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AN ANALYSIS OF PSYCHOLOGICAL FACTORS IN SUBLIMINALY PERCEIVED STIMULI: AN INVESTIGATION OF THE INTERACTION OF SUSCEPTIBILITY TO STRESS AND DEFENSES OF STRESS IN A PERCEPTUAL DEFENSE PARADIGM.

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AN INVESTIGATION OF THE INTERACTION OF SUSCEPTIBILITY TO STRESS
AND DEGREES OF STRESS IN A PERCEPTUAL DEFENSE PARADIGM

A Dissertation
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy
in
The Department of Psychology

by
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ABSTRACT

It was hypothesized in the present experiment that there is an interaction of susceptibility to stress and the amount of stress in a perceptual defense paradigm. It was further hypothesized that GSR would reflect the interaction of susceptibility to stress and amount of stress by providing a physiological measure of autonomic activity prior to and after recognition threshold determination.

Subjects were identified according to readiness to respond to sexual and aggressive pictures as being either high or low in susceptibility to stress (Introverts and Extroverts, respectively). Test stimuli were four personally-relevant emotion-arousing words selected by objective criteria applied to a word association test and four neutral words (matched in familiarity and frequency of usage). These visual stimuli were presented tachistoscopically to four experimental groups of (1) Introverts-low stress conditions; (2) Introverts-high stress conditions; (3) Extroverts-low stress condition; (4) Extroverts-high stress condition. Recognition thresholds for the words presented were determined by a modified method of limits while GSR measures were obtained simultaneously.

The findings are as follows:

1. The interaction effect of Susceptibility to Stress and degree of stress on recognition thresholds was significant.
2. The interaction effect of susceptibility to stress and degree of stress on GSR reactivity was nonsignificant for both whole word response and to subcoption response, although there were numerical trends indicative of such an interaction.

3. GSR reactivity to critical words was significantly greater than to neutral words for both total word responding and subcoption responding.

4. GSR reactivity to vigilance recognition conditions was numerically greater than to defense recognition conditions although not significantly.

5. No sex or experimenter differences were found in the recognition threshold determination.

The results were discussed in terms of Inglis' interaction hypothesis and physiological implications in perception. It was concluded that both elevated and lowered threshold are part of the same functional relationship which depends upon the interaction of the individual's susceptibility to stress and degree of objective stress. It was further concluded that GSR reactivity can be regarded as an indication of subjective affective response to stimuli and is dependent upon personality differences in handling anxiety-provoking stimuli in combination with objective stress involved in the experimental situation. GSR reactivity is an indicator of the anxiety-reducing function of the avoidance activities of the subject and does not necessarily reveal a separate discriminatory process. In light of these conclusions, there is some support for the contention that emotion facilitates perception.
CHAPTER I

INTRODUCTION

Perceptual theory, one of the most important and central concepts in psychology, has a long and varied history. The fundamental problem for classical perceptual psychology was to account for the orderly arrangement of objects in space and time in the world of the perceiver. In early stages of perceptual theories, the role of experience was to provide meaning to sensations. Experimentation, at that stage, was designed to exclude variables which contaminated "pure" measurements of sensations and perceptions. Perceptual theory has evolved to the point where, today, virtually every other mental process is being investigated in terms of its possible role in influencing perception.

An Overview of Perception to Contemporary Work

In prescientific psychology, Thomas Reid (1710-1796) first formulated the distinction between sensation and perception. He referred sensations to the activities of the sense organs as these are experienced in consciousness. Perception he held to be dependent on sensation but different from the former in that the perceiver is aware of the objects or events in his environment and not merely sense impressions. He attributed perception to an "instinctive tendency" in
the human constitution. While this explanation for perceptual meaning was inadequate, he set the stage for further inquiry into the problem along two major lines: nativism and empiricism.

The nativists (Kant, Johannes Müller, Hering, and Stumpf) postulated innate ideas or hereditary predispositions as the explanations of the perceptual processes, while the empiricists (Berkeley, Lotze, Helmholtz, and Wundt), in general, subscribed to associationism as the key to perceptual meaning. These early stages in perception were narrowly conceived, in that most experimenters undertook the task of explaining the mechanism of space perception.

Since Reid, the field has undergone both intensive and extensive development, but the central theme has remained unchanged—to account for the meaning of human experiences. With the development of the academic schools, the field of perception broadened to include the study of cognitive factors such as sets, habits and attitudes.

Perception held a central place in the various schools of psychology, being embraced as a crucial problem by the school of Structuralism. The main proponent of this school, Titchener, held the view that memory of past experience gave meaning to present experience.

Carr, representing Functionalism, held that attention and selectivity as attributes of perception are crucial in adaptation to the environment. He included "organismic" variables, such as purposes or goal sets, as possible perceptual determinants. This theory initiated the trend which has become the central theme in contemporary perceptual
Watson and the Behaviorists ignored perception. The Gestalt School, however, exerted a greater influence on the evolution of modern perceptual psychology than any other group. Gestalt theorists (Koffka, Kohler) held that our perceptual experiences arise as Gestalten or molar configurations which are not mere aggregations of sensations, but organized and meaningful wholes. Their psychology is functionalistic in spirit for the laws of Gestalten make for stability and constancy in an ever-changing world. Their contributions shook the foundations of traditional psychology and is now widely recognized as fundamental. Gestaltists challenged the inadequacy of elementarism and molecularism as broad methodological points of view.

The place of perception points out basic differences between Freidians (Freud, Rank, Jones, etc.) and Neo-Freidians (Adler, Horney, Sullivan, Fromm, etc.). Freud minimized perception, the Neo-Freudians made self-perception and interpersonal percepts of central importance in theory development and behavioral dynamics.

The field of perception began, then, with concern for simple problems of perception, for example, space perception, and has since broadened to include the study of sets, habits, and attitudes within the academic schools. This was only a hint of the great expansion of perceptual psychology that was to occur in the contemporary period.

Contemporary Trends

Contemporary psychologists (Helson, Hobb, Ames, Brunswik,
etc.,) are attempting to formulate comprehensive theories of human behavior which take perceptual processes as their point of departure. In the recent past, miniature systems have become major systems. Old psychophysical experiments are enjoying a rebirth in the form of S-O-R experiments where emphasis is on how the subject's response is influenced by organismic factors instead of stimulus factors. Traditional problems of analysis and synthesis are undergoing re-formulation. Analysis is being carried farther and farther away from the sense organs and sensation to higher centers and more complex mental processes. As a result, perception is no longer conceptualized in terms of a conglomeration of sensory impressions whose meaning is derived either from their linkage with past experience or from the organization of stimuli. Instead, perceptual experience is determined by a complex synthesis of needs, values, attitudes, and personality variables. Thus, if perception is to be understood, the contributions of these inner determinants must be analyzed and assessed.

The contemporary view is that the traditional and Gestalt approaches put the cart before the horse. It is not so much that meaning comes from experience but that meaning is brought to experience. Attitudes, needs, values and sets color our perceptions right from the start. Recent research goes so far as to suggest the possibility of "subliminal perception" where unconscious determinants prevent perception.

Emergence of Organismic Determinants in Perceptual Theory

Motives, needs, sets and emotional states, etc., which classical psychophysicists sought to eliminate from their experiments have become
experimental variables in a large segment of contemporary research. The directive state theory (Bruner and Postman) began in the 1930's and after World War II was dubbed "the new look" in psychology. Proponents of this theory postulate that the direction of perceptual experience is influenced by organic factors of sets, attitudes, values, needs and similar intervening variables.

Much research has been conducted along several lines. Perceptual determinants of motives, needs, and sets have been manipulated by such experimenters as Sanford (1936, 1937), Sipola (1935), and Schafer and Murphy (1943). Emotional states and moods have been studied by Leuba and Lucas (1945). Attitudes and values have been investigated by Bruner and Goodman (1947), Postman, Bruner, and McGinnes (1948), as have personality traits (Witkin et al., 1954).

Perhaps the most challenging and controversial areas in the entire literature of perceptual research are emotional states as perceptual determinants. Recent research suggests the possibility of subthreshold perception—perception below conscious level but nonetheless sufficiently complete to result in emotional reactions, in delayed recognition, and frequently misperception of stimuli.

Perceptual Defense

Most of the research on subthreshold perception is in areas of perceptual defense. Early perceptual defense experiments presented "taboo" and "neutral" stimuli tachistoscopically with increasing clarity until an accurate response occurred, i.e., an ascending method
of limits threshold was determined. Higher thresholds found for taboo stimuli were equated with perceptual defense.

The literature on this problem goes back to a study by Bruner and Postman (1947). Because this study accounts for a more complete demonstration of the concept of perceptual defense, this study will be considered in some detail. These experimenters used the notion of "perceptual defense" and its converse, "perceptual sensitization" or "vigilance", to explain results which they had obtained in an experiment designed to examine the connection between associative reaction times and recognition thresholds. In this study individual association times were measured to ninety-nine words, some "neutral" in connotation (e.g., clock, book, etc.) and some "emotional" (e.g., penis, hygiene, etc.). Six words giving the longest, the six giving the median and the six words giving the shortest reaction time were selected for each subject. Two weeks later the tachistoscopic time necessary for each subject's recognition of chosen words was examined. A significant curvilinear relationship was shown to exist between the two measures of reaction time and recognition thresholds. The investigators suggested that the inverted U-shaped distribution found is because, with the increase in emotionality of the stimulus, most subjects avoided recognition as long as possible, as an anxiety-reducing technique, this constituting perceptual defense. Other subjects, however, tended to recognize more quickly words to which they had initially returned long reaction times; they, in fact, showed perceptual vigilance and sensitization.
It should be noted at this point that Bruner and Postman considered both vigilance and defense as possible responses to threatening stimuli and brought out individual differences in responding. Later experimenters, however, seized upon the perceptual defense aspect of the phenomenon but soon forgot about the vigilance aspect. A long series of demonstrations and rebuttals of the perceptual defense phenomenon began with an experiment by McGinnes.

McGinnes (1949) presented subjects with seven emotional and eleven neutral words and established tachistoscopic recognition thresholds simultaneously with subjects' galvanic skin responses (GSRs). Subjects reacted with GSRs of significantly greater magnitude during pre-recognition presentation of emotional words than they did during pre-recognition presentation of neutral words. In addition, they required longer exposures for accurate recognition and report of emotional words. McGinnes concluded that: "The findings are interpreted as representing conditioned avoidance of verbal symbols having unpleasant meanings to the observer. The stimulus word serves as a cue to deeply embedded anxiety which is revealed in autonomic activity as measured by GSR. Avoidance of further anxiety is con-temporaneously aroused in the form of perceptual defense against recognition of the stimulus object." (McGinnes, 1949, p. 251).

Although the perceptual defense phenomenon began as a concept which encompassed both vigilance and defense, a narrowing of the concept occurred in subsequent experimentation to include only defense. Theories accounting for perceptual defense will now
be considered. It is to be noted that these theories are, in the main, considering only the avoidance reactions rather than both avoidance and vigilance reactions to threatening stimuli.

Theories Accounting for Perceptual Defense

Two main general frames of reference have been used to interpret the experimental findings. The first have been loosely termed the "dynamic" point of view. The second has been identified as the "response availability" approach.

The dynamic point of view will be considered first because the response availability approach has developed as a criticism of the dynamic interpretation. Briefly stated, clinically oriented investigators (Erikson, 1950; Klein & Schlesinger, 1949; Lazarus, Shaffer, Fonda & Heistad, 1950; and McInnes, 1949) have implied an unconscious participation of the individual in actively selecting and rejecting presented material in accordance with needs. Postulation of an unconscious process has led to an intensified investigation of the possibility of learning and discrimination without awareness, utilizing mainly, the GSR.

Proponents of the response availability approach point out that some words have greater frequency of occurrence than others. Differences in this availability to the subject, could, then, act to produce differential recognition thresholds. The main variables recognized by investigators in this theoretical camp are word frequency and bias producing stimuli.
The theoretical positions and experimentation of both positions will now be discussed.

**Dynamic Point of View.** McGinnes (1949), summarizing some work in this area, states, "It seems well established, then, that the perceptual "filtering" of visual stimuli serves, in many instances, to protect the observer as long as possible from an awareness of objects which have unpleasant emotional significance for him." In elaborating this type of approach, Erikson (1950) and Lazarus et al. (1950), have talked about such variables as type of ego defense and the acceptability of the need-factors which, they believe, can influence the degree to which the subject is able to verbalize and recognize the stimulus material.

An apparent paradox appears, since, in order to know what to avoid, the subject must first recognize the stimulus which is to be avoided. This difficulty was recognized from the beginning by Bruner and Postman (1949) who stated: "The paradox remains only so long as we (1) restrict the definition of recognition to one type of response—veridical report and (2) insist that all systematic responses to the stimulus depend on the prior occurrence of correct recognition. Neither of these restrictive assumptions is necessary. There can be tripped off, by the presentation of a stimulus, a multiplicity of response tendencies among which veridical reporting is only one, albeit a most important one. Other systematic reaction tendencies tripped off by the stimulus may be largely affective in nature and lead
to various forms of avoidance responses. Each of these possible responses has its own threshold, determined by characteristics of the stimulus end and by the directive state of the organism (differential "availability" of the responses). Thus, veridical report has its threshold, and affective avoidance response has its. As our experiments suggest, the threshold for affective avoidance response is frequently lower than the threshold for veridical report...If this rather reasonable assumption of the hierarchy of thresholds be accepted a Judas eye notion of double-perception is not required to account for the phenomena of "defensive" perception in which avoidance responses seems to precede correct recognition." (Bruner and Postman, 1949, p. 26.)

The dynamic approach thus places its proponents in the difficult position of having to postulate some process of discrimination occurring prior to the ability of the subject to report correct recognition. More specifically, if the observation that a subject can recognize a certain word at faster exposure speeds than another word, and the observation is attributed to their differential need value, then it would be necessary to assume that the subject is somehow identifying the significance of the two words before he is able to report recognition of them.

With this discussion of the theoretical position on perceptual defense of the dynamic point of view, consideration will be given to experimentation dealing with discrimination without awareness. It is vital to discuss this process because it has been postulated as
an integral part of perception and permits awareness and, thus,
avoidance responses to threatening stimuli.

**Discrimination Without Awareness.** Attempts to delineate
"discrimination without awareness" have a long history. Miller (1939),
in a paper reporting an experiment of his own, reviewed investigations
of this problem over a period extending from 1863 to 1934. Miller's
experiment, and all the studies he mentioned, showed that accuracy
of discrimination was better than chance below the subjects' "limen
of awareness".

Several other experiments have used conditioning procedures
on the GSR. A novel approach was used by Redlich (1935) and Levine
(1930). By the use of hypnotically induced anesthesia, or patients
with hysterical anesthesias, these investigators showed that subjects
gave GSRs to stimuli applied to an anesthetic area. Scott (1930)
conditioned a finger-withdrawal response during the trance state and
tested for persistence of the conditioned response during the post-
trance amnestic period. Presenting mean scores for eight subjects,
he concluded that there was some residual conditioning in the post-
trance period, even though the subjects remembered nothing of
conditioning trials and consequently were not "aware" of the sig-
nificance of the conditioned stimulus.

A different line of attack has been the attempt to condition
responses to stimuli which, by various criteria, are below the subject's
psychophysical threshold. Silverman and Baker (1935) used subliminal
alternating currents as the conditioned stimulus and paired it with
several kinds of emitted responses in human subjects. Although the authors saw some evidence of eye wink conditioning in three out of ten subjects, the results do not warrant positive conclusions on a statistical basis. Newhall and Sears (1933) conditioned finger-withdrawal to a supraliminal light stimulus and tested for conditioned responses at and below the psychophysically determined limen. They reported obtaining conditioned responses with stimuli which were below the limen, and "in several instances visual stimuli that were individually reported unperceived had evoked the conditioned response." This latter observation was incidental to the main interest of the experiment, and Newhall and Sears stated that they believed the problem of whether a conditioned response could occur without consciousness of the subject was still open to question.

GSR Within Perceptual Defense Paradigm. Several experiments have been concerned with the problem of discrimination without awareness within a perceptual defense paradigm. McGinnies' (1949) study, cited earlier, attempted to demonstrate discrimination prior to correct recognition. He found that subjects gave GSR which were greater for emotional words than for neutral words, before the words had been consciously recognised. A crucial shortcoming of the experimental design was that the subjects could have been motivated to withhold their report of the socially taboo words (such as *whore*, *bitch*, *raped*, etc.) even after some suspicion of their meaning was present. In other words, the GSR during the pre-recognition trials could very well have been an emotional response to recognised but not
reported words.

McCleary and Lazarus (1949) found that subjects were able to give discriminatory responses as measured by their GSRs, which they called "subception". They define this term as "a process by which some kind of discrimination is made when the subject is unable to make a correct conscious discrimination."

To avoid the response suppression interpretation of the GSR results, when taboo words were used as stimuli, Lazarus and McCleary (1951) used nonsense syllables conditioned to electric shock. The experimenters obtained greater GSRs to "shock" syllables than nonslash syllables when the subject was not able to perceive the syllable correctly, i.e., when he gave a wrong response. However, it seems possible that, with the administration of shock with nonsense syllables, they could be equated with McGinnes taboo words, i.e., the words would become of strong stimulus intensity through experimental conditioning and thus have the power to elicit greater GSRs if they passed through the subject's mind as a possibility, even though the correct syllable was not given as a verbal response.

Response Availability Approach. The response availability approach began with Howes and Solomon's (1950) criticism of McGinnes' (1949) results. They pointed out that, for different individuals, some words have greater frequency of occurrence than others. Differences in this availability could act in two ways to produce differential recognition thresholds, depending in part upon
the degree of ambiguity of the stimulus materials. On the one hand, the subject is more likely to make use of minimal cues from words which are more readily at his disposal than those which are not. This aspect appears to be very much like the concept of attention or set. On the other hand, if the cues are so minimal that the subject appears to be guessing, the presence of certain words in his response repertoire will increase the statistical probability of these words being correctly identified.

This approach has dealt with several variables dealing mainly with stimulus characteristics which have effects in producing certain types of responses. The main variables receiving attention are those of (1) word frequency, and (2) bias-arousing stimuli.

Word Frequency. Some words are used more frequently than others in spoken and written English. More frequently used words then, may have effects in producing lower thresholds of recognition than less frequently used words, such as, for example, taboo words. Many investigators suggested that the relative frequency of usage of words, as determined for example, by the Thorndike-Lorge word-count (1944) is a more important determinant of recognition threshold than is relative "emotionality-neutrality" of words used in experiments. Howes and Solomon (1951), for example, showed that visual recognition threshold of a word, as measured tachistoscopically, is a approximately linear function of the logarithm of relative frequency with which the word appears in a word-count.

Even more convincing is a study reported by Solomon and
Postman (1952) which also examined the relationship between frequency of prior usage and recognition threshold. Subjects were required to read and pronounce different nonsense (actually Turkish) words from once to twenty-five times. Thresholds of recognition for these words were compared with words subject's had not read. Thresholds varied inversely with frequency of prior usage. Goldstein (1954) and Bresson (1955) reported similar findings.

Supporters of the notion of perceptual defense have denied that word frequency by itself can account for the observed phenomena. Cowen and Beier (1954) report an experiment which required subjects to decipher progressively less blurred carbon copies of emotional and neutral words. Significantly more trials were required to achieve a correct report of the former as compared with the latter. No significant correlation was found between threshold and frequency.

DeLucia and Stagner (1953) found that even with frequency held constant recognition times is still significantly related to association time and they conclude that their data seem to support both the Bruner and Postman emphasis on emotional factors and the Solomon-Howes stress on frequency position.

An ingenious experiment by Wiener (1955) used the same words as both threat and neutral stimuli by placing them in different contexts—for example, placing the word fairy in a context which emphasized its homosexual connotation and in a context which stressed its supernatural connotation. Differences in threshold were shown; in this case, however, critical words were perceived
more quickly when they had been in a threat context than when they
had been in a neutral context.

From the experimental evidence above cited, it appears
that the criticisms of the perceptual defense phenomenon on the
basis of word frequency have not yielded an explanation of the
phenomenon, but they have important implications for methodology
in pointing out a variable which needs to be controlled in perceptual
defense research.

Bias-Producing Stimuli. This second criticism of the
apparent defensive phenomena is that they may be due, at least in
part, to deliberate withholding of responses to emotional words by
subjects until it is abundantly clear that words are being shown,
simply because of the embarrassment involved in reporting words
like penis, whore, and the like, in an experimental situation. This
type of criticism has also been advanced by Howes and Solomon (1950).

Postman, Brensen and Gropper (1953) report a study which
was designed to vary the likelihood of response suppression. Word
frequency was controlled by the word-count method and thresholds
were established by different levels of illuminance. Four different
sets of instructions were used. Thus, one group was "uninformed"
in that they were not warned to expect "taboo" words. A second
group was "informed", i.e., they were told what to expect. A third
group was "facilitated"; they were given instructions designed to
discourage the withholding of taboo responses. A fourth group was
"inhibited", being given instructions designed to encourage the withholding of responses. Results of this experiment showed that thresholds for taboo words were significantly lower than thresholds for neutral words. Relative thresholds for neutral and emotional words, however, varied significantly with the nature of the instructions, as would be predicted from the response-suppression hypothesis.

The response-suppression hypothesis has also been favored by Bitterman and Kniffen (1953). They derive support for their hypothesis from the finding that there was a significant decline in threshold of taboo words as a function of order of presentation. They claimed that the "result is precisely what might be anticipated on the assumption that differences in the threshold of taboo and neutral words (beyond those attributable to frequency of experience) may be accounted for in terms of differential readiness to report rather than in terms of perceptual functioning." (Bitterman and Kniffen, 1953, p. 250.) The difference between taboo and neutral words was in fact significant even in the final position, a fact for which the authors' hypothesis does not seem to account.

In other studies in which subjects were given instructions which led them to expect taboo words, Lacey, Lewinger and Adamson (1953) and Freeman (1954, 1955) have shown that this may, in fact, lead to lower recognition thresholds for taboo than for neutral words. Rothman (1961) using taboo words, also found that lower thresholds for taboo words when subjects were required to give responses other than verbal report, i.e., written-report, component-word responses.
Some data produced by supporters of perceptual defense in reply to the suggestion that their findings are explicable in terms of the response suppression should be considered. McGimnes and Sherman (1952) examined, tachistoscopically, recognition thresholds for eight five-letter words of approximately equal frequency and of neutral meaning. Half of these task words were presented to subjects immediately after the full exposure of a taboo word, half were presented following the exposure of a neutral word. These investigators reported that subjects' thresholds for the former were significantly higher than for the latter. They interpreted their findings in terms of a generalization of an avoidance reaction from taboo to neutral words. They argue that there can be no reason to suppose that subjects voluntarily withheld responses to stimuli which were, in fact, themselves neutral in connotation.

Cowen and Beier (1950) and Beier and Cowen (1953) have also shown that even when subjects are alerted to the possible exposure of threat words, they may still require a greater number of trials and more time for correct report of threat words than for neutral words. Cowen and Beier, (1954) investigated the possibility of response suppression in several ways: by warning the subjects what words they were to expect, by cross-examining them after the experiment, by estimating differences between male and female subjects and by comparing the effect on male and female
subjects of like-sex and different sex experimenters. Results obtained were, in the authors' view, more consistent with the perceptual defense hypothesis than with the notion of response suppression.

Newton (1955) has also examined tachistoscopically visual recognition threshold for pleasant vs. unpleasant words equated for word-count frequency. He found significantly fewer errors for pleasant words. Response suppression is not an adequate explanation since unpleasant words used (e.g., shame, cruel, etc.) were not likely to make subjects withhold verbal report simply from embarrassment.

Minard (1965) criticizes most studies supporting a response bias hypothesis as being restricted in their approach in using an overly restricted conception of perceptual defense. He believes it necessary to develop explanations which allow the stimulus a greater role and do not depend on mechanisms which have their main effects on purely verbal responses. Minard, using visually presented words, a forced-choice methodology, and several measures of response bias, concluded that perceptual defense does occur, independent of the nature or presence of response bias.

Other studies, controlling for response bias, (Elum, 1955; Mathews and Wertheimer, 1958; and Nelson, 1955) have all found evidence for perceptual defense over and above the response bias which may contaminate a measure of perceptual defense.

Minard states that the probability of an accurate response to a stimulus may be a result of the interaction of (a) bias against
certain responses and (b) emotion-arousing properties of presented stimuli. By appropriate experimental design, he suggests, the effect of either variable may be greatly reduced. He concludes that there is evidence that perceptual defense does occur, independent of the nature or presence of response bias.

It may be concluded, therefore, that the effect of response suppression, like the effect of word-frequency, must be taken into account in any well-designed experiment concerning perceptual defense. It seems, however, that when the possibility of withholding responses has been, as far as possible, eliminated or controlled, differences in threshold together with response time remain.

Thus, it can be seen that the response availability approach to perceptual defense has failed to produce alternative explanations of the phenomenon. Experimental tests of the possibilities have, however, delineated a number of parameters of the phenomenon. Specifically, the importance of controlling for word frequency and response bias in perceptual defense experimentation has been demonstrated. A perplexing problem has reappeared, however, inasmuch as vigilance rather than defense has been found in some subjects and as main results under certain experimental conditions.

Final Considerations

From the preceding review of studies which have bearing on the explanations and parameters of perceptual defense research, it is apparent that methodological design can handle most of the
problems which have confused perceptual defense research in the past. Specifically, word frequency and response bias can be controlled by appropriate experimental design. When so controlled, the bulk of the data suggest that perceptual defense still occurs over and above response bias.

Two main issues are made apparent by the foregoing review. First is a failure of experimenters to consider the vigilance response obtained under certain conditions as a part of the perceptual defense concept. The second issue involves inconclusive findings concerning discrimination without awareness. Theoretical viewpoints and evidence concerning these two issues will be subsumed under the headings of (1) A Broadened Conception of Perceptual Defense, and (2) Affective Reactions in Perceptual Defense, respectively.

A Broadened Conception of Perceptual Defense

Early studies on perceptual defense have neglected to acknowledge the possibility of both avoidance and vigilance responses to threatening stimuli. It should be noted that much of the recent research has emphasized only an elevated threshold to emotion-arousing stimuli. Furthermore, vigilance responses obtained in studies of perceptual defense have often been equated with a negation of the concept of perceptual defense.

The first study appearing in the literature (Bruner and Postman, 1949) emphasized that both avoidance and vigilance responses
may occur in response to threatening stimuli. Inglis (1961) and Brown (1961) have recently pointed out that thresholds first rise, then fall, with an increase in stimulus emotionality. Such a complex relationship does not support a restricted definition of perceptual defense.

Emphasis in the present research will be given to an interaction hypothesis advanced by Inglis (1961) which states that avoidance responses are a result of interaction between the individual susceptibility to stress and degree of experimental stress. The importance of personality differences in utilizing avoidance techniques of anxiety reduction are emphasized. Of equal importance is the influence of degree of stress on avoidance techniques. In this view, the effect of high stress on personality differences in avoidance activity serves to disrupt characteristic responses to threatening stimuli.

The following sections will deal with effects of the two main variables of (1) personality differences and (2) degrees of stress and also (3) the interaction of these variables on avoidance activity.

Degree of Stress. A broadened view of perceptual defense phenomenon must take into account the degree of stress the subjects experience in the experimental situation. This consideration has relevance for apparently contradictory results obtained by several studies of perceptual defense which have not been adequately explained
by any alternative explanation and also appear to confuse the notion of perceptual defense as it is usually conceived.

Studies such as those of Lacey, Lewinger and Adamson (1953) and Freeman (1954) who found perceptual vigilance when subjects had knowledge of what kind of stimuli to expect can be explained by a theoretical model proposed by Inglis (1961). One of the contentions of Inglis' hypothesis is that the effect of such instructions is to reduce anxiety, so producing indifference to avoidance.

Personality Differences. A broadened view of perceptual defense must also take into account personality differences in characteristic tendencies to utilize avoidance techniques. Studies such as those of Singer (1956) and Alper (1957) show that individual differences tend to cancel out differences in perceptual defense experiments. Inglis argues that certain experimental data can be interpreted in terms of individual differences in dealing with emotional responses.

Inglis draws on the dimensional analysis of personality proposed by Eysenck (1953). At the base of his theory is the presumably innate balance between cortical excitation and inhibition. Some persons are characterized by nervous systems predisposing them to develop exceptionally strong inhibitory potentials; others are characterized by nervous systems predisposing them to develop exceptionally strong excitatory potentials. Most people are
intermediate between these extremes.

Certain phenomena observable in the psychological lab can be deduced from this hypothesis; particularly stressed by Eysenck is the difference observed in conditioning. He accepts Mowrer's (1950) hypothesis that the socialization process depends on conditioning and hypothesizes that under equal environmental pressure, individuals with strong excitatory and weak inhibitory potentials, who would be expected on that basis to form strong and stable conditioned responses, would also tend to be strongly socialized, while individuals with weak excitatory and strong inhibitory potentials, who would be expected on that basis to form weak and unstable conditioned responses, would also tend to be weakly socialized. The former group would thus tend to develop introverted behavior traits (persistence, high level of aspiration, reliability, etc.) while the latter group would tend to develop extroverted behavior traits.

Anxiety is often defined as a conditioned fear reaction. Hence, Eysenck holds that under equal environment pressure, the person high on introversion should develop strong conditioned fear responses as compared with other persons due to his tendency to develop strong conditioned responses and to react strongly to fear-producing stimuli with his autonomic system.

Since Eysenck's (1953) Introversion-Extroversion personality dimension is central to Inglis' theory, the terms Introvert and Extrovert
will, hereafter refer to high susceptibility to stress and low susceptibility to stress individuals, respectively.

With this brief statement of the effects of stress and personality type on avoidance reactions to threatening stimuli, the interaction of these two variables will now be considered.

**An Interaction Hypothesis.** Inglis argues that certain experimental data can only be interpreted in terms of personality differences in dealing with emotional responses under varying degrees of stress. The important variables in his view are the degree of stress the subject is confronted with in interaction with the subject's susceptibility to stress.

Following Inglis, the availability, to the organism, of anxiety reducing responses in perceptual behavior may be a function of several factors and among these the two most important are likely to be "habit strength" (e.g., as determined by word frequency) and "drive status" (e.g., in terms of their role as "anxiety mediators"), the latter quality depending not only on stimulus quality but upon susceptibility factors within the individual. This point is in agreement with the point made by Lazarus (1955) and by Eriksen (1954a) among others, that one of the antecedents in such experiments is the "kind of individual" used as subject.

In the low stress situation in which habit strength (word frequency) is held constant and drive-value (emotional arousing value
of the stimuli) approaches a minimum, Extroverts may not be concerned to initiate any avoidance behavior toward such stimuli. Introverts, being much more susceptible to stress, may have already begun to initiate such avoidance (i.e., anxiety-reducing) activity. In terms of performance, then, individuals who are extroversion may appear to show perceptual vigilance whereas individuals who are introversion are at this time showing evidence of perceptual defense.

In the high stress situation, in situations of similarly constant habit strength, but where the drive-value is high, then Extroverts perform more markedly their avoidance activity whereas, by reason of the fact that their drive component has not become excessive, Introverts are now avoiding less adequately so that, in terms of performance, the vigilance and defense roles are now reversed.

In such high stress situations both the powerful avoidance activity and the inability to avoid may be maladaptive, since the first leads to the diminished availability of possible relevant cues (for recognition) and the second leads to the increase of anxiety in an already stressful situation.

A summary of Inglis' interaction hypothesis is as follows. Under low stress conditions, Introverts respond to threatening stimuli with defense whereas Extroverts respond with vigilance. High stress conditions reverse avoidance response whereby Introverts respond with vigilance and Extroverts respond with defense.

Inglis (1961) holds that an ideal experiment, specifically
designed to test his hypothesis would at least (a) control for such factors as word frequency and the likelihood of response suppression, and (b) vary systematically such factors as personality structure and the anxiety arousing relevance of the stimuli used, and also take account of their interaction. Although no specific experiment tests Inglis' theory, several experiments provide evidence supporting his contentions. A few of these findings will now be considered.

**Evidence Bearing on the Interaction Hypothesis.**

**Low Stress.** Three studies which would fall into the low stress category outlined above are as follows. Smock (1956a) reported a study of the relevant personality variables. He found that high and low scoring subjects on the Sarason Anxiety Scale (Sarason and Gordon, 1953) were positively associated with delayed recognition of words and that the anxiety-arousing properties of the pre-task word on a neutral word following, also contributed to the elevation of the recognition thresholds under all experimental conditions. The interaction of the present hypothesis was, however, not statistically significant.

Kissen, Gottefeld and Dickes (1957) have also shown that persons who are inhibited (in the sense of "restrained" or "constricted") on projective tests may show raised thresholds for sexual, as compared with neutral words.

Pastell (1956) using shock-associated geometrical figures
as tachistoscopic stimuli, found significant threshold differences between male and female students. Fustell claims that this was because the males found the shocks moderate, while the females found them severe.

High Stress. Investigating high stress and personality, Eriksen and Browne (1956) experimentally manipulated the frequency of response strength of 10 words for two groups. For one of these groups they arranged that these words should also become conditioned stimuli for anxiety (through association with a failure experience). The groups were also divided in terms of high and low scores on the "psychasthenia" scale on the M.M.P.I. They found that while the variables of frequency and recency did, in fact, lower perceptual recognition thresholds for experienced words the reduction was less in the case of the anxiety conditioned words for the high psychasthenic group. They suggest that this difference in threshold was due to the presumed fact that failure-associated words were less anxiety-producing for the high psychasthenic group. The present hypothesis, however, suggests that the reverse may be the case, and that, in the high stress area in which they were operating, the high psychasthenic groups were unable to avoid anxiety mediation and were therefore exhibiting vigilance. This latter interpretation would seem to be more consonant with other results obtained by Eriksen (1952a, 1954a).

Osler and Lewisohn (1954) using the Taylor Anxiety Scale, and ingeniously employing paired stimuli as alike as possible, in
which the difference in one letter alone made them acceptable or unacceptable (e.g., *tit-tot*, *bitch-botch*), also found lower thresholds for the unacceptable words in the high anxiety group. The opposite difference, which would be predicted on the basis of the Inglis hypothesis for the low anxiety group, did not, however, appear.

**Variations in Stress.** Some studies have also experimentally varied the stress. Stein (1952) showed that under conditions of increased anxiety there was an accentuation of either sensitization or defense in 24 neurotic patients, rather than the progressive change from one to the other which would be predicted from the Inglis hypothesis.

Zuckerman (1954) tried to see whether frustration-induced aggressive need had any effect on the tachistoscopic threshold for aggressive words compared with neutral words in groups of subjects in whom had been induced varying degrees of need-strength. Higher thresholds were found for the aggressive words but these were not associated with the differing, presumably need-arousing, conditions. However, the experimental group did show greater variability in threshold phenomena than did the control group.

Hlum (1954; 1957) demonstrated that, by increasing anxiety through two stages, subjects could be induced to show first vigilance and then defense for selected items from the "Blacky Pictures". (Hlum, 1950). The author himself interprets these results in terms of two
psychoanalytic hypotheses, in which vigilance represents the effect of "the unconscious striving for expressing of underlying psycho-
sexual impulses", and defense represents the "warding off of these
threatening impulses as they begin to approach awareness." Elum's
results may be more economically subsumed under the hypothesis
advanced by Inglis which does not involve the personalised agencies
of psychoanalytic theory. A similar interpretation might be made
of Nelson's (1955) confirmation of Elum's results. These findings
suggest, then, that low and high stress have effects on avoidance
responses to threatening stimuli.

The contribution of affective measures to an understanding
of the perceptual defense phenomenon will now be considered. The
main emphasis will be on GSR since this is the affective measure
most frequently utilized in perceptual defense research.

**Affective Reactions in Perceptual Defense**

Discrimination without awareness has been investigated
as a possible explanation of the perceptual defense phenomenon. Since
GSR has been the peripheral physiological technique most often
utilized to assess differential affective responses to threatening
and neutral stimuli within the perceptual defense paradigm, GSR as
a measure of emotion and the contribution of GSR to an understanding
of Inglis' interaction hypothesis will now be considered.

**GSR as a Measure of Emotion.** The importance of emotion and the
nature of its widespread influence have been emphasised by Sherrington (1948): "Of points where physiology and psychology touch, the place of one lies at 'emotion.' . . . To the ordinary day's consciousness in the healthy individual the life of the viscera contribute little at all, except under emotion. Visceral disturbance is evidently a part of the corporeal expression of emotion." (Sherrington, 1948, p. 257.) Farber and West (1960) suggest that emotion be defined as a functional relationship between environmental and neurophysiological reaction.

The GSR reflects the activity of the sweat glands (Lindalay, 1961). Kuno's (1930) opinion is that sweating in man is not uniform over all the body surface, in respect of either actual secretion or physiological significance. Whereas general bodily sweating appears to be temperature regulatory, sweating of palms of the hand and soles of the feet can be provoked by sensory stimulation and mental stress.

A common assumption employed by investigators using GSR as an emotion indicator is that the stimulus used to elicit an autonomic response is representative of anxiety-arousing stimuli for the subject. McGinnes (1949) found that "...stimuli of appropriate sort will arouse autonomic reactions characteristic of pleasure or anxiety...if this be the case, one might be expected to find a change in GSR reactions to visually presented stimuli." Learmonth and Ackerly (1959) found that GSR increased in proportion to the extent to which the subject acts to prevent an expression of feeling. Shagass (1949) found that
degree of anxiety appeared to be related to degree of physiologic disturbance to stress as measured by GSR. Other studies involving GSR as a measure of human emotion have been conducted by Zimny (1963), Sines (1957), and Martin (1956).

There has been evidence supporting GSR as a measure of emotion. Kraebling (1960) conducted an experiment using galvanometer, heart rate, and respiration ratio, and found that GSR showed highest test-retest reliability for all stimuli used. Dysinger (1931) found a correlation of .87 between reported subjective intensity on pleasantness-unpleasantness dimension of tones and magnitude of deflection of the galvanometer. In an experiment requiring Ss to estimate degree of emotional experience to an auditory stimulus, Starch (1910) stated: "degree of intensity of emotional experience to the ringing of a bell corresponds very closely with the amount of deflection." Similarly McCurdy (1950) obtained a correlation of .94 between subjects judgments of words describing themselves and the GSR. Jones and Wechsler (1928) concluded that the GSR has advantages over other laboratory indicators of emotion since it allows for greater precision of measurement and tends to increase the reliability of the results. It would appear, then, with respect to reliability, the GSR warrants continued use as a measure of emotion.

**GSR and Perceptual Defense.** Investigations of discrimination
without awareness as a possible explanation of the mechanism of perceptual defense have utilized GSR (Lazarus and McCleary, 1951; McGinnes, 1949, McCleary and Lazarus, 1949, and others). The rationale behind the use of GSR as a measure of discrimination between critical and neutral stimuli involves the sensitivity of GSR to stimuli of varying intensity. Stimulus intensity produces differential GSR both along physical dimensions of decibels (Hovland and Riesen, 1940; Davis et al., 1955) and light intensity (Lindsley, 1951) and personal meaningfulness of stimuli (Wallerstein, 1954; Bingham, 1943). It has been found that GSR can be changed in amplitude by varying the intensity of the stimulus. Thus, it is reasoned, if discrimination is made prior to stimulus recognition, a differential GSR will be obtained to the two stimulus different intensities, in terms of personal meaningfulness.

The possibility of subliminal discrimination gains support from physiology. Physiological studies have revealed that subliminal stimuli can cause emotional reaction prior to perception of stimuli (Gellhorn et al., 1954, 1955; Miller, 1950). Gellhorn (1963) believes that emotional reactions to stimuli always precede perception of the stimuli and also have implications for recognition of the stimuli. Greater emotional involvement, in his view, facilitates perception and leads to lower perceptual thresholds.

These physiological findings suggest an important method of investigating personality differences in affective responding in
association with avoidance responding to threatening stimuli. If avoidance responding is anxiety-reducing, then individuals who avoid recognition of threatening stimuli as an anxiety-reducing technique should reveal less affective responding on the GSR than individuals who do not utilize this technique.

**Formulation Integrating Interaction Hypothesis and GSR**

GSR provides a valuable supportive technique in evaluating the Inglis interaction hypothesis. If the interaction hypothesis holds, Introverts will initiate avoidance activity to threatening stimuli under low stress conditions whereas Extroverts will not. If the stimulus word serves as a cue to deeply embedded anxiety which is revealed in autonomic activity as is measured by GSR, this measure should reveal the anxiety-reducing function of the avoidance response. Thus, Introverts, utilizing avoidance activity, should reveal less GSR than Extroverts.

Under conditions of high stress, avoidance activity is reversed according to personality type. In this instance, Introverts will not initiate avoidance activity to threatening stimuli whereas Extroverts will utilize such avoidance activity. In this case, Extroverts, should reveal less GSR than Introverts, indicating an anxiety-reducing function of the avoidance activity.

The GSR measure taken simultaneously with the performance measure of threshold to critical and neutral words should, then,
provide physiological indications of the role of avoidance activity.

GSR may also provide evidence for personality differences in discrimination without awareness. The term "subception", as used by Lazarus and McCleary (1951), is "a process by which some kind of discrimination is made when the subject is unable to make a correct conscious discrimination" and provides a useful concept to discuss this consideration. Subception GSR found prior to word recognition would be indicative of discrimination without awareness. GSR, thus would be greater to critical than to neutral stimuli. If subception is related to personality variation, then subception measures obtained on GSR should vary with the interaction of personality type and degree of stress. The same type of interaction outlined above for GSR obtained during the entire stimulus presentation should be revealed by GSR obtained prior to word recognition (subception GSR). Thus, in low stress conditions, the subception GSR measure should be less for Introverts, who use anxiety-reducing techniques, than for Extroverts. In high stress conditions, subception GSR measures should be less for Extroverts, who in this case utilise anxiety-reducing techniques, than for Introverts.

As noted above, most experiments concerning perceptual defense have only investigated the experimental conditions involved in producing defense responses. The above formulation has the advantage over previous investigations of threshold determination and of discrimination without awareness because both vigilance and
defense response conditions can be investigated in relation to the two main variables of stress and susceptibility to stress. Another advantage of the formulation is that it permits the simultaneous investigation of two response measures, the recognition threshold performance and the affective response to threatening and neutral stimuli.

The purpose of the present research is to test the model advanced by Inglis by investigating the effects of personality differences in susceptibility to stress and degrees of stress on avoidance and affective reactions to threatening stimuli presented in a perceptual defense paradigm.

The main hypotheses, as well as the subsidiary hypotheses, advanced in the present research are as follows:

1. Avoidance reactions to threatening stimuli are related to the interaction between Susceptibility to Stress and the Amount of Stress.
   
   a. Under conditions of low stress, Introverts will respond with perceptual defense.
   
   b. Under conditions of high stress, Introverts will respond with perceptual vigilance.
   
   c. Under conditions of low stress, Extroverts will respond with perceptual vigilance.
   
   d. Under conditions of high stress, Extroverts will respond with perceptual defense.
2. Affective reactions to threatening stimuli are related to the interaction between Susceptibility to Stress and the Amount of Stress.

a. Under conditions of high stress, Introverts will respond with greater GSR than Extroverts.

b. Under conditions of low stress, Extroverts will respond with greater GSR than Introverts.

c. Introverts will respond with greater GSR under conditions of high stress than low stress.

d. Extroverts will respond with greater GSR under conditions of low stress than high stress.

3. Subsequent affective response will be greater to threatening stimuli than to neutral stimuli under all experimental conditions.
CHAPTER II

METHOD

Subjects: Subjects used in this experiment were drawn from psychology classes at Louisiana State University. Thirty-two males and 32 females were selected from a pool of 250 students by a selection procedure which will be described in detail as Phase I of this experiment.

Apparatus: A projection tachistoscope with a spring shutter arrangement, oscillographically calibrated, accurate to .005 seconds, was used for obtaining recognition thresholds. This apparatus allowed controlled variation of exposure interval from 2 to 1050 milliseconds. Tachistoscopically presented words were projected at eye level on a beaded-glass screen 10 feet from the subject.

A Keeler Polygraph, Model 302c was used for obtaining galvanic skin responses (GSR). Tarchanoff's method of measuring skin resistance was utilized. Palmar electrodes activated the galvanometer which recorded GSR responses by means of a recording pen which charted responses on polygraph paper.

Materials: Nine pictures obtained from popular magazines were used for subject selection. These were selected by three judges (one clinical psychologist and two psychology graduate students) as being representative of three non-ambiguous categories: (1) sexual
themes, (2) aggressive themes and (3) neutral themes. A description of the nine pictures used is given in Appendix A. Five of the pictures had neutral themes, two had aggressive themes and two had sexual themes.

A word association test was constructed for the purpose of selecting personally emotion-arousing words for each individual S. The procedure of selection of stimuli was similar to that employed by Mathews and Wertheimer (1958) and Minard (1965). Words for the test were selected by the agreement of three judges (one clinical psychologist and two psychology graduate students) familiar with the college population. All the words are common and acceptable in student conversation (e.g., hide, fail, self). The word association test consisted of 45 potentially emotion-arousing words. Each of these potentially emotion-arousing words was paired with a neutral word on the basis of similarity of structure and frequency in English (Thorndike, 1944). A pilot study established that neutral words included in the list were responded to with short reaction time, indicating that they were not potentially emotion-arousing words. The first three words of the test (girl, cat, long) were training words to make sure instructions were understood. Words used in the word association test are presented with their matching neutral words in Appendix B.

**Procedure:** The experiment consisted of three phases:

Phase I: Subject Selection; Phase II: Stimulus Selection; and Phase
III: Word Recognition Test.

**Phase I: Subject Selection.** A pool of 250 students, in groups of 15 to 30, were asked to make written responses to pictures projected by an opaque projector onto a beaded-glass screen. Nine pictures were presented in random order to each group of students with the restriction that each sexual or aggressive picture was separated by the presentation of a neutral picture. Presentation to each group of students in the selection procedure was rearranged in different random orders of presentation with the same restriction mentioned above. Each picture was projected for 3 minutes.

The following instructions were given:

You will be shown nine pictures on this screen. You are to write three sentences to each picture pertaining to the theme portrayed by the picture. Do not attempt to identify the pictures. The pictures were drawn from popular magazines and you will undoubtedly recognize some of them, but I am not interested in this. Please concentrate on the themes rather than descriptions of the pictures. In other words, write about what the people pictured are doing, what they are thinking and what the present actions may lead up to. Write as much as you want to within the three sentence limit. The sentences can be as long as you want to make them. Each picture will be projected for 3 minutes. One minute before each picture is changed, I will announce the remaining time so that you may finish your response to that picture. Are there any questions?

Sexual and aggressive themes obtained from the students were then rated by three judges (one clinical psychologist and two psychology graduate students). The rating scale is given in Appendix C.
The number of sexual and aggressive words used by the students were also tabulated. Utilising the rating and sexual and aggressive word-counts of such responses given by each individual, Introverts and Extroverts were identified. Those individuals receiving the highest ratings and word-counts for sexual and aggressive themes comprised the Extroverts and those individuals receiving the lowest ratings and word-counts for sexual and aggressive themes comprised the Introverts. The total number of individuals chosen for inclusion in the research was approximately 12.8% of the total number of students in the selection phase of the experiment.

**Phase II: Stimulus Selection.** The word association test was utilized to obtain personally relevant stimuli for each S. S was seated in a chair and was then given the following instructions (Minard, 1965b):

"Now, I'm going to study your associations. For the purpose of this experiment, an association is simply the first thing which comes to mind when you see one of the words I'll be presenting. Say the first thing which comes to mind and say it as soon as it comes to mind because I will be timing your responses with a stopwatch."

The words, typed individually on index cards were then presented, one at a time, to each S.

Associative reaction time to the words, and behavioral clues regarding the emotional significance of the word, e.g., blushing, sweating, long explanations of associations and laughter, were obtained. Word selection criteria consisted of:
1) Associative reaction times high relative to:
   (a) S's other times
   (b) Times of comparable subjects for the selected word and

2) Behavioral clues regarding the emotional significance of the word.

This technique allowed the choice of words which had personal emotional significance for the subjects (Minard, 1965b).

Using the above-described criteria of selection, eight words were thus selected by objective criteria applied to the word association test, for each S. Four critical words for each S were identified from responses to the word association test and each of the critical words was matched with a neutral word similar to it in structure and frequency of usage in English (Thorndike, 1944). These eight words comprised the test words to be used in the word recognition phase of the experiment. Five additional neutral words were used as training words. The training words (e.g., cup, gas, sort, chief, suppose) were the same for all Ss.

**Phase III: Word Recognition Task.** During this phase of the experiment each S was presented the series of 13 words tachistoscopically. S was seated before the tachistoscope and the electrodes of the galvanometer were secured onto the palm of the hand. Instructions to Ss were of two types, (1) Low Stress Instructions, and (2) High Stress Instructions, as follows:
1) **Low Stress Instructions:** Today, I am going to give you a test of perceptual speed. During this part of the experiment I am interested in how fast you can see the words I will flash on the screen at very short time intervals.

2) **High Stress Instructions:** Today, I am going to give you an I. Q. test. This test consists of a test of perceptual speed. During this part of the experiment, the speed with which you are able to see words I will flash on the screen at very short time intervals will indicate your I. Q.

Low Stress Instructions were given to one-half of the Extroverts (Low Susceptibility Group) and one-half of the Introverts (High Susceptibility to Stress Group). Likewise, High Stress Instructions were given to one-half of the Extroverts and one-half of the Introverts. Each Stress condition, thus, consisted of 32 Ss, half of which were of the Extroverts Group and half were of the Introvert group. The experimental groups consisted of the following:

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<th>Experimental Conditions</th>
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<td>Stress</td>
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<td>Low</td>
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<td>High</td>
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Ss within each Susceptibility group were assigned at random to the experimental groups.
Besides the instructions related to the purpose of giving the test, all other instructions were identical for the two stress conditions. Further instructions were as follows:

I will project a series of words on the screen starting at very short time intervals and gradually increase the time intervals that the word remains on the screen until you are able to recognize the word. Before I change the word, I will tell you. Remember, the word will remain the same until you correctly recognize the word. If you will concentrate within the rectangle indicated on the screen when I say "ready?", you will have a better chance of seeing the word when it is flashed. Each time the word is flashed, tell me what you see regardless of what it is. It is all right to guess because sometimes you can get the correct impression of the word without really seeing the word very clearly. Remember that this is a perceptual speed test. Do the best you can. Are there any questions?

Two experimenters were used to operate the tachistoscope, a male and a female experimenter who each tested one-half of the female Ss and one-half of the male Ss in each experimental group. A third experimenter recorded GSR and readjusted current back to base rate after recognition of each word occurred. During the training phase of the tachistoscopic presentation of visual stimuli, a galvanometer base rate was taken for each S. This base rate was indicated by the galvanometer pen on the polygraph chart as a stable response during presentation of neutral training words. The base rate established for each S was used as point zero and any rise of the pen above this line during the test word presentation was
considered a response.

Thresholds were first obtained on five training words. Training words were begun at different exposure times below threshold to prevent expectation of a constant number of presentations of the word before recognition occurred. After training words were presented, eight test words were presented. These words were four critical and four neutral words selected by the method explained in Phase II of this experiment.

Order of presentation of the neutral and critical test words to the S were as follows: of the eight test words used in the experiment for each S, a randomly selected order of the four neutral and four critical words were given with the restriction that no more than two neutral or two critical words follow each other.

Test words were first shown 30 milliseconds below the lowest threshold obtained on the training words. For the determination of recognition thresholds, a modified method of limits was used by employing an ascending order of presentation only. Stimuli were presented in three millisecond steps at 10 second intervals until the word was recognized. The criterion of threshold was two correct spoken identifications of the word on two consecutive presentations. Intertrial intervals was approximately 30 seconds.
CHAPTER III

RESULTS

Recognition Data. The performance data of the present experiment consist of mean difference thresholds in milliseconds, between critical and neutral word thresholds for all subjects. These data were obtained by averaging the four thresholds for critical words and the four thresholds for neutral words, for each subject and taking the difference between the two averages.

Perceptual defense is defined as a mean difference recognition threshold in the plus direction, indicating that mean recognition threshold of critical words was greater than mean recognition threshold of the neutral words.

Perceptual vigilance is defined as a mean difference recognition threshold in the minus direction, indicating that mean recognition threshold of critical words was less than mean recognition threshold of the neutral words.

Mean differences between neutral and critical word recognition threshold for the four experimental groups are presented in Table 1. The means are in the plus direction for the Introvert-Low stress condition and Extrovert-High stress condition and minus direction for the Introvert-High stress condition and Extrovert-Low stress condition, indicating perceptual defense and perceptual vigilance, respectively. These data
### Table 1

**Mean Difference Recognition Thresholds (in milliseconds)**

<table>
<thead>
<tr>
<th>Amount of Stress</th>
<th>Susceptibility to Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Introverts</td>
</tr>
<tr>
<td>Low</td>
<td>4.1912</td>
</tr>
<tr>
<td>High</td>
<td>-4.9350(^a)</td>
</tr>
</tbody>
</table>

\(^a\)Minus signs indicate that neutral word thresholds were on the average higher than critical word thresholds; otherwise, critical word thresholds were on the average higher than neutral word thresholds.
are graphically shown in Figure 1.

The first hypothesis of this study stated that avoidance responses are due to an interaction between susceptibility to stress and amount of stress. Accordingly, a factorial two-by-two analysis of variance (Lindquist, 1953) was used to analyze the mean difference thresholds. A summary of this analysis is exhibited in Table 2. From this table it is clear that the two main variables had no significant effect but there was a significant interaction effect. An F ratio of 70.30 \( (p < .01) \) was obtained for the interaction effect. This analysis indicates that a change in one of these variables is dependent on a change in the other variable.

In order to investigate further direction of the interaction, a \( t \)-test analysis of main difference recognition thresholds was performed between means for various Susceptibility Groups and Stress conditions. Both Introvert and Extrovert Groups showed significant mean differences between Low and High Stress conditions \( (t = 6.08 \text{ and } 6.07, \text{ respectively}; p < .001) \).

It was further found that there were differences between Introverts and Extroverts under the same stress conditions. Low Stress conditions produced significant mean differences between Introvert and Extrovert groups \( (t = 7.51; p < .001) \). Likewise, High Stress conditions produced significant mean differences between Introvert and Extrovert groups \( (t = 7.73; p < .001) \).

To investigate the effect of response bias such as may be
Vigilance Defense

-1
-2
-4

Low High

AMOUNT OF STRESS

Figure 1. Mean Difference Recognition Thresholds Showing Interaction of Amount of Stress and Susceptibility to Stress (In Milliseconds)
### TABLE 2

**ANALYSIS OF VARIANCE FOR MEAN DIFFERENCE RECOGNITION THRESHOLDS (IN MILLISECONDS)**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress</td>
<td>.0002</td>
<td>1</td>
<td>.0002</td>
<td>-</td>
</tr>
<tr>
<td>Susceptibility to Stress</td>
<td>13.9409</td>
<td>1</td>
<td>13.9409</td>
<td>-</td>
</tr>
<tr>
<td>Stress I Susceptibility</td>
<td>1331.6096</td>
<td>1</td>
<td>1331.6096</td>
<td>70.3004*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>1136.5043</td>
<td>60</td>
<td>18.9417</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2482.0550</td>
<td>63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at better than .01 level.
the result of subjecting a female subject to experimentation with
a male examiner and vice versa, a male subject subjected to a female
examiner, t-test analysis of the means were performed between these
variables. Sex and experimenter means are shown in Table 3. A t
ratio of .82 was obtained for means derived for males and females.
For the examiner differences, a t ratio of .74 was obtained. Neither
of these results were significant.

GSR Data. Physiological data for the present experiment
consist of mean GSR for critical and neutral words and mean differ-
ences in GSR between critical and neutral words, both prior to and
total word presentation for all subjects.

GSR responses were quantified by counting the area of
individual blocks on the polygraph chart encompassed by the upward
deflection of the galvanometer pen from the S's base rate and its
subsequent return to that level. To compensate for the uneven
number of stimulus presentations required by the Ss for recognition,
mean GSR scores for each word presentation were computed. A mean
GSR score for a word consisted of counting the total area of
response in blocks encompassed by the line of deflection from the
base rate and dividing this figure by the total number of stimulus
presentations for the word. Means were then computed for the four
critical and the four neutral words and the differences between
these two provided the final mean difference GSR measure. If the
TABLE 3

MEAN RECOGNITION THRESHOLDS FOR SEX
AND EXPERIMENTER EFFECTS (IN MILLISECONDS)

<table>
<thead>
<tr>
<th>Sex of Experimenter</th>
<th>Sex of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>Male E</td>
<td>-1.8043&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Female E</td>
<td>-2.1775</td>
</tr>
<tr>
<td>Combined</td>
<td>-1.4909</td>
</tr>
</tbody>
</table>

<sup>a</sup>Minus signs indicate that neutral word thresholds were on the average higher than critical word thresholds; otherwise, critical word thresholds were on the average higher than neutral word thresholds.
mean for the neutral words was greater than the mean for the critical words, the difference was assigned a minus sign.

Besides the total word response means described above, mean difference measures were computed for pre-recognition stimulus presentations, i.e., a subception measure. The subception measure was computed in the same manner as that for the total stimulus presentation except that the mean was computed only for the GSR obtained prior to the final recognition. The magnitude of response for this measure was taken from the GSR for a particular word prior to the two final stimulus presentations, i.e., total GSR response to word minus GSR to final two presentations. This figure was then divided by the total number of stimulus presentations for that word prior to the two final stimulus presentations, i.e., total number of presentations minus two. Subception means were then computed for the four critical and the four neutral words and the differences between these two provided the final mean difference GSR measure for subception. If the mean for the neutral words was greater than the mean for the critical words, the difference was assigned a minus sign.

The means of subception and total GSR to critical and neutral words are presented in Table 4. These data are graphically shown in Figure 2. Means of subception and total GSR mean difference scores are shown in Table 5.

A second hypothesis of the present research was that affective
<table>
<thead>
<tr>
<th>Amount of Stress</th>
<th>Susceptibility to Stress</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Introverts</td>
<td>Extroverts</td>
</tr>
<tr>
<td></td>
<td>Critical</td>
<td>Neutral</td>
</tr>
<tr>
<td>Low</td>
<td>19.40</td>
<td>10.74</td>
</tr>
<tr>
<td>High</td>
<td>29.49</td>
<td>17.14</td>
</tr>
</tbody>
</table>

**Subjection GSR**

**Total GSR**

<table>
<thead>
<tr>
<th>Low</th>
<th>37.08</th>
<th>15.40</th>
<th>49.68</th>
<th>22.62</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>47.33</td>
<td>22.83</td>
<td>33.09</td>
<td>12.74</td>
</tr>
</tbody>
</table>

TABLE 4

MEANS OF SUBJECTION AND TOTAL GSR TO CRITICAL AND NEUTRAL WORDS
Figure 2. GSR Means to Critical and Neutral Words Showing Interaction of Stress and Susceptibility to Stress in Subception and Total Word Response.
TABLE 5

MEANS OF SUSCEPTIBILITY AND TOTAL GSR MEAN DIFFERENCE SCORES

<table>
<thead>
<tr>
<th>Amount of Stress</th>
<th>Susceptibility to Stress</th>
<th>Introverts</th>
<th>Extroverts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Subception</td>
<td>Total</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>8.67</td>
<td>21.68</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>12.35</td>
<td>24.50</td>
</tr>
</tbody>
</table>
reactions to threatening stimuli are related to the interaction between susceptibility to stress and the amount of stress. Accordingly, a factorial two-by-two analysis of variance (Lindquist, 1953) was used to analyze the mean difference scores in GSR for subception and total word presentation, respectively. These summaries are shown in Tables 6 and 7. The two main variables have no significant effect nor is there significant interaction effect for subception or total word GSR mean difference scores.

Inspection of the graphic representation (Figure 2) of the means of the GSRs obtained for critical and neutral words indicate a numerical, though not significant, trend toward an interaction effect reflected in the GSR measure. It can be seen from this graph that when there is vigilance in recognition (Introverts-High Stress and Extroverts-Low Stress) the mean GSR is of greater magnitude than when there is defense in recognition, (Extroverts-High Stress and Introverts-Low Stress).

The third hypothesis of the present research was that subception affective responses will be greater to threatening stimuli than to the neutral stimuli under all experimental conditions. A t test analysis for correlated means was performed between means for GSR obtained prior to stimulus recognition for critical and neutral words for all experimental groups. These results show significant differences for all experimental conditions. Significant t ratios were obtained for Introverts under
### Table 6

**Analysis of Variance for Susceptibility GSR Mean Difference Scores**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress</td>
<td>9.90</td>
<td>1</td>
<td>9.09</td>
<td>-</td>
</tr>
<tr>
<td>Susceptibility to Stress</td>
<td>224.00</td>
<td>1</td>
<td>224.00</td>
<td>-</td>
</tr>
<tr>
<td>Stress X Susceptibility</td>
<td>468.39</td>
<td>1</td>
<td>468.39</td>
<td>1.92</td>
</tr>
<tr>
<td>Within Groups</td>
<td>14,642.29</td>
<td>60</td>
<td>244.04</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15,344.58</td>
<td>63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Table 7

### Analysis of Variance for Total GSR Mean Difference Scores

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress</td>
<td>60.45</td>
<td>1</td>
<td>60.45</td>
<td>-</td>
</tr>
<tr>
<td>Susceptibility to Stress</td>
<td>6.06</td>
<td>1</td>
<td>6.06</td>
<td>-</td>
</tr>
<tr>
<td>Stress I Susceptibility</td>
<td>338.06</td>
<td>1</td>
<td>338.06</td>
<td>-</td>
</tr>
<tr>
<td>Within Groups</td>
<td>27,514.27</td>
<td>60</td>
<td>458.57</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27,918.34</td>
<td>63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
both low and high stress conditions ($t=3.39$, $p < .01$; and $t=3.44$, $p < .01$; respectively). Significant $t$ ratios were also obtained for Extroverts under both low and high stress conditions ($t=2.77$, $p < .05$; and $t=5.36$, $p < .001$; respectively).
CHAPTER IV

DISCUSSION

Personal, Stress and Avoidance Activity

Major findings suggest that personality factors and stress bear a strong relationship to avoidance activity. Under low stress, Introverts react to threatening stimuli with perceptual defense and Extroverts react to threatening stimuli with perceptual vigilance. Under high stress, type of avoidance activity reverses: Extroverts react to threatening stimuli with perceptual defense and Introverts react with perceptual vigilance. These findings support the first main hypothesis which stated that perceptual defense is due to interaction between the individual's susceptibility to stress and degree of stress applied in the experimental situation. The interaction effect of these two variables found in the present experiment are in full agreement with the theoretical framework of Inglis (1961). From these results, it is clear that prediction of results of a perceptual defense experiment must always consider the subject's susceptibility to stress and degree of stress present. Neither of the main variables alone are sufficient to produce perceptual defense, i.e., high or low individual susceptibility to stress alone does not permit prediction of the direction of results which will be obtained within an experimental
situation, nor will high or low amounts of stress alone permit such prediction.

These findings have implication for studies which inform subjects to except taboo words (Lacey, Lewinger, & Adamson, 1953; Freeman, 1954, 1955; Nothman, 1961). Negative results obtained by these experimenters were due to the fact that such instructions are anxiety-reducing and thus the stress was lowered. It was found that by using the extreme of an Introvert-Extrovert personality continuum, characteristic avoidance activity in a perceptual recognition task using threatening stimuli can be reversed from perceptual defense to vigilance and vise versa with a change in the degree of experimental stress employed.

Avoidance Activity and Anxiety

Avoidance of perceiving threatening stimuli appears to be anxiety-reducing. The second main hypothesis advanced in the present research was that the affective response (GSR) obtained will reflect the interaction of susceptibility to stress and amount of stress in the experimental situation by providing physiological measures of affective reactions to the stimuli. Results obtained were not statistically significant but were in the predicted direction. Differences obtained suggest that amount of avoidance activity, as revealed by perceptual defense responses, is anxiety-reducing. Specifically, if GSR may be taken as a measure of emotion,
it was found that when individuals exhibited perceptual defense, less anxiety was noted by GSR than when individuals exhibited perceptual vigilance. These findings suggest that the same interaction between individual differences and amount of stress found in avoidance responding is also reflected in affective responses. Introverts exhibit less GSR when under low stress conditions, and are performing with perceptual defense, than when under high stress conditions, and are performing with perceptual vigilance. Contrariwise, Extroverts exhibit less GSR when under high stress conditions, and are performing with perceptual vigilance, than when under low stress conditions, and are performing with perceptual defense. GSR found during various experimental conditions suggest that the greater the avoidance activity, the less the GSR.

Differences found in GSR activity, along with differences in recognition threshold, then, further suggest that the amount of subjective anxiety present affects perception of visual stimuli. Recognition of stimuli is possible at lower thresholds as anxiety increases. This finding is in accordance with the experimental results of such physiological experiments in which stimulation of the subcortical centers involved in emotional reactivity facilitates perception (recognition of stimuli) (Gellhorn et al., 1954, 1955; Lindsley, 1960). Perceptual defense experimenters have also theorized about this possibility. Pustell (1956), for
example, suggests that vigilance is not due to attractiveness to taboo subjects but rather to a perceptual heightening produced by anxiety.

**Discrimination Without Awareness**

Discrimination found prior to recognition implies that personality differences do not imply a differential influence of stress, as far as anxiety arousal is concerned, but are related to methods of handling anxiety. The third main hypothesis advanced was that galvanic skin response (GSR) obtained prior to word recognition would reflect discrimination without awareness. GSR was found to be greater to critical than to neutral words under all experimental conditions. There was some tendency for the magnitude of GSR to vary with avoidance activity to the recognition task, i.e., with vigilance there was noted greater GSR than with defense response, reflecting personality differences in subception effect. These findings indicate, first, that some process occurs which permits discrimination of critical stimuli from neutral stimuli without awareness, and secondly, that anxiety is greater when avoidance activity in response to a threatening stimulus presentation is not possible.

The present data have strong implications for suggesting the processes underlying the relationship between personality characteristics and type of avoidance activity utilized in stressful
situations. Findings show a relationship between a particular personality area and type of avoidance behavior and furthermore that type of avoidance behavior can be reversed with an increase of stress. According to Inglis (1961), the relationship exists because the Introvert is more fearful of threatening stimuli than the Extrovert, and, hence greater anxiety is aroused for him as a consequence of being confronted with threatening stimuli. An increase in stress, however, motivates the Extroverts to initiate avoidance activity whereas it disrupts avoidance activity in the Introverts. Both situations supposedly occur because of greater subjective anxiety on the part of Introverts; that is, individuals initiate avoidance reactions to their own anxiety-producing covert responses to threatening stimuli under low stress, but under high stress, greater anxiety disrupts effective avoidance activity.

However, present findings indicate that both personality types experience anxiety prior to recognition of the threatening stimuli with no significant differences in magnitude of GSR. The differences, in fact, seem to be related to the type of reaction rather than to the personality type, i.e., the characteristic method of handling anxiety. Thus, it appears that avoidance activity is linked to the cue property of anxiety—i.e., predisposed ways of handling anxiety, rather than to the drive property of anxiety—i.e., the degree of anxiety arousal in the two personality types. The effect
of greater stress is on methods of handling anxiety rather than on degree of subjectively felt anxiety.

The findings that vigilance conditions produce greater anxiety to critical words than do defense conditions has implications for early conceptualizations of "perceptual defense" and points up the necessity of including vigilance and defense when considering avoidance activity. In the past, whenever vigilance was found, it has been regarded as negating the concept of perceptual defense. Perceptual defense then, did not exist if avoidance reactions were not obtained to threatening stimuli. The present findings suggest that even when vigilance is obtained in response to a threatening stimulus, anxiety is present; anxiety in fact, which is greater than when perceptual defense is obtained. This suggests that conditions which produce vigilance are not necessarily less stressful to the individual, but rather influence the manner in which he handles anxiety. Threatening stimuli, then, elicit both anxiety and a method of handling it. But if a certain mode of handling anxiety, for example, perceptual defense, is not observed, this does not imply that anxiety is not aroused.

Findings indicating a subception effect have implications, not only for perceptual theory, but may also have relevance in the field of personality and clinical psychology. The unconscious determination of behavior is a concept of considerable importance in present-day clinical thought. Insofar as autonomic activity
can be regarded as a form of behavior, the present findings can be considered an experimental example of such an unconscious process. The field of psychosomatic medicine is specifically concerned with autonomic activity as a response to threat or conflict situations. Also, clinical observations in this area have emphasized the inability of many patients to identify the stimulus situation to which their symptom is presumably a response. Findings in this experiment might eventually lead to an understanding of these observations.

Integration with Past Research

Present findings appear important to two issues apparent in perceptual defense experiments. One is the inconsistency of perceptual defense findings and the other is the inconclusive findings on discrimination without awareness. The first issue concerns findings which include vigilance responses among some subjects along with defense responses (Singer, 1956) and also vigilance responses found under certain experimental conditions such as those which inform subjects to expect taboo words (Postman et al., 1953; Lacey et al., 1953; Freeman, 1954). The second issue concerns the inconsistency with which discrimination without awareness as measured by GSR has been found (Newhall and Sears, 1933; Miller, 1939; McGinnes, 1949; Lazarus and McCleary, 1951, etc.).

The first issue can be resolved on the basis of an inter-
action effect between personality differences in using avoidance techniques to emotion-arousing stimuli along with differing degrees of stress produced by experimental conditions. Findings in the present research support the contention that perceptual defense is best defined as a descriptive term for any systematic relationship between stimulus emotionality and the ease of recognition of stimuli. Both elevated and lowered thresholds are part of the same functional relationship, as has been suggested by Inglis (1961) and Brown (1961).

The second issue, concerning GSR indications of discrimination without awareness, though it appears to be related to a separate process involved in perception and has so been treated, can also be related to the same relationship indicated above. GSR reactivity, in this view, can be regarded as being indicative of subjective affective response to stimuli and is dependent upon personality differences in handling anxiety-provoking stimuli in combination with objective stress involved in the experimental situation. GSR reactivity, then, is an indicator of the anxiety-reducing function of the avoidance activities of the subject. Trends of GSR data suggest that the amount of affective reactivity is related to lower perception thresholds, adding credence to the physiologically observed facts that emotion facilitates perception (Gellhorn, 1954, 1955; Lindsley, 1960).
Critique

Response suppression does not appear to be a factor in results obtained in this experiment. The experimental design utilized mild threatening stimuli, personalized for each S, and equated for word frequency with neutral words to control for response suppression. Furthermore, sex and experimenter differences were investigated to control for such response suppression which might have occurred due to these variables as has been pointed out (Cowen and Beier, 1954; Minard, 1965, Inglis, 1961) to be an important consideration. No sex or experimenter differences were found in the present experiment. It should be noted that in experiments where response suppression has been found due to sex or experimenter effects (Northman, 1962; Postman, 1951; Pustell, 1956, and others), personality factors of the subjects were not taken into consideration. Alper (1957) and Singer (1956) have also suggested that heterogeneity can cancel out differences in results obtained in a perceptual defense experiment. These experimenters neglected to consider the crucial significance of personality differences which cross sex lines. It is likely that sex differences found were contaminated by differences in personality which includes differences in characteristic avoidance techniques.

The present study elucidates the influence between personality and degree of stress on avoidance activity and affective reactivity to threatening stimuli in a perceptual defense paradigm,
however, certain limitations should be noted. Although the rationale for the procedure of subject-selection was obtained from findings of performance differences on the T.A.T. for Introverts and Extroverts by Foulds (1953), who found low productivity and high productivity, respectively, reliability measures were not obtained for the task used in this experiment. The task appears to be effective, in view of the findings which revealed avoidance differences between Ss defined by this task, but statistical demonstration of reliability would be desirable.

Suggestions for Future Research

College students were used as subject in the present study. Even though the subjects were selected as being extreme cases on a behavioral measure of susceptibility to stress, it would be expected that other groups, such as clinical patients groups, would have greater difference in susceptibility.

Thus, when the dimension of neuroticism is superimposed upon the Introversion-Extroversion dimension (Eysenck, 1961) utilized in this experiment, differences in avoidance technique utilization would be magnified. The results on perceptual defense would possibly reveal these differences to a greater degree and it seems possible that GSR reactivity would be more indicative of anxiety measures in their association with avoidance activity, since such subjects would have stronger avoidance tendencies. Since significant GSR
differences between groups were not found in the present study, it is possible that a more widely differentiated group of subjects would reveal accentuation of the suggested trend as a function of greater personality differences. Eysenck (1957), for example, considers hysteria the neurosis of the Extrovert and obsessive-compulsion neurosis, anxiety states, and depression the neurotic reaction of the Introvert. Research using such subject groups, then, should show the avoidance activity and GSR as they are correlated with personality type and reveal further the relationship between the cue and drive functions of anxiety. Other experimenters suggesting such a possibility are Pascaul et al. (1964), Alvarez et al. (1958), and Finillos et al. (1953).
CHAPTER V

SUMMARY

It was hypothesized in the present experiment that there is an interaction of susceptibility to stress and the amount of stress in a perceptual defense paradigm. It was further hypothesized that GSR would reflect the interaction of susceptibility to stress and amount of stress by providing a physiological measure of autonomic activity prior to and after recognition threshold determination.

Subjects were identified according to readiness to respond to sexual and aggressive pictures as being either high or low in susceptibility to stress (Introverts and Extroverts, respectively). Test stimuli were four personally-relevant emotion-arousing words selected by objective criteria applied to a word association test and four neutral words (matched in familiarity and frequency of usage). These visual stimuli were presented tachistoscopically to four experimental groups of (1) Introverts-low stress conditions; (2) Introverts-high stress condition; (3) Extroverts-low stress condition; (4) Extroverts-high stress condition. Recognition thresholds for the words presented were determined by a modified method of limits while GSR measures were obtained simultaneously.

The findings are as follows:
1. The interaction effect of Susceptibility to Stress and degree of stress on recognition thresholds was significant.

2. The interaction effect of susceptibility to stress and degree of stress on GSR reactivity was nonsignificant for both whole word response and to subception response, although there were numerical trends indicative of such an interaction.

3. GSR reactivity to critical words was significantly greater than to neutral words for both total word responding and subception responding.

4. GSR reactivity to vigilance recognition conditions was numerically greater than to defense recognition conditions although not significantly.

5. No sex or experimenter differences were found in the recognition threshold determination.

The results were discussed in terms of Inglis' interaction hypothesis and physiological implications in perception. It was concluded that both elevated and lowered threshold are part of the same functional relationship which depends upon the interaction of the individual's susceptibility to stress and degree of objective stress. It was further concluded that GSR reactivity can be regarded as an indication of subjective affective response to stimuli and is dependent upon personality differences in handling anxiety-provoking stimuli in combination with objective stress involved in the experimental situation. GSR reactivity is an indicator of the anxiety-
reducing function of the avoidance activities of the subject and
does not necessarily reveal a separate discriminatory process. In
light of these conclusions, there is some support for the contention
that emotion facilitates perception.
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APPENDIX A

Description of the Pictures
Used for Subject Selection

Description

Sexual
1. A nude girl and a man clothed in a T-shirt are lying on an ornate iron bed in a darkened room. The girl is lying on her stomach with arms outstretched, feet crossed, and head upheld. The man is propped up on one elbow facing the girl although their eyes do not meet.

2. A young man and woman are sitting on a bed covered with a red blanket. The girl is clothed in a yellow men's pajama top. She is sitting with legs crossed, Indian-style, her head thrown back with an expression of outcry as the young man, sitting behind her, clutches her arm, thus exposing her shoulder and kisses her on the upper neck.

Aggressive
1. A young man is grasping the collar of an older man. The scene is in a well-but not expensively-furnished room. Both men have intense facial expressions indicating a heated verbal exchange.

2. A man and a woman are engaged in a violent struggle. The man has both of the woman's arms secured and she is bent forward, hair flying, attempting to free herself.

Neutral
1. Four young people, two girls and two boys, are walking down a street in Copenhagen. Two of them have shopping bags and two are eating grapes. All four are smiling and appear happy.

2. A group of young people cooking fish and picknicking on a beach. They are grouped around a palm tree in the foreground; the open water, beach and a combo posed with musical instruments are in the background.
Neutral (continued)

3. A group of young people are in attendance of a buffet supper in a hunting lodge or rustically decorated hotel. The buffet table, laden with foods and wine bottles, is in the foreground. Brightly clothed men and women are gathered together, laughing, eating and drinking.

4. A well-dressed young man is obviously buying men's after-shave lotion at a counter in a well-decorated store. A salesgirl is standing behind the counter.

5. A dark-haired girl is sitting reposed on the edge of a bed made up with pink monogrammed sheets and pillow cases. The room is very elegantly decorated with gold-leaf mirror and marble-topped table. The girl is clad in pink towels and pink ribbon in her hair.
APPENDIX B

Word Association Test

<table>
<thead>
<tr>
<th>Critical</th>
<th>Neutral</th>
<th>Critical</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby</td>
<td>Ball</td>
<td>Lord</td>
<td>Look</td>
</tr>
<tr>
<td>Bite</td>
<td>Bade</td>
<td>Love</td>
<td>Lose</td>
</tr>
<tr>
<td>Body</td>
<td>Beck</td>
<td>Make</td>
<td>Mark</td>
</tr>
<tr>
<td>Breast</td>
<td>Breath</td>
<td>Mama</td>
<td>Ma'am</td>
</tr>
<tr>
<td>Child</td>
<td>Check</td>
<td>Money</td>
<td>Month</td>
</tr>
<tr>
<td>Date</td>
<td>Dark</td>
<td>Mother</td>
<td>Method</td>
</tr>
<tr>
<td>Dare</td>
<td>Deer</td>
<td>Mouth</td>
<td>Month</td>
</tr>
<tr>
<td>Defect</td>
<td>Detect</td>
<td>Neck</td>
<td>Next</td>
</tr>
<tr>
<td>Dirt</td>
<td>Dive</td>
<td>Need</td>
<td>Near</td>
</tr>
<tr>
<td>Dream</td>
<td>Dress</td>
<td>Pain</td>
<td>Pair</td>
</tr>
<tr>
<td>Eat</td>
<td>Ear</td>
<td>Prayer</td>
<td>Prefer</td>
</tr>
<tr>
<td>Fail</td>
<td>Fall</td>
<td>Prick</td>
<td>Prior</td>
</tr>
<tr>
<td>Feel</td>
<td>Feet</td>
<td>Quarrel</td>
<td>Quickly</td>
</tr>
<tr>
<td>Fight</td>
<td>Fifty</td>
<td>Queer</td>
<td>Qotah</td>
</tr>
<tr>
<td>Fine</td>
<td>Five</td>
<td>Self</td>
<td>Slip</td>
</tr>
<tr>
<td>Fire</td>
<td>Five</td>
<td>Sin</td>
<td>Sir</td>
</tr>
<tr>
<td>Food</td>
<td>Foot</td>
<td>Soft</td>
<td>Sort</td>
</tr>
<tr>
<td>Hate</td>
<td>Half</td>
<td>Squat</td>
<td>Squad</td>
</tr>
<tr>
<td>Hard</td>
<td>Hand</td>
<td>Suck</td>
<td>Sunk</td>
</tr>
<tr>
<td>Have</td>
<td>Hair</td>
<td>Wife</td>
<td>Wind</td>
</tr>
<tr>
<td>Hide</td>
<td>Hire</td>
<td>Wish</td>
<td>With</td>
</tr>
<tr>
<td>Home</td>
<td>Hour</td>
<td>Wise</td>
<td>With</td>
</tr>
</tbody>
</table>

*Critical and neutral words matched for frequency by Thorndike-Lorge Word-Count (1944).*
APPENDIX C

Rating Scale for Sexual and Aggressive Themes

<table>
<thead>
<tr>
<th>Rating</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Themes denying sexual content.</td>
</tr>
<tr>
<td>1</td>
<td>Themes relating to love, dating, married love (without sex implied), flirting, romance.</td>
</tr>
<tr>
<td>2</td>
<td>Themes implying sex or sexual desires between married partners.</td>
</tr>
<tr>
<td>3</td>
<td>Themes relating to sex between married partners.</td>
</tr>
<tr>
<td>4</td>
<td>Themes implying illicit sexual relations.</td>
</tr>
<tr>
<td>5</td>
<td>Themes expressing illicit sexual relations.</td>
</tr>
<tr>
<td>6</td>
<td>Themes combining sex and violence, aggression, force, dominance, etc., or sexual perversion.</td>
</tr>
</tbody>
</table>

**Sexual Content Scale**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Themes denying aggressive content.</td>
</tr>
<tr>
<td>1</td>
<td>Themes relating to disagreements, rejection, strong emotions, hostility, stress.</td>
</tr>
<tr>
<td>2</td>
<td>Themes relating to arguments, anger.</td>
</tr>
<tr>
<td>3</td>
<td>Themes relating to restraint and domination, threat, rebellion, violent arguments.</td>
</tr>
<tr>
<td>4</td>
<td>Themes relating to aggression, biting, hitting, grasping, fighting, physical struggles, violence, assault, clutching.</td>
</tr>
<tr>
<td>5</td>
<td>Themes relating to forceful violence, beating, strangling, killing.</td>
</tr>
<tr>
<td>6</td>
<td>Themes relating to extreme violence combined with sex.</td>
</tr>
</tbody>
</table>
VITA

June H. Tuma was the only daughter of six children born to Mary Pospisil Tuma and Harry Tuma in Libuse, Louisiana, on June 22, 1934. She attended elementary school in Pineville, Louisiana and high school in Alexandria, Louisiana. She entered Louisiana State University in 1954 and received the degree of Bachelor of Arts in January, 1958. She re-entered Louisiana State University in September, 1958, as a College Teaching Fellow from the Council of Southern Universities and received the degree of Master of Arts in May, 1962. From July, 1962, to July, 1963, she served a clinical psychology internship at Central Louisiana State Hospital in Pineville, Louisiana. From July, 1963, to September 15, 1963, she served as clinical psychologist at The Alexandria-Pineville Rehabilitation and Child Guidance Center in Alexandria, Louisiana. She became a candidate for the degree of Doctor of Philosophy in August, 1965, while on a psychology training stipend from the State Department of Hospitals of Louisiana. Upon receipt of her degree, she will spend two years at Reiss-Davis Clinic for Child Guidance in Los Angeles, California, where she will become a Postdoctoral Fellow in Child Clinical Psychology, sponsored by the National Institute of Mental Health of the United States Public Health Service.
EXAMINATION AND THESIS REPORT

Candidate:       June M. Tuma

Major Field:    Psychology

Title of Thesis: AN ANALYSIS OF PSYCHOLOGICAL FACTORS IN SUBLIMINALLY PERCEIVED STIMULI: AN INVESTIGATION OF THE INTERACTION OF SUSCEPTIBILITY TO STRESS AND DEGREES OF STRESS IN A PERCEPTUAL DEFENSE PARADIGM.

Approved:

[Signature]
Major Professor and Chairman

[Signature]
Dean of the Graduate School

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:

28 July 1965