but no indication was given of which judge was responsible for a particular score. All three judges rescored these responses, again independently, and returned the protocols to the experimenter. The scoring was compared and the responses upon which there was still scoring disagreement were selected for discussion by the three judges until agreement was reached. In this fashion the final scoring represented unanimous agreement among all three judges.

The number of Level II or hypothesis testing responses was of primary interest in this study, and prior to gathering the data two useful methods of defining this range were foreseen. The first was to count the total number Level II responses, and the second was to consider only those Level II responses after which no reversals to Level I occurred. This latter method of ordering the data was named consistent

Level II responses. Both methods of defining Level II were to be used in testing the hypothesis that schizophrenic subjects would tend to avoid Level II responses, but ultimately (see Chapter III) the second method was rejected.

CHAPTER III

RESULTS

Following the collection of the data, the responses were submitted to the three judges for scoring. As will be remembered from Chapter II the scoring criteria were as follows:

Level I: Reports of sensory experience.

Level II: Hypothesis testing responses; responses making a tentative identification of the stimulus material; responses offering alternative possibilities; or reports of the emergence of figure from ground.

Level III: Responses definitely naming the stimulus material regardless of accuracy.

On the first round of independent scoring there was unanimous agreement among the three judges on 887 of the 1008 responses (88%). The response protocols upon which scoring disagreements occurred were returned to the judges for the second round of scoring. The judges re-scored the 121 responses upon which there had been disagreement, and reduced the number of disagreements to 81. Stated another way, there was at this point agreement on 92% of the total

number of responses. The three judges then met in conference on the final 81 responses upon which there was still scoring disagreement, and, through discussion of the responses, they arrived at unanimous agreement with respect to the remaining responses. The final scores for all 1008 responses are compiled in Appendix C.

Effects of Age and Intelligence

After unanimous agreement had been reached on all responses, estimates were calculated for the relationships between age and total number Level II responses and intelligence and total number Level II responses. Since some variation in IQ and age existed among the groups it was possible that these variations were related to perceptual differences among these groups. Had this been true, it would have been necessary to take these discrepancies into account in the statistical analysis of the data. However, when a Pearson product-moment coefficient of correlation (22, p. 168) was calculated for age and total number Level II responses the resulting r was -.25 which indicates that only about 6% of the variance of total number Level II responses was related to age. Similarly, r for IQ scores and total number Level II responses was .08; this suggests that less than 1% of the variance of total number Level II responses was related to intelligence. On the basis of these relatively low correlations and the matching of groups for age and intelligence,

it was concluded that these two variables probably played little role in determining the final results.

Total Number Level II Responses

A summary of the data for total number Level II responses is in Tables 2, 3, 4, and 5.

After compiling these data it was necessary to subject them to statistical analysis in order to discover if the differences in mean scores for Diagnosis, Color, and Sex could be accounted for on the basis of chance alone. In addition, it was necessary to determine the significance of the interaction among these three variables.

Analysis of variance was selected to yield information concerning differences in mean scores and significance of interactions. The 5% level of confidence was selected as the criterion for determining significance of results. Analysis of covariance could have been used for this purpose, but this more involved procedure was deemed unnecessary for the following reasons: The correlation between age and number of Level II responses and the correlation between intelligence and number of Level II responses were relatively low, and the groups were similar with respect to age and intelligence.

Before conducting an analysis of variance for these data, it was necessary to test the assumption of homogeneity of variance of the scores. In order to test this basic

TABLE 2

Mean Total Number Level II* Responses Distributed Over Diagnosis, Sex of Subjects, and Color of Slide

	Men		Women	
	Chrom.	Achrom.	Chrom.	Achrom.
Schiz., Non-Pa.	11.33	14.66	6.66	18.66
Schiz., Pa.	2.00	17.33	9.33	19.66
Psychot., Non-Schiz.	8.66	13.66	10.33	9.33
Normal	13.33	19.00	6.66	16.66

*Hypothesis testing responses or reports of figure emergence from ground.

TABLE 3

Mean Total Number Level II Responses Distributed Over Diagnosis

Schiz., Non-Pa.	12.83
Schiz., Pa.	12.08
Psychot., Non-Schiz.	10.50
Normal	13.92

TABLE 4

Mean Total Number Level II Responses Distributed Over Sex

Men	12.50
Women	12.17

TABLE 5

Mean Total Number Level II Responses Distributed Over Color

Chromatic	8.54
Achromatic	16.13

assumption, the data were subjected to Bartlett's test of homogeneity of variance (9, p. 196). The resulting chi square was 20.7. At 15 degrees of freedom, a chi square of 19.3 is required for significance at the 20% level of confidence and 22.3 at the 10% level of confidence. Although such questionable homogeneity did not make it impossible to use analysis of variance for these data, it did raise some question as to the full acceptability of such a procedure. However, Lindquist (23, p. 86) has pointed out that under these circumstances it is possible to accept findings which are significant at the 1% level of confidence as though they were significant at the 5% level, and to consider the assumption of homogeneity as having been met in a satisfactory manner. Therefore, it was proper to use an analysis of variance for these data with the reservation that 1% findings would be considered significant only at the 5% level of confidence. This analysis was performed and the results are in Table 6.

Tables 3, 6, and Appendix B show that the differences among diagnostic groups were not significant and that the hypothesis that schizophrenic subjects would avoid Level II responses was not corroborated. The difference between color groups was significant. Those subjects who were exposed to the achromatic slide gave significantly more total number Level II responses than those subjects exposed to the chromatic slide (see Tables 5, 6, and Appendix B).

TABLE 6

Summary Table for Analysis of Variance:
Total Number Level II Responses

Source of Variation	df	ss	s^2	F	Sig. at 5% Level of Confidence
Total	47	2528.67			
Diagnosis	3	74.17	24.72	---	
Color	1	690.09	690.09	16.54	Yes
Sex	1	1.34	1.34	---	
D x C	3	176.41	58.80	1.41	
D x S	3	135.16	45.05	1.08	
C x S	1	0.75	0.75	---	
D x C x S	3	115.43	38.48	---	
Error	32	1335.33	41.73		

It must be noted, however, that of the 48 subjects 4 failed to give any Level I responses; 23 failed to give any Level III responses; and 7 failed to give either Level I or Level III responses (see Appendix C). Thus, 34 subjects gave a truncated series of responses. These truncated response series suggest that if the experimental series had been extended, either in the direction of stimulus vagueness or of stimulus clarity, then additional Level II responses might have been given. If more Level II responses were given, there would be a possibility that non-schizophrenic subjects might contribute more Level II responses than the schizophrenic subjects. Although this possibility cannot be entirely eliminated, it can be shown to be relatively unlikely.

Those subjects who started the experimental series at Level I and ended the series at Level III would be likely to contribute few additional Level II responses if the experimental series had been extended in either or both directions. Therefore, if any of the four diagnostic groups had significantly more subjects who gave truncated response series, that diagnostic group would be likely to contribute more Level II responses than the other groups if the series were to be extended. To test the possibility that extension of the experimental series would give results contrary to those found in this study, it was necessary to compare the subjects in the four diagnostic groups in two ways. The

first was to compare the number of subjects in each of the four diagnostic groups starting the experimental series at Level I. The second was to compare the number of subjects in the four diagnostic groups ending the experimental series at Level III.

Arbitrarily, two Level I responses at the beginning of the series was accepted as evidence that a subject had started the series at Level I. Two Level III responses at the end of the series was accepted as evidence that a subject had terminated the series at Level III. (Two Level I and two Level III responses were selected as criteria in order to eliminate those subjects who were not consistent with respect to initial and terminal responses. Four subjects were eliminated for this reason because they started with a single Level I response; five subjects were eliminated because they ended their series with a single Level III response. With respect to either end of the response series, no more than two subjects were eliminated from any one diagnostic category.)

Chi square (24) was used to test for independence between diagnostic and response variables. This chi square was 2.97 (see Table 7). For three degrees of freedom, 2.97 falls between the 30% and 50% levels of confidence; this is not significant. Judging from this figure, diagnostic groups may be considered to have been drawn from the same population insofar as beginning the experimental series at

Level I is concerned.

When based on a 4 x 2 table chi square could not be used to analyze the data for the number of subjects in each diagnostic group who ended the experimental series at Level III, because the smallest expected cell frequency for the four diagnostic groups was 2.76 (see Table 8); thus, it was necessary to combine the three psychotic groups into one group constituting a 2 x 2 table. Chi square for diagnosis, corrected for continuity (24), calculated from this 2 x 2 table was 8.45. This is significant beyond the 5% level of confidence (see Table 9). This figure indicates that significantly more normal than psychotic subjects had arrived at Level III by the end of the experimental series.

An analysis of consistent Level II responses had been planned as a second test of the hypothesis that schizophrenic subjects would avoid Level II responses more than non-schizophrenic subjects. The absence of closed series for so large a number of subjects made it unreasonable to analyze consistent Level II responses, and this analysis was omitted.

TABLE 7

Number of Subjects Beginning the Experimental Series at Level I Distributed Over Diagnosis

Diagnostic Groups	Number S's Initiating Series at Level I	Number S's Failing to Initiate Series at Level I
Normal	8	4
Psychot., Non-Schiz.	7	5
Schiz., Pa.	4	8
Schiz., Non-Pa.	6	6

TABLE 8

Number of Subjects Terminating the Experimental Series at Level III Distributed Over Diagnosis

Diagnostic Groups	Number S's Terminating Series at Level III	Number S's Failing to Terminate Series at Level III
Normal	7	5
Psychot., Non-Schiz.	1	11
Schiz., Pa.	2	10
Schiz., Non-Pa.	1	11

TABLE 9

Number of Subjects Terminating the Experimental Series at Level III Distributed Over Normal and Psychotic Groups

Diagnostic Groups	Number S's Terminating Series at Level III	Number S's Failing to Terminate Series at Level III
Normal	7	5
Psychotic	4	32

CHAPTER IV

DISCUSSION OF THE RESULTS AND CONCLUSIONS

The purpose of this investigation was to test the following hypothesis: If schizophrenia is a pathological reaction to severe anxiety, and if this condition results in an increased vulnerability to anxiety, and if lack of structure in a perceptual field arouses anxiety in the perceiver, then schizophrenic subjects will show stronger attempts to deny lack of structure than will non-schizophrenic subjects when both are confronted with a poorly structured perceptual situation. Analysis of the results of this study does not support this hypothesis. There were no significant differences among the four diagnostic groups on total number Level II responses (see Table 6).

However, since 34 subjects gave truncated response series, the possibility arose that if the experimental series had been extended, the non-schizophrenic groups might eventually have given more Level II responses than the schizophrenic groups. The number of subjects giving truncated response series was analyzed to test this possibility (see Tables 7, 8, and 9). Since all four diagnostic groups

had approximately the same number of subjects who began the experimental series at Level I, the number of subjects in the four diagnostic groups who were most likely to contribute additional Level II responses would have been approximately the same if the experimental series had been extended in the direction of stimulus vagueness. With such a change in the design of the experiment, the absolute number of Level II responses would be likely to increase, while the relationships among the four diagnostic groups would not be expected to change significantly. However, significantly more psychotic than normal subjects failed to arrive at Level III by the end of the experimental series. As a result, if the experimental series had been extended in the direction of stimulus clarity by increasing the exposure time of the slides, more psychotic than normal subjects would be expected to contribute additional Level II responses. If such a time increase had occurred, the psychotic subjects might have given even more Level II responses than the normal subjects.

Based on the tendencies displayed by the four diagnostic groups, it may be concluded that extension of the experimental series would result in insignificant changes in the findings, or it might possibly demonstrate that psychotic subjects would give significantly more Level II responses than normal subjects. In either event, the hypothesis that schizophrenic subjects would avoid Level II

responses would be rejected.

It is concluded, then, that schizophrenia does not result in a hypersensitivity to minimal anxiety, as "minimal anxiety" is defined by this study. Further study is, of course, needed to discover whether at increased levels of anxiety schizophrenic subjects do differ from non-schizophrenic subjects in the way in which they respond to tasks requiring them to make perceptual organizations.

In the course of testing the above hypothesis several additional findings which warrant discussion appeared.

Certainty of Response

Significantly more normal than psychotic subjects reached Level III (certainty of response) by the end of the experimental series (see Table 9). The tendency for normal subjects to arrive at certainty of response quicker than psychotic subjects suggests an interesting possibility. Fenichel (10) has pointed out that the loss of ability to test reality is usually a concomitant of schizophrenia; the finding that psychotics are retarded in giving indication of perceptual certainty appears to be related to Fenichel's observation. This is, of course, speculation, but it suggests an area for further research.

Emergent Perception

Douglas (8) described the normal perceptual act as progressing through three levels of responses in an orderly

fashion. These levels are: (a) level of sensory experience; (b) level of ambivalence; and (c) level of certainty. The data from this present study, however, do not substantiate her conclusions, for only 4 of the 12 normal subjects and 3 of the 36 psychotic subjects displayed the kind of regularity of the emergent process of perception which she describes (see Appendix C). On the basis of available information, it is difficult to account for this discrepancy. Douglas stated that her conclusions were based entirely on a qualitative analysis of her data; unfortunately, she gives no quantitative data. Moreover, she fails to define the exact meaning of her word, "regularity." Without knowing what she means by regularity, and without knowing how many of her subjects responded with a regular order of emergence, it is impossible to determine the basis for her generalizations.

One modification was made in Douglas' scoring procedure as it was used in this study: included in Level II were all the responses reporting the emergence of figure from ground as well as all ambivalent responses. This modification might account for some differences in findings; however, close inspection of the data (see Appendix D) suggests that this is very unlikely. In any event, further study of the process of emergent perception seems indicated before this concept may be accepted as established fact.

Color

Subjects exposed to the achromatic slide gave significantly more total number Level II responses than did subjects exposed to the chromatic slide (see Tables 5 and 6). This fact stands in complete opposition to what had been expected. In fact, a part of the design of this problem was based on the expectation that the color variable would provide two degrees of stimulus structure. It was predicted that the achromatic slide would prove less structured, produce more anxiety, and result in fewer Level II responses. This prediction initially was based upon speculation, but it was verified in preliminary studies.

One may only speculate why this phenomenon occurred, but the first and most obvious possible reason is that the differences between the preliminary subjects and the subjects used in the formal study produced this irregularity.

A second possible reason is that the obtained results were related to an interaction between the color and content of the stimulus material. Both chromatic and achromatic slides were of a cathedral, and perhaps something about the form or organization of this particular stimulus material in conjunction with color produced the unexpected results. It is also possible that color, when used as it was in this experiment, does not add structure. The average person has probably seen more black and white than colored photographs, and conceivably black and white reproductions

are more "realistic." Possibly the presence of color resulted in color shock, as used in Rorschach terminology (3). That is, color may have induced more anxiety than the added structure reduced.

Another possibility is that the vague stimulus situation was not anxiety arousing. If this were the case and if the achromatic slide was less well structured than the chromatic, it would follow that the subjects presented the achromatic slide would give more Level II responses. Moreover, lack of anxiety in the subjects might explain the lack of significant differences among diagnostic groups on total number Level II responses. However, if no anxiety was induced by the vague stimulus situation it would necessitate critical revaluation of all the research which has been dependent upon the assumption that vague stimulus situations do indeed arouse anxiety in the perceiver. It is clear that additional study of the role of color in perception is needed.

CHAPTER V

SUMMARY

The purpose of this study was to test the following hypothesis: If schizophrenia is a pathological reaction to severe anxiety, and if this condition results in an increased vulnerability to anxiety, and if lack of structure in a perceptual field arouses anxiety in the perceiver, then schizophrenic subjects will show stronger attempts to deny lack of structure than will non-schizophrenic subjects when both are confronted with a poorly structured perceptual situation.

In the experimental test of this hypothesis, 24 men and 24 women, equally divided among four diagnostic groups, served as subjects. These diagnostic groups were non-paranoid schizophrenics, paranoid schizophrenics, non-schizophrenic psychotics, and normals. Half of the subjects were exposed to achromatic stimulus material and half to chromatic stimulus material. This stimulus material consisted of a chromatic slide of a cathedral and an achromatic copy of this colored transparency. Each subject was shown one of these two slides a total of 21 times. The first presentation of the slide was well out of focus, and, in the 20 subsequent

exposures, the stimulus material was brought to clear focus. Throughout the experimental series the slides were exposed for 1/25 second. The subjects were given standard preliminary instructions and asked to report what they saw. The responses obtained in this manner were scored by three judges. The scoring categories were as follows: Level I -- reports of sensory experience; Level II -- ambivalent responses and reports of figure emergence from ground; and, Level III -- responses which indicated certainty as to the identity of the slide.

Denial of lack of structure of the stimulus material was equated with avoidance of Level II responses. Avoidance of Level II responses was then used as a test of the hypothesis that schizophrenic subjects would deny lack of structure. Since there were no significant differences among the four diagnostic groups on total number Level II responses, this hypothesis was rejected. It was concluded that schizophrenia does not result in hypersensitivity to minimal anxiety.

In the course of testing the above hypothesis three additional discoveries were made: (a) significantly more normal than psychotic subjects reached certainty by the end of the experimental series; (b) the regular process of emergent perception described by Douglas (8) was found to be exceptionable; and, (c) the achromatic slide elicited

significantly more Level II responses than the chromatic slide. Need for further research in these three areas was, therefore, indicated.

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APPENDIX A

Amount and Termination Date of Somatic Treatment Received by Subjects

TABLE 10

		Total Mos. Hospitalization	Number Electric Shock Treatments	Date* Last EST	Number Insulin Coma Treatments	Date Last ICT
Schizophrenic, Non-Paranoid						
Chrom.						
Men	S13	3	0	--	0	--
	S17	1	0	--	0	--
	S21	1	0	--	0	--
Women	S1	4	0	--	0	--
	S5	2	0	--	0	--
	S9	13	7	1949	36	1949
Achrom.						
Men	S15	5	0	--	0	--
	S19	12	0	--	0	--
	S23	6	10	10-14-54	0	--
Women	S3	3	0	--	0	--
	S7	4	0	--	0	--
	S11	3	0	--	0	--
Schizophrenic, Paranoid						
Chrom.						
Men	S14	6	7	Jan. '54	0	--
	S18	3	?	1954	0	--
	S22	2	0	--	0	--
Women	S26	11	5	6-1-54	0	--
	S28	2	0	--	?	Oct. '54
	S36	5	0	--	15	1-28-55
Achrom.						
Men	S16	7	3	Oct. '54	9	Oct. '54
	S20	15	0	--	0	--
	S24	2	0	--	0	--
Women	S30	7	0	--	0	--
	S32	12	20	8-5-54	0	--
	S35	10	3	May '54	45	11-8-54

*Experimental trials were in April, 1955.

TABLE 10--Continued

		Total Mos. Hospitalization	Number Electric Shock Treatments	Date Last EST	Number Insulin Coma Treatments	Date Last ICT
Psychotic, Non-Schizophrenic Chrom.						
Men	S25	10	3	1949	?	1947
	S27	7	7	6-28-50	0	--
	S31	100	17	Nov. '46	40	Nov. '46
Women	S2	2	0	--	0	--
	S6	5	13	Aug. '54	0	--
	S10	7	0	--	0	--
Achrom.						
Men	S29	1	0	--	0	--
	S33	34	0	--	0	--
	S34	25	94	5-4-55	112	Mar. '47
Women	S4	4	16	1952	0	--
	S8	53	33	1949	?	?
	S12	41	11	4-2-50	0	--
Normal						
Chrom.						
Men	S40	0	0	--	0	--
	S44	0	0	--	0	--
	S47	0	0	--	0	--
Women	S37	0	0	--	0	--
	S39	0	0	--	0	--
	S42	0	0	--	0	--
Achrom.						
Men	S43	0	0	--	0	--
	S46	0	0	--	0	--
	S48	0	0	--	0	--
Women	S38	0	0	--	0	--
	S41	0	0	--	0	--
	S45	0	0	--	0	--

APPENDIX B

Subjects' Age, IQ, and Total Number Level II Responses

TABLE 11

	Subject	Age	IQ	Total Number Level II Responses
Schizophrenic, Non-Paranoid				
Chrom.				
Men	S13	51	95	5
	S17	39	92	14
	S21	49	118	15
Women	S1	41	110	13
	S5	34	122	2
	S9	44	134	5
Achrom.				
Men	S15	18	79	20
	S19	44	88	3
	S23	37	98	21
Women	S3	28	93	21
	S7	27	110	20
	S11	30	83	15
Schizophrenic, Paranoid				
Chrom.				
Men	S14	48	78	0
	S18	47	148	6
	S22	31	79	0
Women	S26	45	93	2
	S28	27	103	19
	S36	27	90	7
Achrom.				
Men	S16	31	122	15
	S20	42	85	19
	S24	36	108	18
Women	S30	26	90	21
	S32	53	132	21
	S35	34	132	17

TABLE 11--Continued

	Subject	Age	IQ	Total Number Level II Responses
Psychotic, Non-Schizophrenic				
Chrom.				
Men	S25	61	133	13
	S27	65	85	9
	S31	56	90	4
Women	S2	16	79	8
	S6	23	101	21
	S10	41	97	2
Achrom.				
Men	S29	42	78	21
	S33	49	118	0
	S34	58	130	20
Women	S4	44	100	4
	S8	41	116	21
	S12	55	118	3
Normal				
Chrom.				
Men	S40	29	123	8
	S44	58	121	18
	S47	44	100	14
Women	S37	21	119	9
	S39	46	118	4
	S42	33	109	7
Achrom.				
Men	S43	34	119	19
	S46	20	119	18
	S48	40	97	20
Women	S38	23	123	15
	S41	23	123	19
	S45	54	110	16

APPENDIX C

Raw Scores by Diagnostic Groups

TABLE 12

Raw Scores: Non-Paranoid Schizophrenic Group

	Chromatic						Achromatic					
	Men			Women			Men			Women		
Trial	S13	S17	S21	S1	S5	S9	S15	S19	S23	S3	S7	S11
1	1	1	1	1	1	3	2	2	2	2	2	1
2	1	1	1	1	1	3	2	3	2	2	2	1
3	1	1	1	1	1	2	1	3	2	2	2	1
4	1	1	1	1	1	2	2	1	2	2	2	1
5	1	1	2	1	1	2	2	3	2	2	2	1
6	1	1	2	1	1	2	2	1	2	2	2	1
7	1	1	1	1	1	1	2	2	2	2	2	2
8	1	2	1	1	1	1	2	1	2	2	2	2
9	1	2	2	2	1	3	2	2	2	2	2	2
10	1	2	2	2	1	3	2	1	2	2	2	2
11	1	2	2	2	1	3	2	3	2	2	2	2
12	1	2	2	2	1	3	2	3	2	2	2	2
13	1	2	2	2	1	3	2	3	2	2	2	2
14	1	2	2	2	1	3	2	3	2	2	2	2
15	1	2	2	2	1	1	2	3	2	2	2	2
16	1	2	2	2	1	3	2	3	2	2	2	2
17	2	2	2	2	1	3	2	3	2	2	2	2
18	2	2	2	2	2	3	2	3	2	2	1	2
19	2	2	2	2	2	3	2	3	2	2	2	2
20	2	2	2	2	1	2	2	3	2	2	2	2
21	2	2	2	2	1	3	2	3	2	2	2	2

TABLE 13

Raw Scores: Paranoid Schizophrenic Group

	Chromatic						Achromatic					
	Men			Women			Men			Women		
Trial	S14	S18	S22	S26	S28	S36	S16	S20	S24	S30	S32	S35
1	1	1	1	1	2	1	2	1	2	2	2	2
2	1	1	1	1	2	2	1	2	2	2	2	2
3	1	1	1	1	2	1	2	2	2	2	2	2
4	1	1	1	1	2	1	1	2	2	2	2	2
5	1	1	1	1	2	1	2	2	2	2	2	2
6	1	2	1	1	2	1	2	2	2	2	2	2
7	1	1	1	1	2	1	2	2	2	2	2	1
8	1	1	1	1	2	1	3	2	2	2	2	2
9	1	1	1	1	2	1	2	2	2	2	2	2
10	1	2	1	1	2	1	2	2	1	2	2	2
11	1	3	1	1	2	1	2	2	1	2	2	1
12	1	2	1	1	2	1	2	2	2	2	2	1
13	1	1	1	1	2	1	2	2	2	2	2	2
14	1	2	1	1	2	1	1	2	2	2	2	1
15	1	2	1	2	1	2	2	1	2	2	2	2
16	1	2	1	1	2	2	2	2	2	2	2	2
17	1	1	1	1	2	1	2	2	2	2	2	2
18	1	1	1	1	2	2	2	2	2	2	2	2
19	1	3	1	1	2	2	2	2	2	2	2	2
20	1	3	1	1	2	2	3	2	2	2	2	2
21	1	3	1	2	3	2	3	2	3	2	2	2

TABLE 14

Raw Scores: Non-Schizophrenic, Psychotic Group

	Chromatic						Achromatic					
	Men			Women			Men			Women		
Trial	S25	S27	S31	S2	S6	S10	S29	S33	S34	S4	S8	S12
1	1	1	3	1	2	1	2	1	1	1	2	1
2	1	1	3	1	2	1	2	1	2	1	2	1
3	1	1	3	1	2	1	2	1	2	1	2	1
4	1	1	3	1	2	1	2	1	2	1	2	1
5	1	1	3	1	2	1	2	1	2	1	2	1
6	1	1	2	1	2	1	2	1	2	1	2	1
7	1	1	3	1	2	1	2	1	2	1	2	1
8	1	1	3	1	2	1	2	1	2	1	2	1
9	2	1	3	1	2	1	2	1	2	1	2	1
10	2	1	3	1	2	1	2	1	2	1	2	1
11	2	1	2	2	2	1	2	1	2	1	2	1
12	2	1	3	2	2	1	2	1	2	1	2	1
13	2	2	3	2	2	1	2	1	2	1	2	1
14	2	2	3	2	2	1	2	1	2	1	2	1
15	2	2	3	2	2	1	2	1	2	1	2	1
16	2	2	3	2	2	1	2	1	2	1	2	1
17	2	2	3	2	2	1	2	1	2	2	2	1
18	2	2	2	2	2	1	2	1	2	2	2	1
19	2	2	3	3	2	2	2	1	2	2	2	2
20	2	2	2	3	2	2	2	1	2	1	2	2
21	2	2	3	3	2	3	2	1	2	2	2	2

TABLE 15

Raw Scores: Normal Group

	Chromatic						Achromatic					
	Men			Women			Men			Women		
Trial	S40	S44	S47	S37	S39	S42	S43	S46	S48	S38	S41	S45
1	1	3	1	1	1	1	1	2	1	1	2	1
2	1	3	1	1	1	1	1	2	2	1	2	1
3	1	3	1	1	1	1	2	2	2	2	2	1
4	2	2	1	1	1	3	2	2	2	2	2	1
5	1	2	2	1	1	3	2	2	2	2	2	1
6	2	2	2	1	1	3	2	2	2	2	2	2
7	1	2	2	1	1	3	2	2	2	2	2	2
8	1	2	2	1	1	3	2	2	2	2	2	2
9	1	2	2	1	1	3	2	2	2	2	2	2
10	1	2	2	1	1	3	2	2	2	2	2	2
11	2	2	2	2	1	2	2	2	2	1	2	2
12	2	2	2	2	1	2	2	2	2	2	2	2
13	2	2	2	2	1	2	2	2	2	2	2	2
14	2	2	1	2	1	2	2	2	2	1	2	2
15	2	2	1	2	2	2	2	2	2	2	2	2
16	2	2	2	2	2	2	2	2	2	2	2	2
17	3	2	2	2	2	2	2	2	2	2	2	2
18	3	2	2	2	2	3	2	2	2	2	2	2
19	3	2	2	2	3	3	2	3	2	2	2	2
20	3	2	3	3	3	3	2	3	2	3	3	2
21	3	2	2	3	3	3	2	3	2	3	3	2

APPENDIX D

Experimental Protocols

S1

(1) Don't see anything.
Light was shaped different than before. [i.e., practice trials.]
(2) Different shaped.
(3) Still a different shape.
(4) Different shape is all.
(5) Little different shape, not much different.
(6) Little brighter and little different shape.
(7) Different shape.
(8) More blurred, different shape, not as bright.
(9) Different shape and dot in upper part.
(10) Brighter and still a dot in upper part.
(11) Differently shaped, dot still there.
(12) Dot still in it, still brighter.
(13) Quite a lot different shape and dot more down to center.
(14) Lot different shape. [Dot in it. Kind of like this. [held up 3 fingers.]
Runners of light.
(15) It has....dot was larger in it.
(16) Lot different shape. Shaped more like this and dot down.
(17) Kind of looks like front of church house.
(18) It still looks like front of church house or cathedral or something of that nature.
(19) Still looks even plainer, brighter.
(20) Still looks like a church or some kind of a building.
(21) Looks very much like one.

S2

(1) Green light.
(2) Greenish, blue light.
(3) Same color
(4) Same color
(5) Green with a tint of bluish in it
(6) Same color
(7) Same
(8) Green with tint of blue on each side
(9) Same
(10) Same thing
(11) A spot in middle of green
(12) More spots in middle of green and blue on outside
(13) Same thing
(14) Same thing
(15) Looked sort of weird then. Can't tell you; I can draw it.

(16) Hole in middle of that one
(17) Looks more like a house, bird house
(18) Looks more like a chapel
(19) Some kind of church, chapel or church
(20) It was a chapel
(21) Same thing

S3

(1) Three cornered flash. Bottom part square.
(2) Well, about same thing.
(3) Don't know what it was. All three just about alike.
(4) Had black spot in middle of it.
(5) More points up at top to it. Black spot in middle.
(6) That was a....points on top and bottom. Also spot in middle. Top and bottom looked to be same.
(7) About like other one.
(8) That one curves on side. Has points at top and bottom. Black spot in middle.
(9) Look like has legs on it. Points on bottom.
(10) Well....about same as other. Black spot in middle.
(11) About like that / above / only few more points to it.
(12) This side square, this one curved. More points on right side than left.
(13) Very little difference. Points at bottom and top also. This side straight, this side curved. Black spot in center.
(14) Quite a bit different than others, more black to it.
(15) Still has more black with white streak in black. Black spot in middle.
(16) Don't know what that would be. A lot of dark to it. Still same design. More black than white to it.
(17) Seems like spot in middle slightly larger. White part has black streaks over it.
(18) That is pointed at top and on sides square. Still has white and black. Strip of white and strip of black.
(19) That is lot different than other. Looked more like design on church window. Like design I drew in geometry class.
(20) About same thing. Believe clearer than one before.
(21) Well, now that would put me in mind of building or something. It was so much like the others. Still has black spot that's been all the way through on it.

S4

(1) Didn't make out anything.
(2) Too quick
(3) Couldn't make anything out of it, too quick.

(4) Couldn't make out anything. Bright flash.
(5) Still can't make out anything.
(6) Too quick
(7) Didn't make out anything. Just bright.
(8) Still can't make out anything.
(9) Didn't see anything then.
(10) Can't make out anything. Just looks like a flash.
(11) Still don't make out anything.
(12) Can't make out anything out of it. Just looks like a flash to me.
(13) Don't make anything out of it.
(14) Can't make anything out of it. Don't know of anything that looks like that.
(15) Don't make anything out of it.
(16) Don't make anything out of it.
(17) Don't make anything out of it. Looked more like design used for stencil.
(18) Aren't those all about the same design?
-- ? --*
Looks more, all do, more like a design.
Maybe that's just what I have on my mind.
(19) Would that be part of building or White House?
(20) Don't see nothing.
(21) That looks like part of White House.

S5

(1) Honestly, I didn't see anything. [subject blinked.]
(2) I saw a light.
(3) A light.
(4) Another light.
(5) I saw a light.
(6) A light.
(7) A light.
(8) A light.
(9) A light.
(10) A light.
(11) A light.
(12) A light.
(13) A light.
(14) A light.
(15) A light.
(16) A light.
(17) A light.
(18) A light, looks like a bird home.
(19) Looks like a church.

*Indicates E. asked S., "Tell me what you saw."

(20) Didn't see anything that time. [subject blinked.]
(21) A light. It was shaped....no, all I can say, it was a light.

S6

(1) A plain light, black flashes to top and bottom.
(2) Dark jags seems to come from top.
(3) Plain light like thing. Jags at top and bottom.
(4) That one seemed real hazy. Jags lighter at bottom than at top.
(5) Still jags. Mostly from bottom. Plane square.
(6) Real quick light with jags in it.
(7) Didn't seem square. Seemed like an odd design. Jags at top. Something rounded off in a curve at the bottom.
(8) That one seemed about the same.
(9) About same only curve on bottom cut off at right side. Only seemed that way, wouldn't say for sure.
(10) Still seemed same. Dark streaks going up through this way.
(11) Seemed like jags on top, dark streaks coming down between 2nd and 3rd jag. Seems like mountains or something.
(12) Seems like round at bottom. Streak went all through the 2nd and 3rd darts.
(13) Jags, round at bottom. Lots of dark blurs in-between.
(14) Still seems like square. Not square. Round at bottom. Jags at top. Shadows in-between.
(15) Seems like shadow. Same design. Dark spots all around it.
(16) Seems like funny design. An Aztec design, probably. Dark at top, round at the bottom. Spots in-between. Center shaped sorta like an eye.
(17) Same thing only center thing seems to get larger.
(18) About same, only straight lines coming up on it to sides of those three darts.
(19) That one seemed like Gothic design, like on some church.
(20) Seemed like it was dark and light seemed to stand out. Seemed like some design -- ? -- light and other was darker light.
(21) Just looks like a church. Dark background.

S7

(1) Looks like something like a diamond shaped something or shaped something like a star.

(2) Looked a little different than other. Don't know exactly what to say it looked like.
(3) Odd shaped thing with something in middle.
(4) Looked a whole lot like the last one.
(5) They're getting to where they all look about alike.
(6) Looked just the same.
(7) Just the same.
(8) Just the same.
(9) About the same only more streaks down at bottom.
(10) Wasn't hardly so many streaks at bottom.
(11) About like other ones.
(12) About like other ones.
(13) Just like other ones.
(14) A little difference there somewhere, but don't know.....
(15) About same.
(16) About same, I believe.
(17) Quite a bit difference -- ? -- Seemed like round spot in center with triangle shape around that.
(18) Didn't see anything that time.
(19) Looked more like front of some big old castle you've seen. Looked different than others.
(20) About the same as other. Might have been a little difference. Round thing in center.
(21) Looked about same. Maybe round place up a little higher or maybe I'm imagining things.

S8

(1) I didn't see anything, just saw a speck.
(2) Still didn't see anything but a dark blur.
(3) Same thing but looked larger.
(4) Same.
(5) Just a dark spot.
(6) It looks round.
(7) Looks bigger. Kind of oblong.
(8) Same.
(9) Just round, with dot beside it.
(10) Looked like there was 3 spots on that one.
(11) Same. Round and looks larger.
(12) Don't know....several somethings.
(13) Large part with several parts around it. Looks kind of like a snow flake.
(14) Large circle with dots around it. Looks like some kind of a design.
(15) Looks like a large circle with design around side, of some kind.
(16) Looks kind of like picture with large circle in middle.
(17) Looks like a circle with some kind of design around edges. I don't know.

(18) Kind of looks like a church window.
(19) Looked more like a church window then, with lines in it.
(20) Design. Looks like a little triangle or something.
(21) Looks like a church. Front of a church.

S9

(1) Your heart going over top of Mt. Scott. [then word salad_]
(2) No change.
(3) Again, flash of light. More in shape of....center is male....built on pattern of love spelled, l o v e.
(4) Flash of light slanted from my left to right. A hatchet like flash of light.
(5) No change.
(6) The center column is like a tree. Say you were a little angel, ...or a little bird learning to fly.
(7) Flash of light. Patient is here, Mrs. Hall took dictation on this.
(8) Didn't quite get it.
(9) The 3 wise men in story of Christ. Christmas story.
(10) Brown duck. A material used....ducking. Canvas. Pants. Used by army or boy scouts.
(11) Again a brown duck pattern. Story of life.
(12) Outline of a duck blind in Maysville, Kansas I once saw.
(13) State Hospital, Norman, Oklahoma.
(14) That is outline of picture of Whistler's mother.
(15) Nothing.
(16) Nickel.
(17) Picture of Whistler's mother.
(18) Picture of tapestry.
(19) A tapestry work by sisters of Mercy.
(20) The front of Grand Central Station. Big Ben Clock.
(21) Again the front of Grand Central Station.

S10

(1) Flash of light.
(2) Looked the same.
(3) Still looks the same.
(4) Can see no difference.
(5) Still same.
(6) I can see no change in it.
(7) Was it a little bigger then? It looked like it.
(8) Might have been a little larger then.
(9) About the same.

(10) Looked narrower then.
(11) Looked a little smaller.
(12) Looked about the same.
(13) Smaller.
(14) Still smaller, I believe.
(15) Smaller.
(16) Is that supposed to be a design?
-- ? --
About same as before.
(17) About like it was, I guess.
(18) Trying to figure out what that is.
-- ? --
Looked same.
(19) Then it kinda had the shape of a building, far as I could tell.
(20) Looked same as last time.
(21) Believe that's what it is. [a building]

S11

(1) Didn't see anything. Flash.
(2) Same.
(3) All three look same.
(4) Same.
(5) Same.
(6) Doesn't make any different. [i.e., changing setting on the apparatus]
(7) Same only with black spot in middle.
(8) Same.
(9) Flash with black spot in middle.
(10) Same, kind of has corners.
(11) Same.
(12) About same thing I guess.
(13) Same only looks like had three parts that come down.
(14) Still looks same only black spot in middle.
(15) Still looks same. Kind of sharp corner on top.
(16) Same.
(17) Still same only seems like that black spot is larger.
(18) Still same, only, looks a little bit like a building.
(19) About same.
(20) Still looks kind of like a building.
(21) Still looks kind of like a building only brighter.

S12

(1) Didn't see anything but a light.
(2) Light's all I saw that time.
(3) All I can see anytime is light flashing.

(4) Just another light.
(5) Just a light, too.
(6) Just a light, only thing I can see.
(7) Still a light.
(8) Another light.
(9) Still a light.
(10) Just a light a flashing, that's all I can see.
(11) Still a light.
(12) Light again.
(13) A light.
(14) A light.
(15) A light is the only thing I can see
(16) Still a light
(17) Just a light that's flashing.
(18) All I see is a light. If there's any object in it, I can't see it.
(19) Light, but seems like more shade, or something, in it than there was.
(20) That looked a little like a house or church or something, I don't know if it was or not.
(21) Looks like same house or something, looks more like church house, with a steeple.

S13

(1) .... -- ? --
Couldn't hardly describe it. Little light down there. Yellowish light.
(2) A little larger light. Looks like about same width only larger and higher. Looks like about same color.
(3) Well, don't know, about like others. Might have reached up higher.
(4) I don't know. All about same. One about like another.
(5) Well....don't know. Just about same.
(6) That one looked about like others, best I can tell.
(7) Still seems about same.
(8) Still seems about same.
(9) Still seem be same flash. Don't know whether it is or not.
(10) I don't know, it might of been a little shorter, I wouldn't say.
(11) About same.
(12) Don't know, all seem about alike to me.
(13) That might have been a little taller.
(14) Seemed about same as last one.
(15) Seemed about same.
(16) Seemed about same to me.
(17) Seemed like I noticed an opening in that one, I don't know.

-- ? --
Seemed like a hole, a round spot, a dark spot or something.
(18) Still about same height. Seems like it has a hole in it.
(19) Seemed to be about like last one with that opening or hole or whatever it is.
(20) Just about like others.
(21) That one might have been a little smaller. It was shaped like others.
-- ? --
All I could tell was it looks like a light on there.

S14

(1) Flash
(2) Flash
(3) Flash
(4) Flash
(5) Flash. Should I call colors? -- ? --
(6) Flash
(7) Flash
(8) Flash
(9) Flash
(10) Flash
(11) Flash
(12) Flash
(13) Flash
(14) Flash
(15) Flash
(16) Flash
(17) Flash
(18) Flash
(19) Flash
(20) Flash
(21) Flash.

S15

(1) Not square. Square on this side [right_] but other side grooves.
(2) About same.
(3) A little down off screen.
(4) Little dot in middle.
(5) Four corners, a little taken out of each corner and dot in middle.
(6) About same.
(7) Grooves along each side. Dot in middle.

(8) About same.
(9) About same as before.
(10) Both ends had little grooves and dot in middle.
(11) About same. Getting smaller. Dot in center.
(12) Lines coming down further in center. Dot in center.
(13) White on each side. Two lines go all way through.
(14) About same. Has another line right hand side. Small line.
(15) Lines on both sides. Dot in middle. Grooves top and bottom.
(16) Lines and dot still same. Looks like had little square out of right hand bottom corner.
(17) Line on left hand side. Right hand has line and small line in each corner. Dot in center.
(18) Looks like two lines, dot in middle. Dot in middle. Right hand side has some small lines.
(19) Two lines. Small lines going across the bottom.
(20) Looks like lines coming up in "V" shape /inverted_/ at bottom.
(21) Bunch of jagged lines coming down from top and up from bottom.

S16

(1) A form of something I already know. Looks like an airplane. Very streamlined. I'd say an airplane. Streamlined car, from an airplane looking down.
(2) Didn't get anything. Saw it all right.
(3) Looks like I saw something, but looks like little hole in it.
(4) Don't know what that is.
(5) Saw streamlined car with black dot in center. Car or airplane.
(6) Saw something, but dot vertical, elongated in the vertical.
(7) Same thing.
(8) Same thing. Might mention there is a left section that seems to be separated from the fuselage. /body of airplane_/
(9) Same thing.
(10) Like you see....tapered to the outside. Basing that on what I've seen before.
(11) Outside seems to come together. Little black lines protruding down.
(12) I was looking at bottom, but missed it. Saw same thing.
(13) I think that I saw two black lines in bottom half. Vertical black lines.
(14) /laughs_/ I don't know what I saw. Nothing in particular.

(15) Think there were more black lines than two. Maybe three. A more jaggedy line.
(16) Saw vertical line in the right. Full length of the object.
(17) Thought I saw a line slanting from top left half to right of center.
(18) I saw dark lines I hadn't seen before. Nothing particularly different that I can describe.
(19) Looks like a church. Front part of a church.
(20) It is a church with an oval window near top.
(21) Saw a gable on right. Right half seemed....oblique picture with right half apparently being nearer the camera.

S17

(1) Flash.
(2) Flash.
(3) Flash.
(4) Flash.
(5) Yellow flash.
(6) Had a little black in it.
(7) Yellow one.
(8) Had a black spot.
(9) Had a little black spot in it.
(10) Had another little black spot.
(11) It had a little black spot. Dark spot.
(12) It had a dark spot too.
(13) It had a dark spot.
(14) It had a dark spot in it.
(15) Dark spot up here [top] and a dark 'un down there [bottom].
(16) Same way.
(17) Same way.
(18) Same way.
(19) Had a dark spot in middle and one below. Same as rest of 'um.
(20) Had more dark in it than rest of 'um.
(21) Had same as the other one.

S18

(1) Flash of light. Color in it.
(2) Light all I saw. Jagged edges.
(3) Light, colors in it. Jagged edges.
(4) Light.
(5) Always jagged edges. Light.

(6) Light. Thought I saw profile of person, but could be wrong.
(7) Light.
(8) Light.
(9) Light.
(10) Saw light and two dots. More than dots. More like little islands, evenly spaced one above the other.
(11) Again islands. One in upper left, one in lower right. Still jagged effect.
(12) The dots are in different places. Further from top. One center bottom.
(13) Light. I could make my imagination make it take on some shape.
(14) Something, but spots in different place. All /slides_/ have different shape.
(15) A circle instead of a regular spot they've all been. 1/3 down from top. More or less effect of building, office building, coming toward you. Peaked roof.
(16) Looks like a cat squeezed together like an accordion with black spot in center.
(17) Flash of light.
(18) Nothing, not even light.
(19) Church. Front of church, cathedral. Clearest yet.
(20) Same thing only more vivid. Caught glimpse of bell tower.
(21) Same. Picture of front of cathedral taken in bright sunlight.

S19

(1) Eagle, wasn't it? The way it looked to me.
(2) Must have been a German insignia on a uniform.
(3) Must have been brass bars on U.S. uniform.
(4) Couldn't definitely give an answer on that one.
(5) The brass a general wears on his cap.
(6) Couldn't make nothing only a guess at that.
(7) Still stuck on that one. Put it down, watch fob.
(8) Be afraid to try to answer.
(9) Looked kind of like as ash tray.
(10) Couldn't answer that.
(11) Well, one thing I seen there was a bull's eye.
(12) Another one.
(13) Another one; but of a different form and outline.
(14) Same thing, only different form and outline.
(15) Same thing, only different form and outline.
(16) Same thing, only different form and outline.
(17) Different form and outline - "still same thing?" - Yes, still bull's eye.

(18) Same thing, only brass of some kind, with bull's eye, the kind they wear on uniform.
(19) Same thing. Might have been a little different outline.
(20) Same thing, only little different outline.
(21) Same thing, only I believe there's writing on the insignia.

S20

(1) Flash is all I saw so far.
(2) Flash with a dot in it.
(3) Still has a dot, but I can't tell what it is.
(4) Seems the dot gets smaller.
(5) Small dot, very small.
(6) Still see dot. Those flashes seem to change some, but don't know how to explain it.
(7) Dot's still there.
(8) I don't notice a great deal of change in the last few times.
(9) Maybe that dark spot is getting larger. Seemed a little larger that time.
(10) It is larger than it was.
(11) A little larger than it was.
(12) Seems that it's larger yet.
(13) Yeah, it's larger.
(14) Still growing.
(15) Well, ...it seems to me the flash has changed or my eyes are hurting, or something.
(16) That dark spot's larger all right.
(17) Yeah, it did change some. Dot is still larger.
(18) That dot's growed a lot.
(19) I believe that flash split up. More so than ever. More different flashes. I don't know how to explain it.
(20) Some kind of a change. I hardly caught. Old dot's larger, but think I caught a flash of another one.
(21) Quite a change; don't know how to explain it. It looks like a garden gate or something.

S21

(1) Just a flash is all.
(2) Flash.
(3) Flash.
(4) Another flash.
(5) Flash again. A little yellow is all. Something like a spearhead in top of all of 'um.

(6) Same.
(7) Little different shape. Kind of messed up, ragged at bottom. Couldn't tell shape.
(8) Same thing.
(9) A little bit more ragged. Not one object as much.
(10) Still the same. Shaped about like deer hide or some animal hide. Ragged, but no particular shape.
(11) About same.
(12) Well, they very a little, but not too much. That one had a round object in center.
(13) Another round object. Closer to top. About 2/3 of way up.
(14) Another object, about same place. Looks like sun in a dust storm.
(15) More distinct on black, not black, darker. A long straight object about 1/3 way up. Stripes on both sides. Looks like coral.
(16) More like one of them old type clock, although round object looks like clock. General shape like one of them old antique clocks.
(17) Sun-like dial, more brighter. Still has general look of a clock. Ragged edges look like mountains, dark.
(18) Sun-like thing dark. Still has general look of old time clock.
(19) Looked much nicer. Looked like one of those grandfather clocks that time. Looks like "In God we trust," liberty lady. Those flanges shooting off from her head.
(20) Nice looking picture. Guess that's front of cathedral. Roman building.
(21) That was like one of those aristocratic, foreign, you don't see in this country, nice building or castle. Full of nice things.

S22

(1) Green looking light.
(2) Yellowish looking that time.
(3) That one was brighter.
(4) Yellowish looking.
(5) Another yellowish looking.
(6) Believe that was more whiter.
(7) That one looked kind of whitish too.
(8) Kind of yellowish.
(9) That was white.
(10) Whitish looking.
(11) Whitish looking.
(12) Whitish looking.
(13) Whitish looking.

(14) Whitish looking.
(15) Whitish looking.
(16) Whitish looking.
(17) Whitish looking.
(18) Whitish looking.
(19) Whitish looking.
(20) Whitish looking.
(21) Whitish looking.

S23

(1) Different shapes of light.
(2) Pretty near the same. About same form.
(3) Looks same.
(4) Is there something black in center?
-- ? --
[silence]
(5) Can't tell much difference.
(6) Probably same.
(7) About same form.
(8) Looks same. Like this.
(9) That one has black spot in center too.
(10) That one has waves up above and below both.
(11) Practically same as last one.
(12) Different shape. More on top and more on bottom.
(13) That one has bigger spot. Waves above and below.
(14) That had more waves than before.
(15) Practically the same.
(16) That has more. [waves]
(17) That has more. [waves]
(18) More yet.
(19) That's more.
(20) That's different, more of a deeper setting.
(21) That looks like has round spot in center and more of a sharper picture. Steeple is sharper on top. More scattered.

S24

(1) Light, yellow [color] cast. Point was up.
(2) Light. Arches up more in center. Yellow-green.
(3) Light. Shadowed at top. Runs to a point.
(4) Light. Arched point, small arch at right hand side, point rather.
(5) Light. Darker yellow not quite half down. Points center and right.
(6) Light. Shade was down further. Point still in center.
(7) Light. Shadows on left. Point.

(8) Light. Green-yellow. Points. Line 1/2 way down.
(9) Light. Round on left side. Green-yellow. Point on right.
(10) Light. Had bluish cast on right.
(11) Bluish, yellowish. About same as other was. Not square frame. /i.e., the total picture/
(12) Light. Blue on side. Points. Lines zig-zag up and down.
(13) Blue further down. Zig-zag at top. More of a yellow cast.
(14) Blue on left. Points up and down.
(15) About same. Only dark spot to left hand side. Points.
(16) Blue outside. Spot more to center. Greenish yellow.
(17) Dark spot more to center. Blue outside.
(18) Spot in center. Blue on top. Points.
(19) Beginning to look what you would call a church steeple.
(20) Dot in center. Dark spots going through center. Looks more like a church.
(21) Definitely would look like a front of a church.

S25

(1) Saw flash of light. Yellow color.
(2) Looks a little lighter than the other one.
(3) About same as first one.
(4) About same as other one.
(5) Don't see any difference.
(6) Don't see any difference.
(7) Don't see any difference.
(8) Like others, a little more jagged on top.
(9) Seem like I saw a spot close to top.
(10) About same, little jagged at top.
(11) About same.
(12) Don't see any difference.
(13) About same, dark spot's still there.
(14) Thought I saw a dark shadow at bottom this time.
(15) About same.
(16) Dark spots like shadow between your fingers.
(17) Dark shadows up through the pattern.
(18) Same thing.
(19) Few more windows getting in there now.
(20) About same.
(21) About same, dark spots and shadows in there.

S26

(1) Yellow light.

(2) Green yellow light.
(3) Kind of a yellow light.
(4) Another yellow light.
(5) Another yellow light.
(6) Same.
(7) Same.
(8) Same.
(9) Same.
(10) Same.
(11) Same.
(12) Same.
(13) Same.
(14) Same.
(15) It's different figures.
(16) Same as first ones.
(17) Same as first ones.
(18) Same as first ones.
(19) Same as first ones.
(20) Same as first ones.
(21) Like a church building in front of it.

S27

(1) Just flash of light.
(2) Just a flash.
(3) Just a little bit of different color.
(4) About same as it was.
(5) Couldn't tell any difference.
(6) About same.
(7) About same thing.
(8) Little bit lighter blue.
(9) About same thing.
(10) Couldn't see no difference.
(11) Couldn't tell any difference.
(12) About same.
(13) Noticed a little object in there. Don't know what it was.
(14) About same.
(15) About same.
(16) More ornamental shape.
(17) Can't tell any difference.
(18) About same thing.
(19) A little different colored.
(20) Still a little deeper yellow.
(21) A little deeper yellow than that before.

S28

(1) Looks like an arm. Looks like a body. Looks like a pipe down through a body.
(2) Looks like same thing only had a dent in curved part.
(3) Looks like two longer parts on that side.
(4) Looks like a deep curve in the neck part.
(5) A hard one. Looks like a deep curve on right and square across neck part.
(6) Hollow part right here. [touching her throat] Curve in arm or thigh section or whatever you want to call it.
(7) Looks like a bigger square at bottom.
(8) Side slant and slant on arm part.
(9) Gosh, that was a mess. All messed up on side part. It looked like it went back in the top.
(10) Two points. [pointed to throat]
(11) Looks like picture getting all messed up all over in general.
(12) Completely a mess. Lots of lines all messed up.
(13) All mixed up. Lot of shadows.
(14) Just an old messed up picture to me. All lines all jagged and crooked.
(15) Lots of blue in that, color. Blue, yellow, orange and white.
(16) Lots of blue and looks like pillar of building underneath.
(17) Had hole at top, blue sky, building, more shape of building to me.
(18) Lot of yellow on bottom part, picture getting a deeper color tone to it.
(19) Looks like a clock at top, round clock.
(20) Looks like a building to me.
(21) It is a building, don't know of what though.

S29

(1) Dark spot in center.
(2) Another dark spot in center.
(3) Same thing.
(4) Smaller dark spot in center.
(5) Same thing.
(6) Same thing.
(7) A little different. A curve off to left of dark spot.
(8) Dark spot.
(9) Same thing.
(10) Same thing except a dark spot at left. A long streak.
(11) Same thing as last one. Dark line.
(12) Same thing.

(13) A little different. A little streak to right, bottom.
(14) Streaks all over that one.
(15) Several streaks on that one, round in center.
(16) About same as other was.
(17) Streaks on that side closer to center.
(18) About same.
(19) A little different, streaks were narrower.
(20) About same as others.
(21) About same. Two white streaks at bottom.

S30

(1) Looks like a square part of way. Then looks like a design.
(2) Looks just about the same.
(3) These all look alike except top isn't same each time.
(4) Looks like a square except it had two points on each side.
(5) That had dot in center of it, it wasn't square.
(6) About same as others.
(7) Dot in center and it wasn't square.
(8) Dot in center.
(9) That did also.
(10) That was a larger spot in center.
(11) That was big spot in center.
(12) Spot in center.
(13) Spot in center.
(14) Spot in center. Not square.
(15) Spot in center.
(16) That one also.
(17) Spot in center.
(18) Spot in center and it kind of streaky.
(19) Kind of shaped like top of house with spot in center.
(20) Spot in center.
(21) Looked kind of sideways top of house, spot in center.

S31

(1) Lightning.
(2) Seen same flash, but saw my dead mother's face.
(3) Bristow. [town in Oklahoma]
(4) Hominey. [town in Oklahoma]
(5) Dr. Mechling, best in the west.
(6) Looks like you.
(7) Another Farwell.
(8) Little Rock. [town in Arkansas]
(9) Borger. [town in Texas]
(10) Nothing but birds.

(11) Looks like Hominey. [town in Oklahoma]
(12) Just your name over and over.
(13) McFarland, Kansas.
(14) You.
(15) Your age.
(16) You.
(17) You.
(18) Same thing, only different.
(19) Dr. Stephens, best in the west.
(20) Same thing only different.
(21) Davis, Oklahoma.

S32

(1) Flash of light that seemed to have a little streak in it.
(2) Sort of checky....point in center. A leaf maybe.
(3) Almost same thing again.
(4) That one had something different in center.
(5) Can still see that kind of in center. Can't tell what it is.
(6) More or less round in center.
(7) Still had spot, higher up. Streak down this side.
(8) Kind of odd shaped light with something in center.
(9) Still that. Kind of uneven. Top and bottom jagged.
(10) Same thing, but more drop at bottom.
(11) Same old thing.
(12) Same thing.
(13) This time, where place came in it was deeper. Streak ran down from it.
(14) More streaks in side and still have 'em in center.
(15) More and more streaks and holes on side.
(16) Still more streaks, black places, wider than they were.
(17) Same thing. Light part has more dark running into it. Still has spot in center.
(18) More solid light this time. Shape had changed.
(19) Looks like a cathedral or something.
(20) Even more so with spot in center.
--? "What you mean 'more so'?"--
More like a cathedral or building.
(21) Still looks like a that.
-- What? --
Like a cathedral or ornate building.

S33

(1) Flash of light.

(2) About same thing.
(3) Same thing.
(4) Flash of light.
(5) Same.
(6) All looks same.
(7) Same thing.
(8) All same.
(9) Same thing. Don't see a bit of difference.
(10) Same as others.
(11) Same.
(12) Same thing.
(13) Looked same thing. Same thing over and over.
(14) Same thing.
(15) Same thing.
(16) Same thing.
(17) Flash of light.
(18) Looks like it might be widening a little.
(19) Changed a little, widening.
(20) Flash of light.
(21) About same as others.

S34

(1) Flash on there, kind of golden color light.
(2) Little darker center about 2 inches in diameter. Same color.
(3) About same.
(4) Flash with dark center.
(5) Same thing, sort of outline, kind of hand shaped.
(6) Dark spot getting smaller.
(7) Practically same as one before. Smaller diameter center.
(8) Center of large is more peach shaped.
(9) Could draw it, perpendicular pillars on each side.
(10) Extending down at bottom. Looks like center circle is getting smaller.
(11) Bottom part of flash closer to little center spot.
(12) I give up...little different than one before but pretty near same.
(13) On bottom several stripes, fragmentation on bottom part.
(14) Don't know. Practically same as one before.
(15) Like one before only little blank space between bottom and middle.
(16) Pretty near same. Little curlicue on left corner.
(17) Looks like a boy scout badge.
(18) Looks like forming of letters at bottom.
(19) Looks like....little clearer. Looks like clearer exposure of picture before.

(20) Practically same thing as picture before.
(21) Think that was a word but couldn't make it out. Under larger portion of picture.

S35

(1) Light shaped sorta like a bat with a black dot in the center.
(2) I saw a triangle with a straight black line in the center.
(3) Saw a light shaped like this [drew in air with fingers_] and black dot in center.
(4) Light looks like a bat and flared straight up like sun with a black dot in center.
(5) Saw about same shape only it flashed from the side.
(6) Flashed from top and bottom. Shape was about same only slimmer.
(7) Flashed all around.
(8) Flashed all around circular design. The dot had a movement back and forth.
(9) Flashed all around and dot moved up and down.
(10) Looked sorta like a 3 dimensional light that flashed all around and black dot in center came forward.
(11) Flashed all around. Light moved up, all around.
(12) Flashed all around, but seemed to be moving sideways.
(13) Don't know what to call that kind of light. Reminded me of a mirror.
(14) Light flashed all around.
(15) Light reminded me of lightning.
(16) Light reminded me a little of lightning, but had circular motion. Shape was like arrows.
(17) Reminded me of lightning, too.
(18) Reminded me of a neon on a theatre, arrows around it.
(19) Reminded me of a cathedral.
(20) Reminded me of a cathedral.
(21) Reminded me of a cathedral. Light reminded me of a photographer's light. [flash gun_]

S36

(1) Yellow dim light flash.
(2) Light, splotches.
(3) Green color.
(4) Looks like more of a beaming light.
(5) Looked same way, beaming.
(6) Looked same.
(7) Looked same.
(8) A little brighter.

(9) Little smaller.
(10) Looks clearer.
(11) Same thing, but a little blue in center.
(12) Clear and flashed blue on outside.
(13) Still see top of light. Looks just flashes of blue. Blue background.
(14) Different colors, blue and yellow.
(15) More like a fence.
(16) Same. Different colors.
(17) More blue than yellow.
(18) Light looks like it was reflecting a castle.
(19) Same thing only brighter.
(20) Looks like a palace.
(21) Looks like same thing, a King's dwelling house.

S37

(1) Green light.
(2) Another one.
(3) Change in form. Still same color.
(4) Yellow-green light that seems to have a different outer margin each time.
(5) All I see is yellow-green. This time there seems to be a light shade of blue around edges.
(6) Same thing.
(7) All I see.
(8) Don't know whether I'm paying more attention, but shapes aren't changing as much.
(9) Still see same thing.
(10) Same.
(11) See dark clouds, dark spots, I didn't see before.
(12) Reminds me of side of house cause of two dark spots that could have been windows.
(13) I'm seeing same thing I've seen last three times, exactly.
(14) Same thing.
(15) It's getting more holes in it.
(16) It's becoming less of a connected thing and getting more scattered out.
(17) Same thing -- and that is? -- a picture that I know I've seen several times before, but each time I'm seeing more of it.
(18) Looks like a church, side of one.
(19) What it reminds me of is old cathedral shaped up like this with big rectangular windows.
(20) Now that I've decided it's a church it looks more like one every time.
(21) Looks very, very much like one. Blue outline could be the sky.

S38

(1) Just light.
(2) Same.
(3) Spot in it.
(4) Same as one before.
(5) That spot seemed to have something that went down from it. Looked kind of like a key hole.
(6) About same, but little wider light.
(7) Dot was smaller, light was wider, and shadow in bottom part of it.
(8) Spot still smaller and more shadow in the light.
(9) Still more shadow in that one.
(10) Dot still smaller and seems lines up and down, alternate light and dark.
(11) Light is wider, not much difference.
(12) Picture looks narrower and taller and shadow approximately same.
(13) More shadows and less light.
(14) Still less light, believe a little wider than last one.
(15) Still less light and spot and lines about same.
(16) Still less light and more shadows.
(17) Looks like a church window.
(18) Looks like a cathedral front.
(19) That's still what it looks like.
(20) It's a church.
(21) It's a church.

S39

(1) Flash of light.
(2) Didn't see anything.
(3) Yellow green light flash.
(4) Practically same thing. Bluish tinge. Got a little higher.
(5) Practically same thing.
(6) Can't tell any difference.
(7) All near same.
(8) Shape may change a little, can't tell any difference in coloring, but looks same.
(9) Little taller, not quite so wide. Very little difference.
(10) Not quite so bright.
(11) Looked little brighter.
(12) Same as last one.
(13) Last three have looked alike.
(14) May have been a little brighter.
(15) A little space in center of this one, opening or round spot, that I haven't been seeing.

(16) Looked like a round spot in center and around it is yellow bright light. Center is blue spot.
(17) Looked same. Spot looked a little more oblong than it dod round.
(18) More inform of sort of church with spot in center. Taking on more form now.
(19) Looks same. Bright yellow light in form of a church.
(20) The same. Spot may be a little higher up.
(21) Same thing with round center spot toward top.

S40

(1) Piece of light.
(2) Light.
(3) Nothing.
(4) Beginning to resemble a head.
(5) Nothing.
(6) I saw something that faintly resembled a eagle with out-spread wings.
(7) Nothing.
(8) Nothing.
(9) Nothing.
(10) Nothing.
(11) See black dot in all that light, but doesn't mean anything.
(12) Black dot in middle of that eagle. Doesn't really look much like an eagle really.
(13) Something, but black dot is beginning to lengthen a little.
(14) Black dot in light area and seems to be lighter background showing up.
(15) Picture becoming clearer and seems to be taking shape of building of some kind.
(16) Same thing and seems to be a kind of cathedral with spires.
(17) Building is much clearer and sky in background is blue. Black dot seems to be clock or something similar to that.
(18) See a kind of cream-colored stone building, spires, clock on front face of it. Porch-like affair down below.
(19) Same thing. Clearer. Believe clock is 25 minutes to 4:00. /laughs/
(20) Same thing except....clearer. Porch-like affair showing more depth. Blacker.
(21) Don't see much difference. Clock looks like a quarter after five that time. Might be a Mexican building rather than a cathedral.

S41

(1) Dot.
(2) Same thing. Black dot.
(3) Same thing. Sorta like a church window.
(4) Same thing.
(5) Same.
(6) Same.
(7) Same thing.
(8) Same.
(9) Same.
(10) Seems there are some light gray things at the bottom.
(11) Same. Interspaced with gray are the white.
(12) Now seem to be gray stripes, not even, to right of dot.
(13) About same.
(14) More broken with the gray. Same pattern.
(15) Much more broken. Less white. White breaking down into stripes with gray dominant.
(16) Black dot still in middle and white breaking up vertically.
(17) Center black is larger and white seems to diminish some. Still in same position.
(18) Very little white. Appeared almost like a church window with very little light coming through.
(19) Black dot still in center and white instead of being rounded has sharp points more. Taking on perspective, too. Like if a building the perspective goes back toward the left.
(20) Has the form of a cathedral or a church.
(21) Again the same. The archways at bottom are darker.

S42

(1) Flash of light.
(2) Flash of light.
(3) Flash of light.
(4) The beginning of human body.
-- "What do you mean 'beginning'?" --
The torso.
(5) More of the body.
(6) A bulge in the north side of the body.
(7) Same as before.
(8) Still the bulge.
(9) Same thing.
(10) Didn't see any difference.
(11) The light was beginning to be jagged around the edges.
(12) Black spot in the center.
(13) Black spot again in the center.
(14) Black spot getting toward top of the white.

(15) Again it looks like a white jagged light with a black spot in the center.
(16) Looks like an old house on a hill with a sheet of lightning.
(17) Beginning to look like a cathedral.
(18) It's a clearer picture of a cathedral.
(19) It was clear -- ? -- of the cathedral.
(20) Picture of a cathedral.
(21) Cathedral.

S43

(1) Didn't see anything.
(2) No distinguishable markings, nothing distinguishable.
(3) Nothing distinguishable. Some different forms on there.
(4) Saw this. [drew on table]
(5) [drew on table]
(6) About same.
(7) [drew]
(8) About same. Those are just dark spots.
(9) About same. Still getting that little dot in center.
(10) Same thing.
(11) That had some little dark spots on side, but same figure.
(12) Same thing without dots on side that time. Didn't notice them.
(13) Still same.
(14) That one was still having dot in center. Sharp points at top and bottom, but broken.
(15) Seems be changing a little bit. Seems like light is making a point completely up to top. Darkish broken spots on sides.
(16) Still have my dot, still have broken lines, still have points.
(17) Still same only seems like on two sides are darker and center point goes up above the frame.
(18) [laughs] Still have triangle shape, dot in center and more black rods broken.
(19) Looked like....same thing....only reminds me of a cathedral window.
(20) Same thing.
(21) Still same. Seems like it's getting a little lighter.

S44

(1) Flash of lightning.
(2) Flower.

(3) Sunset.
(4) Looks like a butterfly.
(5) Looks like another sunset to me.
(6) Looks like....just like a sunset.
(7) Might be a dog.
(8) Looks like a sunset.
(9) Looks like a volcano.
(10) Still looks like same thing, volcano.
(11) Looks like a burning bush of some kind.
(12) Looks like a bush on fire, burning bush.
(13) Looks like a volcano.
(14) Looks like a butterfly.
(15) Looks like a moth.
(16) Looks more like a lace curtain.
(17) Looks like same lace curtain.
(18) Looks like an ornamental doorway.
(19) Looks like an ornamental doorway.
(20) Looks like front of a gothic building.
(21) Still looks like front of a gothic building.

S45

(1) Flash.
(2) Flash.
(3) Flash of light.
(4) Same thing.
(5) Same thing.
(6) Flash with a dot in the center.
(7) Flash with a larger dark spot in it.
(8) Flash with a small dark spot and shaded at the bottom.
(9) Same.
(10) Same.
(11) Same thing.
(12) Seemed to be a little different. Had a different shape at the bottom.
(13) Just same to me.
(14) Still had the dot, but little different at bottom. Dark lines going down.
(15) About same.
(16) Had a little more at the bottom than the other one.
(17) About same at bottom, but seemed more pointed at top.
(18) That was lined all over with dark streaks and dot in center.
(19) That looked more like front of a house, building.
(20) Same.
(21) Didn't see anything different.

S46

(1) Just a spot.
(2) Spot.
(3) Spot.
(4) Spot.
(5) Spot with a hole in it.
(6) Spot.
(7) Spot.
(8) Spot with 1/4 cut out of it.
(9) Spot.
(10) Spot.
(11) Spot with a hole in it.
(12) Spot.
(13) Spot.
(14) Spot with a hole in it.
(15) Spot.
(16) Spot.
(17) Spot.
(18) Spot.
(19) A church.
(20) Church.
(21) Church.

S47

(1) Flash.
(2) Flash.
(3) Flash.
(4) Flash.
(5) These flashes all have an image. A flash with top shaping down. Two black spots.
(6) Flash built kind of like a pear.
(7) Another flash, all seem to have same shape.
(8) Had black spot in center.
(9) Had black spot in center. Outer lines were more coming to a point.
(10) Pretty near a square. Black in corners and black spot in center.
(11) Clearing up more. Still got the black in the center.
(12) Black streaks running down from the top. Black spot in center.
(13) Coming to a point again. Black spot in center.
(14) A grayish color now on the sides.
(15) White running up into the gray.
(16) Black streaks coming from the top down.
(17) Shape of a tree, no, one of these bushes, evergreen.
(18) Lot of gray streaks down through it.
(19) I've seen a church that looks like that.

(20) Looked very definitely like a church. Reminds me of a church I've seen, not all churches.
(21) Still shaping up like a church.

S48

(1) Flash.
(2) Same thing, had a dark center.
(3) Looked to me like it was an explosion. Dark center. Some object up toward top.
(4) Flash was wider and dark object in center was smaller and object at top was lower.
(5) Looked like a dark round ball in center.
(6) Small dark ball in center. Flash seemed to be brighter.
(7) Very small dark ball in the center of that flash.
(8) Flash seemed to be in three sections, 3 points on top. Dark ball in center.
(9) About same thing.
(10) About same thing.
(11) Small dark ball right in center. Three points seemed to be divided in center.
(12) Small ball still there. Flash different. Three points more divided and shorter.
(13) Same except center section seemed to be divided a little, wider.
(14) Small ball there, but several points on flash. Center was longest.
(15) Seemed to be three different points of the flash, but they were broken up and divided--ball was still there.
(16) About same except seems broken parts are a little closer together.
(17) Seemed like it was a little more broken up. Small ball in center still there.
(18) About decided what that is, looks like lightning through a window.
(19) Flash seems to be getting brighter. Ball still in center. Flashes on outside have streaks through them.
(20) Practically the same.
(21) Looks like a cathedral steeple with lightning or some kind of traveling light going by.