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Perceptual Thresholds in Schizophrenic Patients: A Method for Determining Thresholds and Differences between a Patient Group and a Normal Group

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by

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VITA

Melvin D. Frank was raised in the village of Lombard, Illinois and attended Glenbard Township High School in Glen Ellyn, Illinois. He graduated from the University of Illinois in 1949 with a Bachelor of Science degree, with a major in psychology. He began graduate study in clinical psychology at Loyola University in September, 1949.

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CHAPTER I

INTRODUCTION

Much has been discussed, written, theorized, and reported concerning subliminal perception or "subception," a term coined by Lazarus and McCleary (1951). The interest of the present experimenter was to investigate the perceptual processes involved in such a concept as they appear in emotionally disturbed patients in a state hospital. The evidence for and against subception has remained controversial for some years; and before attempting to study the apparent subliminal responses, it is necessary to cope with, and to some degree solve, the problems of establishing accurate thresholds for both normals and patients. Thus, the purpose of the present study was to offer and examine one method for determining thresholds with such groups and to compare the specific results obtained with a sample group of patients and a sample group of normals.

In setting up the design of this study, a number of questions were posed concerning the ways in which the subjects and the experimental data could provide meaningful information in the areas of perceptual defense and psychophysical thresholds. The study had a large exploratory dimension in view of the use of schizophrenic subjects and the use of human figures as stimuli. The question that appeared to be the most basic was whether schizophrenic patients could perform the task adequately enough to allow the determination of thresholds. From his experience with schizophrenic patients, the experimenter

was convinced that subjects of this type could perform adequately. He also expected that the severity of their emotional problems would cause the patients to manifest lower accuracy than the normal subjects in identifying tachistoscopically presented stimuli. Thus two hypotheses evolved.

1. Schizophrenic patients can produce experimental data in response to tachistoscopically presented outline drawings of human figures, indicating the feasibility of threshold determination.
2. Schizophrenic patients will manifest a significantly lower level of accuracy than the normal subjects in identifying the stimuli.

In addition to the above, primary area of study for this experiment, the present investigator wanted to gain some insight into the emotional factors operating in perceptual defense in schizophrenic patients as well as in normal subjects. It was felt that a measure of subjects' degree of certainty regarding their given responses to the stimuli would provide some knowledge regarding the establishment of more valid thresholds that cannot be found in the measure of accuracy alone.

CHAPTER II

REVIEW OF RELATED LITERATURE

Since the well known work by Miller in 1939 on the subject of subliminal perception, much of the material that has been written about this type of study concerns the factors which influence perceptual accuracy and the differential recognition thresholds, factors which have been postulated as determinents and which must be accounted for in experimentally determining true thresholds. As described by Lazarus and McCleary (1951), these factors fall into two basic categories. One has been called "response availability," and the other "dynamic." Much of the evaluation and criticism of previous studies have been approached on the basis of the structure and elements of these two factors. Response availability refers to the frequency of occurrence or usage of different words. It has been pointed out that when words are more readily at a subject's disposal (because of more frequent usage), the subject is more likely to make use of minimal cues from these words. If the cues are so minimal that the subject's responses appear to be guesses, a higher degree of availability of certain words increases the probability of these words being correctly identified.

Authors who have made studies using the dynamic frame of reference have approached the problem of differential thresholds on the basis of the theory that there is a process in which the individual subject actively selects and rejects the stimulus material according to his particular emotional needs. This

necessarily involves the postulation of a process of discrimination which must take place in the individual prior to his actually making a correct identification and reporting it. Again, the initial problem appears to be the need to find a means of establishing accurate thresholds, including a satisfactory stimulus material which elicits readily available responses among the subjects tested.

McGinnies (1949) felt that it had been well established that a perceptual "filtering" of visual stimuli operates in subjects and serves to protect them as long as possible from an awareness of objects which have unpleasant emotional significance for them. In his view of perceptual defense, he assumed that emotion-inducing stimuli initiate perceptual responses which are consistent with emotional adaptation and that the filtering process is acquired as a technique for organizing perceptions around value expectancies; the process would thus produce maximum reinforcement of the value expectancies. He wanted to find out how a raised or lowered threshold of recognition for threatening stimuli is accomplished before the subject discriminates and becomes aware of their threatening nature. Believing that the answer to this could only come from a fuller knowledge of the neurophysiological processes underlying perceptual response, he set out to detect one aspect of physiological reaction accompanying perception. Specifically, he wanted to see if autonomic reactivity would have a lower threshold to threat than the neural systems which mediate consciousness.

McGinnies devised a randomly ordered list of eleven "neutral" words and seven "emotionally toned" words. The latter included such words as raped, whore, penis, etc. By means of a Gerbrand's Mirror Tachistoscope, the words

were presented to eight male and eight female undergraduate students in psychology. The subjects' GSRs were recorded in reaction to the words. Each subject was tested individually, first determining his threshold and accustoming him to the apparatus through the use of four trial words. A threshold was determined for each stimulus word in the list by exposing it once at 1/100 second, once at 2/100 second, etc., until it was correctly reported. Instructions to the subject were to report whatever he saw or thought he saw on each exposure regardless of what it was. Time for the experimenter to record the GSR was allowed by telling the subject to focus on his response but to withhold stating it until he received a signal. Six seconds were allotted to this withholding period. Analysis of the data was based only on the GSRs prior to the trial on which recognition finally occurred.

The first finding in the data was that mean GSRs were significantly higher for emotionally toned words than for neutral words, as shown by a t test that was significant at the .01 level of confidence. The second finding was that the mean thresholds of recognition (recognition being defined as occurring when a correct response was given) were consistently higher for the emotionally toned than for the neutral words, individual differences in these thresholds being statistically significant in a t test also.

A third finding was based on an analysis of the content (structure or meaning) of hypothesized or guessed words given as responses prior to verbal report recognition. A Chi Square test of independence between the type of hypothesis and the meaning of the stimulus word indicated significantly, at below the .01 level of confidence, that the subjects made proportionately more "unlike" and "nonsense" responses to the emotionally toned words.

McGinnies believed that his findings showed increased emotionality in the subject before recognition and therefore gave evidence that the individual actually discriminates the stimulus before he fully perceives it. Perceptual defense then would be based upon conditioned avoidance of unpleasant or dangerous stimulus objects and designed to delay the greater anxiety that accompanies actual recognition of the stimulus. McGinnies felt that "some integrational processes may occur at the thalamic level which are effective in delaying or modifying cortical integration of visual patterns, while at the same time causing autonomic reaction to emotionally meaningful stimuli." He concluded that while perceptual avoidance is achieved to some degree, anxiety, the conditioned response, is not circumvented entirely.

Believing that the proponents of the "dynamic" approach must postulate some process of discrimination occurring in a subject prior to his ability to report correct recognition of a stimulus, Lazarus and McCleary (1951) took a more specific assumption of this process and attempted to test it. Their assumption was that if a subject's ability to recognize the word "sacred" at faster exposure speeds than the word "income" is attributed to the differential need value between the two words, then the subject is identifying the significance of the two words before he is able to report recognition of them. They asked the question, "Can subjects make discriminatory responses even when they are not able to report the stimulus correctly?" Using ten nonsense syllables of five letters each, nine subjects were given practice at recognition, using varied tachistoscopic exposure speeds and varied illumination for each subject. A range of five different exposure speeds was established for each subject so that at the slowest speed his recognition was near

100% accurate and at the fastest exposure speed his accuracy of recognition did not differ significantly from chance. All of the variations of the exposure speeds were within the total range from one second to 1/150 second. After that step, the procedure was divided into three parts, the equation period, the conditioning period, and the final test period.

In the equation period, a total of 100 presentations was made for each subject, showing each syllable twice at each of the five exposure speeds. Both the speed and order of presentation were randomized. In his verbal response, the subject had to choose one from the group of ten syllables with which he had practice. After completion of the 100 presentations, the ten syllables were divided into two groups of five. The groups were equated for both the number of times the subject used them and the number of times the subject correctly recognized them. The exposure speed at which near 100% accuracy of recognition occurred was used in the final test period as the slowest speed.

In the conditioning period, the GSR was conditioned in a partial reinforcement method to the five experimental syllables by giving an electric shock in random order with one-third of all presentations of these syllables. Random order but equal presentations of each of the ten syllables were continued until consistent conditioned responses were established to the five experimental syllables.

In the final test period, using the exposure speed designated at the end of the equation period (the one at which near 100% accuracy occurred) as the slowest of five speeds, a random presentation of the syllables was followed just the same as in the equation period. The subject was instructed

to delay each verbal report until signalled, which was about five seconds after the tachistoscopic presentation. This gave time for recording the GSR before the verbal report so that the GSR was not contaminated by the verbal report. The subject's expectancy of being shocked (and the concommitment "conditioned GSR") was maintained throughout the syllable presentations.

The main result of the study centered around group mean measures of GSR intensity in two categories of wrong responses in the final test period: (a) Wrong responses to syllables which had been conditioned to shock and (b) Wrong responses to syllables which had not been conditioned to shock. The group means, as well as the means for each individual's responses, showed a higher GSR for the shocked syllables when wrong verbal responses were given than for the non-shocked syllables when wrong verbal responses were given. The group means for the two categories were significantly different as shown by the student's t test. This difference was termed by Lazarus and McCleary as subception effect. They concluded that the subject is capable of making a discrimination at tachistoscopic exposure speeds too rapid for conscious discrimination ("as measured by the subject's inability to report which stimulus was presented"), and they suggested "that the level of perceptual activity indicated by this finding be called subception."

A secondary but pertinent finding was given under the heading of "Response frequency." The authors calculated product moment correlations between the number of times each syllable was used and the number of times it was correctly reported. These correlations were done separately for both the equation period and the final test period data. While the correlations (+.61 and +.67) were not significant for ten syllables, they did suggest that in the

given situation perceptual accuracy may bear some close relation to frequency of usage. The authors felt that this "gives some added substance to the arguments to consider statistical response preference as an important variable in some perceptual recognition experiments."

In the discussion about their findings, Lazarus and McCleary indicated that the subception effect as a kind of mechanism may relate to the possibility that recognition thresholds might be subject to influence by the needs of the individual.

Taking off in large part from the Lazarus and McCleary study, Bricker and Chapanis (1953) said that instead of attributing their results to "unconscious determination of behavior," it should be demonstrated, if possible, that a stimulus will still convey useful information to a subject even when S's first verbal response to the stimulus is wrong. Bricker and Chapanis used tachistoscopic presentations of nonsense syllables with ten male undergraduate psychology students. They set up two lists of five letter syllables. The first list was composed of eight syllables and was called the "List stimuli," the second was composed of five syllables, called the "Nonlist stimuli," and its existence was not made known to the subjects. In a preliminary series presentation of the List stimuli, S was allowed one response for each stimulus and was told to respond each time even if he had no idea what it was. He was given eight, differently arranged lists of the List stimuli. He used a different list as a guide in responding to each single presentation. During the preliminary series, the List stimuli were tachistoscopically presented in random order, and E adjusted the exposure speed and light intensity until S consistently identified half or less of the stimuli correctly. The settings

thus established were used throughout the experimental testing.

Using all thirteen nonsense syllables, a series of 120 experimental presentations was run such that each List stimulus was shown ten times, and each Nonlist stimulus was shown eight times. A List syllable was selected arbitrarily and designated by E as the correct response once for each presentation of a Nonlist syllable. This was done so that conditions would be the same for all presentations except that the Nonlist stimulus would not contain useful information.

Results concerning the primary point of study by Bricker and Chapanis were based only on those stimuli to which the initial response was wrong. Differences between the means for all Ss in the number of additional guesses necessary to make a correct response to List stimuli versus the Nonlist stimuli showed a statistical significance below the .001 level of confidence when compared to chance expectations. This led to the conclusion that the List stimuli did convey some useful information.

A second finding had to do with only the guesses following Nonlist stimuli. The mean number of guesses necessary to make the correct response was not significantly different from the mean expected by chance, and it was concluded that Ss were guessing at random.

Bricker and Chapanis also evaluated and discussed word preferences, word-sequence preferences, and the legibility (relative ease of recognition) of the different syllables or single or two-letter parts of the syllables. They found that Ss responded significantly more frequently with some words than with others, and it was indicated that one word (syllable) in particular occurred more frequently as a first response partly because it was more easily

recognized than other words by most of the Ss. They also found that there were many instances in which words with similar elements followed each other in Ss' responses. Applying some of their own findings in this to the Lazarus and McCleary experiment, Bricker and Chapanis felt that some of the differences among GSRs that Lazarus and McCleary found may have been due to single letters or to two-letter combinations that the S recognized or thought he recognized. Such felt recognitions could have resulted in large GSRs if they could only have been from shock words, or they could have resulted in moderately large GSRs if they could plausibly have been from either shock or nonshock words.

Lazarus, Eriksen, and Fonda (1951) did a personality-centered study, i.e., using perceptual behavior as a means of studying personality dynamics. The experimenters were concerned with the expression of sexual and aggressive needs on a sentence completion test and the auditory recognition of sexual and aggressive material. They predicted that needs revolving around sex or aggression which are freely expressed in the sentence completion situation will produce relatively high recognition accuracy. Conversely it was expected that those needs which are inhibited or repressed will be associated with relatively low recognition accuracy. Secondly it was hypothesized that intellectualizing patients, determined by case history and psychiatric evaluation, would show higher accuracy for threatening material than the repressing type of patient. The subjects were 35 literate psychoneurotic patients at the V.A. Mental Hygiene Clinic in Baltimore, the random selection of patients resulting in a variety of diagnoses. The procedure involved the use of a wire recording consisting of 48 sentences masked with white noise so that recognition was about 50% accurate. Results showed high positive correlations

between performance on the sentence completion test and perceptual accuracy for both the sexual and hostility areas. They found accuracy to be unrelated to response frequencies in these areas. Threatening stimuli elicited two basic reactions: (a) High perceptual accuracy and ready verbalization with some patients and (b) Low perceptual accuracy and minimal verbalization and blocking with other patients. The use of either of these basic reactions was found to be consistent within individuals. It was also found that patients with intellectualizing mechanisms perceived threatening material with significantly greater accuracy than those with repressing mechanisms. Also, there was no difference in response frequency.

As experimenters continued to explore the area of psychological defenses, Eriksen (1954) felt that the nature of the relationships between "ego strength" and psychological defenses was not clear although they have been frequently recognized in clinical practice and theory. He believed that the reason for the vagueness was primarily due to the lack of operational meaning or definition of the concept of ego strength and also in the lack of experimental data on defensive processes. He attempted to gain enlightenment on the problem by investigating some of the personality correlates of individual differences in reactions to threat to self-esteem. Ego strength was defined as "the individual's capacity for appraising the reasonable limits in his interpretations and perceptions of his environment." Using a random sample of 100 male undergraduate students as a standardization group, ego strength was given an operational definition in terms of the extent to which an S's yes-no responses to suggested interpretations of the Rorschach inkblots were in agreement with norms derived from other individuals (the standardization

group) of comparable intellectual level and social background. The traits of hysteria and psychasthenia were measured by their respective scales on the Minnesota Multiphasic Personality Inventory. Subjects for experimental testing were drawn from the same general population as the standardization group (not the same individuals), and each was assigned to one of two groups. One was an experimental group, which was presented with a self-esteem threatening situation, and the other was a control group, which was presented with a situation that was not self-esteem threatening. Each group was given the same basic tasks, but the first group (experimental) had built-in failures in not completing certain of the tasks, and the second group (control) did not have failures associated with the incompleted tasks.

Ego strength, hysteria, and psychasthenia were examined in their respective relationships to the recall of completed and incompleted tasks; these relationships were studied as they operate both in conditions which threaten self-esteem and in conditions which do not threaten self-esteem. Following is Eriksen's summary of his results (1954, page 49).

> The results of this study indicate: (a) Ego strength is directly related to the tendency to recall relatively more incompleted than completed tasks when the situation is not objectively self-esteem threatening, and inversely related to this tendency when the situation does objectively threaten self-esteem. (b) Scores on the hysteria scale are inversely related to the tendency to recall relatively more incompleted than completed tasks when self-esteem is objectively threatened, while scores on the psychasthenia scale are directly related to this tendency. (c) The correlation between hysteria and completed-incompleted task recall was found to be independent of the intercorrelation of these two variables with ego strength. However, the correlation of psychasthenia with completed-incompleted task recall was not significant when the intercorrelation with ego strength was partialled out.

Edwards (1960), attacking the problem of determining thresholds, demonstrated the relationships among some of the methods used in obtaining

limens. The primary concern was in terms of the different kinds of subject responses used to determine recognition of stimuli and the hierarchy they provide in sensitivity to the recognition.

Using an episcotister tachistoscope in a procedure that allowed one projection per second of controllable duration, words from the six-letter, category "A" of the Thorndike Lorge word count were shown to 17 adult Ss. The method of constant stimuli was used to establish a duration threshold to 50% accuracy. Then the duration of each projection was shortened until the point was reached where four words were consecutively presented 60 times each, S making at least 10 guesses to each word with no recognition apparent. With the presentation of from four to seven new words from the list, three tasks, representing three different methods of measuring recognition, were demanded on the presentation of each word. The three tasks, in order of presentation, were: Free Verbalizing (FV), Discerning Guess (DG), and Multiple Choice (MC). In the FV response, S was instructed to give free associations, and his verbal responses were recorded verbatim until he stopped of his own accord. In the DG response, S was instructed to make his three most discerning guesses of the word being presented by whatever technique he desired. In the MC response, projecting was discontinued, and S had to choose a word from a handwritten list composed of the actual stimulus word plus four other words from the list.

In scoring, the DG response was considered correct if any one of the three guesses was the actual stimulus word. The MC response was correct if the stimulus word was selected. In the FV response the degree of relatedness to the stimulus word was determined by 10 judges on a seven category scale on which each category was defined.

Taking the instances (15) in which the stimulus word was recognized by the DG method, all FV and MC data common to these recognitions were removed, and the remaining words were classed as having been presented at subthreshold duration. Similar treatment was given to the MC and FV methods to give some assurance in classing these data as subliminal. Results showed that recognition by the DG method was about what would be expected by altering the 50% threshold. The FV method yielded recognition better than chance, with a Chi Square probability less than 01. The MC method showed better than chance recognition significant at better than .001 level of confidence. The results were interpreted as showing a hierarchy of threshold determining methods in which the most common method, DG, is least sensitive, and the MC method is the most sensitive. It was "suggested that 'subliminal perception' is an artifact of establishing a threshold by one method then testing by another, more sensitive, method."

Goldstein (1962) acted on the conclusion of Eriksen (1958) and Goldiamond (1958), both of whom felt that the dilemma posed by phenomena of perceptual defense is more apparent than real. Goldstein set out to isolate the two sources of variance in perceptual recognition scores pointed out by Goldiamond. The finding of lower thresholds for anxiety-arousing words as compared to thresholds for neutral words, would be explained by Eriksen and Goldiamond by these two sources of variance, which are: (a) Extraneous variance, a component independent of the presence of the perceptual stimulus, and (b) Perceptual variance, a component requiring the presence of the perceptual stimulus. Both of these researchers feel that these components provide a more parsimonious explanation accounting for the phenomena of perceptual

defense than the explanation involving the existence of a process of pre-response discrimination or, as Goldstein puts it, "a supersensitive scanning mechanism which first scans visual stimuli and then inhibits the full recognition of images likely to arouse anxiety." Boiled down to the most elementary level, the threshold differential between anxiety-arousing and non-anxiety-arousing words becomes a simple artifact of the operation of response probability theory. Responses associated with anxiety have a lower probability of being evoked (negative response bias) than responses not associated with anxiety.

In his study evaluating the role of response factors in producing the perceptual defense effect, Goldstein used 60 college students, 30 male and 30 female, as subjects. Each was assigned randomly to one of three groups: (a) A Stimulus Absent (SA) group, (b) A Stimulus Present (SP) group, and (c) An Increasing Information (II) group. Each group consisted of 20 Ss. Anxiety-arousing and neutral words were determined in a preliminary session with each S through the use of a 117 item word association test. Reaction time (RT) and verbal response were recorded for each word; then in a second reading of the list, S was instructed to give the same response that he gave on the first administration. Anxiety-arousing words were selected for S on the basis of prolonged RT and reproduction faults on the second administration. A range of visual sensitivity was determined tachistoscopically for Ss and the lower bound specified for each S. In the experimental testing of Groups SA and SP an exposure time setting of 50-100 msec. below the lower bound was used on the tachistoscopic presentations for all trials. Group II received the first block of trials at this setting; each subsequent block of trials

(4 blocks in all) had a setting 50 msec. above the previous block's level.

While the Ss in group SA were told that words would appear in the tachistoscope, a single nonsense figure composed of five typewritten hash-marks was used for all their trials. Group SP actually received randomly ordered words on their trials, with equal presentations of anxiety-arousing and neutral words. Words were used for Group II in the same way as for Group SP. Since the SA group was shown no actual words on their trials, Goldstein computed pseudoaccuracy scores for that group by scoring S's responses as correct or incorrect according to the random order of stimulus presentations actually used with the other two groups. The chance mean was determined to be 12½% correct.

Goldstein stated the following results:

> (a) A negative response bias (for anxiety-arousing words) is present when no discriminative stimulus is present. (b) This negative response bias would be sufficient to produce significant differences in accuracy, as estimated by pseudoaccuracy scores. (c) Comparison of pseudoaccuracy scores from Group SA with accuracy scores from Group SP indicates that presence of a dsicriminative stimulus did not produce a perceptual defense effect greater than would be expected by response bias alone.

Goldstein interpreted his results as supporting a response probability theory of perceptual defense. He concluded, however, that studies would have to be done in which perceptual recognition scores are obtained under conditions in which no response bias is possible before there is final evaluation of this theory.

Goldstein, Himmelfarb, and Feder (1962) did a follow-up study in which they employed a forced-choice technique, which prevented response bias from affecting accuracy scores. The forced choice did not involve verbalization of the stimulus object. With this change in technique from Goldstein's pre-

vious study, the investigators found no perceptual defense phenomenon. Again, the response probability theory was supported, with the perceptual defense phenomenon being viewed as the product of response availability or response bias. Goldstein (1964) found one remaining weakness in the experimental evidence in that different experimental conditions had been applied to different subject groups. In order to overcome the weakness, he did a study to demonstrate that the same results could be obtained when a given pool of subjects are subjected to all three experimental conditions (i.e., stimulus absent, stimulus present, and forced choice). In addition to using students as subjects, psychiatric patients (half acute and half chronic, diagnoses not given) were used to form a group since it could be argued that different processes could account for perceptual data in normal individuals as compared to persons suffering from intense emotional conflict. Goldstein followed the same procedures used in his previous studies in selecting stimulus words (anxiety-linked and neutral) and in testing under the three conditions. Response data were categorized in terms of response bias with stimulus absent (RBSA), response bias with stimulus present (RBSP), differential accuracy for anxiety words minus neutral words with stimulus present (DASP), and differential accuracy for anxiety words minus neutral words in the forced choice situation (DAFC).

The first hypothesis of Goldstein's study was that the magnitude of the perceptual defense effect would be equal under stimulus-absent and stimulus-present conditions. The second hypothesis was that stimulus-absent data would be an adequate predictor of stimulus present data but not of forced-choice data. The third hypothesis stated that stimulus-present data would not relate

significantly to forced-choice data. In addition to the importance of the hypotheses themselves, Goldstein pointed out that all of the predictions in the hypotheses "are derived from the hypothesis that the probability of using an anxiety-linked word is independent of the available stimulus information but contingent upon an experimental situation in which verbalization of the stimulus objects is required."

The findings of this study supported all three hypotheses, and in turn, gave at least inferential support to the hypothesis from which the experimenter derived his predictions.

Although not statistically tested for significance in and of itself, there was a finding that the patient group manifested a greater degree of avoidance behavior (for anxiety words) in both SARB and SPRB than the student group. The correlations between RBSP and DAFC for both groups were near zero.

Goldstein concluded that his study strongly supported the idea that willingness or capacity to verbalize threatening images is one of the key factors in producing the perceptual defense effect. "The level of avoidance behavior appears independent of the presence of discriminative stimuli, and the predictability across experimental conditions holds only for conditions in which verbalization of the stimulus is required of the subject.

Coopersmith (1964) studied the "relationship between self-esteem and sensory (perceptual) constancy." In his introductory comments he pointed to studies relating self-esteem to persuasibility (Janis, 1954; Leventhal and Perloe, 1962), identification (Stotland and Hillmer, 1962), Motivation (Coopersmith, 1960), the nature of defenses (Cohen, 1959), improvements associated with effective therapy (Rogers, 1961), cognitive processes (Witkin

et al., 1962; Witkin et al., 1954) and perceptual defense (Eriksen and Browne, 1956). "These studies...point to the increasing convergence of perception and personality research as well as revealing the fruitfulness of that convergence."

Separating constancy into the categories of sensory constancy and phenomenal constancy, the latter, as described by Coopersmith, "asks the subject to adopt a naive, object oriented attitude in which he does not seek or control for the determinants of perception." Sensory constancy "requires judgments of the stimulus in terms of the law of retinal image. Since perceptual adjustments must be made to account for set, instructions, and environmental conditions, sensory constancy generally demands a more task oriented, critical and analytic perspective." Experiments in perceptual constancy have shown some inconsistency in their results, including comparisons between normals and psychiatric patients, and have reported high intrasubject variability. This may have resulted from a lack of systematic investigation into the more complex role and problems of sensory constancy (as compared to phenomenal constancy) and into the experimental variables of situational factors, instructions, and the traits of the subject. Much of the research dealing with constancy suggests that phenomenal constancy is easy to elicit and that the vast majority of subjects attain phenomenal constancy readily which reduces individual differences. Further, the research suggests that persons high in self-esteem are more capable of adopting an analytic and differentiated attitude, and that they possess an internal locus of evaluation and are less subject to environmental distraction.

Coopersmith tested the hypothesis that "subjects who are high in self-

esteem would be more likely to achieve sensory constancy than those low in self-esteem." His subjects were 85 preadolescent boys who represented five types of self-esteem. The five types were derived by combining the individual's self-evaluation as determined by responses to the Self-Esteem Inventory (SEI) and an observer's rating of self-esteem behaviors on the Behavior Rating Form (BRF). Discrepancy between subjective and behavioral evaluations was taken as an index of defensiveness. There was an equal number of subjects (17) in each of the five categories of self-esteem. The Ss in each group were those of each type who best met the Es' most stringent criteria out of a population of over 1,500 tested. The five types were High-High (HH) for those in the upper quartile of both SEI and BRF, High-Low (HL) for SEI in the upper quartile and BRF in the lower quartile, Medium-Medium (MM) for both SEI and BRF in the semi-interquartile range, Low-High (LH) for SEI in the lower quartile and BRF in the upper quartile, and Low-Low (LL) for both SEI and BRF in the lower quartile. The Ss of the HL and LH types were rarer in occurrence than those with concurring evaluations.

In the experimental procedure, Ss were tested individually, seated at a table. Looking through a slit in a screen, S was shown a 4-inch square cardboard and was told that the card was square. The card was shown in a number of different positions, with brief explanations as to the difference of its appearance as compared to its actual shape. The S was then shown a board on which were mounted 16 cards of varying vertical dimensions but each in the shape of a rectangle. The S's task was to match the "present" apparent shape of the stimulus cardboard with one of the graded series of rectangles. The task was part of a battery of intellectual and perceptual tasks; it was

presented to approximately half of the Ss under a Stress condition and to the other approximate half under a Nonstress condition. Each group was randomly split for the two conditions of presentation. The splitting was done because pretests showed a tendency for Ss to repeat their matching selection from the Nonstress to the Stress condition.

Chi Square was used to determine the significance of sensory, or retinal, attainment. The results of the study showed that under Nonstress the groups did not differ in their perceptual judgments, but under Stress, those groups high in subjective self-esteem were more able to judge in terms of sensory properties than were those groups medium and low in self-esteem. It appeared from the results that "persons high in their own estimates of personal worth can adopt an analytic attitude, when that attitude is appropriate to the demands of task performance." Also, this analytic attitude had to be selective and controlled enough to identify and exclude nonrelevant stimulus properties. Persons high in self-esteem gave an indication of this selectivity and control in their increased sensory constancy under stress. Coopersmith pointed out the significance of the fact that it was subjective self-esteem rather than behavioral self-esteem or defensiveness that was associated with perceptual constancy.

Coopersmith suggested that a "factor contributing to the increased sensory constancy of persons with high subjective self-esteem may be their possession of a more stable vantage point from which to ascertain the properties of the environment. The conviction of their own ascendancy leads to the general assumption that their perceptions are correct (Janis, 1954) with resultant confidence in their capacity to judge correctly."

The direction of the experimental controversy has moved from the demonstration of subception to the area of perceptual defense and the idea that perceptual processes involve some measure of protection for the individual against threatening elements that may invade and upset his emotional adjustment. Studies have been directed toward determining what the elements of perceptual defense are, toward defining them, and toward crystallizing the specific operation(s) which can account for the individual's particular verbal responses to visual stimuli.

As opposed to the dynamic perceptual defense theory of perception, there is more experimental evidence in support of the response probability theory (a refinement of response availability) with perceptual defense being a function of response bias which exists and operates even in the absence of the stimulus object with which it (the bias) is associated. At the same time, the more dynamically oriented studies have contributed to the understanding and definition of perceptual defense as it appears to operate in response bias, which in turn crucially influences or determines response probability sets in the individual.

In the movement of controversy and conceptualization from subception to perceptual defense and its protective operation, the development of a definition for perceptual defense was pretty well summed up in a statement by Chodorkoff (1954, page 508):

> . . . defensiveness is described as primarily a perceptual phenomenon which follows as a consequence of threat to the individual's self. Defense, in essence, is the prevention of accurate perceptions of what is threatening from reaching awareness. As a result, aspects of the environment and of the person himself may be denied to awareness or may be misperceived. It is in this way that the individual insures the stability of his self. Furthermore, the adequacy of the individual's personal adjustment is considered to be inversely related

to the degree to which experiences are denied awareness.

The last step that can be pointed to at this time in narrowing down the views of researchers is the response probability theory as supported by Goldstein (1962). It appears to be, as Eriksen (1958) and Goldiamond (1958) would contend, the most parsimonious explanation to be considered and tested. The present investigator finds this reasonable and accepts the experimental evidence supporting the reasoning; but there is still a bothersome element which is hard to pin-point and lies in a vague area somewhere between straight physical perception and perceptual defensiveness. Even if psychophysical sets become well established in an individual to perceive a stimulus in a highly specific way, it is not really clear to this investigator how a specific reaction can always be called forth or set off without some process of discrimination taking place between perception and manifest, measurable reaction. Perhaps the inference being made by the major researchers and their experimental evidence is that emotional defenses and adjustment to the environment set up automatic, possibly neurological, reactions to a known or unknown stimulus by way of direct associations between stimulus and affective internal experience. It can then be speculated that after internal, automatic reactions occur, the individual employs, when he can inhibit immediate, impulsive reactions, a process of discrimination before he carries out his reaction externally. In this use, the definition of the term discrimination is offered as: The interpretation by the individual of what a stimulus means to him and what is a safe, or self-preserving reaction to express externally. Out of this sequence of reasoning and questioning arose the question and problem dealt with in the present study, which sought a method of determining thresholds

that can be considered reliable and at least minimally distorted by defenses that cause withholding of report or other fluctuations in manifest, measurable threshold data.

One other point occurred to this investigator as a tentative conclusion to be drawn from this review of related literature. That is the apparent relationship between the two basic categories of approach referred to in the beginning of this chapter as "the response availability" category and the "dynamic" category. The probability theory as discussed here accounts for dynamic factors as predetermined defensive elements brought into a given environmental setting by an individual subject. This theory along with the suggested sequence of a process of discrimination occurring between the subject's internal reaction and his externally expressed reaction might pave the way for a unification of the response availability approach and the dynamic approach. This direction of theorizing is consistent with Goldstein's finding that verbalization of a stimulus object is critical in the operation of perceptual defense.

Looking critically at experimental procedures where thresholds are involved, the use of whole words as stimuli, as in McGinnies's study, presents a complication due to the varying degrees of emotional tones conveyed by different words. The essence of McGinnies' study lay in the finding that subjects gave GSRs which were greater for emotional words than for neutral words when all the words were presented tachistoscopically at exposure rates which were below previously determined thresholds of awareness. The findings of that study were criticized by Howes and Solomon (1950) on the basis that Ss could very well have been motivated to withhold their reports of the socially taboo

words (emotional words) even when there was some awareness of the identity of these words. Thus the thresholds would be invalid; Howes and Solomon attributed the results to the response availability factor rather than to a dynamic factor. While the present investigator does not believe that the response availability factor totally explains the findings, it very well could have contributed to McGinnies' findings and certainly was not accounted for.

The use of nonsense syllables as stimuli, as in the studies by Lazarus and McCleary and Bricker and Chapanis, presents a serious complication similar to the complication with whole words. One of the assumptions that Lazarus and McCleary made in reference to the use of nonsense syllables raised a criticism that the present experimenter feels is important to experimental procedure although in itself it does not invalidate the results of the study. It was claimed that "the use of nonsense syllables precluded the possibility that subjects would have any motivation to withhold their report. This was, you will recall, a crucial inadequacy in the experiment by McGinnies." While the use of nonsense syllables may tend to reduce or minimize <u>obvious</u> associations, it certainly leaves a great deal of room for highly individualized or personalized associations. Such things as two or three letter combinations and reverse order cognition of the letters can elicit many different word and feeling tone associations to different people. Thus, while Lazarus and McCleary reduced the grounds for criticism leveled against McGinnies, they did not, as they would have us believe, eliminate the motivation for withholding reports.

In regard to Lazarus, Eriksen, and Fonda's finding that accuracy was unrelated to response frequency, the present experimenter does not feel that

those results contradict the response availability factor but that the dynamic or emotional factor played such a prominent role in that type of procedure that it overshadowed other determining elements. While the subjects were psychoneurotic outpatients living in the community and not psychotic, institutionalized patients like the subjects in the present study, the Lazarus, Eriksen and Fonda study does demonstrate one possible type of emotional factor that can be studied in emotionally disturbed people.

CHAPTER III

PROCEDURE

The data for this study were collected at Chicago State Hospital. Two groups of subjects were tested: (a) Thirty female student nurses as a normal group and (b) Thirty female patients diagnosed as schizophrenic reactions (any subtype) who were in sufficient contact to understand and follow directions, as manifested in their general ward behavior. Some of the patients came from their wards on their own, and some were escorted to the testing room by hospital staff. All of the patients who came were used in the experiment; none of the patients or their experimental records was dropped after the testing was begun.

The apparatus consisted of a Revere slide projector to which the experimenter adapted a 200 watt projection bulb in place of the original 500 watt lamp. A Kodak lens and shutter mechanism, with an Ektar f:4.5 lens and a Graphic Supermatic "blade" type shutter, was adapted in place of the original projection lens. The lens setting was kept at f:22 throughout the testing. The projection screen consisted of an opal glass (approximately 8" by 10") set into a fiberboard and wood frame similar to a large door. The glass was set at a height that was at eye level for seated Ss. The testing room was an office whose single window was covered by a closed venetian blind. The room was illuminated with a single, 150 watt incandescent bulb with a white metal shade beneath it.

The subjects for both groups were seen three at a time, seated side by side, ten feet from the screen. The experimenter projected the slides from behind the screen, i.e., with the screen between the subjects and the examiner. The projected image of each slide was four inches in height on the screen. The following instructions were given to all Ss:

> I am going to show you a number of different slides. They will be flashed on the screen at various speeds, that is, some will be shown very briefly and others for longer periods of time. They consist of human figures, and I want you to tell me whether each one is a male or female. Make a guess if you are not sure, or even if you only see a flash of light. Also, tell me each time how sure you are of your answer, whether you are sure, fairly sure, not sure, or guessing. This is a study of perception and is concerned with the accuracy of perception at different exposure speeds.

Notification was given to Ss immediately prior to each presentation so that their attention could be focused on the screen at the time of exposure. After each slide presentation, Ss reported, on prepared sheets, whether the slide was male or female by writing M or F respectively. They reported their degree of certainty according to the following scale: S for sure, FS for Fairly Sure, NS for Not Sure, and G for Guess.

For purposes of scoring, tabulating, and showing the statistical findings, the four slides were designated as A, for the male front view, B, for the female front view, X, for the male profile, and Y, for the female profile. In the testing, the slides were presented tachistoscopically, one at a time, at five different exposure speeds, 1/25 second, 1/50 second, 1/100 second, 1/200 second, and 1/400 second, giving the equivalent of twenty different items, i.e., four slides at five speeds each. The slide and exposure speed combinations were designated as follows: A_1 for slide A at 1/25 second, A_2 for slide A at 1/50 second, A_3 for slide A at 1/100 second, A_4 for slide A at 1/200 second,

and A_5 for slide A at 1/400 second. Slides B, X, and Y were combined with the numbers 1 through 5 in exactly the same manner. Both the order of the slides and the speeds of exposure were randomized according to the table of random numbers. This procedure provided a total of 160 presentations for each S, eight presentations of each slide at each exposure speed.

Two sets of graphs were drawn, based on means for each group. The first set shows curves for the accuracy of responses to each slide, i.e., changes in accuracy as the length of exposure increases. This provides a means of deriving psychophysical thresholds. The second set of graphs shows curves for the degree of certainty on responses for each slide, attempting to determine thresholds for Ss' certainty in identifying the slides as male or female. This shows the changes in degree of certainty as the length of exposure increases. In the four point scale of certainty, E felt that there was a rather sharp cut-off, or too much "distance," between Fairly Sure and Not Sure, but he also considered a five point scale too unwieldy for Ss to handle. In assigning values to the certainty scale, the range of +2 (for S) down to -2 (for G) was set with 0 being the mid-point between FS and NS.

The major point of experimental study in this investigation was the difference between the patient group and the normal group in their thresholds of accuracy in perceiving tachistoscopically shown slides of male and female figures. To determine the significance of such a difference, Chi Square tests were used to compare the groups' accuracy in identifying each slide at each exposure speed.

CHAPTER IV

RESULTS

Figures 1 through 4 show the psychophysical curves, in solid lines, for the nurse group based on response accuracy. The curves show the percentage of correct responses (group means) for each slide at each exposure speed. The mean percentages of accuracy for the nurse group showed a range of only 17 percentage points, from 75% to 92% accuracy. Figures 1 through 4 show the psychophysical curves, in broken lines, for the patient group based on response accuracy. The accuracy range for the patient group was 13 percentage points, from 62% to 75%. Also, the curves for both groups showed a number of reversals; thus they did not provide either a typical psychophysical curve or even a smooth curve. The only really apparent trend was the general trend of increasing accuracy with increasing length of exposure for each of the curves. A threshold in the usual sense of a 50% level or 75% level of accuracy could not be determined.

Comparing the two groups, it was readily apparent that the curves for the patient group were consistently lower than the curves for the nurse group. In a statistical study, twenty Chi Square computations were made. Comparing the nurses' curve for slide A with the patients' curve for slide A, Chi Squares were computed between the corresponding points on the two curves. The same computations were made for the curves for each slide. The Chi Square used was a test of independence between two groups. It was used to determine the

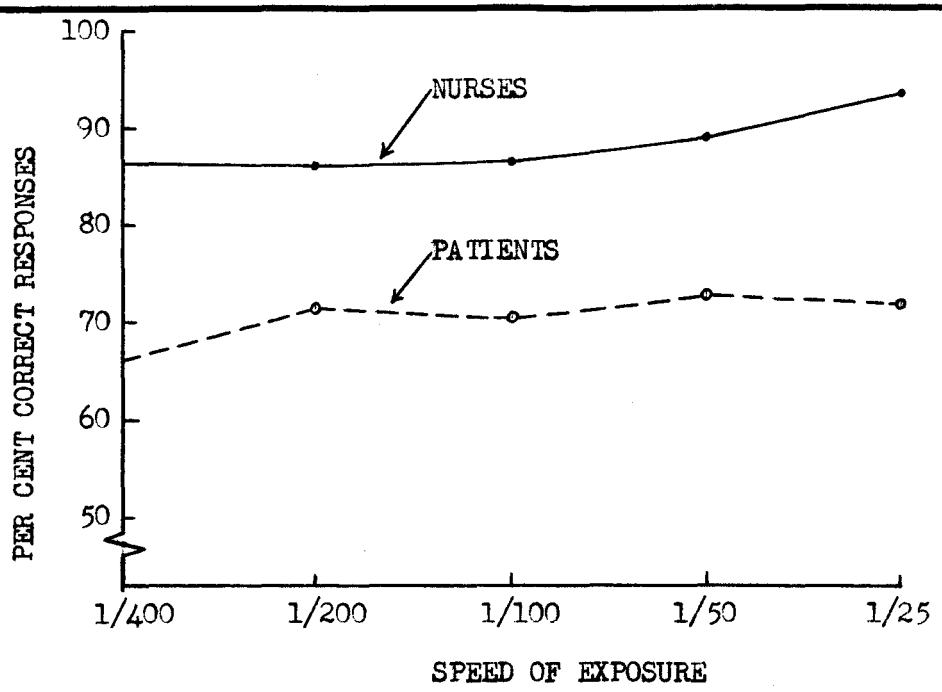


Fig. 1. Distribution of response accuracy scores of the nurse and patient groups for male front view.

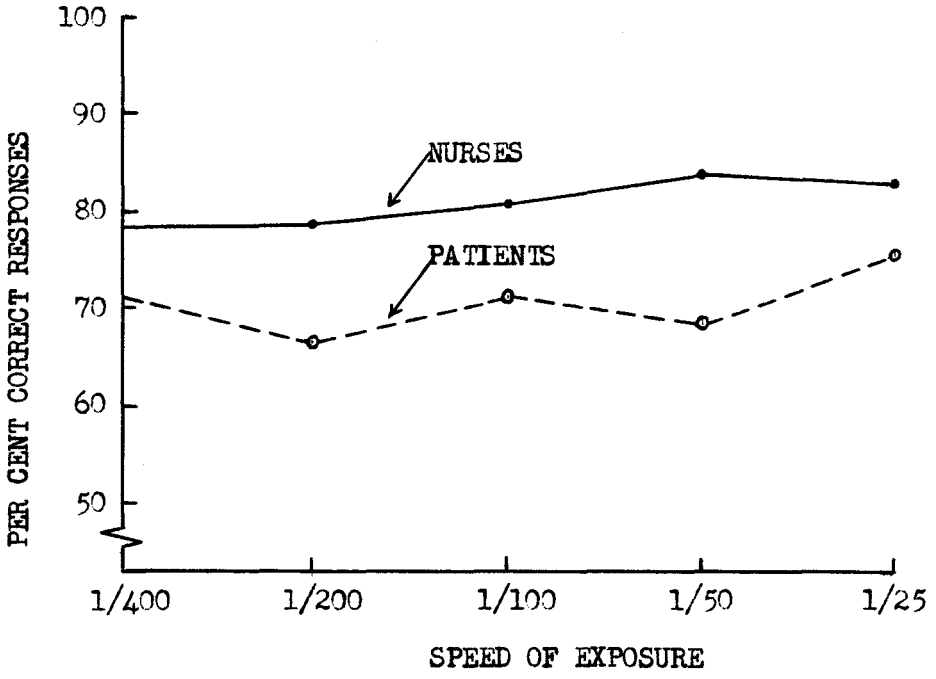


Fig. 2. Distribution of response accuracy scores of the nurse and patient groups for female front view.

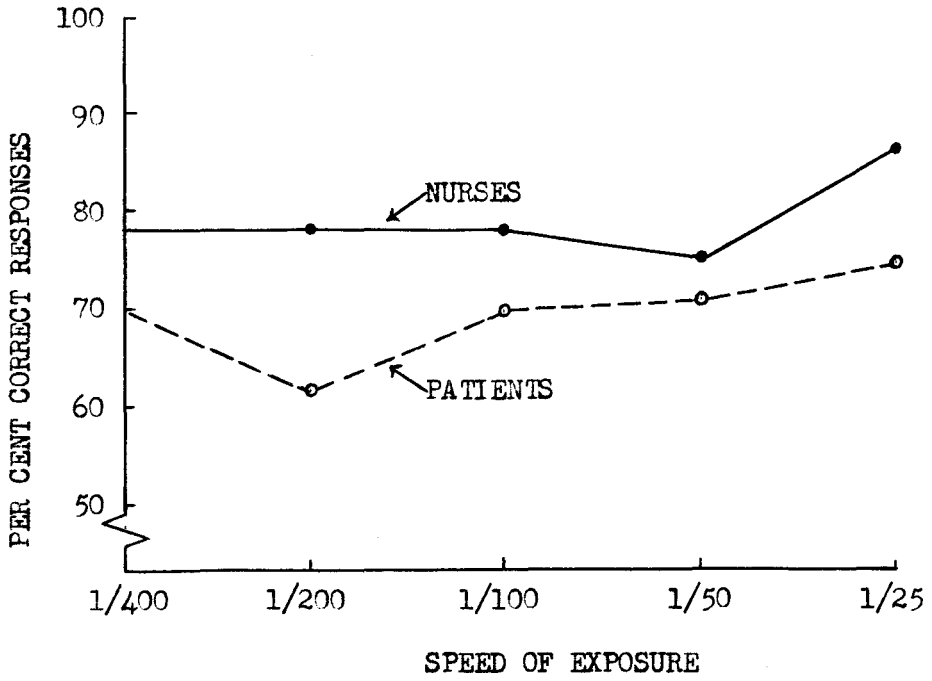


Fig. 3. Distribution of response accuracy scores of the nurse and patient groups for male profile.

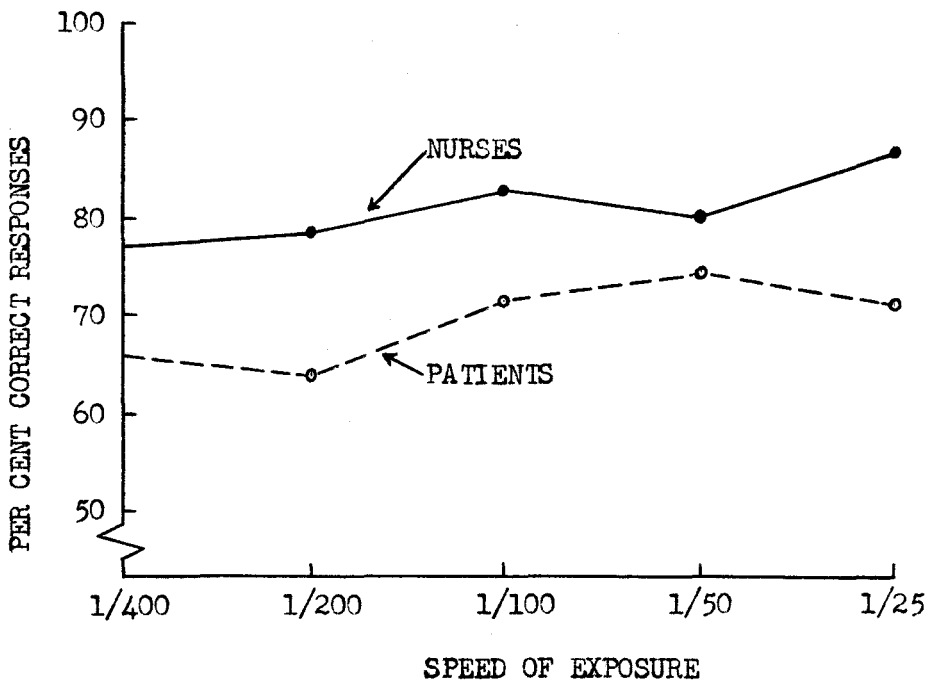


Fig. 4. Distribution of response accuracy scores of the nurse and patient groups for female profile.

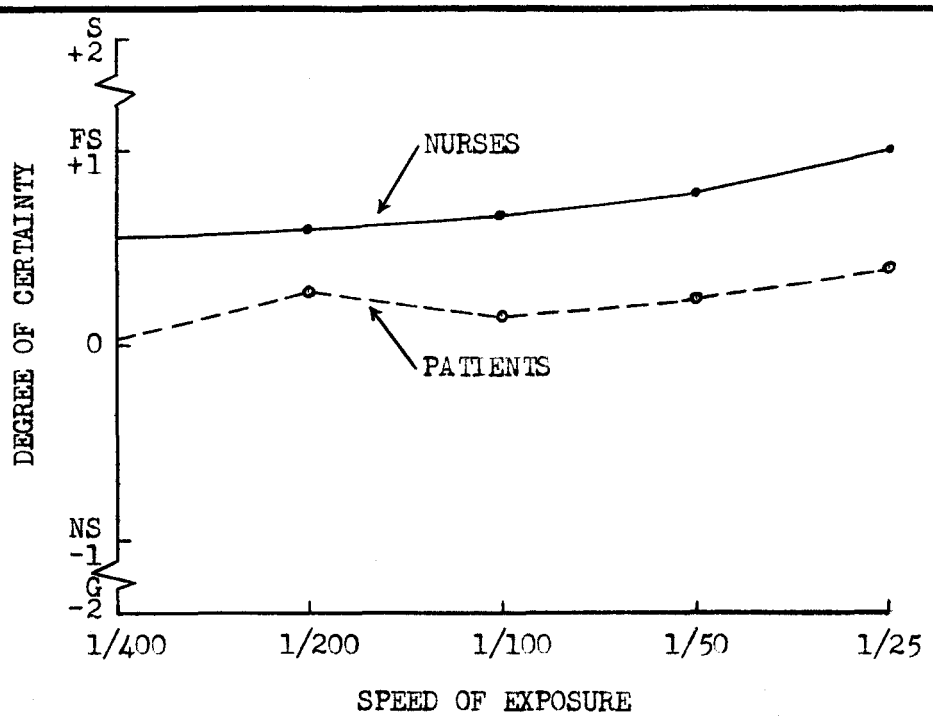


Fig. 5. Distribution of degree of certainty values of the nurse and patient groups for male front view.

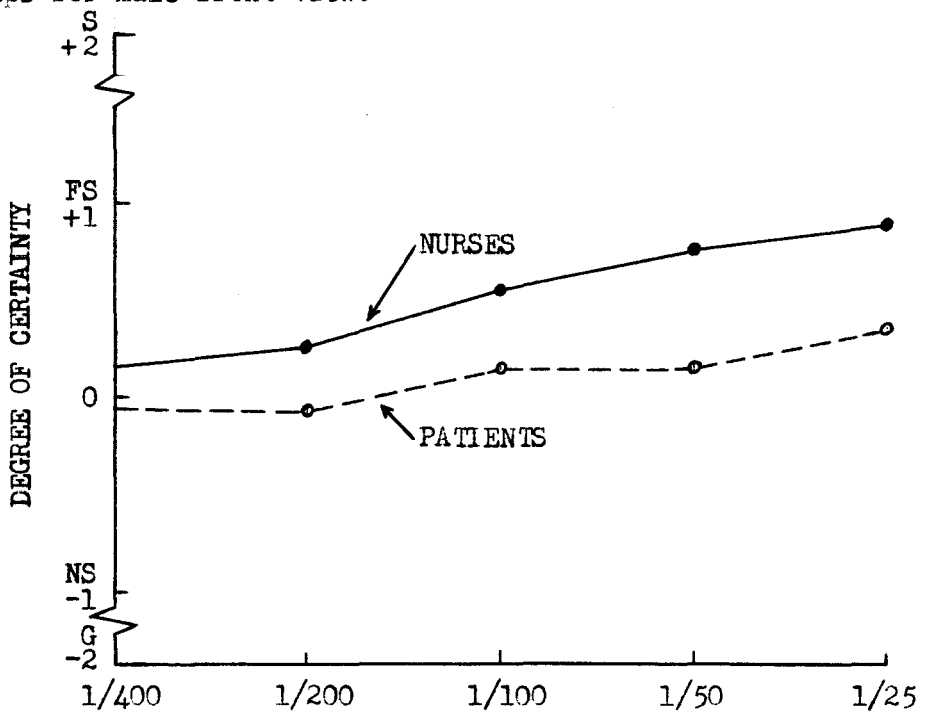


Fig. 6. Distribution of degree of certainty values of the nurse and patient groups for female front view.

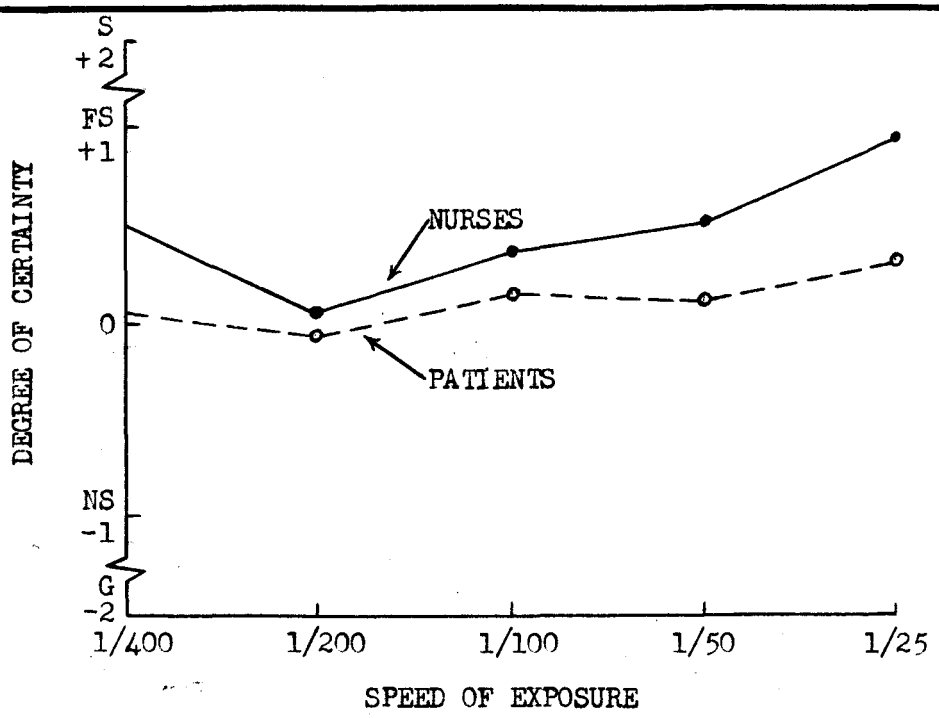


Fig. 7. Distribution of degree of certainty values of the nurse and patient groups for male profile.

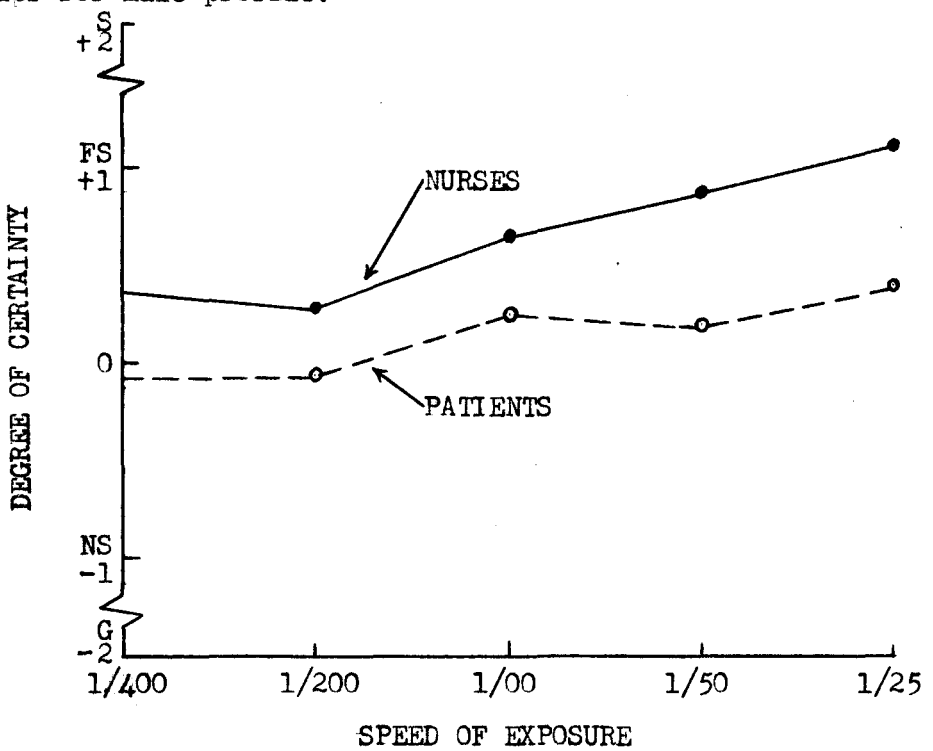


Fig. 8. Distribution of degree of certainty values of the nurse and patient groups for female profile.

likelihood that the schizophrenics and the normals are from the same population insofar as their ability to correctly identify the experimental stimulus is concerned. Chi Square was used because the responses being compared (correct and incorrect identification of male or female figures) are dichotomous, discrete quantities which cannot be measured in fractions, as partly correct or partly incorrect responses. Also, the distribution of responses of Ss to the 240 presentations for each slide at each exposure speed is not a normal distribution, and the variances are not equal for all of these separate distributions. Thus a parametric statistic is not applicable, and the Chi Square, a nonparametric technique was used. A two by two table, giving one degree of freedom, was set up for each slide-speed combination where the two rows were the nurse group and the patient group, and the two columns were correct responses and incorrect responses. The upper left cell was the correct responses for the nurse group, the upper right cell was the incorrect responses for the nurse group, the lower left cell was the correct responses for the patient group, and the lower right cell was the incorrect responses for the patient group. Table 1 shows each Chi Square and its corresponding level of significance.

Seventeen of the 20 Chi Squares were significant at the .05 level of confidence or better, i.e., nine at .001, four at .01, and four at .05. Of the remaining three Chi Squares, two showed significance at the .10 level and one at the .30 level. All of the Chi Squares involving slide A were significant at the .001 level. The three least significant results were divided among the remaining slides. Of the four Chi Squares that were significant at the .05 level, two involved slide B, and the other two were split between slides

X and Y.

Figures 5 through 8 show the psychophysical curves, in solid lines, for the nurse group based on degree of certainty. The curves show the degree of certainty reported for each slide identification (group means) for each slide at each exposure speed. Figures 5 through 8 show the psychophysical curves, in broken lines, for the patient group based on degree of certainty. No statistical test was done on these data since they did not constitute the prime area of concern for the experimental study. Also, it definitely appeared from observation that there was a very similar difference between these two sets of curves as there was between the accuracy curves. Within the patient group, the certainty curves were very similar in shape to the accuracy curves, but the reversals in the certainty curves tended to be fewer and less severe. The same applied a little more notably to the nurse group. While the curves for the nurse group were not typical of the usual psychophysical curve, they were suggestive of the "S" curve in general form.

Following are the results as they applied to the two hypotheses.

1. Even though the usual 50% threshold could not be determined with these specific data, the experimenter does not believe that the first hypothesis was nullified. The patients performed the task as instructed, recording their responses on data sheets in the same manner as the nurses. Their responses were sincere efforts in identifying the stimuli, and not random guesses as indicated by both their relatively high level of accuracy above chance expectations and by their degree of certainty responses associated with the identifying responses. By inspection, the degree of certainty responses definitely suggest that with very few exceptions the patients did not rely

Table 1

Chi Square Values and Corresponding Levels of Significance of Difference Between Patient Accuracy and Nurse Accuracy in Identifying Each Slide-Speed Combination

Slide-speed	Chi Square	Level of significance of chi square
A_1	34.19	.001
A_2	20.83	.001
A_3	19.37	.001
A_4	13.10	.001
A_5	26.10	.001
B_1	3.19	.10
B_2	15.30	.001
B_3	5.98	.05
B_4	8.12	.01
B_5	4.13	.05
X_1	9.57	.01
X_2	1.28	.30
X_3	4.30	.05
X_4	15.15	.001
X_5	4.35	.05
Y_1	15.14	.001
Y_2	3.02	.10
Y_3	9.25	.01
Y_4	11.03	.001
Y_5	7.45	.01

heavily on the "guess" category to account for their choices in identifying the figures. The curves for the patients did not differ from the nurses' curves to a degree that would suggest that different kinds of abilities were being measured in one group as compared to the other group. Both groups showed the same general trend and similar kinds of reversals. The degree of certainty curves were particularly similar in form for the two groups.

A very crucial factor that was not provided for in the data of either group was the necessary, lower degree of accuracy approaching total inaccuracy. The experimenter strongly believes that prototypical psychophysical curves and thresholds can be found and measured in this type of testing and with these specific stimuli by making some simple modifications in the tachistoscopic conditions of presentation. These modifications will be presented in a later section of the discussion. It appeared that the patient group provided the same basic kind of data as provided by the nurse group, and if modifications in tachistoscopic technique could produce smoother, more usual psychophysical curves for the normal group, similar results could be possible for the schizophrenic group.

2. The findings as applied to the second hypothesis left little question in the mind of the investigator. The overall picture showed a significantly lower accuracy of response for the patient group compared to the normal group. Thus the second hypothesis was supported.

CHAPTER V

DISCUSSION

The very high level of accuracy of both groups is not comparable to performance records in any of the related studies. However, in using the results of Edwards as a frame of reference, the procedure in the present study of employing a forced choice method would appear to be a step in the right direction in determining the recognition threshold with a high degree of sensitivity. At the same time, the forced choice method (more similar to Edwards' MC method than either the FV or DG) and its apparent sensitivity may have contributed to the high level of accuracy shown by both groups.

It was pointed out in the review of related literature how whole words used as stimuli (McGinnies, 1949) and nonsense syllables used as stimuli (Lazarus and McCleary, 1951; Bricker and Chapanis, 1953) complicate the determination of thresholds. Cues that may be vague and suggestive of many different associations make it difficult to recognize and account for the effect of response availability factors brought into play by the stimulus material. The present study employed tachistoscopically projected outline images of human figures as stimuli (one image per slide), and the subjects were told to identify each image presented as being either a male or female figure. This limitation upon the identity of the different stimuli, the similarity between the pairs of slides, and thus the limitation in the variety of cues available tends to minimize the range of experience and familarity to be

accounted for in subject responses. The subject does not become involved in new areas of motivation and blocking such as would be encountered with stimuli that open a much wider range of content associations. Compared to specific words, syllables, letter combinations, etc., male and female figures are relatively equally common in everyday environmental experiences for all individuals; bias, preference, or emotional significance would be stimulated more strictly from internal sources and not from a variety of external cues. With this limitation in stimuli, the response availability factor and the factor of invalid thresholds due to subjects' defensive withholding of reports of "emotional stimuli" are at least minimized.

Although not within the scope of the experimental hypotheses of this study, the emotional factor is brought into sharper focus through the use of male and female figures so that significant differences between the number of times a subject reports seeing a male and the number of times he reports seeing a female would seem to be a function of personal bias and/or distortion. These factors could be accounted for specifically and evaluated for future investigation. For example, it might be speculated that patients of a certain type or diagnostic classification would show consistent tendencies to "see" one sex more than the other. Also, there were two similar sets of slides. Both sets were used for threshold testing in the present study, but they also provide a potential for future study to allow the determination of thresholds with one set and the subthreshold testing with the other set. Thus there would be no preliminary practice with the specific stimuli that is used in the final testing. This may be an advantage over the procedure used in the Lazarus and McCleary and Bricker and Chapanis studies in which Ss were

given practice with the same stimuli that were used in the experimental testing.

The significant differences between the nurse group and the patient group in the accuracy of responses suggest a definitely higher threshold for patients perceptual abilities. Their ability to accurately perceive and report what they see is impaired. However, the behavior of the patients while going through the testing procedure strongly suggests certain motivating and emotional factors underlying the impaired accuracy, in both the perceptual process and the responding process. The findings of some of the previous studies appear to be very relevant to these factors and will be brought into the discussion a little later. The patients' difficulties were minifested as fear, uncertainty, and preoccupation. Fear and uncertainty appeared in the uneasy and anxious mannerisms, both physical and verbal, along with the expressed need for frequent repetition of what the task was, the need for encouragement to go ahead, and the need for periodic reinforcement when the task was being done properly. Preoccupation appeared in frequent tangential thoughts raised and in some personalized manners of writing their responses, and in the need for E to remind people to do the task instead of drifting off in thought. It was frequently necessary to check the papers of the patients during the testing to see that they were recording their responses appropriately, usually when they would show in facial expression or verbalization that they were unsure of how "right" they were in their performance.

The question naturally arises as to whether they understood the procedure and what was expected; but almost all of them manifested a grasp of the situation by their initial, recorded responses. There was confusion

obvious in some, but the overshadowing factor was manifest in expressions of uncertainty that they were doing the task correctly or well. Some of the more severe cases expressed fear that their performance, particularly a poor one, would be influential in determining their length of hospitalization. Many expressed, in initial presentations, how fast the exposures were, that they really could not see anything; they questioned E as to what they should do then. As mentioned above, they required much reassurance and support to continue, to complete the task, that they were doing all right, and that the material had nothing to do with their length of stay in the hospital.

It is interesting to note, on an individual basis, that the only perfect paper, i.e., complete accuracy in all responses, was done by one of the patients while the paper with the highest number of errors was done by one of the nurses. The three highest numbers of errors among the nurses were 91, 81, and 77; the three highest numbers of errors among the patients were 88, 82, and 80. At the other end of the scale, the lowest numbers of errors among the nurses were 1, 3 and 3, while the comparably low numbers of errors among the patients were 0, 9 and 19.

The nurses as a group showed a rapid grasping of the task, and although some were obviously quite anxious and uncertain, they all proceeded through to completion with very few questions and little overt need for reassurance or urging. Quite a few expressed a concern similar to that of the patients about the initial presentations being very fast and difficult to see, but they went through the task quite as a school class proceeds through an examination. Most of their concerns were expressed after completion of their testing and then mostly in response to questions from E. The attitudes and feelings they pre-

sented were in great contrast to those of the patients. They readily accepted the fact that the testing would have nothing to do with their grades or course of training. They expressed that while the task was rather difficult and the extent of time of concentration (approximately 45 minutes) rather trying, it was fun and quite interesting. They were curious to know what the findings would be and if they could learn of them later. Many of the nurses wanted to speculate on the possibility that the research would be published some day and felt that it was an exciting prospect to think that they had participated in research that might help understand the patient population with which they had worked.

The notable differences in the feelings and attitudes expressed between the nurse and patient groups suggested great differences in self-esteem and overall self-concept, from positive to negative, respectively, between the two groups. The differences between the certainty curves and the accuracy curves suggested that in further study with this material, the certainty curves might yield more workable and more meaningful data. Also, in view of the apparent emotional factors noted, a more enlightened view of such factors might be gained through exploration of certainty responses, which tend to more directly involve the expressed feelings of the patients.

The present experiment is relevant to the findings and suggestions of Coopersmith (1964) in two regards. In the first place, the stimuli and the task in the present experiment tended to be oriented toward sensory constancy in the sense that the stimuli were limited to two, distinct categories of form, and Ss had knowledge of this (although no knowledge of the number of different slides) in identifying the sexual shape while having to disregard the position

being profile or front view, similar to Coopersmith's Ss having knowledge that the stimulus was a single square and having to disregard the known property in deference to the retinal image (shape) presented by the object in varying positions. Secondly, the self-esteem as manifested in the present experiment, although inferred from behavioral observations, appeared to reflect the Ss' subjective feelings and definitely appeared to be lower for the patients than for the nurses. If it can be assumed that the observational evaluation is relatively accurate, the lower self-esteem of the patients could be a contributing factor to their lower level of accuracy. Perhaps the patients were operating under their own internal stress, creating a comparable situation to Coopersmith's stress condition, and constancy was not attained in identifying the same four figures in repeated presentations to as high a degree as was attained by the nurses. The findings of the present experiment appear to be consistent with the results of Coopersmith's study, which suggests that schizophrenics, in addition to being low in self-esteem, can be described as being less capable of adopting an analytic and differentiated attitude, lacking to some degree in the possession of an internal locus of evaluation, and more subject to environmental (and other) distraction.

The forced-choice method that does not require verbalization of the stimulus object, as used in the present experiment, was similar to the forced-choice condition in the study by Goldstein (1964). This similarity, in view of Goldstein's results, suggests that the perceptual defense phenomenon as an inhibitory factor affecting accuracy was avoided in the present experiment. As per Goldstein's (1962) results, the "presence of a discriminative stimulus did not produce a perceptual defense effect greater than would be

expected by response bias alone." This in turn suggests that the difference in accuracy found in the present study is related to differences in qualities (of the schizophrenic) such as the combined factors of lower self-esteem and lower achievement of constancy as reported by Coopersmith (1964).

The findings in the present study appear to coincide with the qualities and conditions of the response probability theory, and further investigation would probably be fruitful in terms of the on-going convergence of perception and personality theory as well as in refining threshold determination and in understanding the differences in accuracy between normals and schizophrenics found in the present study.

In another view of the data from the standpoint of experimental conditions, E believes that changes in illumination, both in the projected image and in the viewing room (aimed at decreasing the brilliance and contrast presented in the outline figures), would lead to the production of data in the curves that would be more closely fitted to the usual psychophysical curve. It is also possible that smoother, more usual curves might result from changing exposure speeds in ordered gradations from fast to slow instead of randomizing the speeds along with the various slides themselves. Such a procedure more in line with the method of limits might avoid the very early recognition of distinct differences among the few stimuli which probably occurred in the experiment.

CHAPTER VI

SUMMARY

The present study was an attempt to demonstrate a method for determining accurate visual recognition thresholds for both schizophrenic Ss and normal Ss. The Ss studied included a group of 30 schizophrenic patients in a state hospital and a normal group of 30 student nurses. A new type of stimulus is offered in the form of outline images of human figures. Four slides, male front view, female front view, male profile, and female profile, were presented tachistoscopically with both the order and speed of exposure randomized. The Ss were instructed to identify each stimulus presented as being either male or female, guessing if necessary.

Two hypotheses were set up. (1) Schizophrenics would produce adequate data for determining thresholds and (2) The response accuracy would be significantly lower for the schizophrenic group than for the normal group. In addition to the identification of each stimulus, S recorded how "sure" she was of the correctness of each response, according to a degree of certainty scale specified by E. A degree of certainty curve provided an alternative view of a recognition threshold, specifically a view which might reveal emotional factors operating in perceptual defense. Such a view might also provide knowledge as to how the emotional factors affect the validity of a threshold based solely on verbally reported recognition.

Analysis of data was based on group means for responses to each slide

at each of five exposure speeds. Psychophysical curves of response accuracy for both groups were not typical curves although there was a definite tendency showing that accuracy increased as the length of exposure increased. There were quite a few reversals, more in the patient curves, and the ranges of accuracy were well above 50%; the range for the patient group was 62% to 75%, and the range for the normal group was 75% to 92%.

Results as applied to the two hypotheses were as follows.

1. Even though the results pertaining to the first hypothesis would not allow an unconditionally affirmative conclusion, these results definitely suggest that the hypothesis would be fulfilled through a reduction in the illumination in the tachistoscopic technique that would cause nearly complete inaccuracy at the faster exposure speeds.

2. The results of a Chi Square test showed a significantly lower response accuracy for the patient group, as compared to the normals and thus supported the second hypothesis.

Behavioral observations during testing of both groups and discussion with the normal Ss after testing suggested certain emotional factors affecting differences in response accuracy between the two groups. Fear, uncertainty, and preoccupation appeared to be underlying factors impairing the accuracy of the patient group. The patients' feelings and attitudes reflected a much more negative quality to self-esteem and overall self-concept in comparison to the nurses.

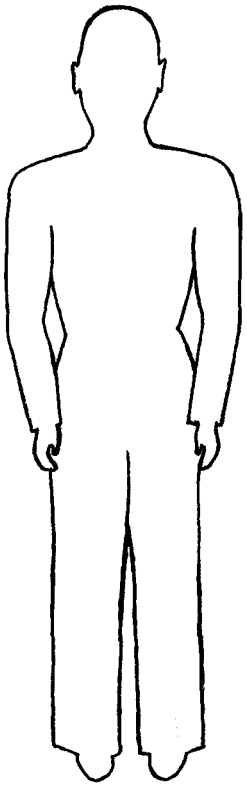
The curves based on degree of certainty were a little smoother and a little more suggestive of typical psychophysical curves than the accuracy curves. They appeared to offer additional potential in establishing more

valid thresholds and in further studying emotional factors operating in perceptual defense.

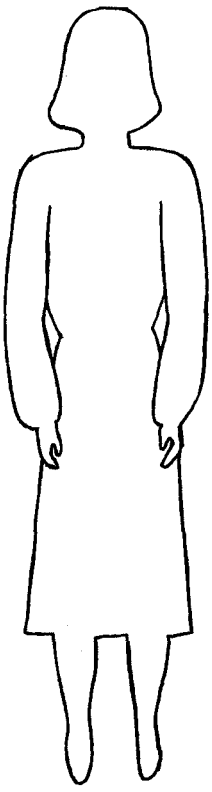
APPENDIX I

STIMULUS FIGURES

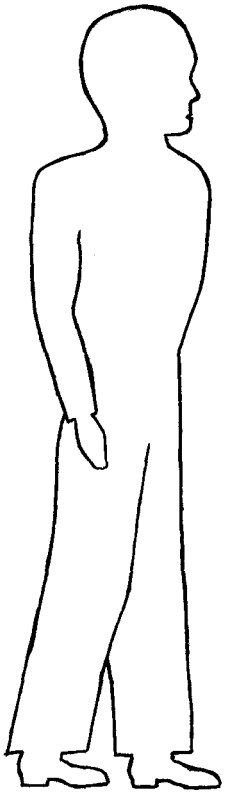
Slide A



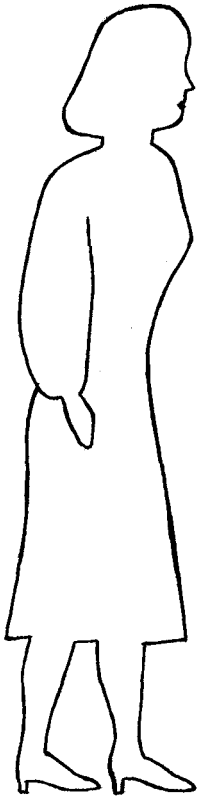
Slide B



Slide X



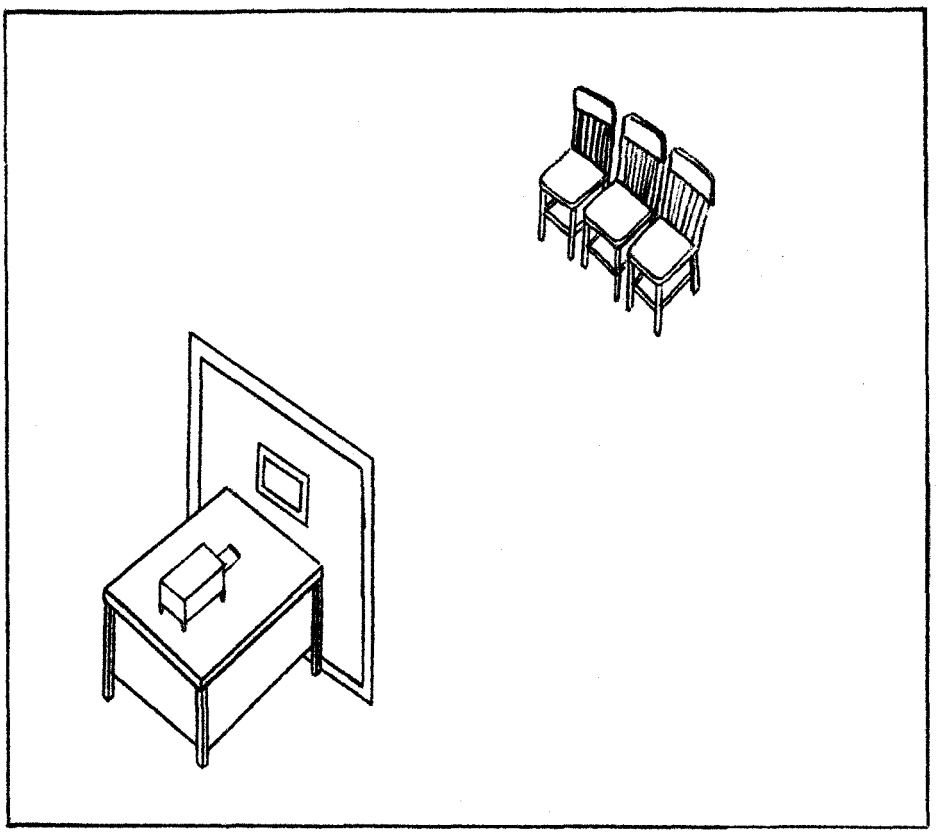
Slide Y



APPENDIX II

Arrangement of Tachistoscope, Screen,

and Subjects in Testing Room



S
FS
NS
G

APPENDIX III

Pt. 21

SAMPLE DATA SHEET

F	G		F	S		F	S		M	S					
M	G		F	S		M	S		M	S					
F	S		F	FS		M	S		F	S					
M	G		M	S		M	NS		M	S					
M	G		M	S		M	G		M	S					
M	G		F	NS		F	S		F	FS					
F	S		F	S		F	G		F	S					
M	G		F	S		F	S		M	S					
F	S		F	S		F	S		M	NS					
F	S		M	S		M	S		M	S					
M	G		M	S		M	S		F	S					
M	S		M	S		F	G		M	G					
F	G		M	S		F	G		F	S					
M	S		M	S		M	G		M	NS					
F	NS		M	S		F	G		M	S					
F	S		F	S		F	S		F	S					
F	NS		M	S		F	G		F	S					
F	S		F	S		F	S		M	S					
F	NS		F	S		F	G		F	S					
M	S		M	NS		M	G		M	S					
F	S		F	S		M	S		F	S					
F	S		M	S		M	S		M	NS					
M	S		M	S		F	S		F	S					
F	FS		F	S		M	S		F	S					
M	S		M	S		F	S		M	NS					
F	S		M	NS		M	G		M	S					
M	S		M	S		M	S		F	S					

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APPROVAL SHEET

The thesis submitted by Melvin D. Frank has been read and approved by three members of the Department of Psychology.

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

The thesis is therefore accepted in partial fulfillment of the requirements for the Degree of Master of Arts.

January 16, 1967
Date

Frank Hobler
Signature of Adviser