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**PERSONALITY CORRELATES OF DECISION MAKING IN A
PERCEPTUAL TASK**

by

Charles Lane

**A Thesis Submitted to the Faculty of the Graduate School
of Loyola University in Partial Fulfillment of
the Requirements for the Degree of
Doctor of Philosophy
February, 1964**

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VITA

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CHAPTER I

INTRODUCTION

In the Late 1940's and early 1950's there was a long and controversial series of experiments directed towards testing the functionalist proposition that perception is an instrumental activity serving the needs and wants of the observer. In just what way, or to what extent personality enters into perception continues to be a matter of some controversy. A measure of the impact which this relationship has had upon areas of psychology less directly related to experimental psychology is evident in the coining of terms such as "Perceptual Defense," and "Subliminal Advertising," and studies relating visual thresholds to psychiatric disorders. That this issue has been of public concern seems amply apparent in a request made by the Commission on Subliminal Projection of the state of New Jersey in 1959 for information on this topic, Goldiamond (1959), and by a rather misguided worry on the part of individuals that they would be compelled by subliminal advertising to buy unwanted items. Apparently some concern continues to exist not only in terms of the public's confusion about subliminal techniques, but also in the field of psychology, as the following excerpt from a recent article would indicate:

While the issue of behavior control first arose in regard to psychotherapy, it is now far broader, and covers other areas such as operant conditioning, teaching machines, hypnosis, sensory deprivation, subliminal stimulation, and similar studies.

As we learn more about human behavior, it is increasingly obvious that it is controllable by various techniques. (Krasner, 1962, page 201.)

More recently, attempts have been made to deal with perception as a process in which decision making may play an important role. Attempts have been

made to quantify the observer's contribution to the perceptual process, and to relate it to variables more readily observable than unconscious processes, and selective utilization of cues. This approach, arising from decision theory, has the advantage that it specifies the observer's contribution to perception at other than the conversational level. It provides quantitative relationships between the sensory capabilities and the nonsensory factors. As pointed out by Goldiamond (1962) the decision making characteristics of an observer may relate to the individual's past history of rewards and aversive consequences associated with decision outcomes. Although inter-individual differences have been observed in a number of signal detection studies, it has not been the focus of investigation.

Although many modifications of the Thematic Apperception Test (TAT) have found use as research tools, no attempts have been made to relate decision making characteristics, as evidenced in a perceptual task, to personality dimensions measured on the TAT. In many ways the TAT seems ideally suited for such a task since the TAT cards are frequently described as depicting ambiguous interpersonal problem situations which the subject is asked to resolve. While the subject's TAT decisions may be infinitely more complex in the handling of the TAT ambiguity and uncertainty, it seems likely that basic patterns and characteristics unique to each individual may be revealed. A manual was constructed for scoring group administered, six card TAT protocols by Lane (1959) along the dimensions of Reliance upon Self, and Reliance upon Others. In addition, an Emotional Word measure, first described by Ullman & McFarland (1957), may contribute a stylistic or language dimension which would enhance the characterization of the subject by the other two measures.

It is proposed that the dimensions of self reliance and other reliance represent basic strategies of relying upon one's inner resources for decision making, and relying upon other people as external sources for decision making in situations where uncertainty is maximized. Also, that to the extent that performance under conditions of stimulus impoverishment, as in threshold measurement situations, represents a solution to the uncertainty, one may expect self and other reliance to be significant determinants of behavior. The logical relationship between Ullman's emotional word measure and decision making is less clear, but is of interest since stylistic dimensions of the TAT have been a relatively neglected area.

The main purpose of this study is to predict the degree to which an observer's decision making characteristics on a perceptual threshold task will be influenced by the experimenter's instructions. The central question is to what extent are self reliant and other reliant observers susceptible to influence from others, or external sources of information on a visual detection task. The predictions will be based upon the TAT measures of self and other reliance.

The following hypotheses are formulated to carry out the main purpose of the study.

1. Self reliant and other reliant observers will show significant differences from each other in the degree to which their perceptual performance is effected by the experimenter's instructions.
2. Self reliant and other reliant observers will be significantly, positively related on those perceptual measures of sensory capabilities.
3. Self reliant and other reliant observers will be positively, but not

significantly related on those perceptual measures of decision criteria.

To the extent that emotional expression on the TAT represents a dimension of guardedness and freedom of expression in the face of the uncertainty of the TAT task, one may expect the following relationship to the perceptual task.

1. The greater the emotional word ratio (ratio of emotional words to total words), the more susceptible will be the observer to external sources of information (experimenter's instructions).

CHAPTER II

REVIEW OF RELEVANT LITERATURE

The review of the relevant literature will be concerned with data in the areas of decision making and perception, and the measurement of self reliance, other reliance, and emotional expressiveness with the Thematic Apperception Test.

Decision Making and Perception

Notable among the studies investigating the influence of decision factors upon perception have been a group of experiments which have been called the "New Look in Perception." These studies have been concerned with testing the general proposition that perception is an instrumental activity serving the needs and wants of the individual perceiver. Bruner & Postman (1949) were leaders in this movement, and espoused the notion that we perceive what we need to perceive, and what we are used to perceiving. Rather than review the vast amount of research which has accumulated in this area, which has been done by Adams (1957) with regard to subliminal perception, by Jenkins (1957) for perceptual defense, and by Goldiamond (1958) emphasizing the psychophysical methodology, some representative studies will be cited which have particular relevance to the proposed investigation.

The "New Look" methodology is exemplified in a study by Deston (1956). In this study the author was interested in the relationship between paranoid schizophrenia and homosexual impulses according to Freud's (1911) formulation. Homosexual and neutral words were presented tachistoscopically to paranoid

schizophrenics, unclassified schizophrenics, and normals. The resulting thresholds indicated that paranoid schizophrenics recognized homosexual words significantly quicker than did the other groups. Thus, the theoretical formulations of defense against homosexuality as a dynamic mechanism of paranoid conditions seemed verified.

However, upon examining the methodology employed, and the perceptual response indicator utilized, one begins to question to what extent perception was actually involved. The perceptual response indicator utilized here was the accurate recognition, and report to the experimenter, of the word being flashed upon the screen. Ignoring the variables of the frequency of usage of such words, and the formal stimulus characteristics such as number of letters of the words, it is fairly obvious that detection, recognition, and finally report are all involved in the resulting accuracy score, or threshold. There is no way of knowing from the response indicator used whether the normals and unclassified schizophrenics actually required longer duration for recognition and detection, or simply kept their mouths shut until they were sure. In any case, the perceptual response indicator utilized here is admitting variance from several sources, the least of which may be perception. That this indicator was coupled with the ascending method of limits of stimulus presentation resulted in lowered thresholds for the paranoids, and the impression of greater sensitivity.

Perhaps the most consistent criticism which has been made of "New Look" research by Adams (1957), Jenkins (1957), and Goldiamond (1958) is that the perceptual response indicator utilized is a relatively invalid one. In most cases the response indicator used has been a semantic one which required

either a yes-no response, or a verbalization of the word flashed. Such indicators admit variance related to language, learning, and personality to such an extent that it is impossible to determine to what extent, if at all, perception is involved.

The approach utilized by the "New Look" studies is heavily dependent upon the validity of the underlying psychophysical procedures, and the manner in which they are utilized. Blackwell's investigations of the psychophysical procedures themselves (1952a, 1952b, 1953a, 1953b) have shown rather conclusively that the semantic indicator (yes-no) is a relatively invalid one. When the indicator is modified to a verbal report of stimulus words, the variance is compounded, and the task ceases to be a perceptual one.

An implicit assumption in conventional threshold measurement studies is one of non-continuous information. That is, that above, or below certain stimulus values no information is received. While this assumption may have considerable merit for signal detection at extreme conditions of stimulus intensity where the physiological mechanisms of the observer set very definite limits, it is misleading when applied too literally to too wide a range of stimuli. Bricker & Chapanis (1953) demonstrated conclusively that stimuli which were incorrectly perceived, and thus below the recognition threshold, still conveyed information to the observer. Goldiamond (1954), in investigating subliminal perception and forced choice judgments, similarly found that above chance level responses occur at all points along the psychophysical ogive, whether above, below, or at that particular statistical point where the probability of reporting stimulus awareness is 50%. These findings appear to be congruent with detection theory which views information as continuous.

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Thus, accuracy is not an all or none phenomena, and that incorrect responses occurring in threshold studies are not really random guesses by the subject, but occur for valid sensory reasons.

Studies by Brown (1960), Erikson (1960), Weiner & Schiller (1960), and Fuhrer & Erickson (1960) all dealing with "Subliminal," and "Unconscious" perception, indicate the trend away from dealing with the threshold as some real inherent property in the individual. Instead these studies emphasize the learning process involved in the perceptual response, and are considerably more skeptical of the actual role played by perception. The discussion of single or dual processes by Weiner & Schiller (1960) is worthy of note. They conclude, after a rather lengthy review of the evidence, that a one process explanation of perceptual behavior under conditions of stimulus impoverishment is entirely adequate. They also found no need to postulate special processes (perceptual defense or subliminal perception) to account for instances in which behavior without awareness has apparently been demonstrated.

When attention has been paid to the underlying assumptions, psychophysical methodology, and perceptual response indicator, the subliminal and perceptual defense effects either vanish, or are adequately explained by existing principles. Goldiamond (1958), reviewing one hundred ninety-six articles on subliminal perception, concludes that until the perceptual variance can be differentiated from the variance due to language, learning, and personality, it will be impossible to assign clear cut roles to these factors. It is regarding this problem that the signal detection model has been of most use in perceptual investigations, and offers the possibility of separating the observer's decision making characteristics from his sensory capacities.

Quite recently several theorists have begun to apply some of the techniques and approaches from information theory and game theory to the classical problem in psychophysics. In the area of perception this has assumed the name of signal detection, and is outlined in the works of Luce (1959), Tanner & Swets (1954), Swets et al. (1961), and Goldiamond (1958, 1962). The importance which this approach has had is exemplified in a statement by Goldiamond (1958, page 213):

Work by Blackwell which systematically investigates differences between indicators, and related research in decision theory and signal detection constitute a major breakthrough in psychophysics and perception. This breakthrough is both methodological and theoretical, and bids to supply new applications of psychophysical techniques as well as insights into new areas.

The signal detection approach to threshold measurement holds that the term threshold is misleading in that it implies that a threshold does exist, and that the only problem facing the experimenter is to measure it. However, a glance at the conflicting results obtained in the area of perceptual defense indicates that the threshold problem is considerably more complex than simply accuracy of measurement. By conceptualizing the subject as an observer whose behavior in a threshold problem is in part a function of the values attached to decision outcomes, it becomes possible to separate the nonperceptual factors from the observer's sensory capacities. Swets et al. (1961) report on two investigations into the effect of varying the pay-offs for hits, and penalties for false alarms which indicate a definite relationship between the resulting detection thresholds and the pay-off schedules. Luce (1959) describes the information which determines any observer's performance as arising from two sources. The first is that information which is internally

available to the observer as a function of the stimulus situation. The second concerns the information derived from prior pay-offs and penalties. The observer is thought of as a decision maker who applies the information gained from prior pay-offs to the information arising currently. Thus the two types of information determine the observer's probability of detecting the signal. The ability to differentiate these two aspects of the observer's performance seems to be one of the major advantages which decision theory provides. To the extent which this theoretical model allows one to separate the observer's sensory capacities from the effects of set, attitude, and motivational variables, one can avoid the confusion which hampered perceptual defense investigations. Traditionally, these two aspects of behavior have been confused in experiments in which the dependent variable is the intensity of the stimulus that is required for the threshold response.

Although decision theorists appear rather reticent to deal with attitudinal, motivational, or "personality" variables, in many instances they fall back upon descriptive terms which indicate that individual differences are operating, and continually make use of the term "Receiver Operating Characteristic" to refer to the performance curves. Tanner & Swets (1954) use such terms as "reckless" and "cautious" to describe the observer's decision making behavior. Smith & Wilson (1953) describe groups of subjects as "conservative" and "liberal" in their utilization of semantic indicators. "No" could mean: (1) I didn't hear, but guess; (2) I heard nothing. "Yes" could mean" (1) I'm certain I heard; (2) I think I heard. Goldiamond (1962), in explaining the implications of signal detection theory, makes use of such terms as "hallucinator," and "detector" to refer to possible signal detection characteristics

as a function of hits and false alarm rates.

However, in the examples given here the description terms all refer back to specific, explicit variables in the observer's behavior--namely, his false alarm rate and his detection rate, instead of the intensity at which detection, recognition, or report occurred. To refer again to the area of gains and losses, a disproportionate false alarm rate leads to a description of the observer as a hallucinator, a liberal, or a careless observer. The converse condition would lead the observer to be described as cautious, conservative, or as a detector. In contrast to this view of the observer the "New Look" studies in perception describe the observer as defending against, or being sensitized to properties of the stimulus (taboo words as an example), and concludes that paranoids have a lower threshold for homosexual words than normals.

The model of signal detection has grown out of decision theory, and consequently has accumulated an impressive array of mathematical formulas which treat decisions as probabilistic occurrences. The implications which the decision theory approach has for personality research in the area of signal detection is indicated in a statement by Goldiamond (1958):

Some of the implication of the work in decision theory appear to be evident. For example, the willingness to take risks as indicated by placement on R.O.C. (Receiver Operating Characteristic) curves conceivably relates to a past history of reinforcements and aversive consequences attached to venturesome behavior (page 216).

Restle (1961) estimates that the number of articles have progressed geometrically over the past five years. Its popularity seems due to its pragmatic value in resolving several problems which have plagued psychophysical investigations.

One of the oldest problems in the field of visual psychophysics and one

which is crucial to this investigation, is that of "Vexierversuch," or the false alarm response. Typically the false alarms have been handled by warning the observer to be more careful, extensive training to eliminate this source of variance, throwing out data which showed an excessive number of false alarms, or finally utilizing a correction for chance. The end results of all these procedures have been first to mask important individual differences, and second to make thresholds obtained through the use of the semantic indicator (yes-no) incongruent with those obtained through other procedures such as the forced-choice indicator. A series of experiments reported by Swets et al. (1961) show that data collected by the semantic and forced choice indicators are congruent when handled within the framework of the signal detection model. This congruence was found not only for visual modalities, but also for auditory modalities.

The individual differences reflected in varying false alarm rates appears to have been neglected by signal detection research up to the present time. It is understandable that such has been the case, since in keeping with the psychophysical tradition signal detection research has been concerned with minimizing individual variance due to such extraneous factors as set, and motivation, and has involved demonstrating the adequacy of the model which often necessitates several thousand observations on a few subjects. However, the formulas provide measures for the effects of set, and motivational variables, and a way of separating this variance from the observer's sensory capacities, which have been their chief concern.

It seems important at this point to draw a distinction between the detection problem in which a binary decision is utilized, and the

discrimination problem in which decisions may become infinitely complex. In the detection problem signals are presented intermittently, and the observer makes his choice as to whether the signal was actually there. In the discrimination problem the signal is always presented, but the choice becomes rather complex, and may involve recognition, description, report, or any number of behaviors.

The chief concern of this study is with the detection problem, and with the false alarm rate rather than some variation of the discrimination problem. The "New Look in Perception" studies, out of which have come such notions as perceptual defense, vigilance, sensitizing, and subliminal perception have been typically discrimination problems. The psychophysical method which is almost generic for "New Look" studies is the ascending method of limits. Characteristically this involves selection of stimulus values well below the threshold. The energy level of the stimulus is then increased by equal increments over successive trials until an "accurate" decision is reached. Investigations into this method by Blackwell (1952a, 1952b, 1953a, 1953b), and Goldiamond (1956) has led Goldiamond (1958) to state:

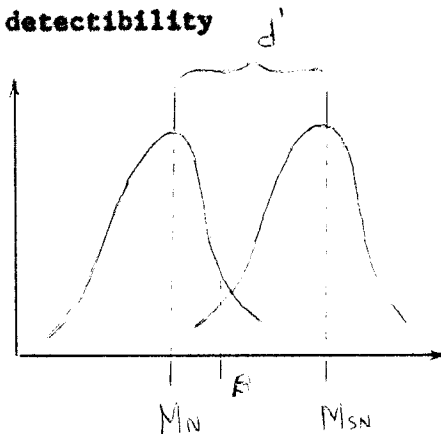
It will be the contention of this discussion that the face validity of this indicator (yes - no) is not convertible into other types of validity, and that one would have to go far in the experimental literature to find a more invalid indicator of concept-perception than this indicator coupled with the method employed (ascending method).

The detection problem is a deceptively simple one. As pointed out by Keller & Schoenfeld (1950):

Nothing seems more reasonable on the surface than to ask a person whether he can or cannot perceive a stimulus or stimulus difference. In this case, however, common sense does not reveal the actual complexity of the experiment or the tacit assumptions upon which we proceed. These experimental situations include far more than the stimuli to be discriminated. (pages 132-133)

In signal detection theory the focus of attention is the observer's operating characteristics rather than the formal stimulus properties. These operating characteristics may be roughly grouped into the detectability of the signal, and the expected value of the decision outcome. Two symbols are used to denote these aspects of the observer's performance.

d' = detectability



F = Criterion based on values of decision outcome, and a priori signal and noise occurrence

These two values are mathematically defined by Swets et al. (1961) as follows:

$$= \frac{p(N)}{p(SN)} \cdot \frac{(V_{N \cdot B} + K_{N \cdot A})}{(V_{SN \cdot A} + K_{SN \cdot B})}$$

where $V_{N \cdot B}$ = reward for correct rejection

$V_{SN \cdot A}$ = reward for a hit

$K_{N \cdot A}$ = penalty for a false alarm

$K_{SN \cdot B}$ = penalty for a miss

$$d' = \frac{M_{SN}(x) - M_N(x)}{(x)}$$

where M_{SN} = mean frequency of distribution of responses occurring to signal + noise.

M_N = mean frequency of distribution of responses occurring to noise alone.

The distributions of N and SN are assumed to have equal variance. Thus d' is an index of detectability of a given signal for a given observer, and granting the assumptions of normality of distributions and equal variance, d' is simply

the normal deviate, or x/σ measure. As the diagram on the preceding page implies, the observer is conceptualized as a statistical decision maker who selects from a priori distributions of noise and signal plus noise. He sets a criterion (β) and bases his decision upon this. If a sample (one observation) exceeds his criteria he reports yes; if it falls below the criteria he reports no. His decision may have the following outcome.

YES : Hit
False Alarm

NO : Correct Rejection
Miss

These outcomes may have varying rewards and penalties attached according to experimental conditions. By substituting a priori probabilities of occurrence in the formula for β an ideal criterion may be specified which would maximize the expected value for the decisions. If several intensities of the signal are used, with varying probabilities of occurrence, a series of ideal criteria may be derived which would constitute the performance of an ideal observer.

Swets et al. (1961) made comparisons between the ideal and actual criteria for three observers in a detection problem who had been informed of the a priori probabilities, and the values associated with various decisions. Rank order correlations for the six experimental conditions yielded values of .70, .46, and .71, where a value of .68 is significant at the .01 level. This indicates that the observers did not merely vary their criteria from one experimental session to another, but that their criteria varied appropriately with changes in the theoretical criteria.

Although the problem of individual differences in the adoption of a decision criterion has not been focused upon in signal detection research, results reported by Swets et al. (1961) indicate rather clearly that individual differences do occur. Swets investigations indicate individual variance, not only in the degree to which observers' actual decision criteria approach an optimal criterion, but also in the R.O.C. curves which were so unique for one observer as to characterize him as a "cautious" observer.

The problem of individual differences in the strategies adopted by subjects in "gambling" or chance dominated situations has stimulated considerable research. Studies by Liverant & Scodel (1960), and Strickland & Rodwan (1963) are representative of research in this area generally, and bear a relationship to the focus of this investigation in that a major variable in both studies was an Internal-External personality dimension. Both studies utilized the general design of requiring either bets or predictions from the subject regarding future occurrences. Their results tend to characterize "Internal" subjects as maintaining a cautious, planned strategy, resulting in fewer false alarm type errors, while the "External" subjects relied more on hunches and previous outcomes. The study by Strickland & Rodwan is of particular interest because it attempts to utilize signal detection measures of decision criterion by computing regression equations for the various "personality" measures. Their findings indicated that although personality variables clearly enter into the observer's placement of a decision criterion, different measures of criterion placement produce different regression equations. The best predictor of personality for their task was found to be the ratio of false alarms divided by the total number of "yes" responses, which is slightly different from the

criterion index recommended by the signal detection model.

Although the study by Strickland & Rodwan utilized signal detection measures of decision criteria, the experimental task was not, strictly speaking, a detection task. Asking a subject to predict a future occurrence is not the same as asking him to make guesses about what has occurred. While it may be argued that decision factors are involved in both types of tasks, it may well be that the specificity of the task serves to determine which criterion measures will be the most appropriate, or the best predictors of "personality." Thus, while investigations of gambling behavior yields evidence which generally supports the concept of individually determined strategies and decision processes, then applicability of this approach to signal detection tasks has not been demonstrated.

Measurement of Self Reliance, Other Reliance,
and Emotional Expressiveness

A group modification of the Thematic Apperception Test will be used to measure individual decision characteristics which will be termed reliance on self, reliance on others, and emotional expressiveness. These characteristics are defined as follows:

Reliance on Self: The extent or degree to which the problem, or plot, and/or the solution or outcome reflects the reliance upon, orientation towards, or the relative importance of the needs, wishes, demands, feelings, and opinions of the hero or main character in the story.

Reliance on Others: The extent or degree to which the problem, or plot, and/or the solution or outcome reflects the reliance upon, orientation towards, or the relative importance of the needs, wishes, demands, feelings, and opinions of character other than the hero or main character in the story.

Emotional Expressiveness: This is actually an emotional word ratio which

is derived by dividing the number of emotional words by the number of words in the story. The definition of emotional words is that one developed by Ullman & McFarland (1957).

The Thematic Apperception Test (TAT) was specifically selected since it presents the individual with a series of interpersonal situations to which he is to respond by making up a story. In this study it is assumed that the manner in which the subject resolves the conflict depicted on the TAT card will yield information pertinent to the individual's behavior patterns in similar situations in which he is asked to resolve uncertainty. However, the relationship between fantasy behavior, on a projective technique, and behavior measured in other situations has been the subject of a countless number of investigations. Quite recently, Ebel (1961) examined the concept of validity of tests and has proposed substituting meaningfulness or utility for current notions of validity. Thus the question one would ask regarding the use of the TAT in a study of signal detection is in what way does it add to any understanding of the performance of observers?

Although the TAT was originally designed by Murray in 1935 as a method of investigating the fantasy of normal individuals, its use as a clinical instrument seems to have overshadowed this original intention. Eron (1955), however, points out that its chief merits lie in the laboratory as a research tool. Perhaps as a consequence of its popularity as a diagnostic aid, utilization of group modifications of the TAT has been a relatively neglected area. However, interest in group modifications of the TAT stems naturally from the economy of time involved in such a procedure as compared with individual administration. Type of administration has been investigated by Harrison & Rotter (1945), Eron & Ritter (1951), and Sarason & Sarason (1958). The general

consensus of these investigations is that while group administration leads to differences in the formal characteristics of the stories, the content remains almost the same for written group administration and oral individual administration.

For the six cards which will be used in the proposed study (1, 2, 4, 6BM, 7BM, 18BM), Lane (1959) found that in comparing six card records with data reported by Eron (1950, 1953) significant differences occurred in only two of a possible thirty theme categories for males, and in two of a possible fifteen for the female group.

The evidence for similarity along the formal dimension is less direct. Ullman & McFarland (1957), and Gurel & Ullman (1958) have both used emotional expressiveness (number of "emotional" words) as variables, and report norms based upon Individual administration of TAT to a total of 275 V.A. patients referred for psychiatric evaluation. Comparison of these data with that collected by Lane (1959) using undergraduate college students and group administration method was made by ranking the six cards which both studies had in common according to the number of emotional words. Coefficient of Concordance was used to measure the relationship between the two rankings, and yielded a value of .774, which is significant at the .01 level.

It was not possible to make comparisons for story length, but it seems likely that this measure would vary considerably, since in the group modification of five minute time limit is imposed. Regarding language characteristics such as emotional words, the group modification may offer an advantage in that the raw data are solely a function of the subject, and are not dependent upon the examiner's writing speed, transcribing ability, or memory as is the case

with individual administration.

Reliability for the two measures has been assessed in the form of interscorer reliability. For the emotional word measure, Ullman (1958) reports a correlation of .92 for 20 protocols scored by five raters, which is significant at the .01 level. For the self-other reliance measures, Lane (1959) reports average interscorer reliabilities for three raters using 20 protocols were .68 for self reliance, and .72 for other reliance, both of which are significant at .01 level.

Related Personality Dimensions

Historically, the patterns of reliance on self and reliance on others have been described in various ways by a number of personality theorists, philosophers, and psychoanalysts. James (1907) described "Tender-minded," and "Tough-minded" types of "mental make-up" in terms suggesting a dimension of rigidity, and resistance to change. Psychoanalytic theory, as exemplified by Freud (1908, 1916), and Michaels (1959) makes use of descriptive terms such as oral and anal characters to refer to certain character traits. The anal character is associated with traits such as distrust, rebellion against environmental demands, and obstinacy, while the oral character embodies such traits as dependence on others, and "requiring a constant source of supplies from the external world for the satisfaction of their needs," Michaels (1959, page 360). Horney (1945) developed a classification of character types which she considered to be the three basic strategies of life. These strategies were defined and labeled as follows:

Detached Person: the person who moves away from people. He expects neither good nor bad from people. Maintenance of emotional distance

from others is his primary sin. He behaves according to the principle of nonparticipation. (page 264).

Aggressive Person: (feels) he should be able to master the adversities of fate, the difficulties of the situation, the intricacies of intellectual problems, the resistances of others, and conflicts in himself. He may be extremely proud, consciously or unconsciously, of his faculty of fooling everybody--and in his arrogance and contempt for others believes he actually succeeds in this. Conversely he is most afraid of being deceived. (page 192).

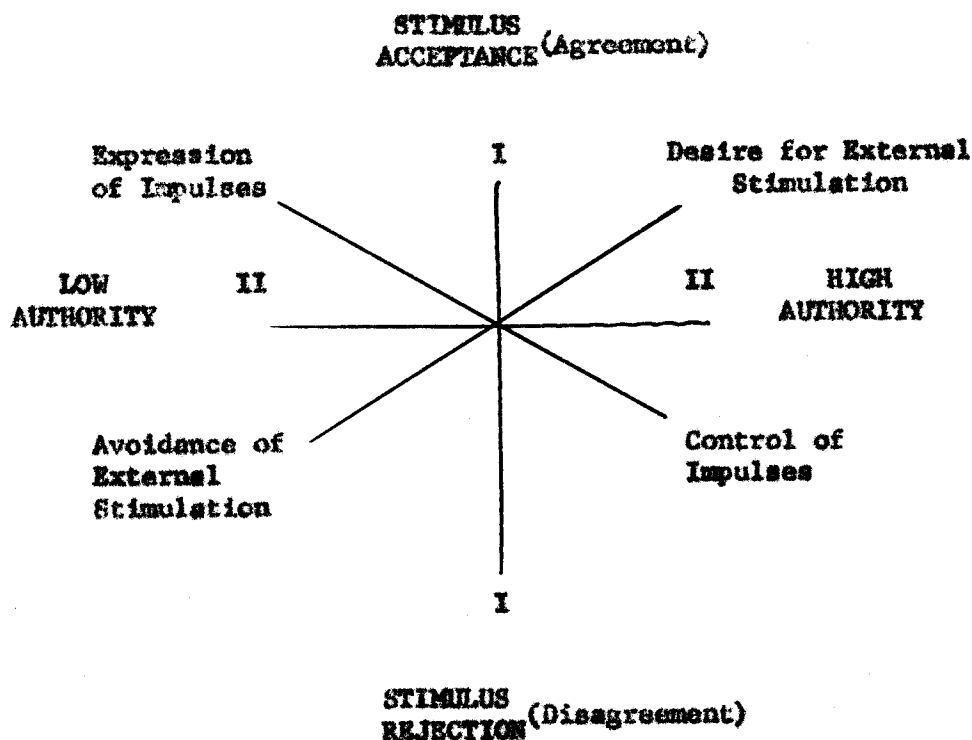
Compliant Person: These people then do what they think others expect them to do; they are what they think others desire them to be. They may develop considerable astuteness about what others need or expect. They will feel lost when left to their own resources. (page 168).

Adler, as represented by Ansbacher (1956), conceives of the individual as always striving towards the goal of self assertion, but may adopt differing ways of relating to others which are necessary for the achievement of this goal. Perhaps the greatest similarity among these approaches is that they view the individual as adopting one or the other of the strategies, and exclude the possibility that an individual may shift strategies, or that these patterns may exist simultaneously as behavioral alternatives for the same individual.

More recently, such concepts as acquiescence, and Social Desirability have received considerable attention. Characteristically, these concepts have been measured through paper and pencil questionnaires of the MMPI type, with few attempts made to integrate these concepts with existing personality theories, or to view them as personality dimensions. However, some notable exceptions have occurred which have led to some integration of these concepts.

Couch & Keniston (1960) report a rather thorough review of the agreeing response set, and investigate its implications as a manifestation of the responders personality, interests, or personal "style." They factor analyzed

several of the measures currently used in assessing the agreeing response set, and found the factors represented below.



Yessayers (regarding responders) were classified, or described as individuals with weak ego controls, who accept impulses without reservation, and who "agree" and easily respond to stimuli exerted on them. Naysayers (disagreeing responders) were described as inhibiting and suppressing responses, and rejecting all emotional stimuli. They conclude that response set is a manifestation of a deep seated personality syndrome, whose underlying determinants serve to explain the phenomena of acquiescence. Also, that in its pure form the agreeing response set represents a tendency to say yes to an item (or situation) regardless of content (or kind).

Among the studies on social desirability Strickland (1960), and Marlow &

Crowne (1961) found that high social desirability was associated with yielding to social pressure on Ash's Line Judgment situation, and inhibiting or suppressing hostile responses to frustrating tasks. Allison & Hunt (1959) report that high social desirability groups, in addition to suppressing anger, also appear to be "other directed" rather than "inner directed." In summary, the traits and concepts discussed may be grouped around the self-other strategies as follows:

Reliance on Self

Tough-minded
Aggressive Person
Obstinate
Stimulus Rejection
Low Authority
Inner Directed

Reliance on Others

Tender-minded
Compliant Person
Dependent
Stimulus Acceptance
High Authority
Other Directed

These are not viewed as opposite ends of the same continuum, however, but as separate continua along which the individual may vary simultaneously. On logical grounds one cannot expect the individual to exhibit consistently other-reliant behavior regardless of the situation. Also it seems erroneous to classify an individual as "either," "or." Thus, the scoring scheme, and the selection of subjects takes into account the individual's scores on both these continua. Product moment correlation was computed between the two scores for the standardization sample of 150 cases (see Appendix C for description of the subjects), and yielded a correlation coefficient of $-.028$. This finding would seem to support the view that these dimensions are statistically independent of each other, and that knowledge of one provides little, if any, direct information about the other.

The formal aspects of the TAT utilized in this study are verbal productivity, and emotional expressiveness. These will be combined into an emotional word ratio, which is derived by dividing the total number of emotional words for the six stories by the total number of words, and multiplying by one hundred. Use has been made of similar ratio scores by McClelland (1955), and MacBrayer (1959), and emphasizes the logic that language characteristics are more meaningful if expressed in terms of a ratio between the total verbal production and particular kinds of words. This would also have relevance for the clinical testing situation in which story length and utility seldom have a one-to-one relationship. The definition of emotional words used in this study will be that proposed by Ullman (1958), and given in detail in Appendix A.

While it is generally agreed by clinicians, and users of the TAT that a great deal may be learned from the formal aspects, there does not appear to be much consistency in the literature regarding the sorts of things supposedly revealed. Holt (1958) states that not what is told, but how it is told can teach us most about personality, particularly in its structural aspects. Milam (1954), and MacBrayer (1959) both found criticism to increase story length, but also that the ratio of aggressive, sex, and optimistic words to total words did not change with amount of criticism. McClelland (1955) reports that story length did not vary significantly for achievement oriented versus neutral subjects, and that the content of the stories, analyzed along a variety of dimensions, was not systematically related to the length. Ullman & McFarland (1957) found that both story length and emotional words were significantly related to ratings of interpersonal adequacy of VA psychiatric patients made by their group therapists. Ullman (1958) compared VA psychiatric patients

classed as "internalizers" and "externalizers" on the basis of biographical data reflecting the behavioral expression of emotion, and found that externalizers gave significantly more emotional words in their TAT stories. Gurel & Ullman (1958) compared rankings of TAT cards, using VA patients, according to Weisskopf's Transcendence Index and emotional words, and found the two measures correlated .85. Calvin (1950) found a greater frequency of "uncertain" language in the stories of subjects classed as "low certainty" on the basis of their confidence in guesses they were required to make on an experimental task, but this finding did not reach significance.

Comparing this dimension with the self-other reliance dimensions, product moment correlations were computed for the 150 subjects of the standardization sample. The emotional word ratio was found to correlate negatively, $r = -.308$, with self reliance, and positively, $r = .463$, with other reliance.

An excellent summary of experimental approaches to word usage is provided by Nunnally & Flaugher (1963). Although Nunnally does not specifically mention the TAT as an approach to word usage, he notes other forms of written communication such as suicide notes and personal letters. He quotes a study by Osgood & Walker (1959), which compared stereotypy and use of emotional words in suicide notes and personal letters. Their findings were that suicide notes were more stereotyped, and contained more words relating to emotions than personal letters.

In summary, there appears to be considerable face validity and historical precedent for the concepts of self and other reliance as characterizing an individual's ways of dealing with interpersonal relationships, and/or decision making. However, when one proposes to measure these concepts with a group

modification of a projective technique, supporting evidence becomes scanty or non-existent. The work reported by McClelland (1955) provides a notable exception to this lack of research with the group TAT. The opinion of many researchers regarding the group TAT seems exemplified in a statement by Christie & Lindauer (1963):

We are left with the old Scotch verdict of 'not proven' as far as Achievement is concerned, and suspect that this would be true of most projective techniques in research if they were subjected to equally vigorous examination. There seems to be little in the way of critical comment about the use of projective techniques in research which will dissuade psychologists from using them. (page 220)

The evidence relevant to language dimensions of the TAT seems to have failed to provide any consistent behavioral relationships. In some instances motivational states of subjects appear to be reflected in their choice of words, while in others no such relationship could be established. Nunnally warns that it is usually necessary to work with large samples, 300 subjects or more, in order to document the small correlations expected between word usage and individual differences in other areas. However, he concludes that sufficient positive results have been obtained to leave little doubt that correlations between individual differences in word usage and differences in learning, perception, and personality do exist. For the purposes of this study it will be assumed that emotional words do not occur randomly, but are a function of the subject's willingness and/or capacity for emotional expression through the media of written stories. Also, that this willingness or capacity represents a strategy which the individual adopts in the face of the ambiguity and uncertainty of the TAT task.

CHAPTER III

PROCEDURE

Group Administration of TAT

One Hundred twenty introductory psychology students were tested using the six card group TAT previously described. Each of four introductory psychology classes was tested as a group, with each class containing approximately 30 students. The testing was carried out in the classroom following the procedure described in detail in Appendix B. Briefly, this procedure involves the projection of 35mm slides of the TAT cards for a period of five minutes per card, during which time the subject writes his stories in a test booklet provided for this purpose. After the testing, the remainder of the class period was used to discuss the TAT, and answer questions about the test.

Selection of Subjects

Forty-five subjects were selected from the total group tested on the basis of their scores on the self reliance and other reliance dimensions. The selection was designed to yield three groups: Self group (high self reliance-low other reliance), Middle group (equality of self and other reliance), and Other group (high other reliance-low self reliance). A difference score was devised in such a way as to maximize any discrepancy between the self and other scores. Details of the computation of this score are presented in Appendix E.

Those subjects which were selected were contacted, and asked to participate in a "Decision Making Research Project." They were told that they

had been selected because their TAT stories were judged as "typical" of college students generally.

Subjects

Table 1 presents the characteristics of those students who were selected, and agreed to participate in the research.

Table 1
Subject Characteristics

Group	Dimensions	d Scores	Mean Age	Sex	N
I	High Other Low Self	-10 to -29	19.5	9M 6F	15
II	Self = Other	+ 2 to - 5	20.2	6M 9F	15
III	High Self Low Other	+14 to +33	19.8	6M 9F	15
Total				21M 45F	45

Although there was no definite reason to believe sex to be a variable in the investigation, an attempt was made to keep the male-female ratio balanced for the entire sample so that the resulting effect could be examined.

Perceptual Task

The perceptual task was modeled after signal detection problems generally, and involved the detection of a visual target or signal presented against a background of noise or masking light. The five signal intensities

which were used in the study were selected from among ten trial intensities which were investigated in a pre-study with a separate group of 20 subjects. In the pre-study the noise was held constant, and the signal intensity was varied through the 10 intensities by means of a variable polaroid filter. The duration of the signal was set at .01 second throughout (the variability of the shutter mechanism is not known), and each observer was given 10 trials at each intensity with probability of occurrence constant at .50. The observer pressed a "yes" or "no" button for the series of signals, which were presented in blocks of ten using the method of constant stimuli, with an intersignal duration of 8 seconds. The following intensities were used in the pre-study.

Table 2
Signal Intensities Used in Pre-Study

Intensity	Angle of Rotation	Percent Transmittance
1	30 degrees	75
2	72 "	10
3	45 "	50
4	60 "	25
5	67 "	15
6	52 "	37.5
7	38 "	62.5
8	77 "	5
9	23 "	85
10	18 "	90

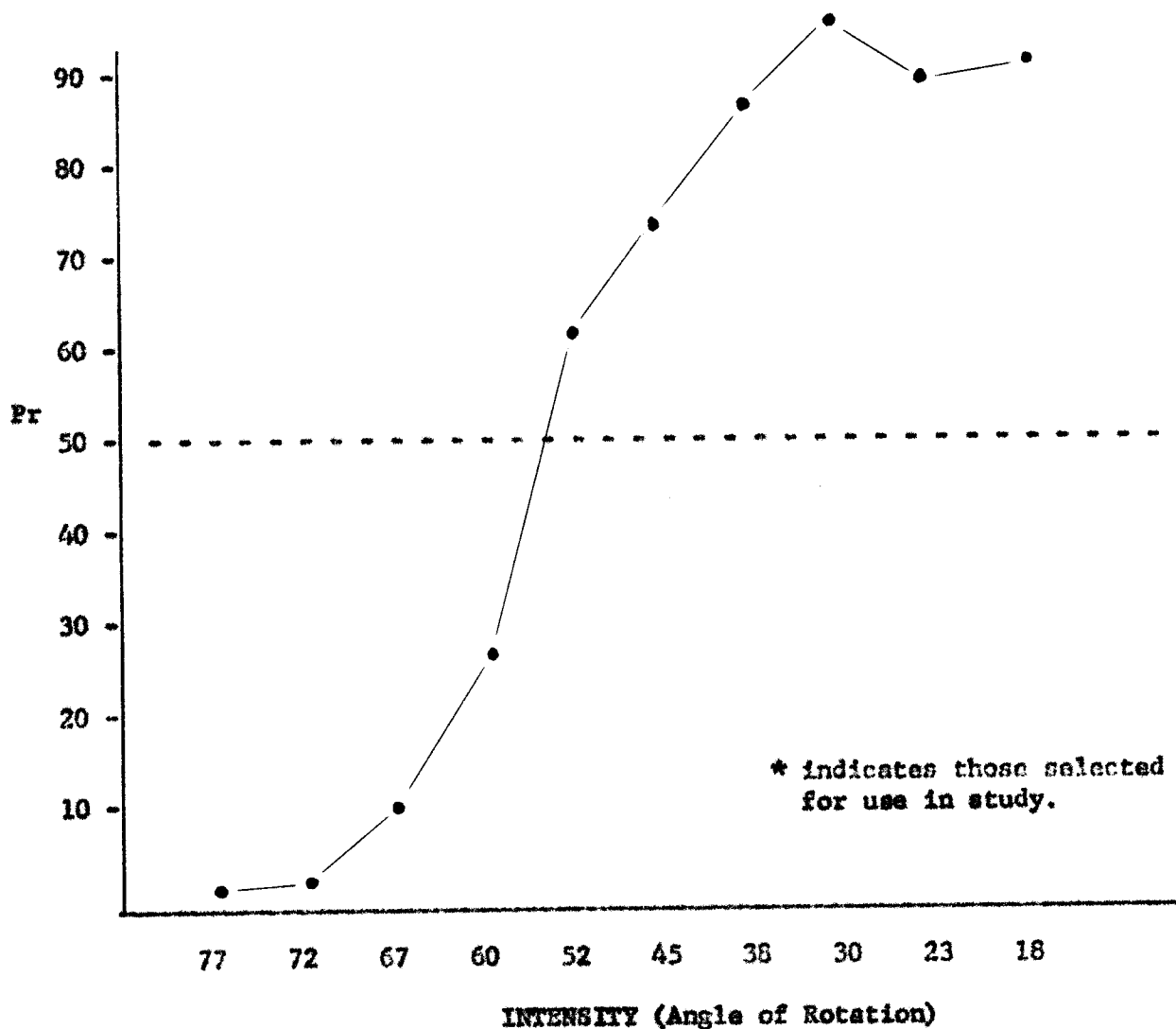
The order of presentation of the intensities was random, and the occurrence of signal or noise for any one trial was also random within the limits of presenting the signal 50% of the time. Figure 1 presents the results of the

pre-study, with P_r equal to total accuracy of response utilizing the conventional chance correction of $P_r = \frac{P_{SN}(A) - P_N(A)}{1 - P_N(A)}$ where $P_{SN}(A)$ = Proportion

$$1 - P_N(A)$$

of Hits, $P_N(A)$ = Proportion of false alarms.

Figure 1



In addition to those marked with an asterisk, two other intensities of 56 and 64 degrees were included to provide middle intensities for the segment of the curve marked off by those used in the pre-study.

The perceptual task for the investigation proper was divided into two parts--a baseline series, and an E.S.P. (Extrasensory perception) series. In the baseline series subjects were instructed that this was to be a simple visual detection experiment in which they were to watch the screen and "guess" whether or not a signal had been flashed. They were given 20 practice trials with the intensity set on 60 degrees (the middle intensity), and the probability of occurrence at .40. After the practice trials, during which the experimenter gave them feedback as to correctness, the five intensities were presented in random order, with 20 trials at each intensity. The intensities used, and the associated probabilities are presented in Table 3.

Table 3
Signal Intensities and Probabilities Used in
Major Investigation

Intensity	Angle of Rotation	Probability of Signal
1	60 degrees	.50
2	64 "	.30
3	52 "	.40
4	67 "	.60
5	56 "	.70

No information as to correctness of the "guess" was given the subjects on this series, and the response was a pressing of a "yes" or "no" button. The

order of presentation of the intensities, which was randomized, followed the order of the intensity number in Table 3.

After completion of the baseline series subjects were given a paragraph explaining extrasensory perception in a rather positive, and plausible manner (the paragraph is reproduced in Appendix D), and asked to read it. Subjects were then asked to indicate their "belief" in extrasensory perception by checking a position on a five point scale represented below.

- +2 Strongly believe true
- +1 Believe possible
- 0 Neutral
- 1 Skeptical
- 2 Strongly disbelieve

The subjects were then given the following instructions:

We are now going to determine to what extent extrasensory perception has entered into the previous experiment. I am going to look at a series of cards with the same signal on them as was used before (subject was shown cards). You are to crystal gaze at the screen, and try to read my mind. The projector will be running, and everything will be the same as before, except there will be blank film in the projector. You will indicate your guesses by pressing one of the buttons as you did before.

The subject with the best performance in extrasensory perception will receive thirty dollars. In case of ties, the amount will be divided among the winners. You will be given points for your guesses according to the following schedule:

- yes - circle present = +1
- Yes - circle absent = -3
- no - circle present = -1
- no - circle absent = +3

The E.S.P. series were then started using the same five intensities with the

same associated probabilities, but in an ascending order according to intensity. Signals or blanks were always presented, and, as in the baseline series, there was no feedback as to correctness of the guess. There was no attempt on the part of the experimenter to convey information to the subject through any media except the presentation of signals and blanks during the E.S.P. series. After the E.S.P. series each subject was asked:

- 1.) Whether he got any information from the screen which influenced his guesses during the E.S.P. series.
- 2.) How did he utilize this information in his guesses.

Apparatus

Signal sequences were made through the use of a Keystone tachistoscopic slide projector which allowed signal duration to be controlled at .01 second, and intersignal intervals at 8 seconds. The sequences were automatic once the slide tray was loaded into the projector. Signal intensity was varied by means of a variable polaroid filter attached to the lens of the projector, which was calibrated to measure angle of rotation, which can be converted into percent of transmittance according to tables provided by Polaroid (1952). The signal itself was a gray disc, which before projection had a density separation of 1.00 to .70 when compared to the background, and as measured on the Kodak Gray Scale--Series V. When projected, the signal had a diameter of 7.50 inches, which yielded a visual angle of 4 degrees 28 minutes for the subject seated 8 feet from the screen. The screen was a "backlight," plastic, semi-opaque model permitting projection of the signal from the rear of the screen. Experimenter and observer occupied separate, adjacent booths, with the screen mounted in the wall separating the two booths. Masking illumination was

provided by two 100 watt bulbs, one 75 watt bulb, and one 22 watt flourescent light, all of which were arranged to yield a uniformly illuminated screen of 15 foot candles, as measured from the subject's side of the screen. The observer's booth was also illuminated with two 40 watt bulbs, and one 22 watt flourescent light, all of which yielded a reading of 10 foot candles. All readings were taken with a Weston Sight Meter, Model 703, type 3 A. Table 4 presents the reading taken for the five intensities used.

Table 4

Photometric Measures of Five Intensities

Intensity	Angle of Rotation	Meter Reading at Screen	
		Noise	Signal + Noise
1	60 degrees	No Difference	
2	64 "	0	.50
3	52 "	0	1.00
4	67 "	.50	2.00
5	56 "	1.00	3.00

Hypotheses

It was the general hypothesis of this investigation that the observer's performance in the perceptual task, particularly on the E.S.P. series, is contingent upon decision factors as well as his sensory capabilities. Also that these decision factors may very well be related to the personality dimensions of self and other reliance, in so far as this perceptual task is concerned. The emotional word dimension appeared to be less directly related to decision factors, but was found to correlate significantly with the self and other reliance dimensions. Self reliance and low emotional expressiveness

were viewed as characteristics of a "guarded" strategy which would lessen the influence of external sources of information (experimenter's instructions) in decision making. Other reliance and high emotional expressiveness were viewed as characteristics of an "open" strategy which would maximize the influence of external sources of information in decision making.

In addition, detection theory specifies the criterion of the "Ideal" observer for varying proportions of signal and noise presentations, and varying pay-off schedules. Thus, actual criteria of the observers were compared with the theoretical model. Performance on the two perceptual tasks was characterized or described by the following measures:

- a) Hits
- b) False Alarms
- c) Total Accuracy = $\frac{P_{sn}(A) - P_n(A)}{1 - P_n(A)}$ where $P_{sn}(A)$ = Proportion of Hits
 $P_n(A)$ = Proportion of False Alarms
- d) Decision Criterion) Specified by Detection Theory
- e) Detectability)

The following specific hypotheses were made:

1. There will be no differences between the three Self-Other groups on measures a, b, or c on the baseline series.
2. There will be significant differences among the self-other groups on the E.S.P. series on measures a, b, and c.
 - a) There will be significant differences between the three self-other groups in degree of effect of the E.S.P situation. These differences will be significant between the extreme groups, I and III, but not between either extreme group and the middle group.
3. There will be a positive relationship between Emotional Expressiveness (Emotional Word Ratio) and degree of effect of the E.S.P. situation for

the total sample of 45 subjects.

4. The relationship between the decision criteria for the ideal observer and that utilized by the three groups will be positive, but not significant.

a) The relationship will be greatest between Group III and the ideal observer.

5. The relationship between detectability of the intensities of the two perceptual tasks will be positive and significant between the three groups. That is, using detectability of the intensity as a measure of the observers sensory capabilities, there will be a significant positive relationship among the three groups.

6. For the total sample of 21 males, and 24 females, there will be no significant differences on any of the perceptual measures.

7. Degree of belief in E.S.P. will not be significantly related to effect of the E.S.P. situation for the total sample.

8. The effect of the pay-off schedule will be to depress the false alarm rate for the E.S.P. series, as a function of saying yes less frequently.

a) It is expected that this effect will be a differential one for the three groups--group I will have significantly less yes responses than group III.

Data Analysis

Although it was the original intention of the investigator to utilize parametric techniques in data analysis, a more thorough consideration of the data yielded by the procedures employed suggested that nonparametric techniques would be more appropriate. This decision was based primarily upon two

considerations. First, the bulk of the perceptual data is of the yes-no variety, which is subsequently summed and converted into frequencies and proportions. Such figures are more congruent with an ordinal scale than with an interval scale. This is particularly true in the case of difference scores derived from an individual's performance under two conditions, as is the case for the two perceptual tasks. Finally, the small size of the three groups ($N = 15$) makes ranking techniques more desirable since extreme values occurring within the groups do not effect rankings to the degree that mean values are notably changed. Thus, the following techniques were utilized.

The Wilcoxon matched-pairs signed ranks test was used to test for effect of:

- a) Effect of E.S.P. Situation on perceptual measures.
- b) Effect of pay-off schedule on yes responses.

The Kruskal-Wallis one-way analysis of variance was used to test significance between groups on the three perceptual measures for the two perceptual tasks. It was also used to test for significance between degree of belief in E.S.P. and affect of E.S.P. situation. The Mann-Whitney U test was used to test for significance between various combinations of two groups on each perceptual task, and for difference scores between the two perceptual tasks.

Chi-square was used to test for sex differences for each of the perceptual measures on the two perceptual tasks.

Spearman rank order correlations were used to relate the following measures.

- a) Number of emotional words--perceptual measures
- b) Number of words--Perceptual measures

- c) Emotional Word Ratio--Perceptual measures
- d) Ideal Criterion--Actual Criterion
- e) Detectability of the various intensities--relationship between the three groups according to ranked detectability of the intensities.

Contingency coefficient was used to measure association between positive and negative attitudes or belief about E.S.P., and whether subject verbalized getting information from the screen during the E.S.P. series.

CHAPTER IV

RESULTS AND DISCUSSION

The results of this study will be presented in terms of five major areas: (1) Self-Other group differences, (2) Verbal productivity measures, (3) Signal detection and perceptual tasks, (4) Sex differences and belief in E.S. P., and (5) Individual strategies.

The results and discussion are presented together to facilitate comprehension by the reader by avoiding continual referral to separate tables of numbers. The results are discussed rather briefly for each of the four sections, and then followed by a more general discussion.

Since non-parametric techniques were used throughout the analysis of the data, all of the frequencies were converted to rankings. These rankings were based upon hits (saying yes when a signal was presented), false alarms (saying yes when only noise was presented), and accuracy (saying yes when a signal was presented plus saying no when noise was presented). The accuracy measure is in actuality a measure of "correctness" of response.

1. Self-Other Group Differences

The major hypothesis of this investigation was that the extreme self-other groups would differ significantly in the decrement of performance produced by the E.S.P. instructions. This was tested directly by computing difference scores based upon performance on the two perceptual tasks, so that each individual served as his own control. However, since it may be of interest to know how the groups performed on the separate tasks the analyses

presented in Tables 5, 6, 7 and 8 were computed.

The three groups of the self and other dimensions were first compared with each other on the two perceptual tasks to determine if there were differences among the groups on the baseline, and on the E.S.P. series. Table 5 presents the H values of the Kruskal-Wallis one-way analysis of variance for the baseline and E.S.P. series. Table 5 indicates that the groups differ significantly on the accuracy measure in the baseline series, and on the hit

Table 5
Differences Among the Self-Other Groups on
Baseline and E.S.P. Series

Measure	Baseline	E.S.P.
Hit	.03	10.31**
False Alarm	1.43	.73
Accuracy	19.27**	4.62

$$* \chi^2 .05 (d.f. = 2) = 5.99$$

$$** \chi^2 .05 (d.f. = 2) = 9.21$$

measure in the E.S.P. series. These differences were investigated further by comparing the groups with each other, and utilizing the Mann-Whitney U test. Table 6 presents the U values resulting from this analysis. Table 6 indicates that the differences between any one pair of the groups was not significant. This implies a consistency of performance among the three groups considering the E.S.P. and baseline series separately. The data were next analyzed to

Table 6
Differences Between Self-Other Groups on
Accuracy and Hit Measures

	Accuracy (Baseline)	Hit (E.S.P.)
Other vs. Self	84.6	106.4
Other vs. Middle	74.6	80.3
Self vs. Middle	65.1	84.2

U .05 (N = 15) \leq 64

determine if the E.S.P. situation makes a difference generally in the performance of the entire group of 45 subjects. Table 7 presents the Z values derived from the Wilcoxon matched pairs signed ranks test. The results presented in Table 7 indicate that the E.S.P. situation does lead to a significant difference in performance on the three perceptual measures--a decrease in

Table 7
Differences Between E.S.P. and Baseline
Performance Total Sample

	Hit	False Alarm	Accuracy
Z	4.54	3.66	4.37
P	.00003	.00016	.00003

accuracy, a decrease in hits, and an increase in false alarms. The next step was to determine if the E.S.P. situation produced a decrement in performance for each of the three groups. Table 8 presents the T values for the Wilcoxon matched-pairs signed ranks test for the three groups over the three performance measures. The results of Table 8 indicate that for the Other and Middle

Table 8
Differences Between E.S.P. and Baseline
Performance Self-Other Groups

	Hit	False Alarm	Accuracy
Other Group	5.33**	16.50*	1.50**
Middle Group	14.50**	0.0 **	7.00**
Self Group	15.00**	35.50	41.00

* $p \leq .01$

** $p \leq .005$

groups the E.S.P. situation produces significant differences in performance on all three measures. For the Self group, the E.S.P. situation produces a significant difference only in the number of hits. As in Table 7, the direction of the differences was a decrease in accuracy and hits, and an increase in false alarms. Thus, the Self group appears more resistant to the effects of the E.S.P. situation than the Other and Middle groups. However, further analysis is needed to determine if the groups differ from each other in the degree of effect which the E.S.P. situation produced, as is suggested in Table 8.

A Kruskal-Willis one-way analysis of variance was used to compare ranked difference scores resulting from the two perceptual tasks. This analysis yielded H values of 10.68 (significant at .01) for hits, 5.40 for false alarms, and 9.68 (significant at .01) for accuracy. This indicates a differential reaction among the three groups which reaches significance for the hit and accuracy measures, and supports the major hypothesis of this investigation. The next step was to compare pairs of groups to further investigate the significant differences which were found.

The Mann-Whitney U test was used to compare the groups. Table 9 presents the results of these comparisons. The results presented in Table 9

Table 9
Comparisons of Groups on Effect of E.S.P.

	Hit	Accuracy
Self vs. Other	80.50	52.01**
Self vs. Middle	118.17	98.85
Other vs. Middle	76.17	69.75*

* U .05 \leq 72

** U .01 \leq 56

offer additional support for the hypothesis of differences between the extreme groups--the Self group vs. the Other group. The significance between the Other and Middle groups was unexpected, and is contrary to predictions made concerning these groups. Apparently the disparity or difference between the Middle and Self groups is less than between the Other and Middle groups.

Table 10
Differences Between E.S.P. and Baseline Performance Over
Five Intensities--Self-Other Groups--Hits

Group	I	II	III	IV	V
Other	1.50**	2.50**	5.83**	12.25**	10.36**
Middle	15.50	17.50	1.25**	21.93	8.40*
Self	13.93	10.98	10.66**	40.37	6.50*

* P ≤ .05

** P ≤ .01

While there are several possible explanations for this finding, the most plausible ones involve the short comings of the predicting instrument, and the heterogeneity of the Middle group. It is noteworthy that while Table 9 indicates significant differences between the groups for the hit and accuracy measures, only the accuracy measure continues to show significance when the groups are compared separately with each other.

The next step in the analysis was to further investigate the differences in performance indicated in Table 8. The results of Table 8 indicate that the Self group was more resistive, showed less of a decrement in accuracy and less of a rise in false alarms, to the effects of the E.S.P. situation. This finding was followed up by breaking down the performance into the five signal intensities utilized in both baseline and E.S.P. series. Tables 11, 12, and 13 present the results of this analysis. Wilcoxon matched-pairs signed ranks test was used to compare each group's performance with itself under the two

Table 11

Differences Between E.S.P. and Baseline Performance Over
Five Intensities--Self-Other Groups--False Alarms

Group	I	II	III	IV	V
Other	17.32	25.99	16.16	2.40**	9.93
Middle	32.65	26.99	4.66**	0.00**	5.56*
Self	57.78	42.00	29.25	37.65	17.58

* $P \leq .05$
** $P \leq .01$

Table 12

Differences Between E.S.P. and Baseline Performance Over
Five Intensities--Self-Other Groups--Accuracy

Group	I	II	III	IV	V
Other	2.50**	13.66**	11.83**	9.25**	16.50**
Middle	43.24	17.15*	7.66**	6.66**	5.50*
Self	37.98	27.91	14.25	24.91	11.40

* $P \leq .05$
** $P \leq .01$

experimental conditions. The results presented in Tables 11, 12, and 13 indicate that while the false alarm measure remains relatively stable from baseline to E.S.P. series, the hit and accuracy measures reflect considerable variance over the two perceptual tasks. The results of Tables 11 and 13 support

the findings of Table 8 that there is a diminishing of effect of the E.S.P. situation from the Other group to the Self group. This is most clearly demonstrated in Table 13 on the accuracy measure where all five intensities show a significant difference for the Other group, four are significant for the Middle group, and none are significant for the Self group. It is interesting to note that on the hit measure, Table 11, the Middle and Self groups are quite similar, both having two significant differences occurring on the same two intensities, while they differ quite markedly on the accuracy measure.

2. Verbal Productivity and Perceptual Performance

Since the subjects of this investigation were selected on the basis of their scores on the Self and Other dimensions, and not on the basis of verbal productivity measures, the approach was essentially an exploratory one concerned more with finding relationships than with formulating specific hypotheses. However, it was the investigator's expectation that there would be a positive relationship between the Emotional Word Ratio (E.W.R.) and the degree of effect of the E.S.P. situation upon perceptual performance. Since the E.W.R. is a ratio between two measures, it was also possible to explore the relationship between each of the two measures making up the ratio (the number of emotional words divided by the total number of words) and the perceptual measures. Table 13 presents the rank order correlations which were computed for the entire sample of 45 subjects between the degree of effect of the E.S.P. situation and verbal productivity. The results indicated in Table 13 support the expectation of a positive relationship between verbal productivity and effect of the E.S.P. situation. However, the magnitude of the relationship

Table 13
Relationship Between Verbal Productivity
Measures and Perceptual Performance

	Total Words	Emotional Words	E.W.R.
Hit	.156	.166	.048
False Alarm	.049	.106	.228* (t=1.71)
Accuracy	.215	.281** (t=2.50)	.143

* t .05 (d.f. = 43) = 1.68

** t .01 (d.f. = 43) = 2.42

between emotional words and accuracy, and emotional word ratio and false alarm is not enough to be of any predictive utility.

3. Signal Detection and the Perceptual Tasks

In comparing the perceptual tasks in this investigation to those typically used in signal detection research several crucial differences are readily apparent. These are summarized below.

<u>Signal Detection</u>	<u>Present Study</u>
Feedback of information on correctness (learning ?).	No feedback
Subject has knowledge of probabilities of signal occurrence	No knowledge of probabilities
No biasing instructions	E.S.P. instructions
2000 or more observations per subject	200 observations per subject.

In view of the differences cited above it is to be expected that differences between the "ideal" observer, as specified by signal detection theory, and actual performances of the Self-Other groups would be rather marked. This is particularly the case for the ideal observer which is defined theoretically as a "system" which makes optimum use of the information available in any particular situation, including signal probabilities, feedback information, and pay-off schedules. In order to compare the performances of the Self-Other groups with that specified as "ideal", the signal intensities of the two experimental situations were plotted according to actual and theoretical values of β . This decision value takes into account the pay-off schedule, and the a priori signal and noise probabilities, but not variations in signal strength. Figures 2, 3, and 4 present actual and theoretical values of β , the decision criterion, plotted to show the relationship between the average β values for the Self-Other groups and the Ideal Observer.

Figure 2

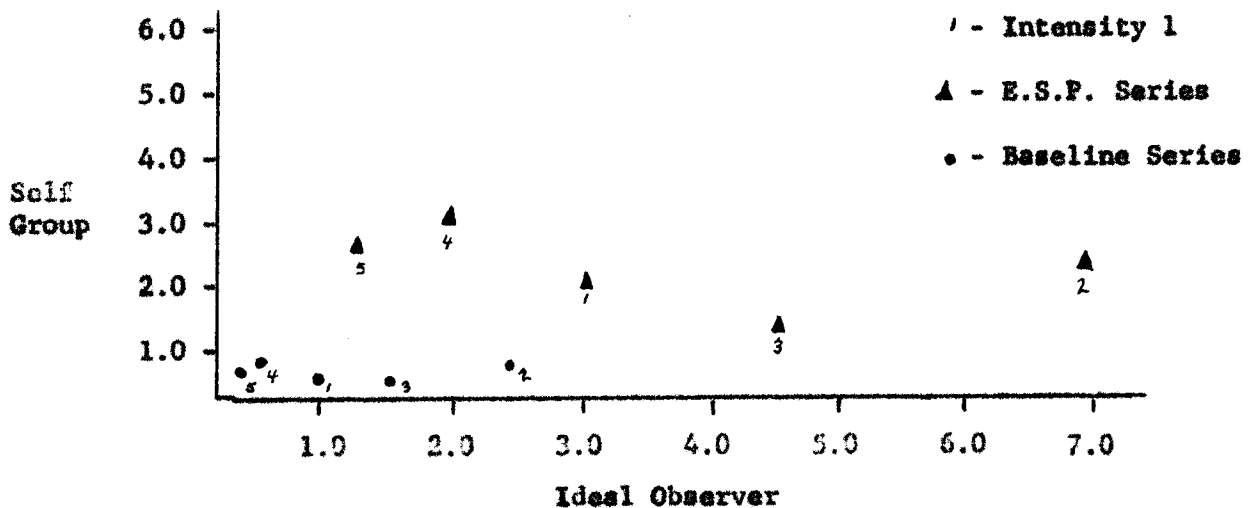
Decision Criteria (β) - Self Group vs. Ideal Observer

Figure 3

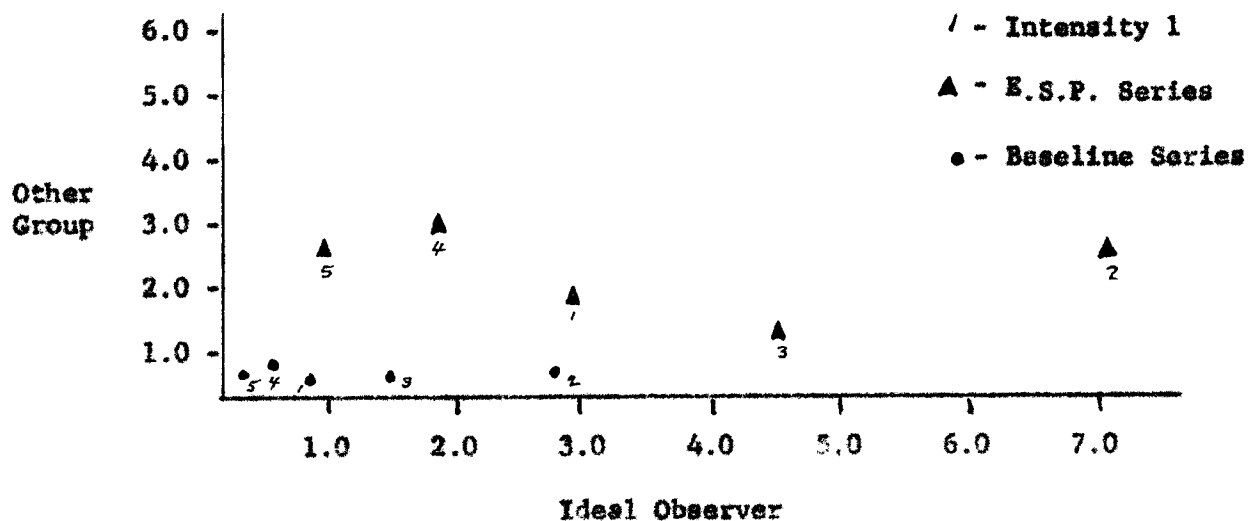
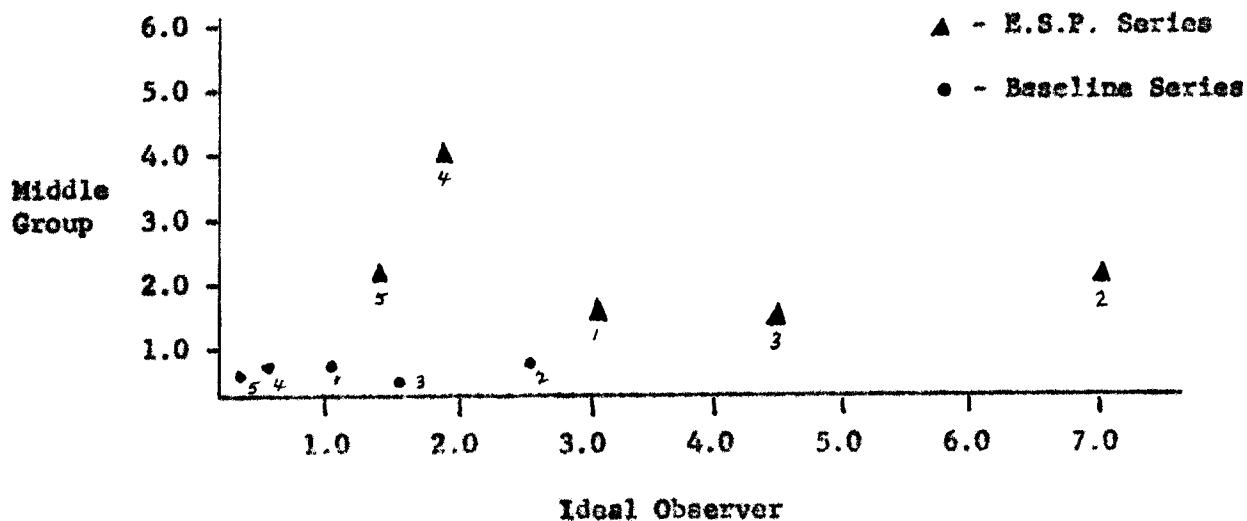
Decision Criteria (β) - Other Group vs. Ideal Observer

Figure 4

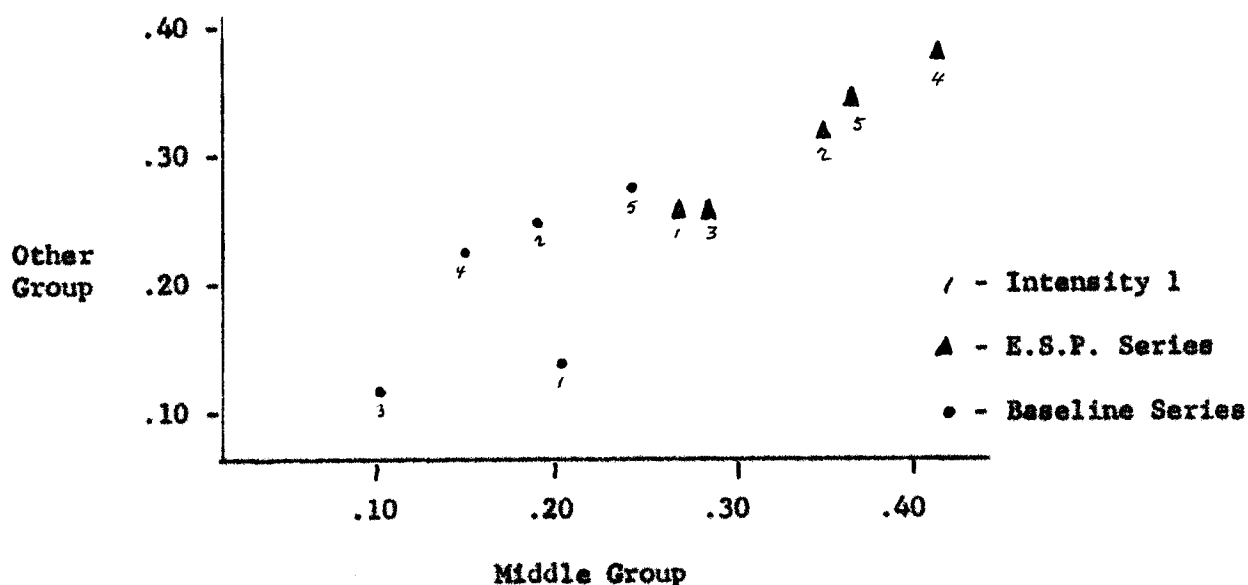
Decision Criteria (β) - Middle Group vs. Ideal Observer

Figures 2, 3, and 4 evidence the expected low relationship between the Self-Other groups and the theoretical decision criteria. While the dispersions in

three figures are quite pronounced, Figure 2 suggests that the relationship between the Self group and the Ideal Observer may be greater than that reflected in Figures 3 and 4. The Self-Other groups were then compared with each other in terms of decision criteria. Figures 5, 6, and 7 present plots of the average false alarm proportions, $P_N(A)$, for the groups. False Alarm proportions instead of values were used as indices of the actual decision criteria consistent with the recommendations of Swets et al. (1961).

Figure 5

Decision Criteria Indices [$P_N(A)$] -
Other Group vs. Middle Group



Figures 5, 6, and 7 indicate definite positive relationships among the three groups in decision criteria placement for the various signal intensities. Figure 7, in particular, shows a rather tight grouping with minimal dispersion, and suggests a greater relationship between the Self group and the Other group

Figure 6
Decision Criteria Indices [$P_N(A)$] -
Self Group vs. Middle Group

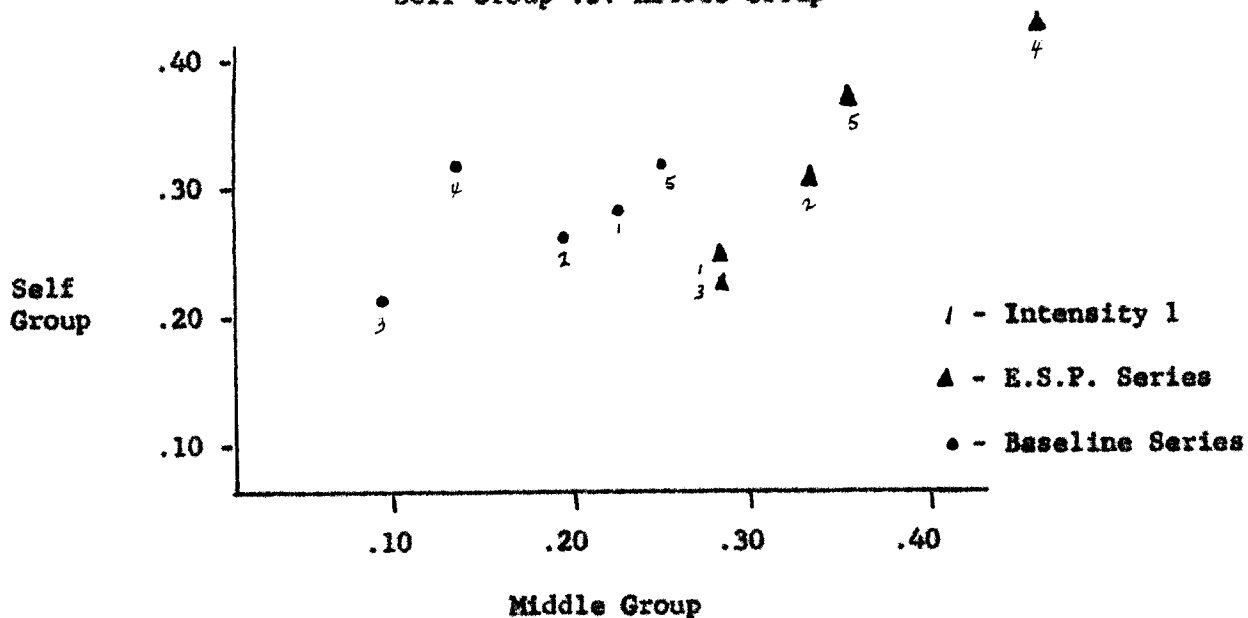
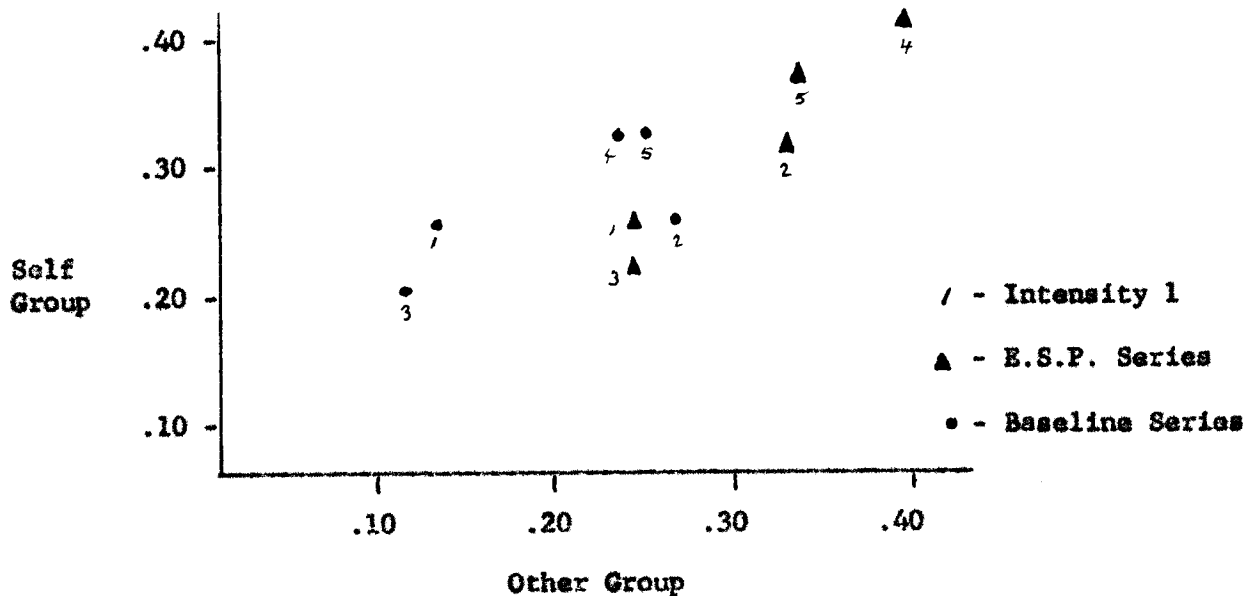


Figure 7
Decision Criteria Indices [$P_N(A)$] -
Self Group vs. Other Group



than would be expected. However, previous results have indicated that it may be the degree of shift in criterion placement in going from the baseline to the E.S.P. series which best differentiates among the Self-Other groups. Inspection of the decision criterion values themselves, presented in Table 15 offers some evidence on this issue. These values are, again, average false alarm proportions. The greater the magnitude of the proportion, the further the cut-off is moved along the decision axis towards the noise distribution, and consequently the more lenient the criterion becomes--increasing the probability that a noise presentation will result in a false alarm response.

Table 15

Average False Alarm Proportions for Self-Other Groups

	Other	Middle	Self	N (Observations)
Baseline	.191	.178	.271	750
E.S.P.	.273	.343	.305	750
Total	.497	.509	.559	1500

The values in Table 15 imply that all the groups shifted their criterion towards a more lenient cut-off in going from the baseline to the E.S.P. series. However, the values in Table 15 also indicate the groups did not retain their relative positions for the baseline, E.S.P., and total series.

It is also of interest to determine if the shifts in criterion indicated in Table 15 represent significant differences between the various proportions. The significance of the differences between the various proportions

was tested using Z values, which are presented in Table 16. The groups are

Table 16

Differences Between False Alarm Proportions for Self-Other
Groups On Baseline, E.S.P., and Total Intensities

	Other vs. Self	Other vs. Middle	Self vs. Middle
Baseline	3.33**	.54	3.88**
E.S.P.	.75	2.33**	1.54
Total	4.00**	1.50	2.50**

** Significant at .01 level

also matched against each other for consistency of performance on the baseline and E.S.P. series. This comparison yielded Z values of 1.42 for the Self vs. Self, 4.00 (significant at .01) for Other vs. Other, and 6.87 (significant at .01) for Middle vs. Middle. This indicates that the Middle and Other groups shifted their criterion significantly from baseline to E.S.P., while the Self group remained relatively stable. Thus shifts in criterion towards a more lenient cut-off by the Middle and Other groups made them more similar to the Self group, which held the most lenient criterion on the baseline series.

It was not possible to compute ideal detectability values for the various signal intensities since this would require a more exact photometric definition of the signal and noise ratio than was possible with the apparatus used. However, it was possible to compute actual detectability measures based

upon the performance of the Self-Other groups utilizing the formula

$$d' = \frac{P_N(A) - P_{SN}(A)}{\sigma}$$

where $P_N(A)$ = False alarm proportion

$P_{SN}(A)$ = Hit proportion

$$\sigma = 1.0$$

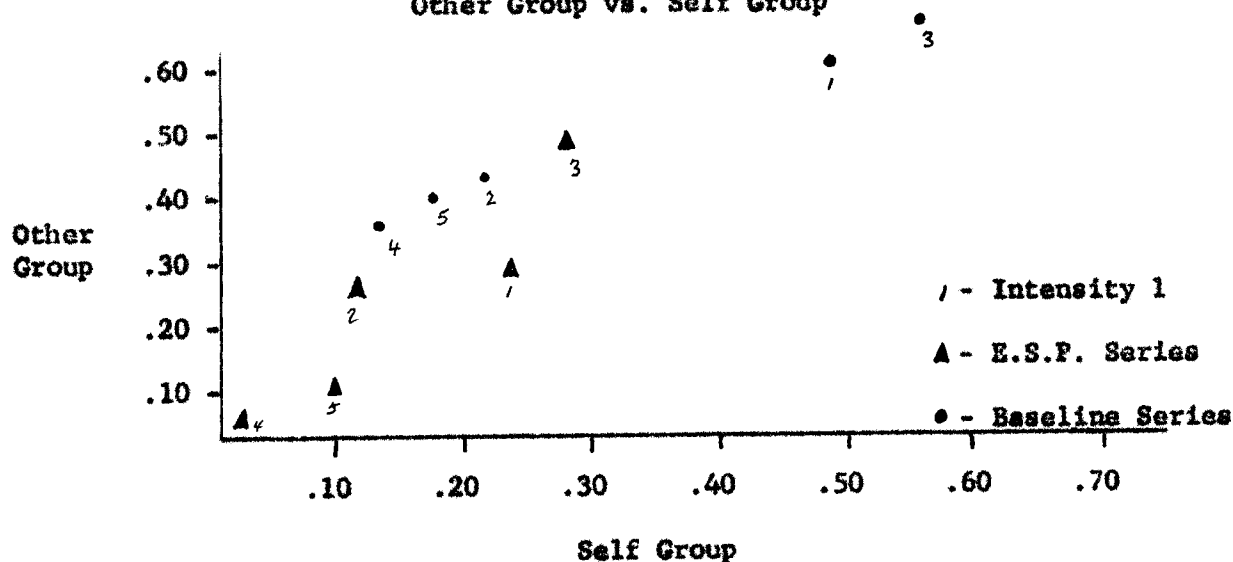
These detectability measures were plotted for the two experimental situations in such a way that the Self-Other groups were compared with each other.

Figures 8, 9, and 10 present the plots of these data.

Figure 8

Detection Measures [$P_N(A) - P_{SN}(A)$] -

Other Group vs. Self Group



The plots of Figures 8, 9, and 10 definitely indicate a positive relationship between the groups on the detectability measure. Certainly this is to be expected if the detectability reflects to any extent the sensory capabilities of the observer. While direct comparisons with the plots reflecting decision criteria are not possible, Figures 8, 9, and 10 appear to reflect a greater

Figure 9

Detection Measures $[P_N(A) - P_{SN}(A)] -$

Other Group vs. Middle Group

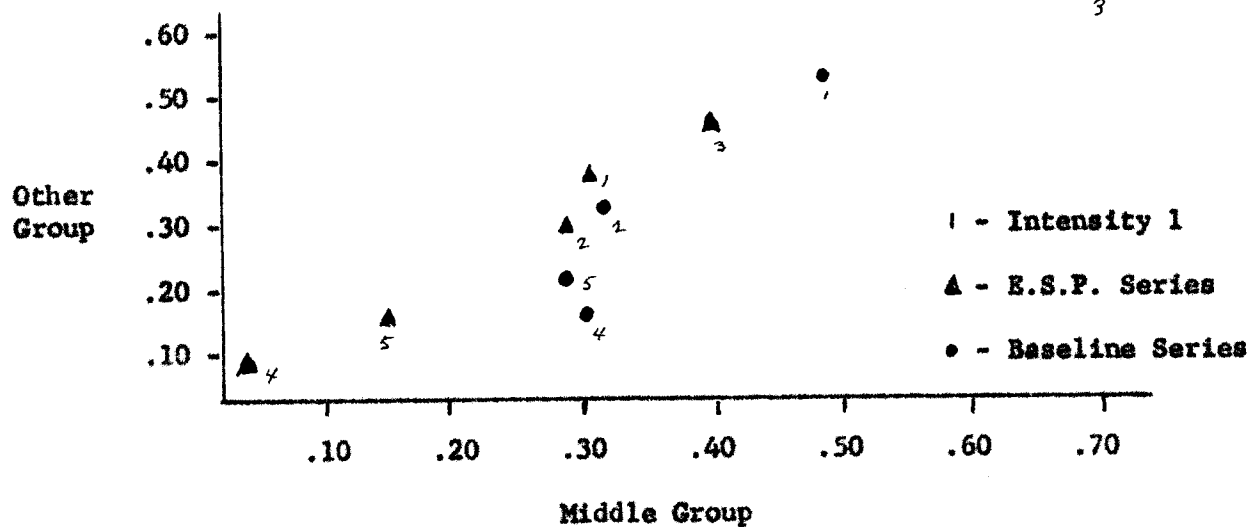
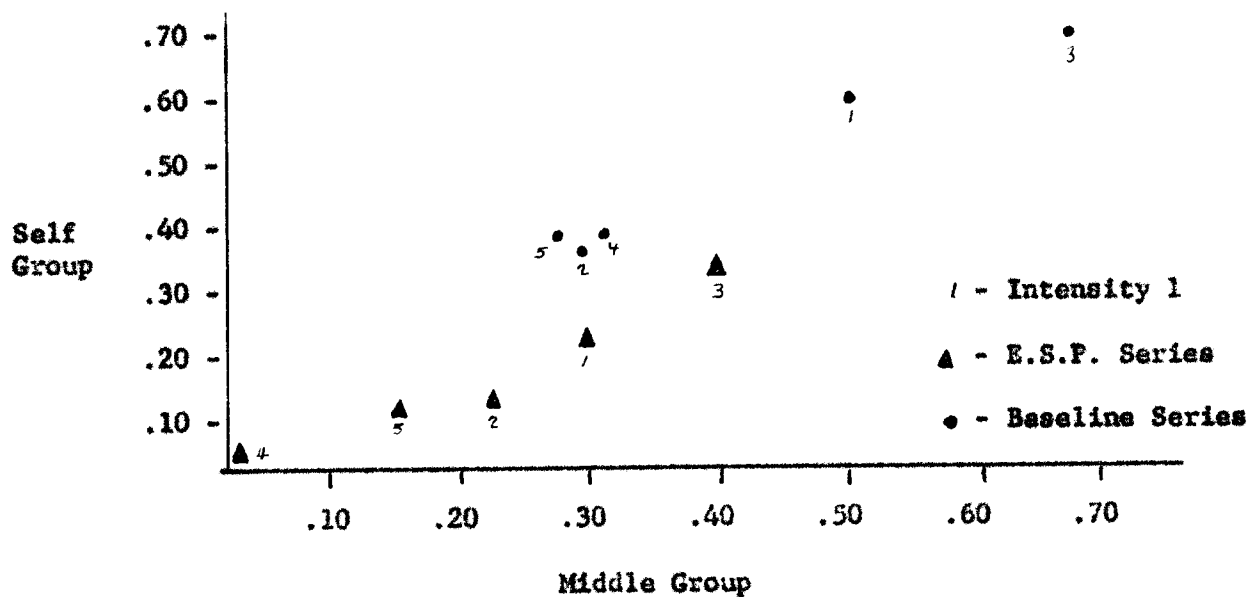


Figure 10

Detection Measures $[P_N(A) - P_{SN}(A)] -$

Self Group vs. Middle Group



relationship between the groups than do Figures 7, 8, and 9.

The perceptual tasks utilized in this study placed rather heavy demands upon the observers since they were given no information regarding the correctness of their guesses, were deliberately misled by E.S.P. instructions, were penalized by false alarms, and had no knowledge of a priori signal occurrences. Under these conditions one would expect that whatever strategy the observer adopted to reduce the uncertainty of the task, his performance on the E.S.P. series would show a decrement in accuracy as a function of a reduced number of hits, and a corresponding increase in misses. The effect of the E.S.P. instructions might be expected to encourage individuals to utilize subjective cues and "hunches," while the false alarm penalty would be expected to act as an inhibitor against saying too many Yeses. Figures 11, 12, and 13 present the performance of the entire sample of 45 subjects on both baseline and E.S.P. series.

The performance curves of Figure 13 present rather dramatically the decrement in accuracy induced by the E.S.P. situation, when probability of response is computed using one of the conventional chance correction formulas. The dip in the curves at intensity 56° is rather difficult to explain since this intensity ranks second in brightness, and has a signal probability of .70. Obviously, however, this intensity presented a more difficult task than the degree of illumination or probability of occurrence would warrant, and since it occurs over both series and all measures, it is highly unlikely that it is a spurious or chance occurrence. Apparently, the angle of rotation of 56° alters the signal noise relationship in such a way as to make it less detectable.

Figure 11

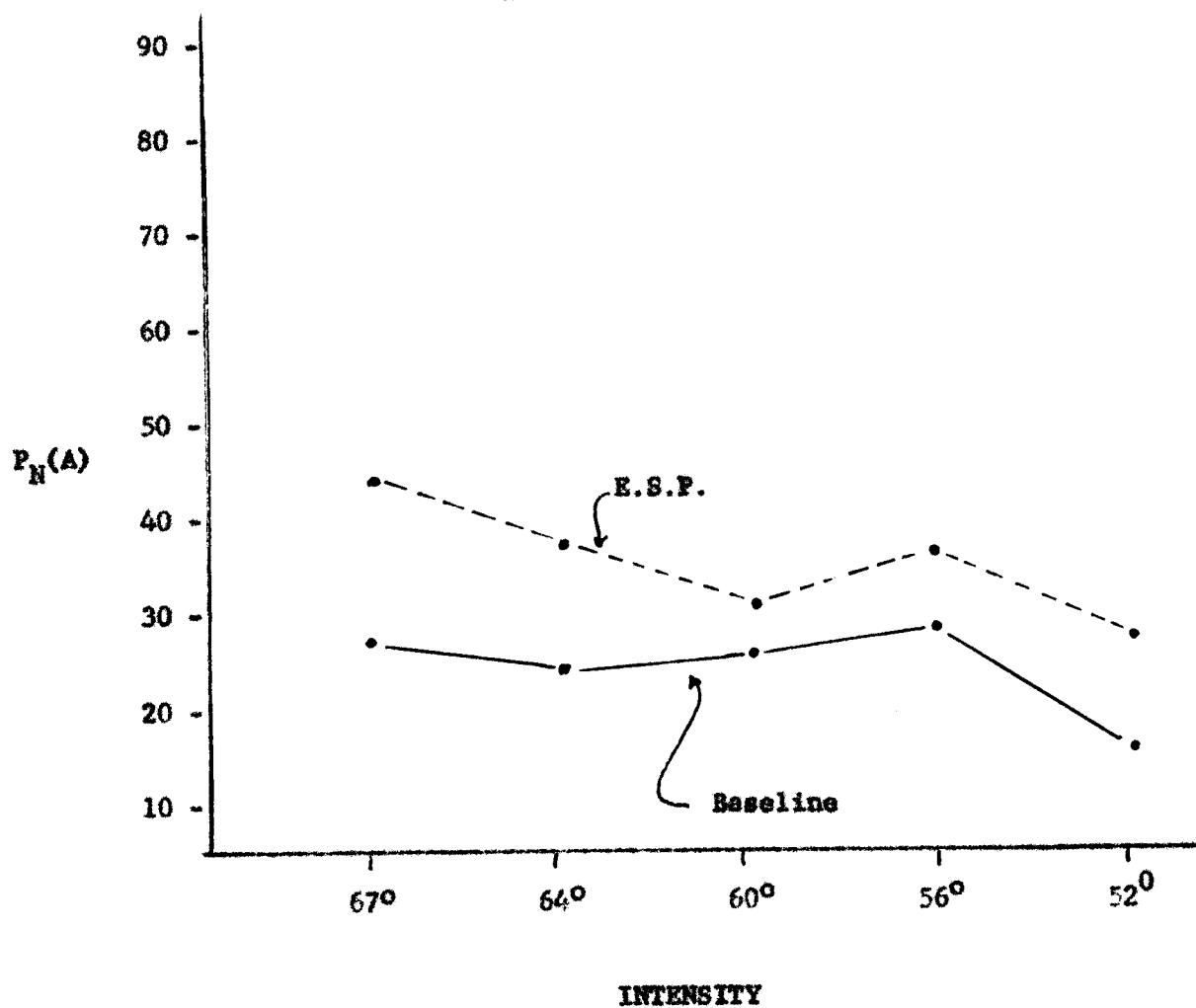
False Alarm Rate [$P_N(A)$] as a Function of Intensity

Figure 12

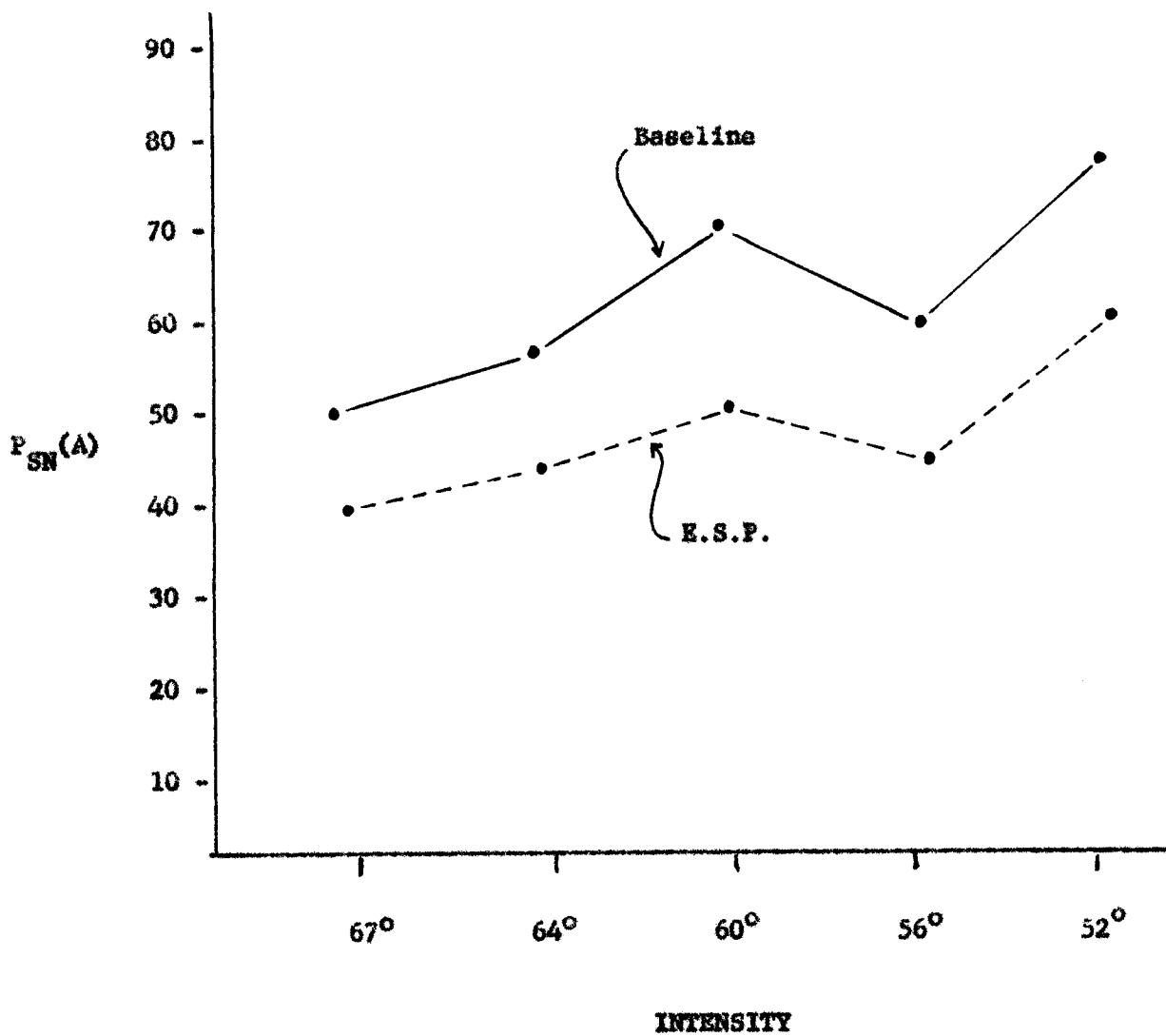
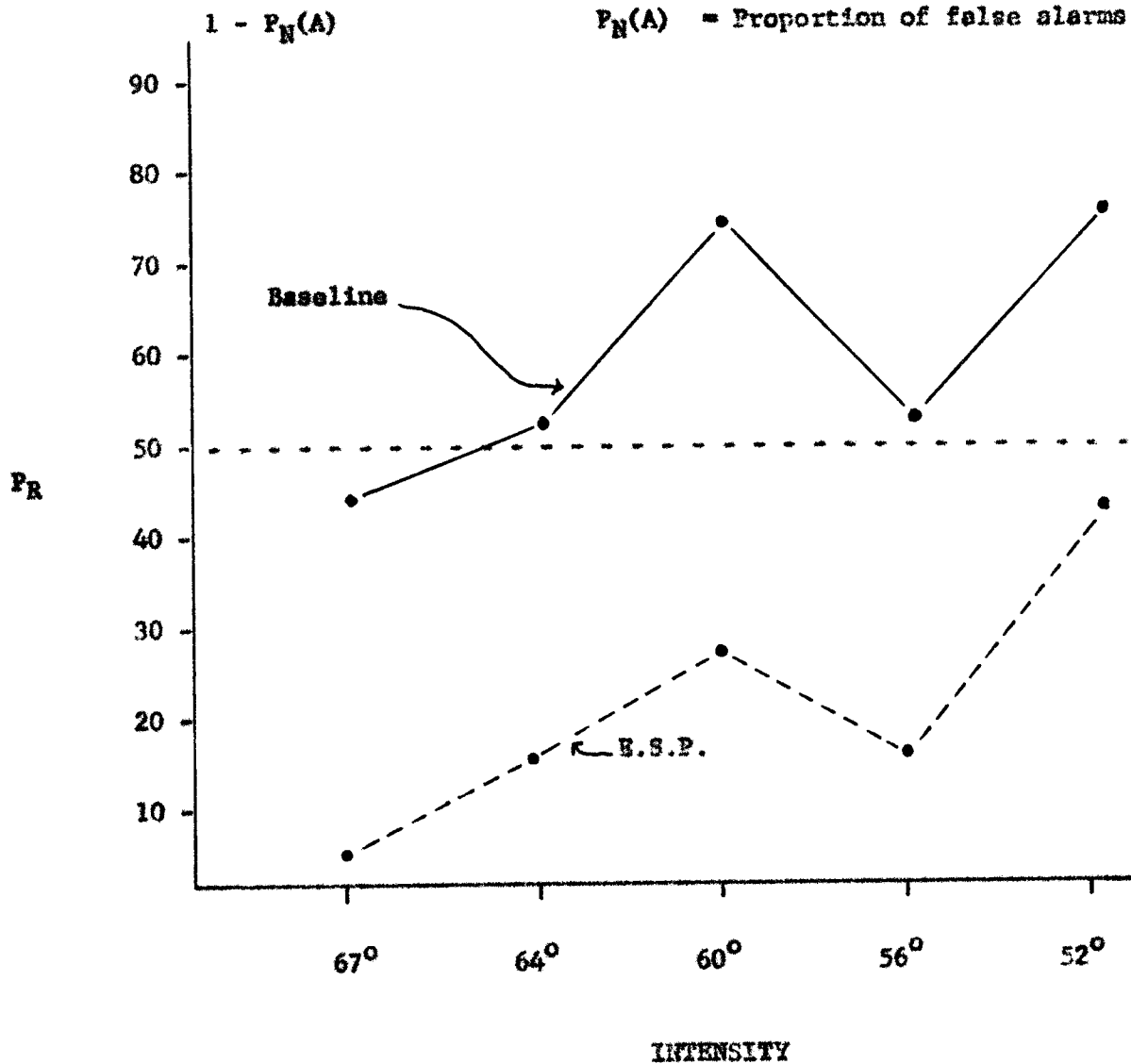
Hit Rate [$P_{SN}(A)$] as a Function of Intensity

Figure 13

Accuracy (P_R) as a Function of Intensity

$$P_R = \frac{P_{SN}(A) - P_N(A)}{1 - P_N(A)}$$

where: $P_{SN}(A)$ = Proportion of hits $P_N(A)$ = Proportion of false alarms

4. Sex Differences and Belief in E.S.P.

Subjects' belief in E.S.P. was measured on a five point scale so that degree of belief could be investigated as a variable influencing the biasing effect of the E.S.P. situation. This was done by computing Kruskal-Wallis one-way analyses of variance of the rankings on the perceptual measures according to the five belief categories. This analysis yielded H values of 1.77 for hits, 1.32 for false alarms, and 3.27 for accuracy, none of which are significant. This would indicate that degree of belief in E.S.P., as measured on the five point scale, did not make a significant difference in the degree of effect which the E.S.P. situation had upon performance as reflected in the three measures.

The sex of subject variable was investigated by comparing males and females in the two perceptual situations, on the three perceptual measures. A two by two Chi-square design was employed which yielded values of .004 for hits, .740 for false alarms, and .003 for accuracy, none of which are significant. Apparently, sex of subject was not a significant variable in determining perceptual performance.

In order to determine to what extent sex of subject may have been a factor in belief in E.S.P., the five point scale was collapsed into a positive and negative dichotomy, throwing out five subjects who were neutral. A two by two Chi-square design was utilized, and yielded a value of 3.74, which fell short of the value required for significance (3.84). It is interesting to note, however, that for the sample of 40, 28 were positive in their belief in E.S.P., and only 12 were negative.

5. Individual Strategies

The E.S.P. situation utilized in this study was designed to maximize uncertainty, and present the observer with a situation in which he would be forced to adopt one of two strategies: (1) playing the game according to "hunches" related to E.S.P. instructions, or (2) playing the game according to information appearing on the screen, related to signal and noise presentation. Follow-up questioning of the subjects indicated that in fact these two strategies were utilized by most of the subjects. Typically, the observer started out utilizing strategy 1, but shifted to strategy 2 as signal strength increased. Table 17 gives the frequencies occurring with the various strategies described by the subjects. Table 17 gives an indication of the variety

Table 17

Frequencies of Strategies Adopted on E.S.P. Task

Strategy	Frequency
1. Not influenced by False Alarm penalty	35
2. Influenced by false alarm penalty	10
3. Guessed opposite of what appeared on screen	6
4. Guessed same as what appeared on screen	37
5. Compared "hunch" with what appeared on screen	2
6. Kept eyes closed part or all of E.S.P. series	9
7. Kept eyes open during E.S.P. series	36

of behaviors allowed by the situation, and indicates that subjects did not always "go along" with what they saw on the screen, even though they might have been aware that signals were being presented. This also suggests that the E.S.P. task may have been more complex in its effect upon the individual than had been anticipated. Formal analysis of the data was done to determine if the false alarm penalty had any effect upon the frequency of the "yes" responses, although the frequencies reported in Table 17 suggest that it did not. The Wilcoxon matched pairs signal ranks test was used to compare shifts in frequency of yes response in going from baseline to E.S.P. series, and yielded a Z value of .593, which is not significant. Next differences in scores were subjected to Kruskal-Wallis one-way analysis of variance to test for differential effect of the false alarm penalty for the Self-Other groups. This analysis yielded an M value of 6.85, which, when referred to a chi-square table of values reaches significance for $X^2 .05 = 5.99$. The Other and Middle groups, which showed the greatest divergence in frequency of yes responses, were then compared using the Mann-Whitney U test. This analysis yielded a U value of 122.85, with $U \leq 72$ required for significance. These results indicate that while the combined differences of yes frequency were significant, the differences between any two groups was not significant.

6. Implications

The implications of the results presented in this chapter are discussed with reference to three general areas: Signal Detection and Self and Other Reliance, The Perceptual Tasks, and The Group Thematic Apperception Test (TAT).

Signal Detection and Self and Other Reliance

The results of the analysis based primarily upon the signal detection model are somewhat disappointing in that they did not consistently reflect differences among the Self-Other groups. Although the E.S.P. situation brought about a general increase in false alarms, and a decrease in hits, both of which were significant for the total group of subjects, these differences did not hold up when the Self-Other groups were compared separately. Swets et al (1961) recommends using the false alarm proportion as an index of the observer's criterion placement. Analyses based upon this measure indicated that while the groups differed significantly from each other (the Self and Other) on the baseline and total series, the E.S.P. situation tended to diminish this difference, with both groups adopting a more lenient cut-off. The Other and Middle groups did, however, reflect a significant degree of shift in criterion placement in going from baseline to E.S.P. series, while the Self group did not. This suggests that the self reliant observer maintains a higher false alarm rate, is less effected by biasing instructions, and consequently is more accurate on the E.S.P. series. The tendency to maintain a higher false alarm rate may be interpreted as the adoption of a more lenient criteria, or a more reckless strategy, but, whatever the interpretation, it appears to be a relatively stable characteristic which holds true for a sample of 200 observations. The other reliant observer maintains a significantly lower false alarm rate, is more effected by biasing instructions, and consequently is less accurate. The lower false alarm rate may be interpreted as a more stringent criterion, or a more cautious strategy which is quite susceptible to influence from external variables--misleading instructions. These findings also imply

that the other reliant observer tends to be more influenced by information from another person, the experimenter, than information arising out of his own sense impressions.

However, these results are somewhat at variance with those reported by Strickland and Rodwan (1963), who investigated criterion measures in the context of a probability matching task. Their findings suggest that the more externally oriented the subject, and the greater his need for approval, the more likely he is to commit false positive errors in predicting occurrence of signal or blank--implying a more lenient criterion. It is difficult to compare the two studies, however, since different decision criterion measures, and different experimental tasks were used. Perhaps the findings of this study add weight to Strickland and Rodwan's conclusions that the determination of a subject's criterion placement is a rather complex affair, which is heavily dependent upon the tasks utilized, and the measures used to infer the criterion. For the task utilized by Strickland and Rodwan the most appropriate measure turned out to be false alarms/total positive responses, while in this study the most appropriate measure seemed to be accuracy, or hits + correct rejections.

The detectability measures specified by signal detection theory seemed to reflect less variability than the criterion indices, and the results suggest a greater degree of similarity among the groups on this measure. This implies that the groups performed most consistently on those aspects of the task which were most directly related to sensory capacities, and that variations in performance may be more appropriately ascribed to decision factors. The fact that the detectability measure seems to show less variability than

the criterion measure lends some support to the signal detection model generally, and to the claim that the model is able to separate decision factors from sensory factors.

The signal detection model has been criticized by Luce (1963) and Atkinson (1963) for emphasizing expected pay-offs in such a way as to set the decision criterion according to experimental conditions, and allowing no possibility for trial-by-trial fluctuations. Both Luce and Atkinson propose a learning process to account for inferred shifts in criterion placement. The results reported in this study suggest that the subjects as a group tended to shift their criteria for each of the ten experimental conditions in the direction of maximizing expected pay-offs as predicted by the detection model. However, since no trial-by-trial analysis was done, it is possible that a learning process might have functioned to produce the correspondance between the ideal and actual criterion values. The variations between the actual and ideal criterion values for the three groups reported in Figures 2, 3, and 4 point up the difficulty which probabilistic decision theories have in predicting performance where motivational variables are important. Certainly the three groups were not expected to conform very closely to any ideal performance measure, since the tasks were selected to highlight individual differences. However, the signal detection model alone does not make differential predictions for motivational variables, and a learning process which predicts trial-by-trial fluctuations, as proposed by Luce (1963), and Atkinson (1963) may be able to make more refined predictions.

The data generally support the major hypothesis of differential reaction to the E.S.P. situation which follows along the lines of Self and Other

Reliance. Self reliant observers were significantly more accurate than other reliant observers, and other reliant observers were significantly less accurate than the middle group. However, Tables 10, 11, and 12 indicate that the decline in accuracy which happened to all three groups was more a function of shift in false alarm rate for the Middle group, and a shift in hit rate for the Other group. The Self group got significantly fewer hits on only two of the five intensities, with the false alarm rate increasing, but not reaching significance on any of the five intensities. Thus, the groups performed differently for different reasons. These findings suggest that the Middle group was more variable, perhaps more heterogenous, than the Self and Other groups, and to the extent that false alarm rate indicates decision criterion, shifted their criterion significantly on three of the five intensities in response to the E.S.P. bias.

The Perceptual Task

The perceptual tasks utilized in this investigation presented rather different conditions for the observer than either signal detection designs, or probabilistic learning tasks. The observer's uncertainty may be considered a function of the signal to noise ratio, the varying probabilities of occurrence of signal and noise, the E.S.P. instructions, and the absence of feedback of correctness. The tasks were designed to maximize uncertainty, and to force the individual to adopt one of two strategies: (1) relying upon the E.S.P. instructions, and (2) ignoring the E.S.P. instructions and paying attention to what was being presented upon the screen. The results indicated that these strategies were used by the subjects, but rarely did a subject utilize only

one of the two possibilities. Subjects typically began the E.S.P. series with strategy 1, but shifted to strategy 2 after a varying interval of time. Since this shift generally resulted in increasing accuracy, the length of time required (or number of trials) for the subject to make this shift was probably related to the Self-Other dimensions.

However, since individual performance curves indicate considerable variance within the groups, it is possible that the E.S.P. bias may be considerably more complex than was originally anticipated. Certainly the strategies of comparing "hunches" with what appeared on the screen, guessing in opposition to what appeared on the screen, and vacillating between the two strategies were unexpected, and cannot be accounted for by any of the experimental variables. It is possible that the experimental variables which added to the uncertainty of the task also served to complicate the understanding of the individual differences. For example, the absence of feedback (reinforcement) would considerably complicate whatever learning process might be operating on a trial-by-trial basis, effecting criterion placement, and the resulting strategy.

Performance relative to the five different signal intensities are presented in Figures 11, 12, and 13. It is interesting to note that the E.S.P. situation produced a sufficient decrement in accuracy to lower the entire curve below the conventional threshold level of 50%. Since this investigation was not concerned with establishing visual limits for the subjects in terms of a "threshold" measure, the varying signal intensities are of little importance in and of themselves. However, certain implications concerning threshold measurement techniques seem warranted.

As indicated in Figure 13, the E.S.P. bias, and the false alarm penalty, which are the only changes made in the visual task for the E.S.P. series, lowered the performance curve quite drastically, but did not change the shape of the curve. This seems to imply a constancy in performance similar to what might be expected if an additional filter were added to the lens of the projector, and each signal intensity was decreased by a constant amount. It is only when the decision criteria are considered that the results become meaningful. It was not the observer's visual acuity which had altered, but the criterion which determined hit rate and false alarm rate which had been shifted. If decision factors are not taken into account, and conventional chance corrections are applied to establish a "threshold" value, one would conclude that E.S.P. instructions and false alarm penalty had significantly influenced perception.

Psychophysical measurement in general rests on the assumption that the observer's decision criterion is a stable parameter, and that his behavior is primarily a function of the detectability of the stimulus. Both Luce (1963) and Atkinson (1963) have questioned this assumption, and Luce further proposes a non-randomly varying sensitivity level. If the observer's criterion is not a stable parameter, but varies with a variety of conditions, and may be in part a function of motivational variables (as this study indicated), psychophysical investigations should be designed so as to yield an index of the observer's criterion stability as a characteristic of a measuring "instrument." It is further recommended that in studies involving psychophysical measurement and motivational variables, where the number of observations per subject is not great enough to yield an unbiased estimate of an observer's criterion

placement, the establishment of a "baseline" provides a satisfactory control for the influence of the motivational variables.

The Group Thematic Apperception Test

Since the TAT measures resulted in significant differences in accuracy between the extreme groups in the predicted direction, the scoring scheme and the personality dimensions involved may provide a useful tool for further research. The measures of Self and Other reliance would appear to have relevance for a variety of situations in which individuals "process" information arising out of their own experience, and from external sources. Liverant and Scodel (1960), and Strickland and Rodwan (1963) exemplify a current interest in the dimension of Internal-External Control: degree to which an individual perceives the events that happen to him as a function of his own control, as opposed to those events being the result of external forces, fate, or chance. The Self-Other reliance dimensions, as defined and measured in this study, would seem to have some relevance for the Internal-External explorations since it utilizes a projective approach to assessment, which may add to the understanding of the dimensions involved. Many of the current studies in the areas of problem solving and decision making have tended to employ paper and pencil measures of attitudes and motivational variables in preference to projective techniques on the ground that projective techniques did not lend themselves to quantification, utilized unreliable scoring schemes, and had little if any predictive utility. The results of this study suggest that the thematic apperception technique using the standard TAT cards is a potentially reliable technique, with some degree of predictive utility, provided that some care is

taken in the construction of the scoring scheme to be used. Also, that group modifications of the TAT, based upon normative data, are potentially useful research tools.

The scoring scheme used in this investigation was based almost exclusively upon normative studies of the TAT such as those of Eron (1950, 1953), and Rosenzweig (1949), and was concerned only with the reliance upon self and reliance upon others dimensions, rather than a global assessment of "personality." These two dimensions were treated as statistically independent, based upon a correlation of $-.028$ for 155 subjects, and orthogonally related, rather than as opposite extremes of a single continuum. The results generally justify this rationale, and suggest this approach as a fruitful one for personality investigations where sufficient normative data is available to construct a scoring scheme for TAT cards.

The scoring scheme and personality dimensions involved in this investigation have two rather definite limitations. Since the technique of measurement is a group technique, and this investigation dealt only with predictions for groups, its applicability for individual assessment and/or prediction is questionable. A glance at the individual performance curves yielded in this investigation indicates a considerable degree of variance in the performance of subjects within the groups. This variance is reflected to some extent in the data reported, and is particularly evident for the Middle group. This implies that the predicting instrument has some shortcomings in that the groups selected are heterogenous, and that the Middle group in particular contains individuals who are quite dissimilar. This variance in performance also implies that the experimental tasks involve factors other than those of self

and other reliance. These two explanations appear equally likely, since the TAT is certainly not a perfectly reliable instrument, and the perceptual tasks are sufficiently complex to allow other factors to effect performance.

CHAPTER V

SUMMARY AND CONCLUSIONS

The main purpose of this investigation was to predict accuracy of performance of groups in a visual perception task from scores derived from a group administered, six card Thematic Apperception Test (TAT), utilized a scoring scheme developed by Lane (1959) for this purpose. In addition, it was possible to investigate the relationship of some of the measures utilized by the signal detection model proposed by Swets et al. (1961) to the personality dimensions of reliance on self, and reliance on others. Verbal productivity, defined by Ullman & McFarland (1957), and measured from the written TAT stories, was related to performance on the perceptual task.

The following hypotheses were formulated according to the main purposes of the study.

1. Self reliant and other reliant observers will differ significantly from each other in the degree to which their perceptual performance is effected by the experimenter's instructions.
2. Self reliant and other reliant observers will not differ significantly on those perceptual measures most directly related to sensory capabilities.
3. Self reliant and other reliant observers will differ significantly on those measures of decision criterion.
4. Emotional words will be positively related to the degree of effect of the experimenter's instructions on perceptual performance.

The personality variables of self and other reliance, as measured by the

group TAT, were proposed as logically related to basic strategies available to observers in signal detection tasks where uncertainty is maximized. Although evidence relevant to language dimensions of the TAT is rather inconclusive, it was also proposed that these dimensions may be related to behavior in uncertain situations.

The literature reviewed supported the general notion that personality factors enter into the placement of decision criteria, and the formation of strategies in chance dominated situations. However, systematic investigation of personality variables possibly involved in signal detection performance had not been attempted.

TAT protocols were obtained from 120 introductory psychology students through group testing procedures carried out in four classes. Three groups of 15 subjects were selected on the basis of their scores to represent a High Other-Low Self (Other group, a Middle group, and a High Self-Low Other (Self) group. These subjects then participated individually in visual perception tasks involving first a baseline series utilizing the method of constant stimuli for presentation of signal or blank, for the five signal intensities with signal duration constant. Biasing instructions concerning extrasensory perception were then given. Finally, an E.S.P. series was presented using the same signal intensities in an ascending order, under the guise of an E.S.P. task. Statistical treatment of the data consisted of nonparametric analyses comparing groups, and stimuli series, and relating emotional words to perceptual performance.

The results indicated that:

1. The self reliant group was significantly more accurate than the

other reliant group on the E.S.P. series, when accuracy was measured as a decrement in hits plus decrement in correct rejections, with the baseline as the standard.

- a. The other group was significantly less accurate than the middle group, in terms of deviation from the baseline.
 - b. The decision criteria adopted by the self group appeared closest to that specified by the signal detection model as "ideal" for the combined tasks.
 - c. Neither the hit nor the false alarm measures separately showed consistent significant differences between the Other, Middle, and Self groups.
2. Number of emotional words was significantly related to perceptual accuracy.
- a. The emotional word ratio was significantly related to frequency of false alarm.
 - b. Neither coefficient was of sufficient magnitude to have any predictive utility.
3. Agreement among the groups appeared higher on the detectability measures than on the decision criterion measures.
4. Neither sex of subject, nor degree of belief in E.S.P. were significant variables in the effect of the E.S.P. instructions on performance.
5. The penalty imposed upon false alarms during the E.S.P. series did not significantly reduce the frequency of "yes" responses for the total of 45 subjects, but there was evidence of a significant

differential effect on the three groups.

Conclusions

Since the predictions specified were upheld for the accuracy measure, the scoring scheme and the personality dimensions involved are considered to have some degree of predictive utility for binary decision making tasks similar to those used in this investigation. However, its use should logically be restricted to group testing.

The evidence seems rather inconclusive that personality variables directly determine, or significantly influence an observer's criterion placement. Apparently, criterion placement is at best a rather complex variable, and there exists some confusion as to the appropriate measures from which to infer an observer's criterion. If accuracy is an appropriate measure, then the results clearly point to the influence of the personality dimensions of self and other reliance as determining factors in the selection of a decision criterion.

Implications were pointed out relevant to threshold measurement practices, and, consistent with the signal detection model, that where binary decisions are used to infer threshold values, the conventional "chance" corrections will not overcome variance due to shifts in an observer's decision criterion. It is also evident that if binary decisions are used, the experimenter is using a measure which has been repeatedly shown to be particularly susceptible to extraneous variance from a variety of sources, some of which include motivational variables.

Finally, the methods of TAT manual construction, and perceptual

investigation proved to be quite satisfactory. The weighting of scores according to frequency of occurrence reported in normative studies provided an adequate basis for predictions. The use of a baseline series in the perceptual task proved to be a desirable feature, and enabled any shifts in performance to be readily detectable.

APPENDIX A

EMOTIONAL WORD RATING SCALE

General Definition:

Words with a specific "punch" to them, which convey tension, action, or feeling, or which breath life into communication.

Specific Definition:

Nouns which deal with interpersonal relationships of a tensional nature such as COMPETITION, HOPE, APPROVAL, TROUBLE, STRENGTH, SANITY, ARGUMENT, DECISION, and PROBLEM.

Verbs which deal with human tensions or motivations such as STRIVE, PLEAD, RANG, RESTORE, TRY, WONDER, LOVE, LOSE, REGRET, ENDURE, MUST WANT, STARE, FRUSTRATE.

Modifiers: either single words or groups of words counted as one emotional word, which tell of the human condition beyond the overtly descriptive. Such words as EXTRA KICK, REACHED THE END, CHEER UP, WRONG, BEWILDERED, DAZE, STRAINED, WILFUL, RASH, IMPULSIVE, COOL, GOING TOO FAR, TENSE, DEPRESSED, and DECISIVE are emotional words. Words which are descriptive of the stimuli (the cards) such as . . . YOUNG, OLD, MALE, FEMALE, MOTHER, and SON are not emotional words.

Words which are not in any of the above categories, but which communicate emotion:

Exclamations: such as HECK WITH HER, THIS IS HARD, or LIKE ME FIXING TO LEAVE HOME are examples, and will be considered an emotional word.

Unusual or Unexpected combinations of words which are expressive and are

not due to the subject's inattention to the stimuli, such as HOLY PROTECTOR, SIDE OF SYMPATHY, and BUT IT HASN'T BEEN DONE are examples, and are counted as one emotional word.

Examples:

1. He seems like he's AFRAID of sliding down the rope. He doesn't seem HAPPY about it.
2. Well this picture seems, this first seems UPSET and she seems to be trying to talk to him, and he seems very ANGRY about the situation. I see another woman in the background. I don't know if they QUAR-RELLED OR not. He looks like he's KIND OF IN A DAZE. He DOESN'T WANT to talk about it, whatever it is.

APPENDIX B

GROUP ADMINISTRATION PROCEDURE

Directions to Subjects

This is an experiment to find out more about this test, rather than to find out anything about you. Your papers will remain anonymous, and the only information which we want about you personally is your sex and age. In this case we are interested in how you do as a group--not individually.

Pictures will be flashed upon the screen, and you are to tell what happened before, what is happening in the picture, what the characters seem to be thinking and feeling, and how it all turns out. You will write your stories on the paper provided for you in the test booklet. Please begin each story on a different sheet of paper. Number the stories consecutively. (These instructions are mimeographed and stapled in the test booklets so that the subjects can refer back to them if necessary). Are there any questions? (In answer to any questions repeat those parts of the general instructions applicable.)

Test Materials

A booklet will be provided for each subject. This booklet will contain 10 lined pages, and a copy of the instructions.

Card Presentation

The six TAT cards used to make up the test are 1, 2, 4, 6BM, 7BM, and 10 BM. 35mm slides of these cards will be used for the testing procedure. Testing will be carried out in the class room following the general procedure

outlined by Henry (1956), Bron & Ritter (1951), and Sarason & Sarason (1958). The slide will be projected on the screen for a total of five minutes. Subjects will be warned after four minutes have elapsed that they have one minute to complete their stories. The room will be darkened enough to allow projection of the slides, but with enough light remaining so that the subjects can see to write their stories.

APPENDIX C

DESCRIPTION OF STANDARDIZATION SAMPLE

Subjects making up this sample were male and female introductory psychology students, who were tested in groups of 5, 15, 20, 30, and 40 to investigate size of group as a variable. The mean age for males was 21, and for females was 19. All were either sophomore or juniors.

No significant differences were found attributable to group size, and differences between the self-other dimensions for males and females, while significant for selected TAT cards, were not significant for the test as a whole. Similarly, differences between males and females on the emotional word ratio dimension were not significant. The following data pertinent to the three dimensions are based upon the sample of 150 students (98 males; 52 females) described above.

	<u>Mean</u>	<u>Sigma</u>
Reliance on Self (Male)	2.748	.663
Reliance on Self (Female)	2.819	.674
Reliance on Others (Male)	2.401	.344
Reliance on Others (Female)	2.416	.397
Reliance on Self (Total)	2.783	.668
Reliance on Others (Total)	2.408	.370
Emotional Word ratio (Male)	5.29	1.79
Emotional Word ratio (Female)	5.44	1.30
Emotional Word ratio (Total)	5.34	1.54

APPENDIX D

EXTRASENSORY PERCEPTION INFORMATION

The phenomena of extrasensory perception has been studied quite extensively by Dr. Rhine at Duke University. His research demonstrates that some individuals are able to make guesses about events which are significantly more accurate than chance, even though these individuals do not have access to information through the customary sense modalities. That is, they are able to receive information, and consequently their judgments are significantly more accurate than if they were forced to rely upon their physical senses alone. In order for this to function, however, the subject typically must concentrate, and the examiner also must think of the information to be communicated to the subject. In other words, the examiner acts as a transmitter, and the subject as a receiver.

APPENDIX E

SCORING MANUAL RATIONAL

I General Scoring Principles

This manual is to be used for scoring responses to six cards selected from the regular TAT battery--1, 2, 4, 6BM, 7BM, 18BM. The primary purpose for which these cards have been selected, and consequently the aim of the scoring manual, is to access or measure Reliance upon Self and Reliance upon Others as these two dimensions are reflected in the stories given to the six cards. The manual has been constructed so as to facilitate the separate scoring of theme and outcome. In the scoring of these two parts of the story, the scorer refers to the appropriate heading--Self Reliant Themes, or Other Reliant Themes, for that particular card and selects that scoring category which most closely approximates the story which he is scoring. The same procedure is to be followed in scoring the outcomes. For cards 2 and 4 separate scoring principles have been derived for males and females. On the other cards, however, males and females are scored on the same set of principles. The weighted scores assigned to the various themes and outcomes were derived as follows. A five point scale was agreed upon for use, and given the following definitions. That is, a response is assigned a score of from 1 to 5 on the basis of the following criteria.

a) Frequency of Occurrence--the percentage of occurrence for various types of themes and outcomes has been reported by Eron (1950, 1953), and Rosenzweig (1949). A response having a high frequency of occurrence would appear to have less significance in that it tells less about the individual.

Occurrence of such a response would seem to signify that the individual is behaving much the same as others to the same card. Consequently, such a response tells more about the card than about the individual. Conversely, responses having a relatively low frequency of occurrence would have more significance--reflecting a greater degree of individuality or uniqueness in dealing with the card. The following figures represent the percentage intervals and the corresponding weighted scores.

Table 18

TAT Scores According to Frequency of Occurrence

Percent Occurrence	Score	Number Of Items
0 - 9	5	15
10 - 15	4	27
16 - 25	3	24
26 - 35	2	20
36 -	1	19

b) Degree of Other or Self Reliance--This was determined through the agreement of judges as to ranking of the responses along the two continua. Care was taken so that the scores meant the same on all of the six cards used. That is, a response classified as self reliant, and given a score of 3 on card 1 will reflect, as much as possible, the same degree of self reliance as all other responses receiving similar scores on other cards. However, in remaining consistent with the above principles, it was necessary to change

certain scores for certain cards in order to more closely approximate the weighting suggested by the frequency of occurrence.

c) Specific Scoring--The specific scoring steps may be exemplified in the same scoring sheet reproduced below.

Card	<u>Theme</u>		<u>Outcome</u>	
	Self	Other	Self	Other
1		1		3
2	Not Appropriate		3	
4		3	3	
6BM		3		4
7BM		2		4
18BM	_____	<u>2</u>	_____	<u>3</u>
	0	11/5	6/2	14/4
MEAN OTHER SCORE = $25/9 = 2.8$			Mean self theme = 0	
MEAN SELF SCORE = $6/2 = 3.0$			Mean self outcome = 3.0	
			Mean other theme = 2.2	
			Mean other outcome = 3.5	

As indicated in the scoring blank, one derives six different scores from the protocol. These are all mean scores, summed first according to theme and outcome, and then for the two personality dimensions. The decision was made to utilize only the final self and other scores, since this seems to most fully characterize the subject's overall performance. It is recognized, however, that in so doing one is masking certain variations in performance which are reflected in the component theme and outcome scores.

Sample Protocol

MALE

Card 1

The boy has been wrested away from his play by a parent who desires him to play the violin. The boy not happy about the situation and is contemplating what he should do to get out of the practice session. He knows that if he does not practice the consequences will not be pleasant for he has no desire to play the violin. He is angry and hurt at being denied his play time, and considers smashing the violin as an effective means of eliminating it from his life. He decides against it and practices, although reluctantly.

THEME: Other R. 1OUTCOME: Other R. 3Card 2

Well, this picture is symbolic-symbolic of growing urban life in the nation. This girl's parents are not educated--she has gone to school. And later on she will become a school teacher.

THEME: Not AppropriateOUTCOME: Self R. 3Card 4

This guy is a service station attendant and isn't married, and this girl is his girl friend who is a waitress. They have been going with each other. She is a very jealous type. He doesn't like this because he likes to run around with other women. They have just had a big argument about it. He is about to leave her, and she is trying to coax him to stay. He will probably leave her anyway because he is tired of her being so possessive.

THEME: Other R. 3OUTCOME: Self R. 3Card 6BM

The young man has just been expelled from college following a wild drinking party in which a coed claims that she was raped by the men present. The young man does not remember whether or not he was a party to the crime, but he was very drunk. He has just told his grandmother the story, and she is hurt and shocked to think he would be involved in such a thing. The man feels very guilty first about being drunk, and second telling his grandmother or hurting her, for she has been very good to him. In the proceeds of the trial he is found guilty of rape and is sentenced to die, at which the grandmother commits suicide.

THEME: Other R. 3OUTCOME: Other R. 4Card 7BM

This looks like a father and his son sitting close together. The father has just advised his son on whether he should get married or not, and his son is really torn between what he would like to do, and what sounds reasonable as stated by his father. He'll probably wait like his father wants him to until he gets a good job.

THEME: Other R. 2OUTCOME: Other R. 4Card 18BM

This guy is obviously being helped in some manner. He's drunk. Someone's helping him on with his coat, and to stand up. He's got a pained expression on his face. He got drunk for a reason--because he had an argument with his wife. He feels he has to go home and face the music. He doesn't want to. He will go home and they will argue.

THEME: Other R. 2OUTCOME: Other R. 3

Mean Other Score = 25/9 = 2.80

Mean Self Score = 6/2 = 3.00

The difference scores which will be used to differentiate the experimental groups combine the above scores in the following manner.

$$d_1 = (\text{self}) 6 \text{ minus } (\text{other}) 26 = -19$$

$$d_2 = (\text{self}) 2 \text{ minus } (\text{other}) 6 = -4$$

$$d_1 = 2 \quad = -23$$

Thus, in this example, the difference is negative 23, which indicates the dominance of other reliance. Had the score been positive, the self reliance dimension would have been dominant. The numerical value indicates the magnitude of the difference, while the valence indicates the directionality of the

difference. The difference score also combines the two aspects of the subjects performance expressed in the mean score--the weighted score assigned to the stories, and the number of stories classed as other reliant or self reliant. By combining these two aspects the differences are maximized, and one takes into account not only the cumulation of weighted scores, but also how this score was achieved. In the example the mean self score of 3.00 was achieved with only two stories of a possible 12, while the self score of 2.80 was achieved with 9 stories.

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APPROVAL SHEET

The dissertation submitted by Charles Lane has been read and approved by five members of the Department of Psychology.

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

The dissertation is therefore accepted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy.

January 14, 1964
Date

Frank Kobler
Signature of Adviser