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THE RELATIONSHIP OF IMAGERY ABILITY AND THE
EFFICACY OF IMPLOSIVE THERAPY OF RAT FEARS

A Dissertation

Submitted to the Graduate Faculty of the
University of Windsor
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Psychology

by

Lawrence James Ryan

September, 1971

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ABSTRACT

The study investigated the relationship of imagery ability and the process and outcome of implosive therapy. A relatively recent development in psychotherapy, the system of implosive therapy is based on learning theory and psychodynamic principles. It was hypothesized that Ss with high measured imagery ability would experience more intense levels of anxiety during implosion and less intense levels during a posttherapy behavioral and self report test than Ss with low imagery ability.

Female Ss were screened from undergraduate classes according to their response to an item on a fear inventory indicating a level of rat fear. Also at the prescreening phase imagery measures and baseline anxiety measures were acquired through self report questionnaires. At a later date Ss who met the selection criteria and who volunteered were seen individually and submitted to pretherapy behavioral and self report measures of rat fear before listening to an implosive therapy tape. Self report measures of fear were administered twice in the course of the tape, and posttherapy behavioral and self report measures followed it.

Ss were assigned to high and low imagery groups, and members of each group were matched for level of trait anxiety. Statistical comparisons were made between the two groups on the basis of data

obtained in the experimental procedure. A significant difference was observed between the two groups with respect to the level of state anxiety experienced during the implosion session. The high imagers sustained high levels of anxiety more so than low imagers. High imagers also demonstrated significantly less rat fear on a behavioral avoidance test administered after implosion. The test involved the pass or fail criterion of picking up a live laboratory rat. Low imagers demonstrated significantly lower levels of anxiety on two self report measures administered at the posttherapy test.

The results were discussed with respect to the effectiveness of the overall procedure and the discrimination of high and low imagers on the basis of the measures employed.

INTRODUCTION

The system of implosive therapy first appeared publicly in 1964 in the book, The Modes and Morals of Psychotherapy (London, 1964). London introduced the theory in general terms and predicted that the new system would be a potent force in the future of psychotherapy (London, 1964). In 1968 Stampfl, the author of implosive therapy, his theories and an example of his treatment procedure were presented on the national television broadcast, the Twenty-first Century. At the time implosive therapy was considered a radical and direct approach to psychotherapy and a part of the current trend of behavior therapies.

While the theory underlying implosive therapy is based on learning principles, the actual technique involves the process of imagining scenes of varying degrees of emotional arousal. In the present study we are attempting to shed some insight on the relationship of imagery ability and the elicitation of anxiety as well as the extinction of fear in the implosive therapy procedure. Does the level of one's imagery ability enhance the evocation of anxiety producing stimuli during the implosive procedure? Is there a relationship between imagery ability and behavioral and self report changes subsequent to the implosive process?

Consequently, the issues that will be dealt with in the course of this study include: fear, the extinction of fear, the particulars

of the implosive process and the construct of imagery ability.

Fear

While fear has not been consistently and precisely discriminated from anxiety in psychological literature, at least several authors have agreed that there are nuances of meaning that distinguish the two terms. Anxiety is considered to be fear set off by cues or symbols from some remote and uncertain danger. It is the anticipation of a potentially punishing or aversive event, not in response to the event itself, but in response to the stimuli that are associated with the event. On the other hand, fear is a broader term. It includes the anticipatory anxiety as well as the reactions that are made in response to the disturbing event itself (Wickens & Meyer, 1955; Cattell, 1961; Levitt, 1967). Consequently, anxiety involves a conditioned component, while fear does not necessarily do so. An organism experiences anxiety only if it has learned to associate the aversive qualities of some event with stimuli that are associated with or precede the event. Fear is experienced both as the learned anxiety reaction as well as unlearned aversive or disturbing events.

Except in the most naive of neonatal organisms, human fear is experienced along with anxiety reactions, as fear is inevitably conditioned in the presence of a wide variety of contextual cues. Both fear and anxiety share the same physiological reactions. Consequently, operationally both fear and anxiety are identical. The distinction between the two reactions is at present considered to be theoretical, and they are treated identically by experimentalists

(Levitt, 1967).

Anxiety is a principle of foremost importance in behavior therapy. The main tenet of most behavioristic therapy systems is that anxiety constitutes a learned habit or reaction. This is demonstrated by the conditioning of anxiety to neutral stimuli in the laboratory for both animal and human Ss (Wolpe, 1958; Watson & Raynor, 1920). The laboratory model for the conditioning of anxiety is quite simple. Some aversive condition such as confinement or electric shock is preceded by a neutral stimulus such as a bell, buzzer or the color of a cage. By the Pavlovian conditioning principles the neutral stimulus takes on the properties of a naturally aversive stimulus becoming a conditioned stimulus. Liddell demonstrated this procedure in sheep who were stimulated with electrical shock preceded by a buzzer (Liddell, 1966).

While the development of anxiety has been explained by Freud in analytic terms, Dollard and Miller have translated these theories into empirical research. Dollard and Miller viewed anxiety as a powerful secondary drive. Fear is generalized from situations of pain or deprivation by its association with the cues or circumstances that surround the originally aversive situation, or by the process of stimulus generalization. Conflict also gives rise to anxiety when two incompatible drives motivate an individual. The individual's level of anxiety also helps determine how he will handle the conflicting situation (Hall & Lindzey, 1966).

Operationally anxiety can be measured from physiological,

psychological and behavioral measures. Lang (1966) contended that fear cannot be measured alone from any one of the above sources. As a construct in an experiment, fear or anxiety according to Lang is:

associated with three measurable behaviors: verbal, motor and somatic. The verbal aspect of fear is clearly illustrated by the patient's statement, "I am afraid." It is also revealed in disturbances of speech pattern or verbal recall. The main motor component is simple avoidance. The individual who is afraid of heights requests a hotel room on the first floor. A hooded rat, shocked previously in the black compartment, jumps a barrier into the white enclosure. The motor component may also show itself in failures of coordination or "displacement behavior." The third relevant sector of behavior involves the muscular and autonomic substrate of fear. Distress is betrayed by alterations in respiration, cardiac rate, and blood pressure, and by a decrease in skin resistance and an increase in electromyographic levels (Lang, 1966, p. 41).

The verbal aspect of anxiety measure is represented by both psychometric projective and questionnaire methods. Projective methods, while useful in clinical diagnostic procedures are problematic in research as they lack quantifiable results and require extensive evaluations by trained and experienced clinicians to interpret their significance which is likely very dependent upon the background and present status of the S (Levitt, 1967). A number of questionnaire methods have been employed effectively in experimental situations to measure anxiety. These include the Manifest Anxiety Scale (Taylor, 1953), the S-R Inventory of Anxiousness (Endler, Hunt & Rosenstein, 1962), the Fear Survey Schedule (Geer, 1965), the Affect Adjective Check List (Zuckerman, 1960), the Freeman Manifest Anxiety Test (Freeman, 1953), the State-Trait Anxiety Inventory (Spielberger & Gorsuch, 1966) as well as the IPAT tests of anxiety

(Cattell & Scheier, 1961; Scheier & Cattell, 1960). Each test has its own limitations and was designed for use in rather specific situations.

Measures of approach and avoidance have been used to quantify fear in regard to specific objects or situations. It was Wolpe who defined the proximation phobia as the increase of anxiety with decreasing distance from a fearful object (Wolpe & Lazarus, 1966). A variety of experimental studies involving forms of behavior therapy have employed the avoidance response as a behavioral measure of anxiety level or fear at various points (Jones, 1924; Lang & Lazovik, 1963; Lang, Lazovik & Reynolds, 1965; Kirchner & Hogan, 1966; Willis, 1968; and Singer 1969).

Extinction

Since behavior therapy claims the relief of anxiety through the use of conditioning principles, the process of extinction is discussed in most behavioristic systems. A concise definition of extinction is stated as follows, "omission of the unconditioned stimulus or reinforcement that previously followed eliciting stimuli or instrumental responses (Wolpe, 1966 p. 173)." Behaviorally extinction is defined as, "the progressive weakening of a habit through the repeated nonreinforcement of the responses that manifest it (Wolpe & Lazarus, 1966 p. 14)." The systems of behavior therapy include other phenomena such as counterconditioning and reconditioning within their frameworks. However, the principle of extinction is the most basic, and supporting principles of change can be interpreted as derivatives of it. The above definitions of extinction are rather

simplistic. Other authors have offered more comprehensive analyses of the phenomenon. For example, Guthrie viewed extinction as a form of inhibition due to the interference caused by the learning of a response that was incompatible with the one extinguished. Habit patterns are difficult to extinguish because they are maintained by highly specific cues that are often only secondarily associated with the habit itself. These cues are often not confronted in daily life which makes the extinction process even more inaccessible. Consequently in order to break or extinguish a habit, it is necessary to first isolate the cues that are pertinent to the habit, and then substitute other behaviors in the presence of the cues (Hilgard & Bower, 1966).

Mowrer's two factor theory offered the principle of fatigue as an explanation of extinction. Basically the nonrewarded behaviors are inhibited by the conflict that results from the fatigue that follows the unrewarded performance. Fatigue generates the response of resting which is incompatible with and inhibiting to the original response (Mowrer, 1960). Hull's theory of extinction was closely related to Mowrer's as he employed an inhibition theory as well (Hilgard & Bower, 1966).

To account for the extinction or change of behavior that takes place in traditional forms of psychotherapy, Holland & Skinner (1961) viewed the therapist as a nonpunishing audience who allowed the expression of emotional responses by the patient. The responses were extinguished by the nonreinforcing attitude of the therapist. Even the Freudian concept of transference relationship, important

for therapeutic change within that system, has been interpreted by Soloman & Wynne (1954) as a duplication of parts of the conditioned stimulus patterns associated with the original traumatic experience to which emotional responses are attached. The establishment of the transference relationship allowed for the extinction of the emotional responses.

Implosive Therapy

In discussing implosive therapy London (1964) introduced Stampfl as an action therapist who presents a learning theory based system of an innovative nature. A therapeutic system based on learning theory must of course adhere to basic learning principles. Pavlov's basic conception of learning was one of stimulus substitution, resulting from the temporal contiguity of two stimuli. Thorndike, on the other hand, conceived of learning in terms of response substitution. Mowrer (1960) found both of these theories lacking as an independent or complete explanation of avoidance learning. In order to fully explain the phenomenon of avoidance learning, he stated that both forms of learning were necessary. He referred to the Pavlovian paradigm as sign learning and to the Thorndikian model as solution learning. The result is a conditioned reaction to the previously neutral stimulus. The organism reacts with arousal or fear to the conditioned stimulus which was previously incapable of eliciting such a reaction. This is simply stimulus substitution or Pavlovian learning. Thorndikian learning or response substitution is involved when the organism produces a response which anticipates and removes it from the onset of the

noxious stimulus.

Implosive therapy is partially based on Mowrer's two factor learning theory and on psychodynamic principles. In several recent papers, Stampfl and his associates have presented the basic theory as well as experimental and clinical evidence supporting the system. Stampfl (1967) explained the theory using the example of avoidance learning both in the animal laboratory and in human psychopathology. In regard to the former case he states:

Laboratory animals can be conditioned to react emotionally to previously neutral stimuli by pairing these stimuli with painful stimulation (e. g. electric shock). The emotional state resulting from this pairing is labeled as fear or anxiety, and the stimuli producing the emotional state are designated as danger signals or conditioned stimuli. The fear or anxiety state functions as a motivator of behavior, while the reduction or elimination of the fear state serves as a reinforcer of behavior (Stampfl, 1967 p. 12).

In regard to human psychopathology Stampfl provides the following explanation:

As a result of past specific experiences of punishment and pain, strong anxiety reactions are conferred to initially "neutral" stimuli." The neutral stimuli correlated with the painful events then acquire the potential to produce anxiety reactions. The image (thought, memory, neural engram) of the stimuli correlated with the past experience of pain will be avoided, and whatever action or mechanism which prevents them from recurring will be learned and maintained on the basis of anxiety reduction.

In general, it can be said that the defensive maneuvers and systems of the human patient result from attempts on his part to avoid or terminate stimuli (imagery, thoughts, impulses) that function mainly as internal danger signals. The laboratory animal's avoidance behavior, on the other hand, may be seen predominately as a response to external danger signals. In both cases the stimuli, whether internal or external possess the capacity to produce the negative emotional state of anxiety. Avoidance behavior based on an

anxiety reaction to internal or external stimuli is seen as the key explanation of the behavior (Stampfl, 1967 p. 13).

In his system Stampfl assumed that the patient was exposed to only a small fraction of the anxiety inducing stimuli. These few cues were sufficient to produce a small amount of anxiety which is sufficient to drive easily learned avoidance behaviors. If the patient were forced to confront more of the internal stimuli which function as danger signals, then greater levels of anxiety would be elicited and extinction in the absence of reinforcement would be more likely.

Stampfl derived his actual theory and technique of implosive therapy after he related conclusions from two general observations. First, he observed that success in play therapy with children depended on the degree of emotional response accompanying behavior patterns during the play session. He noted that typical playroom behavior included emotionally intense experiences of hostility, aggression and sexual behavior. After such episodes more adaptive behavior changes tended to follow without interpretation on the part of the therapist or insight on the part of the patient. Secondly, he was impressed by the observations of Maslow and Mittelman (1951) who claimed that the pathological behavior of the neurotic resulted from his vague and unidentifiable feelings of anticipated catastrophe, abandonment, condemnation and loss of love (Stampfl, 1967). Stampfl also viewed the neurotic as engaging in defensive and avoidant behavior as his means of weakening the expectation of catastrophe. He claimed that anticipated catastrophe, even though

it was subjectively perceived as such, had stimulus properties. Consequently, anxiety states were viewed in terms of being the result of simple conditioning that can be easily examined in the laboratory. Painful experiences that are associated with them were conditioned in the process as well.

Therefore, Stampfl's theory assumed that human psychopathology is initiated and maintained by anxiety eliciting stimuli both of an interoceptive and exteroceptive nature. The patient tends to avoid anxiety evoking stimuli. Patterns of avoidance are arranged sequentially by the degree of aversiveness. Some stimuli are so threatening that they are completely avoided or repressed. Avoidance patterns are arranged in the order such that those most closely associated with trauma are avoided or repressed more than those more remotely associated with trauma. The former are subsequently more resistive to extinction because of their lack of accessibility to awareness (Levis, 1967). The role of the therapist in implosive therapy is therefore to devise a method to deprive the anxiety producing stimulation of its potential.

Stampfl based much of his theorizing on the studies of Solomon and Wynne (1954) who demonstrated that the transference relationship of dynamic therapy helped extinguish anxiety responses since the relationship duplicated in part the stimulus patterns associated with the original experience of anxiety. By virtue of the similarity of the transference relationship with the original anxiety provoking experience, extinction takes place. Miller (1951)

had observed that in the case of experimental neuroses, the animal extinguished faster when in the original punished situation. Solomon, Kamin & Wynne have subsequently based the conservation of anxiety hypothesis on this theory. They state:

The best way to produce extinction of the emotional response would be to arrange the situation in such a way that an extremely intense emotional reaction takes place in the presence of the CS. This would be tantamount to a reinstatement of the original acquisition situation and since the US is not presented a big decremental effect should occur. (Solomon, Kamin & Wynne, 1953 p. 299)

This theory which is very important to implosive therapy has been demonstrated experimentally in studies by Block (1958), Denny, Koons & Mason (1959), Knapp (1965) and Weinberger (1965).

In regard to psychodynamic theory, Stampfl (1967) viewed the notions of abreactions, catharsis and ventilation as counterparts to experimental extinction. The elicitation of these phenomena in the course of traditional therapy is often associated with the remission of symptomatic behavior. However, it is the mechanism of repression that prevents the expression of the emotional state in the therapy session and consequently blocking the reproduction of the anxiety provoking stimuli in an unpunished state when they would have the opportunity to extinguish. It is the specific role of the implosive therapist to present to the patient an approximation of the hypothesized repressed material based on interview data, testing information and theoretical speculation. Therefore, implosive therapy takes the form of the therapist presenting to the patient repeatedly and as vividly and clearly as possible an approximation of repressed material in order to elicit an intense

emotional reaction in the absence of primary reinforcement. In accordance with the principle of generalization of extinction, the conditioned emotional response gradually decreases along with the disappearance of the symptomatic behavior that had been previously motivated by the emotional state as an avoidant response.

The subhuman studies supporting the theory of implosive therapy were based on the avoidance conditioning paradigm employing a shuttlebox. The basic fear conditioning experiment involved the pairing of a "neutral stimulus" with an aversive stimulus. The neutral stimulus acquired the capability of eliciting fear by virtue of its contiguity to the aversive stimulus. The animal was given the opportunity to escape the aversive stimulation by crossing a barrier to the opposite side of the box. The neutral stimulus soon became a danger signal, and the animal avoided the aversive stimulus by making his crossing of the barrier at the onset of the neutral stimulus (Levis, 1967).

Stampfl observed that this type of behavior, although truly avoidant, was not persistent and failed to persevere once the shock was turned off. In contrast, human psychotic and neurotic symptoms persist for years. He hypothesized that this was due to several factors. For one, the shuttlebox was viewed as conducive to the learning of competing responses such as freezing which interfered with the avoidance response. Further the stimuli in the situation before and after the shock were not distinct enough to provide significant discrimination between the two chambers for the animal. The animal failed to associate one box with safety

and one box with danger. Finally it was hypothesized that conditioning occurred to a variety of stimuli rather than to just one. Consequently, further experimentation involved some modifications of the basic shuttlebox experiment (Levis, 1967)

Levis (1961) made each of the shuttlebox compartments a distinct stimulus situation by making one black with a grid floor and the other white with a solid floor. He added a drop gate to separate the two compartments. The situation was also modified by the introduction of three distinct stimuli during an 18 second interval between the conditioned stimulus and the unconditioned stimulus. The stimuli were presented serially in six second segments and consisted of the following: gate raising, flashing light, and a buzzer. The unconditioned stimulus was electric shock from the grid floor. Further each animal was handled in the transfer from the white box back to the black box for the following trial. Under these modified conditions, the criterion of avoidance responses was reached in only one to three shock trials, and the latency of response decreased gradually to the first few seconds of the 18 second interval. As expected, the extinction procedure began to take place as fear was reduced and the animal allowed himself to remain in the black compartment for longer periods of time. However, it was noted that for the last of the three stimuli, the buzzer, extinction was particularly resistant, since it likely had the highest attachment to anxiety and was closest in time to the onset of the shock. The avoidance response was still strong to the buzzer after 1000 trials and

showed indications of persisting well past this point (Levis, 1961)

Stampfl (1961) found a similar strong resistance to extinction in a study involving a fourth order serial stimulus pattern. His results were replicated by Kostansek & Sawrey (1965) and were in support of the hypothesis that it is likely a complex stimulus pattern that underlies the maintenance of persistent psychopathological behavior (Levis, 1967).

The actual procedure of implosive therapy with humans was explained by Levis (1967) and Stampfl & Levis (1966 b). With the subhuman subject the E is responsible for the conditioning process, and subsequently the choice of stimuli to present in the implosive session is no problem. However, with the human patient, the therapist must use his clinical skills to reconstruct the conditioning paradigm. The therapist can use case history materials, interview or test data to formulate his approximation of the conditioning contingencies. It is unimportant whether or not the patient understands or accepts the significance of the cues to be presented, since the emphasis in implosive therapy is on the extinction of anxiety evoking stimuli that perpetuate the patient's symptoms. Again the basis of the procedure is the presentation of the anxiety laden stimulus cues in the absence of the primary reinforcement.

Since the exact and complete replication of anxiety laden cues is impossible, the presentation of the therapist's approximation is a reasonable substitute. By the process of generalization of extinction, the hypothesized cues are effective

in the extinction process. Accuracy and reality of detail in presenting the cues is very important in producing the most efficient and effective extinction process. This includes both internal and external sensory cues and consequently, descriptions of both objects and situations as well as movements, feelings and reactions must be presented as realistically and vividly as possible.

Since it is assumed that psychopathological behavior has been maintained for a rather long time, it is also held that the contiguous pattern of stimulation is rather complex, as it was demonstrated in the modified shuttlebox experiment (Levis, 1961). Therefore, several levels of cues are hypothesized and presented by the clinician. Also parallel to the Levis (1961) experiment is the assumption that the feared stimuli are arranged in some sort of a hierarchy in terms of which stimuli are avoided. The "avoidance serial cue hierarchy" is consequently proposed by the authors (Stampfl & Levis, 1967 a). Those cues relatively remote from the primary reinforcement are low on the avoidance serial cue hierarchy and may often be identified from the contingencies surrounding the patient's symptomatic behavior. These are called symptom contingent cues. When anxiety associated with the symptom contingent cues is extinguished, other cues assumed to be higher on on avoidance serial cue hierarchy are presented. Such cues are believed to represent the dynamic interpretation of the patient's symptoms. These are called "hypothesized sequential cues" and have been categorized as follows:

1. Aggression Scenes presented in this area usually center

around the expression of anger, hostility, and aggression by the patient toward parental, sibling, spouse, or other significant figures in his life. Various degrees of bodily injury are described including complete body mutilation and death of the victim.

2. Punishment The patient is instructed to visualize himself as the recipient of the anger, hostility, and aggression of the various significant individuals in his life. The punishment inflicted in the scene is frequently a result of the patient's engaging in some forbidden act.
3. Oral Material In this category oral incorporative and destructive scenes involving, for example, eating, biting, spitting, cannibalism, and sucking are introduced.
4. Anal Material Anal retentive and expulsive scenes comprising a variety of excretory and related anal situations are described.
5. Sexual Material In this area a wide variety of hypothesized cues related to sex is presented. For example, primal and Oedipal scenes, and scenes of castration, fellatio and homosexuality are presented.
6. Rejection Scenes where the patient is rejected, deprived, abandoned, shamed, or left helpless are enacted.
7. Bodily Injury Scenes involving mutilation and death of the patient are introduced where fear of injury appears dominant (e. g. in phobic reactions such as falling off a high building; being hit by a car; dying from an infection). This procedure is followed also in cases where suicidal fantasies are present.
8. Loss of Control Scenes are presented where the patient is encouraged to imagine himself losing impulse control to such an extent that he acts out avoided sexual or aggressive impulses. These scenes usually are followed by hospitalization for the rest of his life in a back ward of a mental hospital as a result of his loss of control. This area is tapped primarily with patients who express fear of "becoming insane" or concern about being hopeless and incurable.
9. Acceptance of Conscience Scenes are portrayed in which the patient confesses, admits and believes he is responsible and guilty for all sins and wrongdoings (as portrayed in scenes from other categories) throughout his life. The surroundings may be described as involving a court room scene with all the patient's family and loved ones present. After his confession he is convicted by the court, sentenced to death, and executed. In some cases, after death the patient is asked to picture himself going before God and the theme is essentially repeated with God condemning him to eternal suffering. An attempt is then made to fit the patient's "hell" to his "sins."
10. ANS and CNS Reactivity The sensory consequences of

autonomic and central nervous system reactivity may function itself as a cue for anxiety. Scenes are introduced in which the patient is asked to visualize the sensory consequences of his own nervous system (e. g. heart pounding, perspiration increase, increase in muscular tension, involuntary discharge of the bladder or bowels).

(Levis, 1967 p. 31-32)

After making several hypotheses concerning the nature of the patient's problems, the therapist instructs the patient to close his eyes and to vividly and clearly imagine the scenes which he presents. Generally no information is given to the patient concerning the theory or process of implosive therapy until after the first session (Stampfl & Levis, 1967 a). The therapist ordinarily spends the first 10 to 20 minutes of the first implosive session in the presentation of neutral scenes involving everyday objects and places that are not anxiety provoking for the patient in order to acquaint him with the imagery process and the attendance to specific detail. It is during this time that the therapist forms an impression of how vividly and clearly the patient is capable of imagining.

In subsequent sessions, gradually the therapist presents the hypothesized anxiety cues in the form of imagery. When anxiety is elicited, either measured by Galvanic Skin Response or more commonly by behavioral observations such as sweating, flushing, or increased motor activity, it is assumed that the particular cue has been previously conditioned to anxiety. The therapist upon recognition of anxiety would continue presenting even more anxiety evoking stimuli related to that one cue. He seeks to attain a maximal level of anxiety from the cues he has chosen. Anxiety is maintained at the highest level in the patient by repeatedly

presenting anxiety provoking stimuli in greater detail until there is evident some sign of spontaneous reduction of anxiety to the specific cues.

Reports of clinical studies claiming success using implosive therapy have made their way into the literature coincident with the appearance of the theoretical issues. Stampfl cited some of the details of his successful treatment of a patient with a symptom of compulsive handwashing. He also reported that in his own practice, he has found the method effective in a wide range of neurotic and psychotic disturbances. He also believed that it showed promise in the treatment of characterological disorders. He claimed success in one to fifteen sessions depending on the severity of the symptoms (Stampfl, 1967).

Stampfl & Levis (1967 b) further elaborated their theory by reporting the treatment cases of a college student with a compulsion to check to make sure his radio was turned off after having gone to bed, as well as that of a man with a hysterical blindness. Hogan (1968 a) demonstrated significant changes in several clinical scales of the Minnesota Multiphasic Personality Inventory after implosive therapy in a female patient who was diagnosed as having an acute undifferentiated schizophrenic reaction.

Several experimental studies provided more controlled and empirical evidence of the efficacy of implosive therapy. Hogan (1966) subjected groups of hospitalized patients similar in age, education, intellectual ability, prior hospitalization, and length of treatment to implosive and intensive nonimplosive therapy.

Posttreatment Minnesota Multiphasic Personality Inventory scores of the implosive groups were significantly different in the direction of improved adjustment from their pretreatment scores. In this group 18 of the 26 Ss were discharged from the hospital and remained out for a one year followup period. The nonimplosive group showed little change on the same questionnaire and only 8 of the 24 Ss were able to meet the release from the hospital criteria.

Kirchner & Hogan (1966) enlisted female college students who were afraid of rats and submitted them to the pretherapy test of actually picking up a rat. If they failed to do so, they were randomly assigned to experimental and control groups. After being assembled together in a language laboratory, the experimental or implosive group heard a recording of a rat phobia session of implosive therapy. The controls heard tapes of music and were instructed to imagine pleasant scenes. All Ss heard the tapes using individual earphone headsets. Of the implosive Ss 10 of 16 passed the posttherapy test of picking up the rat, while only 5 of the 19 controls did so. The contingency chi square was significant at the .03 level.

Levis and Carrera (1967), in a study involving outpatients, also used pretherapy and posttherapy Minnesota Multiphasic Personality Inventory scores to compare the effectiveness of implosive therapy and two other conventional methods varying in their number of treatment sessions. Results indicated that only the implosive therapy groups yielded significant shifts away from psychopathology as measured by the self report inventory. However, they point out that, since

the implosive therapy technique was so obviously different from any conventional therapeutic method from the patient's point of view, there could have been a "placebo effect" in favor of change with the experimental group.

Hogan & Kirchner (1967) studied the effectiveness of short term implosive therapy in helping college females overcome their fear of rats. Similar to their previous study (Kirchner and Hogan, 1966) an in vivo pretest and posttest was involved. Random assignment was made to implosive and control groups for 43 Ss who failed the pretherapy test. Both the implosive therapy and the control groups were provided with one therapy session on an individual basis, with the implosive group receiving a rat implosion session and the controls receiving neutral imagery scenes. Results indicated that 14 of the 21 implosive Ss passed the posttherapy test, while only 2 of the 22 controls did so. The chi square was significant at the .001 level of confidence. In this study the authors attempted to use Galvanic Skin Response recordings, but found these measures to be more influenced by body movements than by the actual imagery used. In another study Hogan and Kirchner (1968) considered a snake phobia, comparing the outcome of implosive, eclectic verbal and bibliotherapy. In the implosive therapy group 7 of 10 Ss passed the posttherapy test of actually picking up a snake while 4 of 10 in the eclectic verbal and 1 of 10 in the bibliotherapy groups passed the test. The difference between the implosive therapy group and the other two groups was significant at the .05 level of confidence.

Willis (1968) conducted a study comparing the effectiveness of

systematic desensitization and implosive therapy in the treatment of mice fears in college females. Results indicated that systematic desensitization was significantly more effective than implosive therapy, and the latter appeared no more effective than the control measure. The author stated that the implosive therapy sessions consisted of scenes based on two of the thirteen highest items of the systematic desensitization hierarchy involving fearful situations with mice. It is the present author's opinion that the Willis study failed to do orthodox implosive therapy, as it is defined and practiced by Stampfl and his associates, since the level of imagery described would not approach the extreme intense level that is prescribed by Stampfl. Also lacking were the dynamic implications that are important to the successful application of the procedure.

Prochaska (1969) completed a study using taped implosive therapy sessions treating college males suffering from test anxiety. The author delineated several implosive therapy groups according to the approach he used on the therapy tapes during treatment sessions. One was based on symptom cues, another on dynamic cues and the final on general anxiety cues. These were compared with a control group who heard neutral scenes and a waiting list group who received no treatment. All of the implosive therapy groups were significantly superior to the control and treatment groups in terms of improvement.

Singer (1969) employed the Kirchner & Hogan (1966) tape in a study examining some assumptions regarding anxiety and several subject characteristic variables in implosive therapy. The author used an approach latency measure in his pretherapy and posttherapy

in vivo tests along with the pass or fail criterion of picking up the rat. He found the approach latency measure sensitive in determining the relationship of subject characteristic and outcome, but failed to replicate the results of the previous study (Kirchner & Hogan, 1966) for the pass or fail criterion. However, the author pointed out that because of his rigorous selection procedure, he employed a highly fearful sample, and in this light, he discussed the findings in terms of their support of the implosive technique.

The majority of the research involving implosive therapy has been accomplished in studies that provided evidence for the verification and therapeutic efficacy of the system. Generally a majority of the studies have employed sophisticated design and experimental procedures. At the present time it appears that implosive therapy has gained considerable ground in establishing itself both from theoretical and practical points of view.

Some considerations that follow from the literature reviewed above have particular relevance to the present study. They include:

1. Implosive therapy has been demonstrated to be successful in the treatment of a variety of phobias.
2. Group administered tape recorded implosive therapy sessions have been demonstrated as effective in the treatment of a rat phobia. The Kirchner & Hogan (1966) tape is an example of such a recording.
3. Latency measures of approach have provided a discriminative measure of fear responses (Willis, 1968; Singer, 1969).

Imagery

A contemporary definition of the word "image" as cited from the Dictionary of Psychology (Dreaver, 1952) reads, "a revived sense experience in the absence of sensory stimulation, viz., seeing with the mind's eye." The early investigators of imagery including Galton also viewed the construct from this point of view. Early research was subject to a good deal of criticism as imagery study was considered to be lacking in empiricism.

Watson dismissed the construct of imagery from psychology justifying his stand by pointing to an alleged lack of correlation between the verbal reports of Ss and objective measures of imagery at the time (Watson, 1914). From this time studies dealing with mental imagery decreased in the literature. In reviewing Psychological Abstracts the poverty of listings under the heading "imagery" from the 1920's well into the 1950's is observed. However, this trend has been reversed and the study of imagery has gradually been reintroduced into the literature with the benefit of more empirical methods.

Many authors have attempted to define the various types of mental imagery. Galton himself named two types, voluntary and spontaneous imagery. The former, he defined as the ability to call up specified images at will, while the latter he defined as the normal functioning of imagery in the mental processes (Betts, 1909).

Boring (1935) distinguished the after image, memory image and imagination. The after image had perceptual characteristics, and referred to the lingering visual perception of a physical

stimulus for a few seconds after the stimulus has been removed. A memory image had reference to a specific time and place. It was compared to the eidetic image which is discussed later. The imagination image according to Boring was composed of a combination of elements from several different memory images. It further involved the creative aspects of the mental processes and accounted for the presence of imaginary figments such as a mermaid or centaur. Boring claimed that memory and imagination made up most of the content of thought (Boring, 1935). In a later study, Gordon (1949) identified two types of imagery, controlled and autonomous, which coincided with Galton's voluntary and spontaneous dichotomy respectively. Richardson (1969) in the latest and one of the most comprehensive works in the area concurred with Boring's threefold classification and used similar terms to label the various types of imagery:

A final classification is the eidetic image, which is defined as, "a visual image persisting after stimulation, relatively accurate in detail, colored positively and capable of being scanned." (Haber & Haber, 1964 p. 131) Eidetic imagery was thus distinguished from voluntary and spontaneous images especially in its persistence, richness of detail, reliability of repeated evocation and the positive report of color details. Most authors recognized the eidetic type as a separate and rare entity. Allport (1924) believed that the eidetic image functioned to intensify sensory experience in youngsters. However, in a study of a large sample of New Haven elementary school children, it was demonstrated

that only eight per cent possessed eidetic imagery as defined by Haber & Haber (1964).

Generally, across the literature three types of imagery have been identified, although all authors have not used the same terms for all three types. The voluntary image of Galton and the imagination image of Boring and Richardson have been the subject of much current research. Voluntary imagery has been examined in relation to brain correlates, physiological responses, semantics, intelligence and several other variables. It is also voluntary imagery that is an integral part of at least two recently developed forms of psychotherapy, systematic desensitization and implosive therapy.

In some recent studies Sheehan (1966 a, 1967 b) gave evidence in favor of the argument proposing a functional similarity of imagery and perceiving. The proponents of psychotherapy systems employing imagery have supported these arguments. Such systems based their results on the assumption that the process of imagining an object or event had similar effects as the process of actually experiencing it. Luria (1960) provided some anecdotal evidence reporting the extreme vividness with which some Russian Ss were capable of imagining. Some data relating to electroencephalography reported later in this section also supported the similarity of imagery and experience.

Methods of Study While the early studies in visual imagery were conducted using only introspective methodology, the basic conclusions which Galton arrived at in the early 1900's were not

essentially discordant with our present knowledge of the nature and function of mental imagery. Primarily Galton stated that individual differences do exist in the ability to evoke mental images. Some people can exercise this faculty to a greater extent than others, but most people possess it to some degree. Individual differences, when they do exist, are found chiefly in the degree of clearness and vividness. Galton believed that imagery was rather evenly distributed among the various sense modalities rather than being dominant in any one (Galton, 1907). In contrast Titchener (1913) claimed that visual imagery was dominant in everyone, and consequently constructed a questionnaire heavily weighted with this bias.

One of the earliest and most comprehensive papers reviewing the methods for studying imagery was published by Fernald in 1912. While some aspects of her presentation were reflective of the introspective school as it existed then, she had the foresight to consider the possibility of other more empirical means of investigating imagery. Of course, the first method enumerated was introspection, by which she meant the analysis of competent observers, of the workings of their own minds. A second method described was the questionnaire which involved the presentation of a carefully selected list of questions to a large number of Ss who were likely to be untrained in introspection. Of course, it is obvious that this method was still largely dependent upon the introspective method since it was fundamentally a self report. However, it had the advantage of statistical quantification and analysis which the introspective

method lacked since the latter generally used a very small number of Ss and involved qualitative analysis of the data (Fernald, 1912).

Fernald further referred to the "word methods" of Titchener. As a criterion of imagery these methods used the associative quality of words. Mentioned specifically was Kraepelin's test in which one was required to construct one list of objects characterized by colors and another by sounds.

Previous to Fernald's comprehensive study, Betts (1909), also an introspectionist, had discussed two alternative methods in the study of images. Both were based on traditional introspection. From his work in the area Betts concluded that introspection was the only direct evidence of the presence of imagery.

Generally the early studies were concerned with the clearness and vividness of images. Other writers were apparently dissatisfied with the limitations of this dimension in accurately describing imagery. Pear (1927) suggested a broadening of imagery from the confines of the Galtonian dimensions of clearness and vividness. Consequently, a variety of research has resulted examining a number of other variables and their relation to imagery.

Physiological Correlates As early as 1943 evidence was found in the literature asserting a relation between imagery and alpha rhythm of the electroencephalogram. Golla, Hutton & Walter (1943) distinguished between the small alpha rhythms of the pure visual imagers and the more persistent alphas of those employing auditory and kinesthetic imagery. A later study by Mundy-Castle (1951) used

a questionnaire to measure imagery and reported no significant relationship of alpha type and imagery ability, although the relationship between alpha type and visual imagery approached significance.

Short (1953) in essence replicated the results of Golla et al. (1943) showing that visual imagers regularly demonstrated alpha blocking on electroencephalogram records, whereas verbal imagers showed alpha persistence. Walter & Yeager (1956) concluded that high imagery ability was associated with a high rhythmic occipital electroencephalogram record. Barratt (1956) and Oswald (1957) performed studies that fail to find a relationship between imagery types and electroencephalography. Oswald proposed that the previous results supporting the relation of the two phenomena were artifacts of the particular experimental procedures especially with respect to the difficulty of the task involved which tended to desynchronize the electroencephalograph protocol (Oswald, 1957). Drever (1958 b) and Slater (1960) also failed to provide supporting evidence from their studies in this area.

In a recent study, Simpson, Paivio & Rogers (1967) compiled the Imagery Test Battery to distinguish between high and low imagers and submitted nine Ss in each category to verbal and visual problems while electroencephalograms were being recorded. Results showed the main effect of imagery type to be nonsignificant. High imagers did not differ significantly from the low imagers. They did report that the interaction of imagery type and conditions approached significance at the .10 level. High imagers tended to have greater amplitude on the records during the control conditions than did

low imagers.

While there are studies to support both sides of the argument, it can be concluded that the present results are at least conflicting with respect to the relation of imagery activity and electroencephalographic measures. Procedural differences may account for the results on both sides. A good deal more study is required before any firm conclusions can be made. For the time being, we must follow Simpson (1967) who stated, "considered along with the conflicting reports in the literature . . . no firm statements can yet be made relating modes of thinking to EEG patterns." (Simpson et al., 1967 p. 50)

Eye Movement and Pupilometry Correlates A study by Brown (1966) sought to connect eye movements with visual imagery ability. Brown distinguished two groups by a questionnaire method. He found that the habitual visualizer displayed significantly different types of eye movements than did his comparison group named "nonvisualizers."

Attempts have also been made to employ pupilometric devices under various forms of imagery tasks. Paivio & Simpson (1966) and Simpson & Paivio (1967) concluded that dilation, which may reflect the cognitive difficulty of the imagery task, was greater for abstract than concrete words, but did not vary with word pleasantness. The results of the second study also pointed out the importance of task difficulty and the involvement of motor responses as possible contaminants in this type of research.

In a later study by Paivio & Simpson (1968) the previously mentioned Imagery Test Battery was employed to discriminate between Ss

of varying imagery ability. The Ss were asked to generate mental images suggested by concrete and abstract words. Pupillary reactions were continuously photographed. Results demonstrated no significant effects due to imagery ability. Similar to the electroencephalographic studies the eye movement and pupilometry studies are conflicting and in need of further elaboration.

Imagery and Paired Associate Learning Several studies have also involved paired associate learning and imagery ability. As had been mentioned previously, memory techniques (Fernald, 1912) were used in the study of imagery. The paired associate technique employed the function of memory which has been equated to imagery ability.

Much of the research on this topic is recent. Paivio & Oliver (1964) attempted to give support to the theory that imagery served as a mediator of verbal associations. Using a paired associates technique, they found that learning was indeed facilitated when the stimulus noun was of a specific as opposed to a general nature. Reece (1965), using children age three to eight, found that both verbal and visual cues were effective in producing superior learning when compared to Ss without the help of the prescribed imagery mediation. Paivio & Yuille (1967) found that Ss given the mediation instructions to use imagery were superior to those who employed the construct of meaningfulness as a mediator. Similar results were obtained in studies by Dominowski & Gadlen (1968) and Roser & Bolz (1968).

One of the major factors in these types of studies were the structural syntactic characteristics of the actual word involved in the memory or paired associate experiment. It has been found

that some types of words are more effective than others in facilitating learning. In his research, Paivio (1968) isolated several word characteristic factors. These factors include "concreteness-abstractness" and "meaningfulness." The general conclusion from several studies was that performance on memory tasks was facilitated by the factor of concreteness (Paivio & Yuille, 1969; Paivio, 1968; Yarmey, 1967; Frencke, 1968). Some studies specified that the concreteness factor was most effective on the stimulus side of the paired associate paradigm (Paivio, Yuille & Smythe, 1967; Yarmey, O'Neill & deRyk, 1968; Yuille & Paivio, 1968).

Intelligence, Skills and Imagery Many of the studies dealing with the relationship between imagery and intelligence have been correlational studies. This question was of concern to the pioneers in imagery study. Galton (1907) believed that imagery ability might be helpful in some professions. However, he did not connect the level of imagery with the level of intelligence. Betts (1909) corroborated this position and reported the lack of a correlation between imagery and success in college studies. He claimed that if there were any correlation, it would be small and negative. Both Galton and Betts admitted the possibility of a high correlation between some specific abilities or vocational requirements and facility in the process of imagery. Ray-Chowdhury (1957) reported a significant relationship at the .01 level between imagery as measured by the Barratt Questionnaire (Barratt, 1953) and specific performance abilities as measured by Kohs Blocks and the Passalong and Dearhorn Form Board. Schmeidler (1965) reported a significant

positive correlation between imagery ability as measured by a Galtonian questionnaire and the specific construct of creativity. From these results Schmeidler speculated that it was the creative individual who was more adept in making use in an adaptive way of the products of primary process thinking which he connected with imagery production.

Studies by Patal & Pathak (1961) reported no significant relation between auditory and visual imagery and intelligence. They also related imagery to the performance of some specific abilities. Bower (1947) found no relation between imagery ability measured by self ratings and tests of mental ability. Contrary to these findings, an earlier study by Davis (1932) reported a positive but low correlation between self report ratings of imagery ability and scores on the Army Alpha Test. As yet it appears that the relationship, if any, between intelligence and imagery is unknown.

Reasoning and Imagery In regard to reasoning processes and intellectual styles, several studies have reported positive relationships between imagery ability and problem solving. Davis (1932) obtained a significant correlation between the manner of reported intellectual processes, which he equated with imagery, and objective test results. Roe (1951) compared verbal and visual imagers on the basis of several more common psychometric techniques. She found that visual imagers did significantly better on math problems at the .01 level. Visual imagers had a significantly greater amount of "W" on the Rorschach, while the verbal imagers had significantly more "Dd" at the .01 level. The Thematic Apperception Test stories of the visual imagers were shorter than those of the verbal imagers

also at the .01 level. Somewhat contradictory to these studies is the investigation by Powers (1935) who reported that Ss who rated themselves high in imaginal powers failed to demonstrate problem solving ability superior to those who rated themselves as low on imagery ability.

Imagery and Sex Differences Galton believed that females tended to be high in terms of their visualization powers. Sheehan (1967 a) in a study noting individual differences in imagery ability, used a shortened form of the Betts Questionnaire Upon Mental Imagery (Betts, 1909) and reported that the imagery of females was more vivid than that of males. A study by Palmer and Field (1968) also concluded that females possess more vivid imagery. Paivio & Ernst (1970, personal communication) found a significant interaction effect in an incidental recall experiment that involved the factors of sex and imagery. One final study by Davis (1932) reported inconsistent findings failing to note sex differences in imagery ability. However, this study seems to have failed to provide the Ss with a true imagery exercise since it merely equated imagery with introspective reports of intellectual processes in problem solving. Generally it seems safe to conclude that females possess greater imagery ability than males and are likely to produce more vivid and clearer imagery.

Imagery and Hypnosis A further variable that has been studied in relation to imagery ability is susceptibility to hypnosis. Studies by McBain (1954), Palmer & Field (1968), Palmer (1967) and Sutcliffe, Perry & Sheehan (1970) have reported positive correlations. The Palmer & Field article was the most relevant work in that the positive

correlation was reported when voluntary imagery was involved. However, the authors report that the relationship was weakened considerably when spontaneous imagery was considered. The recent article by Sutcliffe et al. (1970) employed the shortened form of the Betts Questionnaire Upon Mental Imagery as well as the Stanford Hypnotic Susceptibility Scale and reported a correlation ratio of .791 which is significant at the .01 level.

Measurement of Imagery Although several methods for measuring imagery have already been mentioned, a more comprehensive review will be presented. Generally there seem to be two general methods in most experimental studies, the self report questionnaire and the objective test. The questionnaire method has been attributed to Galton who pioneered imagery investigation with his classic "breakfast table technique." His questionnaire allowed the S to respond to questions concerning the imagery modalities of vision, audition, gustation, olfaction, kinesthesia and a miscellaneous class for imagining such sensations as heat, hunger and drowsiness. Betts (1909) made Galton's technique more statistically useful by broadening the range of questions considerably and by having the S rate his imagery on a seven point scale. Betts also made Galton's miscellaneous category into that of "organic" imagery.

For the most part subsequent experimenters have used this basic technique and format in their self report studies of imagery (Ray-Chowdhury & Vernon, 1964; Schneidler, 1965; Brown, 1966; Mundy-Castle, 1951 and Bower, 1947). It is interesting to note that while this method was in common use for about 50 years, there were no

attempts at establishing reliability or standardization norms with any of the specific questionnaire methods. Sheehan (1967 a) was the first investigator to attempt any form of standardization. He used a factor analytic technique and published a shortened form of the Betts Questionnaire Upon Mental Imagery, for which he subsequently demonstrated a positive test retest correlation of .78 (Sheehan, 1967 c). His new form of the Betts questionnaire reduced the original 150 items to 35. Sheehan concluded that the test measured a general ability for imagery and was valid for use with other samples. Generally Sheehan's work (Sheehan, 1967 a, 1967 c) with the Betts (1909) questionnaire is the most reliable self report measure of imagery ability, and according to Richardson (1969), it is adequate for use in further research studies.

Several other objective measures of imagery ability have been reported. These include: word tests, memory tests and tests of some form of spatial ability. The word tests are of minor importance and are typical of the word methods described earlier and proposed originally by Fernald (1912). Word tests have also been employed by Robbins (1965), who failed to provide standardization and validating data, and Higginson, (1938). In her comprehensive study Fernald (1912) also included a variety of memory tests such as the memory for sounds color and movements. Moody (1967) employed, along with other objective measures, two tests which involved memory of motor movements that were previously perceived on a film. Christiansen & Stone (1968) also included a memory test, the Memory for Designs Test (Kendall & Graham, 1948, 1956) in their battery measuring visual imagery.

One recent study sought intercorrelations between several methods of measuring imagery including a memory technique, labeled "picture memory." The investigators, Rimm & Bottrell (1969) found positive and significant correlations between the picture memory technique and respiration changes during imagination of fearful scenes and also between picture memory and recall improvement on a paired associates learning experiment. The latter method is a word method, and the results of the experiment added strength to the relationship between imagery and word techniques. In summary Rimm & Bottrell (1969) described picture memory techniques and self ratings as valid in predicting an individual's emotional response to imagined fearful scenes specifically in regard to the role of imagery in the therapeutic process of systematic desensitization.

The final and most popular of the objective tests of imagery are those involving spatial ability. Fernald's battery (1912) included a spatial test in the form of a tracing task while blindfolded. At least one of her memory tests also included this factor as she instructed the S to reproduce an arrangement or the modification of the arrangement of several objects.

One of the most comprehensive studies investigating the relation of several spatial tests and imagery was completed by Barratt (1953). The investigator administered a total of 23 different spatial tests to a large sample of undergraduates, and used factor analysis to identify the three factors of spatial manipulation, spatial reasoning and shape recognition. The author then set out to examine the 12 tests which clustered in each factor in terms of

their relationship with imagery ability. Using a questionnaire, the author identified high and low imagers. He further instructed the Ss to rate each test for its involvement of imagery. Only those tests in the spatial manipulation factor were significant in this respect. The Ss who rated the tests in the spatial manipulation factor as high in imagery involvement obtained significantly higher test scores on these tests. Of the six tests in this factor, two were significant at the .01 level, the Flags Test and the Cube Surfaces Test, while one test was significant at the .02 level, the Thurstone PMA Space Test, and two at the .05 level, the Spatial Equations and the Visualizing Blocks Test.

Other investigators have involved the use of spatial ability tests in measuring imagery without any clear demonstration of reliability or validity. These include: Ray-Chowdhury & Vernon (1964), Christiansen & Stone (1968), Moody (1967), Stewart (1955), Roe (1951) Higginson (1938) and Zabudowska (1935).

A final and more empirical attempt at measuring imagery was that of Simpson, Paivio & Rogers (1967), who sought to distinguish between high and low imagers in an electroencephalography study. To accomplish this they employed the Imagery Test Battery, which was originally proposed and standardized by Hyman (1966). The Imagery Test Battery consisted of the Minnesota Paper Form Board Test (Likert & Quasha, 1941) which is a test of spatial ability, plus two questionnaires. One of the questionnaires was a multiple choice device in which the S responded concerning his method of solution on the form board. The final inventory was a modified version of a Galtonian questionnaire.

A total imagery score was obtained from the combined scores of the three subtests. None of the tests were weighted as more or less important in the scoring procedure (Paivio, 1970 personal communication). It is interesting to note that while the Minnesota Paper Form Board was included in Barratt's (1953) spatial manipulation factor, it clustered more consistently around the shape recognition factor. Barratt did not report significance for the relationship of the shape recognition factor to imagery as he did for the spatial manipulation factor. However, he concluded that imagery is important for the shape factor but to a lesser extent than for the spatial factor.

The Present Study

In light of the above, additional research concerning some organismic variables of implosive therapy and its relation to imagery ability is warranted. Several authors have discussed imagery in treatment procedures including systematic desensitization (Lazarus & Abramovitz, 1962; Wolpin & Raines, 1966; Davis, McLemore & London, 1970). The results of these investigations have been conflicting. From the theory, descriptions, procedures and from an examination of actual transcribed and taped implosive therapy sessions, it seems that the factor of imagery plays an even greater role within the implosive system than it might in systematic desensitization. In desensitization the imagers are within the realm of concrete reality and often within the repertoire of the patient's past experience. The imagery employed in implosive therapy is extreme and likely beyond the fantasy level of the patient.

As has been evidenced above, the psychological construct of imagery has been the subject of considerable research. The experimental studies have supported the hypothesis that there are individual differences in imagery ability within a college population (Sheehan, 1967 c). Consequently it would be expected that individuals of varying degrees of imagery ability might also vary in their response to a psychotherapeutic technique that employs imagery as its main vehicle of communication. It would be reasonable to hypothesize that Ss with varying levels of measured imagery ability would also show different levels of elicited anxiety during the actual implosive therapy session, as well as differences in outcome measures of implosive therapy. Richardson (1969) questioned the role of imagery ability in systematic desensitization and cited the need for more empirical research. It would seem that the same question would be even more pertinent to implosive therapy.

Some indirect evidence is gathered from several discrete studies. Sutcliffe et al. (1970) described a significant relationship between imagery level and hypnotic susceptibility. Singer (1969) reported a statistically significant relation between suggestibility and measures of state anxiety administered after implosive therapy. Consequently it is likely that the level of imagery ability might also have some effect on measures of approach and avoidance or state anxiety in an implosive therapy paradigm.

Basic to these speculations is the assumption that individuals who differ in imagery ability do not also differ in general anxiety levels. Richardson (1969) provided some limited evidence to support

this assumption. However, for this reason it might be useful in the present study to distinguish between state and trait anxiety according to Spielberger (1969). State anxiety indicates how an individual feels at a particular moment. Trait anxiety refers to "relatively stable individual differences in anxiety proneness." (Spielberger, 1969 p. 2)

Hypotheses

Consequent to the above, several specific hypotheses may be stated with respect to imagery ability and the process of implosive therapy. Between groups who differ in imagery ability but not in level of trait anxiety:

1. High imagers will demonstrate significantly higher degrees of state anxiety during an implosive therapy session than low imagers.
2. High imagers will perform significantly better than low imagers in terms of pass or fail criteria on a postimplosive therapy behavioral avoidance test with a feared object.
3. High imagers will demonstrate significantly lower approach latency and distance from a feared object in a postimplosive therapy behavioral avoidance test with a feared object.
4. High imagers will demonstrate significantly lower degrees of state anxiety during a postimplosive therapy behavioral avoidance test with a feared object.

METHODOLOGY

The experimental procedure was essentially similar to Singer (1969) who also studied subject characteristics in an implosive therapy research project.

Subjects

Sixty female volunteers were solicited for this study from large classes at several womens' colleges in the Detroit, Michigan area. With the permission of their deans and professors 214 Ss were initially contacted and screened through their regular class sessions. However, subsequent participation in the experiment was dependent upon each S meeting the criteria as detailed in the procedure section.

Measurement Instruments

Several different psychometric devices were used to measure both imagery ability as well as affective reactions at various points in the study. The following tests were employed to determine the level of imagery ability:

1. Sheehan's short form of the Betts Questionnaire Upon Mental Imagery (Sheehan, 1967 a) was administered as a part of the prescreening battery. This measure was reviewed in the above literature. Because of its demonstration of statistical reliability, the Sheehan questionnaire

was used to distinguish high and low imagers. After computing the mean of the prescreening administration, a method like that of Christiansen & Stone (1968) was used to determine inclusion in high and low imagery groups. Very simply, those above the mean were called high imagers and those below the mean were called low imagers.

2. The Imagery Test Battery (Simpson, Paivio & Rogers, 1967) was administered as an additional index of imagery ability. A more detailed discussion of this measure is found in the above review.

The following tests were employed to measure and operationally define affective states at several points in the experimental procedure:

1. Spielberger's (1969) Trait Anxiety Inventory was used in the prescreening battery to determine the level of trait anxiety. It was on the basis of this measure that Ss of high and low imagery ability were matched to control for the possible effects of the initial level of trait anxiety which was demonstrated by Spielberger (1969) to be a relatively enduring personality variable. According to scores obtained on the prescreening Trait Anxiety Inventory 30 Ss designated as high imagers were matched with 30 Ss designated as low imagers.

2. Spielberger's (1969) State Anxiety Inventory was used at various points in the procedure to measure and define S's transitory state anxiety. It was administered in the prescreening phase to establish a comparison with published normative data as well as once at each of the subsequent experimental phases. Levitt (1967) reviewed

the Spielberger tests and concluded that both the state and trait anxiety forms were carefully developed on sound theoretical grounds using rigorous and sophisticated methods. A high correlation between the state and trait measures is expected in a nonthreatening situation. Spielberger obtained high correlations (.44 to .55) between the state and trait anxiety scales when administered to females in the same testing session with a neutral instructional set. In such cases the state measure fails to reflect elevations in anxiety since they are assumed to be absent from the situation. Lower correlations are expected when the trait measure is compared with the state measure under varying degrees of stress. In these instances the state measure reflects changes in the level of excitation whereas the trait measure fails to do so (Spielberger, 1969).

3. The Fear Survey Schedule (Geer, 1965) was used in the prescreening phase primarily to determine which Ss possessed a fear of rats and mice. This measure has been used by other researchers to represent the S's overall fearfulness as well as a measure of fear generalization (Singer, 1969). Since only a single page abbreviated form of the schedule was employed, its extended interpretation was limited in the present study.

4. Walk's (1969) Fear Thermometer was employed at various points also to elicit the degree of state anxiety experienced. It consisted of a ten point self rating scale on which the S responded by drawing a line up the "thermometer" to indicate the level of anxiety experience. It has been reported to be a sensitive instrument in assessing transitory anxiety states by Wolpe & Lazarus (1966), Prochaska (1969) and Singer (1969).

5. The IPAT Eight Parallel Form Anxiety Battery (Scheier & Cattell, 1960) was administered as a part of both the pretherapy and posttherapy self report batteries to measure the level of state anxiety. The battery consisted of seven short subtests each dealing with the S's reaction in a variety of situations. Eight equivalent forms are provided by the authors, who claim the battery to be useful in measuring changes in anxiety levels in the course of psychotherapy procedures (Scheier & Cattell, 1960).

6. The physiological questionnaire was developed by the present author for use in this study to define and measure self report of state physiological reactivity to anxiety. Reliability and validity data of this measure are presented in Appendix C.

Copies of all measures, answer and data sheets used in the present study are found in Appendix A.

Apparatus

The rat avoidance apparatus as designed and utilized by Singer (1969) was employed as the test for behavioral manifestation of rat fear at two points in the experiment. The apparatus is described as follows:

The apparatus consisted of a track made from a 14 feet long board 8 inches wide with a guide strip running down the center. A 9" x 9" x 11" rat cage was mounted on wheels, which straddled the center guide strip. The cage door was on top of the cage and was secured with a simple latch. A nylon pull rope was attached to the base of the cage and threaded through an eye at the front of the board. At the front of the board was a platform, called the dock, which received the rolling cage and provided stability when the cage was being opened. The cage, with two adult white rats, was placed at the far end of the board. The subject stood in front of the dock and pulled the rope to make the cage roll forward. The apparatus was set

up three feet above the floor.
(Singer, 1969 p. 27-28)

Some minor modifications of the apparatus were made by the present author to make it more convenient to transport and to assure the stability of the rolling cage. Also the distance on the side of the apparatus employed in the present study was indicated in centimeters.

A similar method of measurement and quantification of the rat avoidance behavior was employed by Willis (1968). Both Willis (1968) and Singer (1969) reported that such an apparatus is sensitive and useful in providing more discriminative avoidance measures in implosive therapy.

Procedure

The prescreening battery was administered during about 40 minutes of the Ss' regular class period. Standardized instructions were employed at all phases of the experiment and their scripts can be found in Appendix B. The following measures comprised this portion of the study known as the prescreening battery: (listed in the order of presentation)

1. The Imagery Test Battery (13 minutes)
2. The Trait Anxiety Inventory (2 minutes)
3. The Sheehan short form of the Betts Questionnaire Upon Mental Imagery (10 minutes)
4. Physiological questionnaire (2 minutes)
5. The Fear Survey Schedule (5 minutes)
6. The State Anxiety Inventory (2 minutes)

7. The Fear Thermometer (1 minute).

The entire battery was distributed in a folder in a fixed order at the onset of the period. As an introduction the Ss were informed that the E was doing some research in an area that dealt with common fears and feelings of college students. An identification sheet was provided at the front of the battery for the S to indicate interest in further participation by filling in her name and where she could be reached. All Ss were asked to fill in the basic information including age, class rank, and marital status even if they chose not to participate in the second phase. The Ss were informed that further participation would require an additional hour and a half of time at a later date in the semester, and that they would be paid if they were chosen for and completed participation in the second phase of the experiment.

Those Ss who indicated a willingness to participate and who responded to item #10 on the Fear Survey Schedule by indicating a fear rating of four (some) through seven (terror) in regard to rats and mice were invited to participate in the second phase. A total of 76 Ss who met the selection criteria participated fully in the second phase of the experiment.

Each S was seen in a plain office on her own college campus and a short nonspecific description of the nature of the experiment was given. At this time the S was informed that she would be given the opportunity to pick up a live rat during the experiment. It was emphasized that the S herself was free at all times not to pick up the rat and that she could withdraw from the experiment at any time. The S was asked to sign a waiver of responsibility form which also included

a contract for payment of three dollars. All Ss were asked not to discuss the specific procedure of the experiment with friends. Questions were answered in a nonspecific manner in accordance with the above information.

If the S decided that she wished to participate further and signed the release of responsibility form, she was taken to an adjacent experimental room which contained the apparatus. If she decided not to participate, she was thanked for her time and excused. Only one of 77 Ss eligible and contacted declined at this point.

In the experimental room the S was asked to stand in front of the apparatus and take the pull rope in her hand. The S was then given the following instructions: "when I say begin, I want you to pull the cage down the track to this mark on the dock. When you have done this, I want you to open the cage and pick up one of the rats." The E recorded the elapsed number of seconds until the S picked up the rat as well as the distance in centimeters that the cage was pulled. The E stood about three feet to the left of the S in a position where he could easily read the calibrations on the side of the apparatus. Similar to Singer's (1969) study, a S was considered to have failed the pretherapy test if she did not advance the cage in 60 seconds, or if the cage came to a complete stop and was not moved further, or if no attempt was made to open the cage after 60 seconds.

The latency score was the total amount of time elapsed from the beginning signal to the time when the S actually lifted the animal out of the cage. In the case of failures the latency score was the number of seconds to the last complete stop plus 60. The

procedure described above was referred to as the pretherapy behavioral avoidance test.

Immediately after the pretherapy behavioral avoidance test all Ss were asked to complete the pretherapy self report battery. The following measures were included: (in order of administration)

1. The Fear Thermometer
2. The State Anxiety Inventory
3. The physiological questionnaire
4. The IPAT Eight Parallel Form Anxiety Battery (Form B) (12 minutes)

Upon completion of the pretherapy self report battery the S was escorted back to the office. Sitting in a chair the S was fitted with the headphone set and informed that she would be listening to a tape about rats. The S was asked to follow the instructions given on the tape as closely as possible. The E remained seated adjacent to the S.

At the climax of anxiety elicitation, which occurred about 20 minutes into the tape, the recording was stopped and the implosive therapy I self report battery was administered. The point chosen for the administration of the implosive therapy I battery was immediately after very vivid scenes of imagery describing a rat entering the S's mouth, passing through the throat and proceeding to devour the internal organs. At this point the S was asked to completely resign herself to the rat. Most overt indications of anxiety, such as sweating, extreme grimaces, crying, screaming and other contortions were elicited at this point. The implosive therapy I battery consisted of the same measures used in the pretherapy self report battery. Because of its length and obvious disruption to the implosive process the IPAT Eight

Parallel Form Anxiety Battery was not administered at this point.

At the close of the tape an additional self report battery was administered. This battery is identical to the implosive therapy 1 battery and was called the implosive therapy 2 self report battery.

Upon completion of the implosive therapy 2 self report battery the S was again escorted to the experimental room where the instructions for the behavioral avoidance test were repeated. The same measures were taken as had been on the pretherapy behavioral test. This portion of the study was known as the posttherapy behavioral avoidance test. A self report battery known as the posttherapy self report battery followed immediately. This final battery was identical to the pretherapy self report battery including the IPAT Eight Parallel Form Anxiety Battery (Form C).

When she finished the posttherapy battery each S was paid for her time as contracted, reminded not to discuss the nature of the experiment and thanked for her cooperation. Table I summarizes the experimental procedure.

TABLE I
SUMMARY OF EXPERIMENTAL PROCEDURE

Experimental Stage	Measures
Prescreening	<p>Prescreening battery</p> <ol style="list-style-type: none"> 1. Imagery Test Battery <ol style="list-style-type: none"> a. Minnesota Paper Form Board b. Questionnaire A c. Questionnaire B 2. Trait Anxiety Inventory 3. Sheehan-Betts questionnaire 4. Physiological questionnaire 5. Fear Survey Schedule 6. State Anxiety Inventory 7. Fear Thermometer
Pretherapy	<p>Pretherapy Behavioral Avoidance Test</p> <ol style="list-style-type: none"> 1. Total latency 2. Distance 3. Pass or fail for picking up the rat <p>Pretherapy self report battery</p> <ol style="list-style-type: none"> 1. Fear Thermometer 2. State Anxiety Inventory 3. Physiological questionnaire 4. IPAT Eight Parallel Form Anxiety Battery
Implosion	<p>Implosive therapy 1 self report battery</p> <ol style="list-style-type: none"> 1. Fear Thermometer 2. State Anxiety Inventory 3. Physiological questionnaire <p>Implosive therapy 2 self report battery</p> <ol style="list-style-type: none"> 1. Fear Thermometer 2. State Anxiety Inventory 3. Physiological questionnaire
Posttherapy	<p>Posttherapy behavioral avoidance test</p> <ol style="list-style-type: none"> 1. Total latency 2. Distance 3. Pass or fail for picking up the rat <p>Posttherapy self report battery</p> <ol style="list-style-type: none"> 1. Fear Thermometer 2. State Anxiety Inventory 3. Physiological questionnaire 4. IPAT Eight Parallel Form Anxiety Battery

RESULTS

Imagery Ability and Trait Anxiety

The Discrimination of High and Low Imagers Sheehan's adaptation of the Betts Questionnaire Upon Mental Imagery was a reliable measure of imagery ability. Relatively constant means and standard deviations were obtained for all three samples employed in the course of the study. Specific data is found in Table II. Unfortunately, the Sheehan questionnaire did not correlate significantly with any of the other measures of imagery ability at the prescreening stage. The three subtests of the Imagery Test Battery further failed to correlate significantly with each other. On the prescreening battery (N=214) divergent validity is demonstrated by the failure of the Sheehan questionnaire to correlate significantly with any of the anxiety measures or subject variables.

Because of its face validity and demonstration of reliability, the Sheehan short form of the Betts Questionnaire Upon Mental Imagery was employed in the present study as the criterion for the discrimination of high and low imagers. For the experimental sample a t value of 10.71 (df=58) demonstrated a significant difference beyond the .001 level between the means of the Sheehan questionnaire scores of those designated as high and low imagers.

The Control of Trait Anxiety Roughly equivalent scores were

TABLE II
MEANS AND STANDARD DEVIATIONS OF
THE SHEEHAN-BETTS QUESTIONNAIRE UPON MENTAL IMAGERY

Sample	N	Mean	Standard Deviation
Pilot study	19	201.58	21.71
Prescreening	214	195.95	22.09
Experimental	60	197.85	22.50

obtained on the Spielberger Trait Anxiety Inventory in the pilot, prescreening and experimental samples. Means and standard deviations for the trait anxiety scores obtained in this study as well as normative data are found in Table III. The scores obtained in the present study were not significantly different from the norms for undergraduate females that are provided by the Spielberger (1969) standardization sample. The prescreening sample of the Trait Anxiety Inventory approximated a normal distribution. At the prescreening stage the trait anxiety scores correlated significantly with the State Anxiety Inventory ($r=.638$ $p<.01$), the Fear Survey Schedule ($r=.468$ $p<.01$), the physiological questionnaire ($r=.353$ $p<.01$), and the Fear Thermometer ($r=.378$ $p<.01$). The prescreening situation was assumed to be a nonthreatening one with a low level of anxiety elicitation. No significant correlations were obtained between the Trait Anxiety Inventory and any of the variables including the State Anxiety Inventory administered in the subsequent anxiety provoking experimental stages.

In the experimental phase the 30 high and 30 low imagers were matched for their level of trait anxiety as measured on the prescreening battery. This was attested to by a t value of zero ($df=58$) when the means of the Trait Anxiety Inventory for the high and low imagery groups were compared. The mean of the high imagery group for the Trait Anxiety Inventory was 40.03 ($SD=8.95$), while that of the low imagery group was 40.03 ($SD=8.85$).

Effectiveness of Experimental Treatment for the Total Sample

Behavioral Measures of Rat Avoidance for the Total Sample The McNemar

TABLE III
MEANS AND STANDARD DEVIATIONS FOR SPIELBERGER
TRAIT ANXIETY INVENTORY

Sample	N	Mean	Standard Deviation
Pilot	19	39.37	7.37
Prescreening	214	39.51	8.87
Experimental	60	40.03	8.82
Normative	213	38.25	9.14

Test (Siegel, 1956) yielded a chi square value of 15.78 ($N=60$ $df=1$ $p < .01$) indicating that the change of 13 Ss from the fail to the pass category on the posttherapy rat avoidance test is significant. Table IV contains a summary of the McNemar Test and a fourfold table specifying the number of Ss changing from the pretherapy to posttherapy administrations on the pass or fail criterion of the rat avoidance test.

A significant difference was also obtained on a t test comparing the mean latency measures of all Ss ($N=60$) on pretherapy and posttherapy performances of the behavioral avoidance test ($t=6.64$ $p < .005$). For all Ss the mean latency for the posttherapy approach of 45.63 seconds ($SD=24.50$) was significantly lower than the mean latency demonstrated in the pretherapy attempt of 63.30 seconds ($SD=28.07$). No significant difference was obtained with respect to the distance measure

Self Report Measures of State Anxiety for the Total Sample Baseline measures were established for the state anxiety measures in the prescreening stage of the experiment under a condition of assumed neutral anxiety elicitation. All of the baseline measures were significantly lower than at all of the subsequent administrations of the same measures. Table V contains means and standard deviations for the three state anxiety measures at all experimental administrations. Tables VI, VII and VIII contain summaries of the Newman-Keuls analyses including ordered differences between means for the various administrations of the Fear Thermometer, the State Anxiety Inventory and the physiological questionnaire respectively.

Through the experimental stages a logical progression of anxiety

TABLE IV

FOURFOLD TABLE FOR THE MCNEMAR TEST FOR THE SIGNIFICANCE OF CHANGE
OF PERFORMANCE ON PASS-FAIL CRITERION FOR ALL SUBJECTS

		Posttherapy	
		Fail	Pass
Pretherapy	Pass	0	26
	Fail	21	13
$\chi^2 = 15.78^*$		df = 1	N = 60

* $p < .001$

TABLE V
 MEANS AND STANDARD DEVIATIONS OF STATE ANXIETY MEASURES
 AT VARIOUS EXPERIMENTAL STAGES
 FOR ALL SUBJECTS

Experimental Stage	Fear Thermometer		State Anxiety Inventory		Physiological Questionnaire	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
Prescreening	1.63	2.34	35.95	10.47	47.95	13.56
Pretherapy	4.40	3.09	44.40	9.80	57.87	13.11
Implosive therapy 1	6.15	3.11	57.65	12.18	80.80	16.91
Implosive therapy 2	4.42	3.17	49.75	14.86	71.60	20.94
Posttherapy	3.70	3.43	43.27	14.98	62.55	19.32

TABLE VI
 SUMMARY OF NEWMAN-KEULS ANALYSIS FOR DIFFERENCES BETWEEN
 ALL POSSIBLE PAIRS OF ORDERED FEAR THERMOMETER MEANS

	Posttherapy	Pretherapy	Implosive therapy 2	Implosive therapy 1
Prescreening	+1.99*	+2.69*	+2.71*	+4.44*
Posttherapy		- .70	- .72*	-2.45*
Pretherapy			+ .02	+1.75*
Implosive therapy 2				-1.73*

Note— Plus sign indicates increase in scores. Minus indicates decreases.

* $p < .05$

TABLE VII
 SUMMARY OF NEWMAN-KEULS ANALYSIS FOR DIFFERENCES BETWEEN
 ALL POSSIBLE PAIRS OF ORDERED STATE ANXIETY INVENTORY MEANS

	Posttherapy	Pretherapy	Implosive therapy 2	Implosive therapy 1
Prescreening	+7.32*	+8.45*	+13.80*	+21.70*
Posttherapy		-1.13	- 6.48*	-14.38*
Pretherapy			+ 5.35*	+13.25*
Implosive therapy 2				- 7.90*

Note— Plus sign indicates increase in scores. Minus indicates decreases.

* $p < .05$

TABLE VIII

SUMMARY OF NEWMAN-KEULS ANALYSIS FOR DIFFERENCES BETWEEN
ALL POSSIBLE PAIRS OF ORDERED PHYSIOLOGICAL QUESTIONNAIRE MEANS

	Pretherapy	Posttherapy	Implosive therapy 2	Implosive therapy 1
Prescreening	+9.92*	+14.60*	+23.75*	+32.85*
Pretherapy		+ 4.68	+13.73*	+23.93*
Posttherapy			- 9.05	-18.25*
Implosive therapy 2				- 9.20*

Note— Plus sign indicates increase in scores. Minus indicates
decreases.

* $p < .05$

arousal was observed. The progression was also indicative of the overall effectiveness of the procedure. The lowest level of anxiety was elicited in the prescreening session which was administered in groups during regularly scheduled class sessions. The highest level of anxiety was elicited for all three measures at the experimental implosive therapy 1 stage. At this point, which came in the middle of the implosive tape, the Ss had just listened to extremely vivid descriptions of a dirty sewer rat entering the mouth. The other administrations of the battery reflected intermediate levels of anxiety at no point as low as the criteria set by the baseline administrations nor as high as the extreme level of anxiety elicited at the implosive therapy 1 stage. Generally after the implosive therapy 1 administration the subsequent repetitions of the battery represented a gradual diminishing of anxiety levels for all three measures.

Further evidence of the anxiety provoking effect of the procedure was obtained from two by two analyses of variance for each of the state anxiety measures with repeated measures for administration and single measures on imagery ability. On the Fear Thermometer, the Spielberger State Anxiety Inventory and the physiological questionnaire, significant F values of 29.75, 44.36 and 60.29 ($df=4$ $p < .01$) were obtained respectively for the main effect of administration. It is clear from these analyses that for all Ss on all three measures of state anxiety, the point of administration or stage of the experiment at which responses were elicited was a significant factor in determining changes in the

level of state anxiety. Tables VI, VII and VIII contain summaries of the Newman-Keuls (Winer, 1962) tests for the significance of difference between all possible pairs of ordered means for each of the state anxiety measures. It is clear that the procedure as proposed and executed was quite effective in establishing baselines of anxiety arousal and in eliciting as well as measuring increases and decreases in anxiety.

For all Ss the procedure has demonstrated its effectiveness in reducing the fear of rats at least with respect to the behavioral avoidance measure of latency and the pass or fail criterion of picking up a rat in the posttherapy test. When pretherapy self report data were compared with those obtained at the posttherapy stage, none of the three measures of affective state revealed a significant difference in the direction of reduced fear. Paradoxically the physiological questionnaire manifested a significant difference in the direction of increased anxiety for all Ss when the pretherapy mean of 57.87 (SD=13.11) was compared with the posttherapy mean of 62.55 (SD=19.23). For this measure a t test yielded a value of 1.88 which is significant at the .05 level (df=50). The IPAT Eight Parallel Form Anxiety Battery also failed to manifest a significant difference from pretherapy to posttherapy stages. The lack of agreement between the behavioral measures and the measures of state anxiety will be considered further in the discussion section.

Effectiveness of Experimental Treatment for High and Low Imagers

Behavioral Measures of Rat Avoidance for High and Low Imagers

A chi square test revealed a significant difference at the .05 level between the high and low imagers for the pass or fail criterion on the posttherapy attempt to pick up the rat. No significant difference was reported at the pretherapy attempt. The contingency tables for these two tests are found in Tables IX and X. These data indicate that the high imagers demonstrated more change than the low imagers in terms of picking up the rat in the posttherapy test. The lack of a significant chi square at the pretherapy test makes it unlikely that this difference existed before the Ss were exposed to the procedure.

Upon further analysis of the nominal data using the Binomial Test (Siegel, 1956), the high imagers manifested a significant difference at the .01 level in terms of the number of Ss who fell into pass or fail categories at the posttherapy stage. Table XI contains a summary of the Binomial Tests. The data further indicated the lack of a significant difference in terms of the probability of a pass or fail score for the low imagers at the posttherapy stage. As expected repetitions of the same analysis failed to manifest significant differences for either the high or low imagers at the pretherapy stage.

It might be concluded that the behavioral measure of picking up or not picking up a rat after having been subjected to the implosive procedure bears a relationship with the subject characteristic of imagery ability. The behavioral measures of latency and distance failed to manifest significant differences between high and low imagery groups.

TABLE IX

CHI SQUARE CONTINGENCY TABLE FOR PRETHERAPY PASS-FAIL CRITERION

	Low imagers	High imagers
Pass	11	15
Fail	19	15

$\chi^2 = 1.70$ df = 1 N = 60

TABLE X

CHI SQUARE CONTINGENCY TABLE FOR POSTTHERAPY PASS-FAIL CRITERION

	Low imagers	High imagers
Pass	16	23
Fail	14	7

$\chi^2 = 4.42^*$ df = 1 n = 60

* $p < .05$

TABLE XI
 SUMMARY OF Z VALUES OBSERVED ON BINOMIAL TESTS
 FOR HIGH AND LOW IMAGERS ON PASS-FAIL CRITERION
 AT PRETHERAPY AND POSTTHERAPY STAGES

	Observed z values	
	Pretherapy	Posttherapy
High imagers	1.55	-2.74*
Low imagers	-1.28	.18

* $p < .01$.

Self Report Measures of State Anxiety for High and Low Imagers

As expected no significant differences were observed between the high and low imagers on any of the state anxiety measures either at the prescreening or pretherapy stages of the experiment. Further no significant difference existed between the two groups for any of the three state anxiety measures at the implosive therapy 1 stage. At this point both groups displayed very high levels of anxiety due to the content of the tape. However at the implosive therapy 2 stage significant differences were obtained at the .05 level between high and low imagers for all three measures of state anxiety. A similar phenomenon was reported at the posttherapy stage for two of the three measures, the Fear Thermometer and the State Anxiety Inventory. Table XII contains means, standard deviations and t values for the various anxiety measures at the several experimental stages for high and low imagers.

On the two by two analysis of variance of the Spielberger State Anxiety Inventory scores with repeated measures for administration and single measures on imagery ability, a significant F value of 4.14 (df=4 $p < .05$) was obtained for the main effect of imagery ability. Thus for the several administrations of the State Anxiety Inventory, the observed differences in means were partially accounted for by the factor of imagery ability as well as the factor of experimental stage as reported earlier. The same analysis revealed a significant interaction effect for the State Anxiety Inventory as well. An interaction F value of 3.71 (df=4 $p < .01$) was obtained. Neither the Fear Thermometer nor the physiological questionnaire yielded significant

TABLE XII

MEANS, STANDARD DEVIATIONS AND T VALUES OF STATE ANXIETY MEASURES
AT VARIOUS EXPERIMENTAL STAGES FOR HIGH AND LOW IMAGERS

Experimental stage	Fear Thermometer		State Anxiety Inventory		Physiological questionnaire		t
	High I	Low I	High I	Low I	High I	Low I	
Prescreening							
Mean	1.62	1.63	35.93	35.97	47.10	48.80	.33
S. D.	1.67	2.26	9.54	11.14	11.49	12.21	
Pretherapy							
Mean	5.03	3.77	45.90	42.90	59.30	56.43	.84
S. D.	2.94	3.16	9.63	9.90	14.12	12.90	
Implosive therapy 1							
Mean	6.20	6.10	58.67	56.63	81.57	80.03	.34
S. D.	2.92	3.34	13.25	12.48	17.18	16.90	
Implosive therapy 2							
Mean	5.17	3.67	55.47	44.03	76.90	66.30	2.01**
S. D.	3.15	3.07	14.80	12.75	20.88	19.95	
Posttherapy							
Mean	4.57	2.83	47.17	39.37	64.43	60.67	.76
S. D.	3.08	3.59	15.73	13.32	19.14	19.47	

Note— T between values of high and low imagers

* $p < .05$

** $p < .025$

*** $p < .01$

F values for either the imagery factor or the interaction effects.
The IPAT Eight Parallel Form Anxiety Battery also failed to manifest differences between high and low imagers.

DISCUSSION

The First Hypothesis

The results supported the first hypothesis that a significant difference exists between the means of measures of state anxiety for high and low imagers during the implosive therapy process. At the implosive therapy 1 stage both high and low imagers experienced intense levels of anxiety, and no significant differences were noted between the two groups for any of the three measures of state anxiety. At the implosive therapy 2 stage a significant difference was reported at the .05 level (see Table XIV) between high and low imagers for the three measures of state anxiety, the Fear Thermometer, the State Anxiety Inventory and the physiological questionnaire. At this point the high imagers experienced a significantly higher level of anxiety than the low imagers. During implosion intense levels of anxiety were initially elicited from both groups. For the high imagers a high level of excitation was also observed at the end of the tape, whereas for the low imagers decreases in excitation were observed at the end of implosion.

The decrease in the state anxiety measures demonstrated by the low imagers at the conclusion of the tape may have constituted actual extinction of the state anxiety responses. However, an alternative post hoc explanation is that the observed decrease reflected a loss

of interest in the tape and a failure to visualize and internalize the imagers that are suggested. In the final 20 minutes of the tape the Ss were given four opportunities to visualize their own frightening and anxiety provoking scenes. One of these self implosion exercises occurred immediately before the conclusion of the tape. The narrator gave general directions and silent pauses followed ranging from 60 to 95 seconds for each exercise. The long periods of silence may have constituted rest periods or at least periods of decreased excitation for the low imagers as demonstrated by the lower level of excitation on the implosive therapy 2 measures. On the other hand the high imagers maintained a high level of excitation even at the end of the tape where little outside stimulation was present due to the self implosion exercises.

The level of anxiety exhibited by the high imagers at the implosive therapy 2 administration might also be explained in terms of a tendency for that group to persevere the effect of the anxiety producing cues for a longer period than the low imagers. Anxiety theory suggests that there are at least two distinct modes of anxiety manifestation. Cattell (1971) delineates anxiety manifestation from the inner experience of introspection and secondly from observable behavior in oneself and others. The anxiety measures that were chosen for the present study represented both of these modes. Both the Spielberger State Anxiety Inventory and the Fear Thermometer employed the introspective method since they asked the S to report his subjective impression of his inner feelings. The physiological questionnaire, while still introspective since it is a self report,

represented the S's impression of his external or observable experience. The present results suggest that both modes of manifest anxiety were sustained for the high imagers at the implosive therapy 2 stage. The perseveration of anxiety at this point allowed for the internalization of anxiety cues by the high imagery group. According to the theory of implosive therapy, it is the internalization of anxiety within the implosive session that provides the most optimal condition for the extinction of anxiety responses (Stampfl, 1967). Since the high imagers demonstrated perseveration of anxiety, a greater level of extinction with respect to the behavioral avoidance response might also be expected.

The Second Hypothesis

The second hypothesis was also supported by the chi square reported in Table XI. Positive results were obtained for the hypothesis that high imagers would be significantly different from low imagers on the pass or fail criterion of the behavioral avoidance measure at the posttherapy stage. Paradoxically the behavioral measure failed to coincide with the self report measure in terms of its manifestation of anxiety in the posttherapy situation. The demonstrated extinction with respect to the the behavioral avoidance criterion seems incompatible with the significantly higher means obtained on the state anxiety measures when the high imagers were compared with the low imagers who failed to demonstrate the behavioral extinction.

More information was gained from an alternative analysis of the

data. When the means of the three state anxiety measures of all Ss who passed the posttherapy test were compared with those who failed the test, significant t values were obtained. Table XIII contains means and t values for the three measures of state anxiety for both passing and failing subjects at the posttherapy stage. On all three measures the 39 passing Ss obtained significantly lower means indicating a lower state of excitation than was experienced by the 21 failing Ss. The observed pattern of low anxiety elicitation accompanied by behavioral approach in this analysis was more consistent than the pattern obtained when the data were analyzed in terms of high and low imagery groups. However, when the high and low imagers were analyzed within the pass and fail groups, the contradiction between the behavioral and self report data arose again. Within the passing group the high imagers obtained means that were higher than those of the low imagers for all three state anxiety measures. The same condition was observed in the analysis of high and low imagers within the failing group. Table XIV contains means of the high and low imagers within the pass and fail groups for three measures of state anxiety at the posttherapy stage.

From the additional analysis it can be concluded that the high imagers responded with high levels of excitation on self report measures of state anxiety both when extinction of the behavioral avoidance response had been demonstrated as well as when it was lacking. High imagers can be described as more prone to elevations in state anxiety measures than the low imagers.

TABLE XIII

MEANS AND T VALUES OF PASSING AND FAILING GROUPS AT POSTTHERAPY STAGE

Measure	Passing Mean (N = 39)	Failing Mean (N = 21)	T
Fear Thermometer	2.72	5.48	3.26***
State Anxiety Inventory	40.40	48.95	2.03*
Physiological questionnaire	57.79	70.62	2.65**

Note-- T between the means of passing and failing groups
 * $p < .025$
 ** $p < .01$
 *** $p < .005$ $df = 58$

TABLE XIV
 MEANS OF HIGH AND LOW IMAGERS WITHIN PASSING AND FAILING GROUPS
 FOR MEASURES OF STATE ANXIETY AT THE POSTTHERAPY STAGE

Measure	Passing Ss		Failing Ss	
	High I (N=23)	Low I (N=16)	High I (N=7)	Low I (N=14)
Fear Thermometer	3.83	1.00	7.00	5.07
State Anxiety Inventory	43.87	35.75	57.43	51.07
Physiological questionnaire	61.04	45.88	75.00	69.14

The Third Hypothesis

In regard to the third hypothesis no significant differences between either the latency or distance scores of high and low imagers were obtained at the posttherapy stage. The usefulness of these measures is questioned as it was observed that the majority of the Ss pulled the cage the entire distance to the dock in a very short time. However, opening the cage, inserting the hand, and actually picking up the live rat proved to be a much more aversive task.

It is believed that the latency measure was too gross to discriminate the specific subject characteristic of high and low imagery ability. The distance measure proved to be of little value to the present study, a finding which supported Singer's (1969) impressions. Nonetheless, the use of the rat avoidance apparatus and procedure was warranted and of value primarily in demonstrating the overall effectiveness of the implosive process. A significant change from pretherapy to posttherapy latency scores for all Ss was reported earlier. It might be helpful in further studies to break down the latency response into two separate measures. One measure would include the time from the beginning signal till docking. A second measure would record the time from docking until the rat is picked up.

The Fourth Hypothesis

Significant differences between high and low imagers were revealed for two of the measures of state anxiety at the posttherapy stage. However, this difference failed to support the fourth

hypothesis since the difference was in the opposite direction as originally expected. It had been hypothesized that high imagers would experience lower levels of anxiety than low imagers at the posttherapy stage. At this stage the high imagers experienced significantly higher level of anxiety for the Fear Thermometer and the State Anxiety Inventory (see Table XIV). Since a significant difference was not obtained at this point with respect to the physiological questionnaire, it seems that the high imagers perseverated only the introspective mode of anxiety manifestation, whereas the external mode had diminished.

The extremely short interval between the end of the tape and the posttherapy test may have contributed to the observed differences. The posttherapy test took place from two to five minutes after the conclusion of the tape and it is possible that the interval was too short for the optimal effects of extinction to be manifested with respect to the self report measures. Nonetheless extinction was manifested with respect to the behavioral measures as stated above. A longer interval would have allowed an opportunity for the rather strong cues of the implosive therapy tape to diminish. A longer interval was built into the previous studies on which the present was based. Singer (1969), Kirchner & Hogan (1966) and Hogan & Kirchner (1967) exposed Ss to the posttherapy test at various intervals ranging from several minutes to one half hour after the conclusion of the tape.

Evaluation of the Present Study

The findings of this investigation indicate that the questions that have been raised concerning the role of imagery ability in

the process of implosive therapy were well founded. Because of its experimental design the present study was limited in the extent that generalizations concerning the results can be made. The level of imagery involved in the actual procedure of implosion was not manipulated. Consequently, there remains the question that the level of imagery ability might be related to a number of other personality, intellectual or a combination of both factors that were not considered within the present design. Nonetheless, the present study must be viewed as introductory in a field where hopefully more discriminative research will follow. It does seem clear that the construct of imagery is worthy of further investigation in relation to the process of implosive therapy.

It is the feeling of the present author that imagery ability alone is hardly the major determining factor in the outcome of implosive therapy. Undoubtedly other factors including attentional facility, semantic considerations and other subject variables, such as those studied by Singer (1969) are also important. It is believed that the present study is sufficient to establish imagery ability as one of the subject variables necessary to fully explain the process of implosive therapy.

The experimental design of the present study was rather efficient and relatively uncomplicated. It offered minimum intrusion in the lives of those who participated, and in many cases it provided an intense, interesting and rewarding experience. On the other hand, it may be criticized as artificial as it did not involve a clinic group with debilitating symptoms offering the implosive system an

opportunity to prove itself with a population for whom it was intended.

The author was pleased with the majority of measurement instruments chosen for the study. The Spielberger State Anxiety Inventory proved to be especially discriminative and pertinent to the purpose of the study. Its use revealed a significant interaction effect for the factors of imagery ability and experimental administration suggesting that the role of imagery ability in the implosive process is complex. Both the Fear Thermometer and the physiological questionnaire displayed the capacity to reflect changes in state anxiety over short periods of time. The IPAT Eight Parallel Form Anxiety Battery administered at the pretherapy and posttherapy stages failed to discriminate changes in excitation level over the short period allowed for by the present design. Perhaps this measure would have shown more sensitivity if several implosion sessions had been included over several days with administrations of the measure after each, as well as after the posttherapy test.

Issues for Further Investigation

Further study should attempt to regulate the level of imagery cues employed in the implosion session itself. With various levels of imagery within the implosive condition using different tapes, added auditory and visual stimuli, as well as with the knowledge of the S's imagery ability, a more controlled and discriminative study might be accomplished. The effect of varying levels of imagery ability on the process and outcome of self implosion procedures should also be investigated.

The variable of imagery as presented in the present study offers the possibility of followup studies of a simple nature. Imagery ratings of individuals who have been involved in implosive therapy might be gathered after the conclusion of therapy, as the construct is considered to be a rather enduring trait, and related to measures of duration and success of the procedure as well as to followup measures of adjustment.

Imagery level might also be studied in combination with other variables in the system of implosive therapy such as suggestibility and demand characteristics as suggested by Singer (1969).

Conclusions

The findings of the present study, while limited and introductory in a field where little is known, have led to the following conclusions:

1. Success on behavioral measures of very short term exposure to implosive therapy may be related to the level of imagery ability.
2. High imagers are more likely to sustain high levels of anxiety elicitation during implosive therapy, a condition which apparently leads to greater extinction of behavioral avoidance responses.
3. High imagers are more prone to elevations in self report measures of state anxiety even though behavioral measures may be indicative of reduced anxiety.

4. Self report of physiological reactivity to anxiety, as measured by the physiological questionnaire in the present study, is a variable that is closely related to other self report measures of anxiety.

SUMMARY

The study investigated the relationship of imagery ability and the process and outcome of implosive therapy. A relatively recent development in psychotherapy, the system of implosive therapy is based on learning theory and psychodynamic principles. It was hypothesized that Ss with high measured imagery ability would experience more intense levels of anxiety during implosion and less intense levels during a posttherapy behavioral and self report test than Ss with low imagery ability.

Female Ss were screened from undergraduate classes according to their response to an item on a fear inventory indicating a level of rat fear. Also at the prescreening phase imagery measures and baseline anxiety measures were acquired through self report questionnaires. At a later date Ss who met the selection criteria and who volunteered were seen individually and submitted to pretherapy behavioral and self report measures of rat fear before listening to an implosive therapy tape. Self report measures of fear were administered twice in the course of the tape, and posttherapy behavioral and self report measures followed it.

Ss were assigned to high and low imagery groups, and members of each group were matched for level of trait anxiety. Statistical comparisons were made between the two groups on the basis of data

obtained in the experimental procedure. A significant difference was observed between the two groups with respect to the level of state anxiety experienced during the implosion session. The high imagers sustained high levels of anxiety more so than low imagers. High imagers also demonstrated significantly less rat fear on a behavioral avoidance test administered after implosion. The test involved the pass or fail criterion of picking up a live laboratory rat. Low imagers demonstrated significantly lower levels of anxiety on two self report measures administered at the posttherapy test.

The results were discussed with respect to the effectiveness of the overall procedure and the discrimination of high and low imagers on the basis of the measures employed.

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APPENDIX A

QUESTIONNAIRE A (Sheehan-Betts)

Page 1

READ THE DIRECTIONS ON THE SEPARATE ANSWER SHEET. RECORD YOUR RESPONSES IN THE PLACES PROVIDED ON THAT SHEET. DO NOT WRITE ON THIS BOOKLET

VISUAL IMAGERY: Think of some relative or friend whom you frequently see, considering carefully the picture that rises before your mind's eye, and classify the images suggested by each of the following questions as indicated by the degrees of clearness and vividness specified in the Key:

1. The exact contour of the face, head shoulders and body.
2. Characteristic poses of head, attitudes of body, etc.
3. The precise carriage, length of step etc. in walking.
4. The different colors worn in some familiar costume.

Think of seeing the following considering carefully the image or picture which comes before your mind's eye; and classify the images suggested by the degrees of clearness and vividness specified in the Key:

5. The sun as it is sinking below the horizon.

AUDITORY IMAGERY: Think of each of the following sounds, considering carefully the image which in each case comes to your mind's ear, and classify the images suggested by each of the following questions as indicated by the degrees of clearness and vividness specified in the Key:

6. The whistle of a locomotive
7. The honk of an automobile
8. The mewing of a cat
9. The sound of escaping steam
10. The clapping of hands in applause

CUTANEOUS IMAGERY: Think of "feeling" or touching each of the following considering carefully the image which comes to your mind's touch, and classify the images suggested by each of the following questions as indicated by the degrees of clearness and vividness specified in the Key:

11. Sand
12. Linen
13. A fur muff
14. The prick of a pin
15. The warmth of a tepid bath

GO ON TO THE NEXT PAGE

KINAESTHETIC IMAGERY: Think of performing each of the following acts considering carefully the image (do not confound this with an incipient movement of the muscles concerned) which comes to your mind's arms and legs, lips etc., and classify the images suggested as indicated by the degrees of clearness and vividness specified in the Key:

16. Running upstairs
17. Springing across a gutter
18. Drawing a circle on paper
19. Reaching up to a high shelf
20. Kicking something out of your way

GUSTATORY IMAGERY: Think of tasting each of the following considering carefully the image which come to your mind's mouth, and classify the images suggested by the degrees of clearness and vividness specified in the Key:

21. Salt
22. Granulated (white) sugar
23. Oranges
24. Jelly
25. Your favorite soup

OLFACTORY IMAGERY: Think of smelling each of the following, considering carefully the image which comes to your mind's nose and classify the images suggested by each of the following questions as indicated by degrees of clearness and vividness as specified in the Key:

26. An ill ventilated room
27. Cooking cabbage
28. Roast Beef
29. Fresh paint
30. New Leather

ORGANIC IMAGERY: Think of each of the following sensations considering carefully the image which comes before your mind and classify the images suggested by the degrees of clearness and vividness specified in the Key:

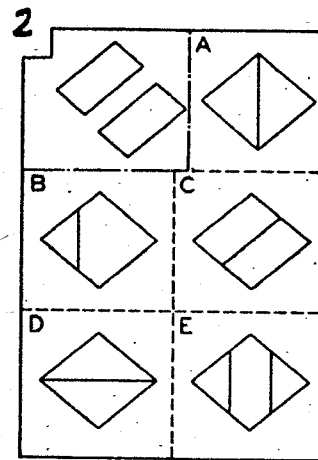
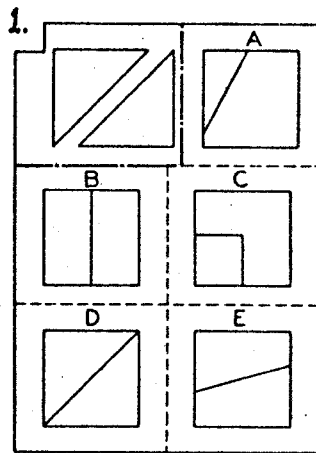
31. Fatigue
32. Hunger
33. A sore Throat
34. Drowsiness
35. Repletion (as from a very full meal)

ITB FORM BOARD TEST

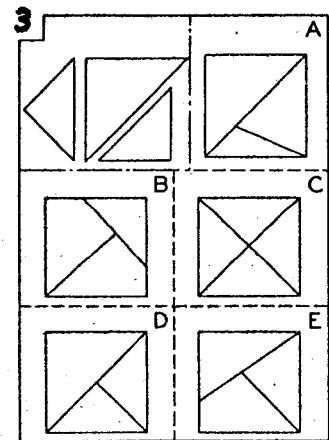
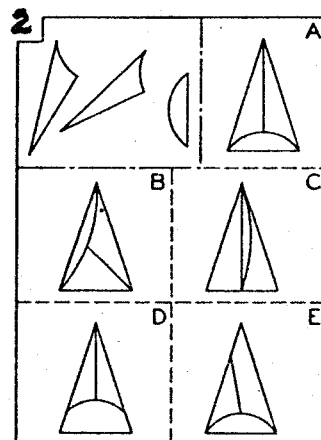
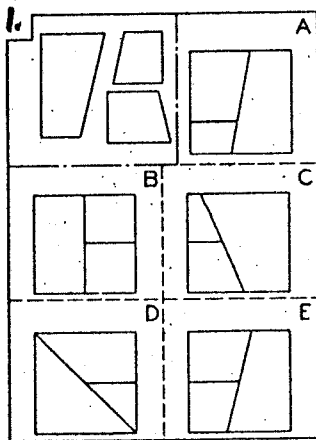
DIRECTIONS: Look at practice problem 1. There are two parts in the upper left-hand corner. Now look at the five figures labeled A, B, C, D, E. You are to decide which figure shows how these parts can fit together. After you find the correct figure, mark your answer on the Answer Sheet. Now do practice problem 2. If your answers are not the same as those which the examiner reads to you, RAISE YOUR HAND.

When instructed, begin working. You will have 8 minutes. Please work carefully, yet try to finish in the allotted time. You should try and concentrate while doing these problems, for you will be questioned about your methods of working these problems.

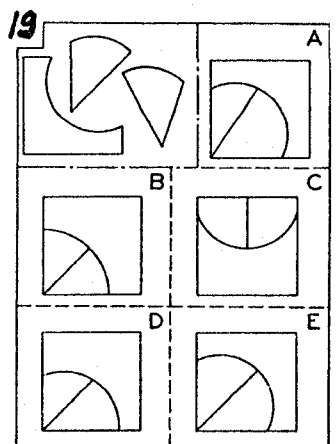
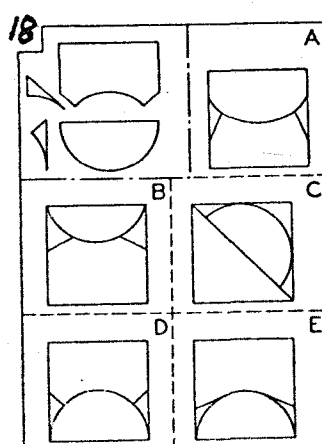
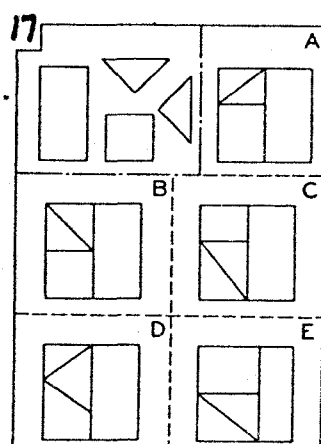
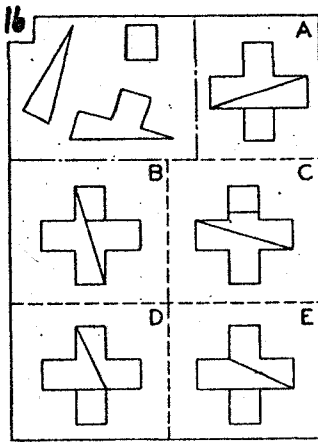
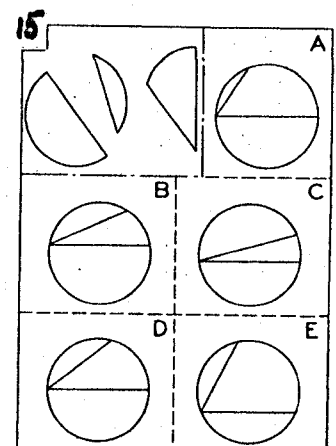
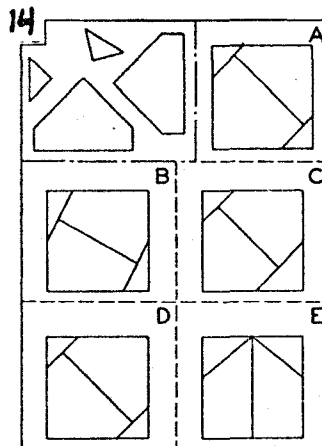
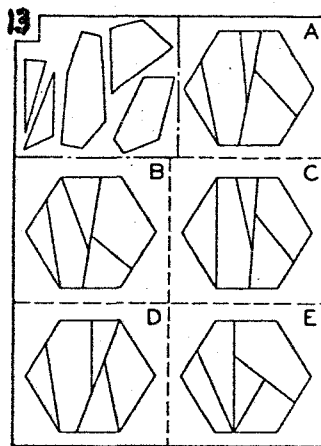
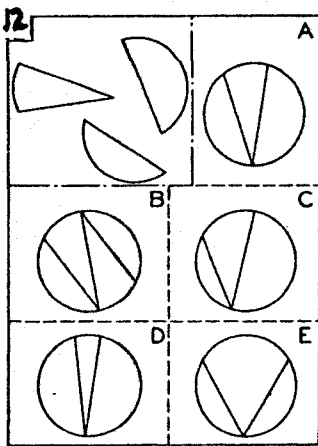
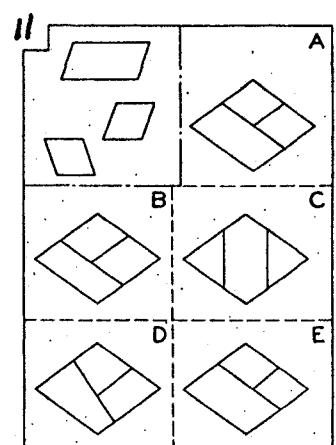
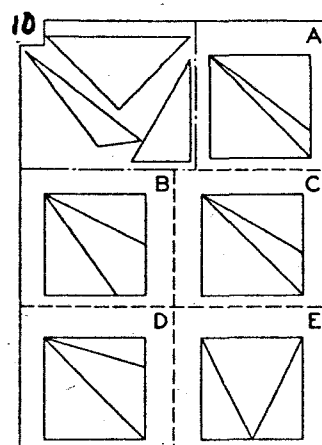
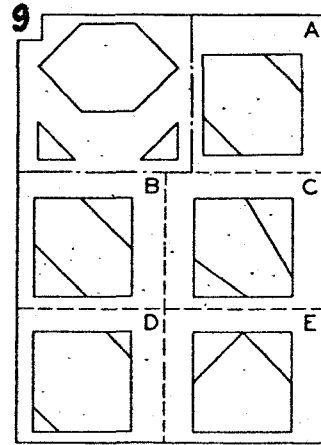
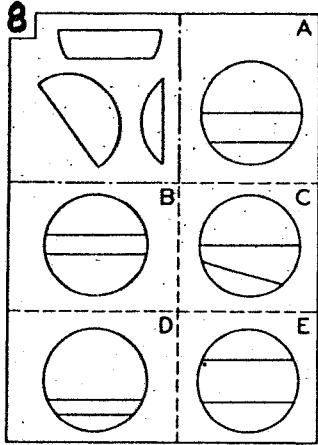
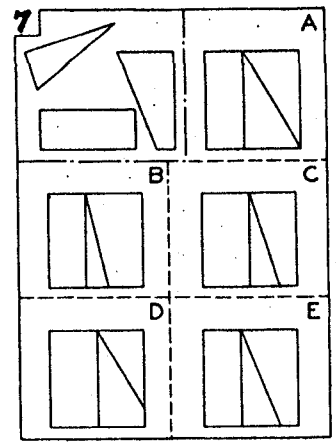
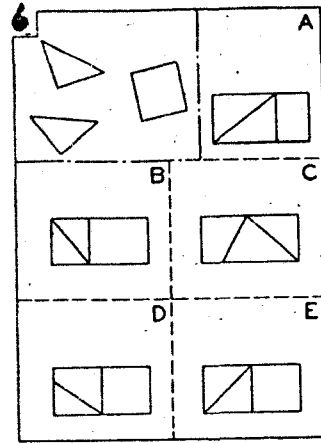
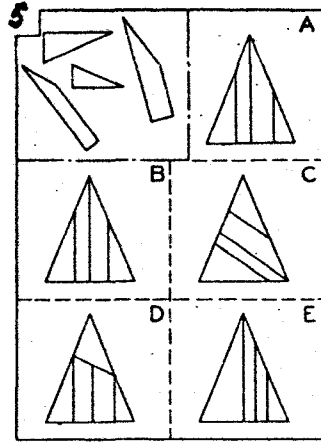
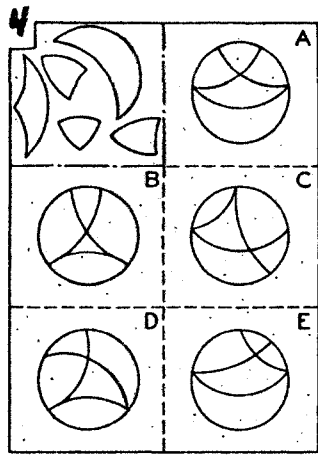
PRACTICE PROBLEMS

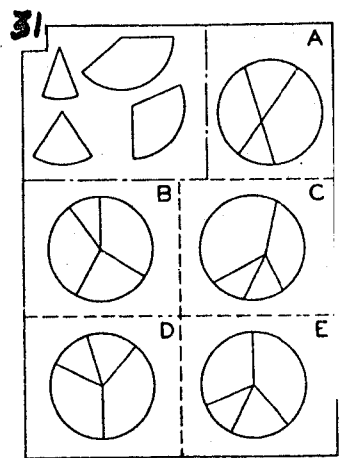
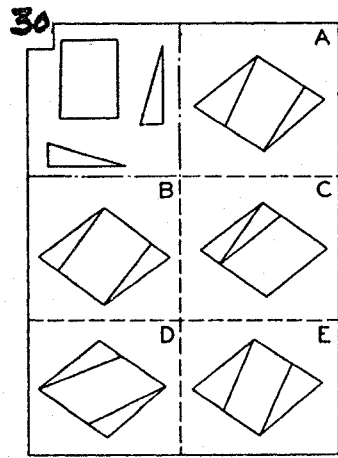
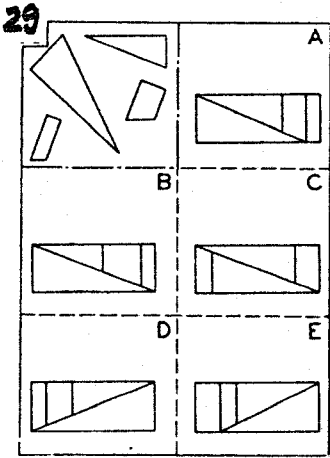
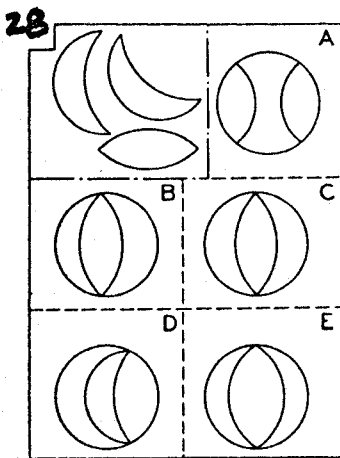
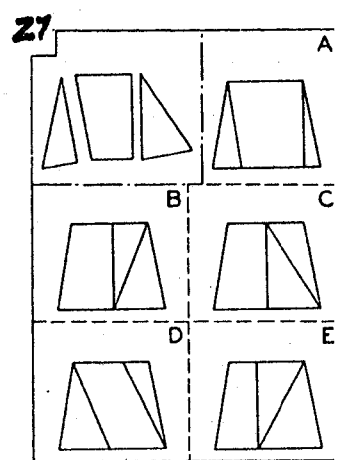
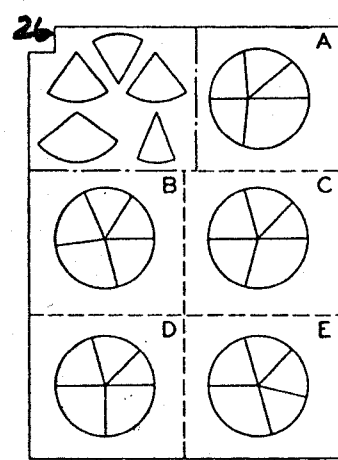
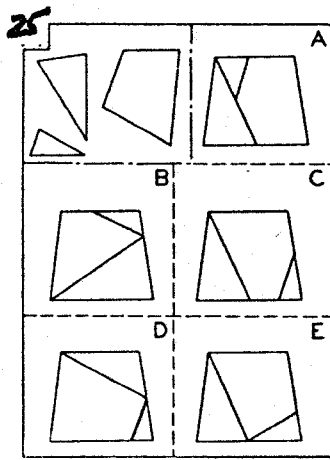
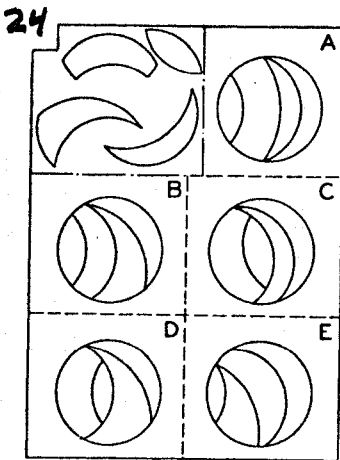
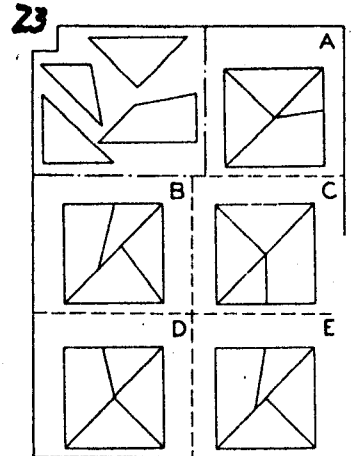
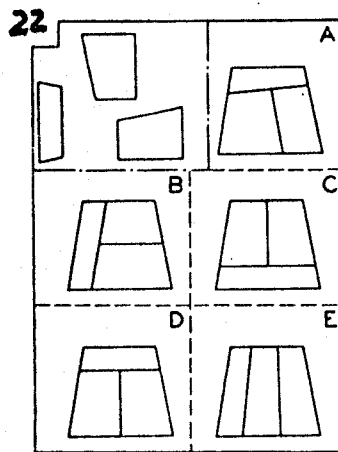
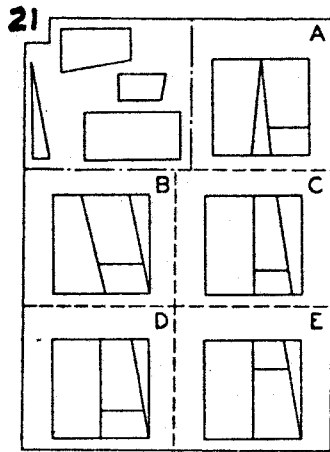
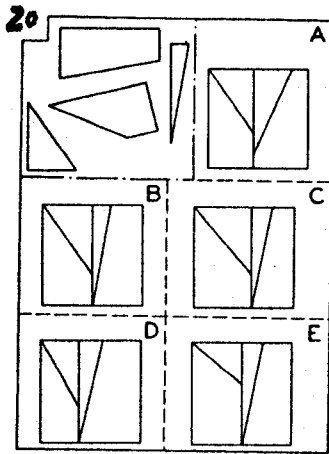


DO NOT BEGIN UNTIL INSTRUCTED TO DO SO



MOVE ON TO THE NEXT PAGE





ITB QUESTIONNAIRE 1

DIRECTIONS: Respond to the following questions concerning the problems that you have just worked by placing a check next to the letter of your choice for each question in the appropriate place on the ITB Answer Sheet (Under the Section marked ITB "Questionnaire 1." Do not write on this sheet.

1. In solving the problems of this test did you visualize the figures, holding them as a sort of 'picture in the head' during the solution process? Or, at the moment of solution did you "see" the result, e. g., the completed figure in a new position, the assembled parts etc., as a whole? In any of these cases were your visualizations:
 - a. Almost photographic in strength and clearness of detail
 - b. Strong and clear with shape and form defined
 - c. Clearly present, rich in essential detail
 - d. Moderately clear with some detail
 - e. Present as a general impression only
 - f. Vague and ill-defined
 - g. Absent altogether

2. In solving the problems of this test did you MAKE USE of whatever visualizing was present in getting the relations between the shapes, forms, spaces. Were visual images an essential part of the process? Did they help you? Did you feel, "this would be easy if I could get a clear picture of it and hold it in my head." Did you try deliberately to get images as your method of approach? How important were they?
 - a. The most important factor in solution
 - b. A major factor in solution
 - c. Definately used, along with other important factors
 - d. Of some use in solution
 - e. Of minor importance in an incidental way
 - f. Of no use at all, purely incidental if present
 - g. A hindrance to solution-just 'got in the way.'

3. In the solution of the problems of this test, did you find yourself manipulating the figures and/or parts in visual imagery, juggling them into various positions, turning them around and over, forming new combinations, imaging how they would look in such and such a position, in a kind of mental trial and error? With what facility was this manipulation effected? Try to consider this apart from the inherent difficulty of the item.
 - a. Manipulation of images almost as easy as that of real objects.
 - b. Manipulation easy and effortless.
 - c. Manipulation only effected with some difficulty
 - d. Manipulation difficult to point of creating tension
 - f. Manipulation scarcely possible. Feelings of frustration?
 - g. Manipulation impossible

Imagery Test Battery

ITB QUESTIONNAIRE 2

The object of these questions is to learn the degree to which people differ in the ability to see "in their mind's eye" and to revive past sensations. Please be as honest as you can on these questions.

BEFORE ANSWERING ANY OF THESE QUESTIONS, THINK OF THE LAST MEAL THAT YOU ATE AT A TABLE AND CONSIDER CAREFULLY THE PICTURE THAT RISES BEFORE YOUR MIND'S EYE. ON THE ANSWER SHEET UNDER THE SECTION MARKED 'ITB QUESTIONNAIRE 2' PLACE A CHECK NEXT TO LETTER UNDER EACH STATEMENT THAT BEST DESCRIBES YOUR EXPERIENCE. Do not write on this sheet.

1. Is the image dim or clear?
 - a. very dim
 - b. dim
 - c. clear
 - d. very clear
2. Is the brightness equal to or brighter than that of the original scene?
 - a. either equal or brighter
 - b. less bright
3. Rate the scene as having all parts clearly defined at the same time or as having some parts clearer than others.
 - a. all parts clearly defined at the same time.
 - b. some parts more clearly defined than others.
4. Rate your visual imagery of the entire room in which you ate the meal.
 - a. can get single image of the entire room.
 - b. can get image of part of the room.
 - c. get poor image of the room.
5. Rate your image of the food in terms of color-black and white.
 - a. colored image
 - b. black and white image
 - c. can't tell what color image is.

NOW THINK ABOUT A GLOBE OF THE EARTH

6. Can you mentally see more than one hemisphere of a globe at the same instant of time?
 - a. can mentally see more than one hemisphere at same time.
 - b. can mentally see only one hemisphere at same time.
7. How well can you project an image of your dinner plate on a piece of paper?
 - a. very well
 - b. fairly well
 - c. not very well
8. Can you get a distinct visual image of any one member of your family?
 - a. very well
 - b. fair image
 - c. poor image or no image.

STAI FORM X-2

Trait Anxiety Inventory

NUMBER _____

DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
1. I feel pleasant.....	1	2	3	4
2. I tire quickly.....	1	2	3	4
3. I feel like crying.....	1	2	3	4
4. I wish I could be as happy as others seem to be..	1	2	3	4
5. I am losing out on things because I can't make up my mind soon enough.....	1	2	3	4
6. I feel rested.....	1	2	3	4
7. I am "calm cool and collected".....	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them.....	1	2	3	4
9. I worry too much over something that doesn't matter.....	1	2	3	4
10. I am happy.....	1	2	3	4
11. I am inclined to take things hard.....	1	2	3	4
12. I lack self confidence.....	1	2	3	4
13. I feel secure.....	1	2	3	4
14. I try to avoid facing a crisis or difficulty.....	1	2	3	4
15. I feel blue.....	1	2	3	4
16. I am content.....	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me.....	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind.....	1	2	3	4
19. I am a steady person.....	1	2	3	4
20. I become tense and upset when I think about my present concerns.....	1	2	3	4

State Anxiety Inventory
TRIAL _____

STAI FORM X-1

NUMBER _____

DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

NOT AT ALL
SOMEWHAT
MODERATELY SO
VERY MUCH SO

- | | | | | |
|---|---|---|---|---|
| 1. I feel calm..... | 1 | 2 | 3 | 4 |
| 2. I feel secure..... | 1 | 2 | 3 | 4 |
| 3. I am tense..... | 1 | 2 | 3 | 4 |
| 4. I am regretful..... | 1 | 2 | 3 | 4 |
| 5. I feel at ease..... | 1 | 2 | 3 | 4 |
| 6. I feel upset..... | 1 | 2 | 3 | 4 |
| 7. I am presently worrying over possible misfortunes..... | 1 | 2 | 3 | 4 |
| 8. I feel rested..... | 1 | 2 | 3 | 4 |
| 9. I feel anxious..... | 1 | 2 | 3 | 4 |
| 10. I feel comfortable..... | 1 | 2 | 3 | 4 |
| 11. I feel self-confident..... | 1 | 2 | 3 | 4 |
| 12. I feel nervous..... | 1 | 2 | 3 | 4 |
| 13. I am jittery..... | 1 | 2 | 3 | 4 |
| 14. I feel "high strung"..... | 1 | 2 | 3 | 4 |
| 15. I am relaxed..... | 1 | 2 | 3 | 4 |
| 16. I feel content..... | 1 | 2 | 3 | 4 |
| 17. I am worried..... | 1 | 2 | 3 | 4 |
| 18. I feel over-excited and rattled..... | 1 | 2 | 3 | 4 |
| 19. I feel joyful..... | 1 | 2 | 3 | 4 |
| 20. I feel pleasant..... | 1 | 2 | 3 | 4 |

FEAR SURVEY SCHEDULE II

NUMBER _____

DATE _____

DIRECTIONS: The items in this inventory refer to things or experiences that may cause fear or other unpleasant feelings. Circle the number from 1 to 7 that describes how much you would be disturbed by it nowadays.

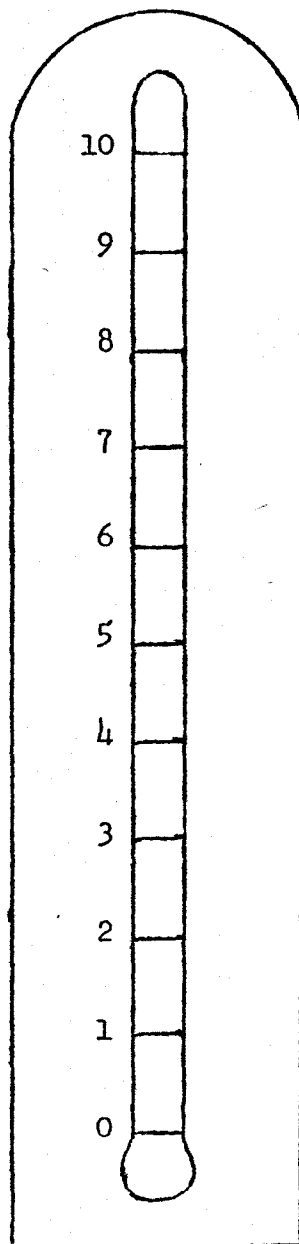
	None	Very Little	A Little	Some	Much	Very Much	Error
1. Sharp objects.....	1	2	3	4	5	6	7
2. Being a passenger in a car.....	1	2	3	4	5	6	7
3. Dead bodies.....	1	2	3	4	5	6	7
4. Suffocating.....	1	2	3	4	5	6	7
5. Failing a test.....	1	2	3	4	5	6	7
6. Looking foolish.....	1	2	3	4	5	6	7
7. Being a passenger in an airplane..	1	2	3	4	5	6	7
8. Worms.....	1	2	3	4	5	6	7
9. Arguing with parents.....	1	2	3	4	5	6	7
10. Rats and mice.....	1	2	3	4	5	6	7
11. Life after death.....	1	2	3	4	5	6	7
12. Hypodermic needles.....	1	2	3	4	5	6	7
13. Being criticized.....	1	2	3	4	5	6	7
14. Meeting someone for the first time	1	2	3	4	5	6	7
15. Roller coasters.....	1	2	3	4	5	6	7
16. Being alone.....	1	2	3	4	5	6	7
17. Making mistakes.....	1	2	3	4	5	6	7
18. Snakes.....	1	2	3	4	5	6	7
19. Being misunderstood.....	1	2	3	4	5	6	7
20. Death.....	1	2	3	4	5	6	7
21. Crowded places.....	1	2	3	4	5	6	7
22. Blood.....	1	2	3	4	5	6	7
23. Heights.....	1	2	3	4	5	6	7

Number _____

TRIAL _____

Date _____

DIRECTIONS: Please draw a line up the "thermometer" starting from the bottom to indicate the "degree" of fear you feel at this moment.



"FEAR THERMOMETER"

IPAT EIGHT PARALLEL FORM BATTERY

Form C
Annoyances

Everyone knows that some things irritate him more than others, that is, rub him the wrong way. You will be given a list of such happenings that annoy some people. For each happening, tell us whether you find it very annoying, somewhat annoying or not annoying

	<u>Very Annoying</u>	<u>Somewhat Annoying</u>	<u>Not Annoying</u>
1. A broken shoe lace	_____	_____	_____
2. Hypochondriacs (people who worry constantly about their health)	_____	_____	_____
3. Being interrupted in the middle of some work	_____	_____	_____
4. People who "know it all."	_____	_____	_____
5. Paying more than the usual price for some service or article	_____	_____	_____
6. Practical jokes	_____	_____	_____
7. People who are always borrowing things	_____	_____	_____

IPAT EIGHT PARALLEL FORM BATTERY

Form C

Do You Sometimes?

Sometimes we do things that perhaps we should not do and sometimes we fail to do things that we should do. No one acts all the time in an ideal way but it is often hard to be honest and admit our actual behavior. Please try to answer these questions in the way which you believe is true for you. Answer only Yes or No. Answer each question.

	<u>YES</u>	<u>NO</u>
1. I sometimes say damaging things about a person that I would not tell him to his face	---	---
2. I always admit it when I am wrong	---	---
3. I always try to do things promptly, instead of putting off things I should do right now	---	---
4. I have sometimes hated a person so much that I have had a momentary impulse to kill him	---	---
5. I always keep secrets that I promise to keep	---	---
6. I sometimes wish evil things would happen to my competitors or opponents	---	---
7. I have sometimes kept books as my own which I have borrowed from the library, when the record has been lost	---	---

IPAT EIGHT PARALLEL FORM BATTERY

Form C
Skills

Answer each of these questions by choosing the response that is closest to right for you.

1. Have you had any experience as a salesman?
A. No B. Little C. Some D. Quite a bit
With experience, how good a salesman would you be?
a. Poor b. Fair c. Average c. Very good
2. Have you ever gone deep sea fishing?
A. Never B. Rarely C. Occasionally D. Often
With practice, how good a deep sea fisherman would you be?
a. Poor b. Fair c. Good d. Excellent
3. Have you ever done any singing?
A. Never B. Rarely C. Occasionally D. Often
If you tried, how good a singer would you be?
a. Poor b. Fair c. Good d. Excellent
4. Have you ever had a wrestling bout?
A. Never B. Rarely C. Occasionally D. Often
If you tried how do you think you would do against people of your own sex and weight?
a. Very good b. Good c. Average d. Poor
5. Have you ever killed a dangerous snake?
A. Never B. Once C. Several times D. Often
If the need to do this ever arose, do you think you could do it?
a. Not at all b. Very poorly c. Poorly d. Satisfactorily
6. Have you ever tried dress designing?
A. Often B. Occasionally C. Rarely D. Never
With practice, how well do you feel you could design dresses?
a. Poorly b. Fair c. Good d. Excelently
7. Hve you ever taught any kind of school?
A. Yes, for a long time B. Yes, for a short time
C. Only occasionally D. Never
Do you think that with experience you'd make a good teacher?
a. Yes, definitely b. Yes, probably c. I'm not sure
d. No, I wouldn't

IPAT EIGHT PARALLEL FORM BATTERY

Form C
Comments

Here are some statements about some past events and some events which could possibly happen in the future. It's the kind of thing you'd read about in the newspaper. There are three possible comments given on each "news item." Choose the one that comes closest to being how you'd react to this news item.

1. Income tax is said to be going higher.
 - a. That should make any government unpopular. _____
 - b. What will they want next, our blood? _____
 - c. Probably necessary, but hard to take. _____

2. A man who claimed to have discovered perpetual motion has been put into an asylum
 - a. It seems he was too emotional about it, even if he is right. _____
 - b. That's stupid; great inventors have always been mistreated. _____
 - c. It's been totally disproved time and again; that's where the guy belongs. _____

3. Coach Simpson was fired after his team lost seven straight games.
 - a. The losses could have been due to conditions beyond his control. _____
 - b. That's baseball for you. There always has to be someone to put the blame on. _____
 - c. Probably serves him right. Most coaches are idiots anyhow. _____

4. Rita H_____ just got married for the fifth time
 - a. She's almost beat the world's record. _____
 - b. Movie stars always seem to have difficulty this way. I wonder why? _____
 - c. This doesn't set a very good example for young people. _____

IPAT EIGHT PARALLEL FORM BATTERY

Form C
Checklist

Each of the characteristics in the list below are things some people have more than others. For each characteristic, let us know how you stand on this characteristic. If you have it, do it, or experience it more than most people your age and sex, check "more than most." If you're average in this respect, check "average"; if below average (compared to others your age and sex), check "less than most." Don't spend a lot of time thinking about each one. The first answer that comes to mind is usually the best and most natural for you

	<u>Less Than Most</u>	<u>Average</u>	<u>More Than Most</u>
1. Want to get away from it all	_____	_____	_____
2. Pulse beat is rapid	_____	_____	_____
3. Lose feeling in arms or legs (legs or arms go to sleep)	_____	_____	_____
4. Egotistical ("stuck on myself")	_____	_____	_____
5. Fluent in speech (talk a lot and can find the right word)	_____	_____	_____
6. Constipated (have trouble moving bowels)	_____	_____	_____
7. Sensitive to pain	_____	_____	_____
8. Dislike loud noises and loud people	_____	_____	_____

IPAT EIGHT PARALLEL FORM BATTERY

Form C.

Embarrassing Circumstances

Everyone knows that some things embarrass him more than others, that is, make him blush or be uncomfortable. Here below is a list of some happenings. For each one tell us whether you would find it not embarrassing, somewhat embarrassing, or very embarrassing.

	<u>Not</u> <u>Embarrassing</u>	<u>Somewhat</u> <u>Embarrassing</u>	<u>Very</u> <u>Embarrassing</u>
1. Having to have something explained to you several times	_____	_____	_____
2. Asking for novocain (pain-killing) shot at the dentist	_____	_____	_____
3. Your gossip about someone gets back to them and they tell you about it	_____	_____	_____
4. A friend cries in your presence	_____	_____	_____
5. Your dentist tells you that you have bad breath	_____	_____	_____
6. Attending a social function, dressed inappropriately, (informal, for example, at a formal dance)	_____	_____	_____
7. You get angry at a good friend without real cause	_____	_____	_____

IPAT EIGHT PARALLEL FORM BATTERY

Form B
Questions

Answer each of the following questions according to what is true of you at this moment (not last week, or usually). Try not to use the middle or uncertain response for any oftener than you have to, perhaps once every three or four questions. Remember, answer what is true for you now, at this moment.

1. My nerves get on edge so that certain sounds, e. g., a screechy hinge, are unbearable and give me the shivers.
A. Often B. Sometimes C. Never
2. In discussion, with some people, I get so annoyed that I can hardly trust myself to speak.
A. Sometimes B. Rarely C. Never
3. I feel sure that I could "pull myself together" to deal with an emergency.
A. Always B. Often C. Seldom
4. I feel grouchy and just do not want to see people.
A. Occasionally B. In between C. Rather often
5. I make a point of not being absent-minded or forgetful of details.
A. Yes B. Uncertain C. No
6. I am confident I can do most things at least a little better than most people.
A. Yes. B. In between C. No
7. I occasionally have vivid dreams that disturb my sleep.
A. Yes B. In between C. No
8. I sometimes get an unreasonable dislike for a person:
A. but it is so slight that I hide it easily. B. In between C. which is so definite that I tend to express it.
9. I get slightly embarrassed if I suddenly become the center of attention in a social group.
A. Yes B. In between C. No
10. Most people are a little queer mentally, though they do not like to admit it.
A. True B. Uncertain C. False

IPAT EIGHT PARALLEL FORM BATTERY

Form B
Annoyances

Everyone knows that some things irritate him more than others, that is, rub him the wrong way. You will be given a list of such happenings that annoy some people. For each happening, tell us whether you find it very annoying, somewhat annoying or not annoying.

	<u>Very Annoying</u>	<u>Somewhat Annoying</u>	<u>Not Annoying</u>
1. Meeting deadlines	_____	_____	_____
2. People you have to deal with who are of very low intelligence	_____	_____	_____
3. Soft drinks or beer served warm	_____	_____	_____
4. Being splashed by cars while walking on a rainy day	_____	_____	_____
5. Bad-smelling breath	_____	_____	_____
6. The emphasis given sex crimes in popular newspapers	_____	_____	_____
7. People who don't dim their lights when their car approaches yours at night	_____	_____	_____

IPAT EIGHT PARALLEL FORM BATTERY

Form B

Do You Sometimes?

Sometimes we do things that perhaps we should not do and sometimes we fail to do things that we should do. No one acts all the time in an ideal way, but it is often hard to be honest and admit our actual behavior. Please try to answer these questions in the way which you believe is true for you. Answer only Yes or No. Answer each question.

- | | <u>YES</u> | <u>NO</u> |
|--|------------|-----------|
| 1. I sometimes fail to do what I know is right, because I lack courage. | --- | --- |
| 2. I always put in an honest day's work, when working for pay. | --- | --- |
| 3. I have sometimes picked on or bullied someone smaller than myself | --- | --- |
| 4. I am just as polite to people at home as when I am out in company | --- | --- |
| 5. I always have good rational and unemotional reasons for doing things. | --- | --- |
| 6. I sometimes take credit for doing things that were really done mostly by someone else | --- | --- |
| 7. I sometimes do not show enough gratitude for the things people do for me. | --- | --- |

IPAT EIGHT PARALLEL FORM BATTERY

Form B
Skills

Answer each of these questions by choosing the response that is closest to right for you.

1. How much card playing do you do?
A. Never B. Rarely C. Occasionally D. Often
With practice I think I might play cards
a. Excellently b. Good c. Fair d. Poorly
2. How often have you spoken on the radio?
A. Often B. Several times C. Occasionally D. Never
If I put my mind to it, I think I could announce
a. Very good b. Good c. Average d. Fair
3. How often have you been chairman of a meeting?
A. Often B. Occasionally C. Rarely D. Never
If I were to have more practice as chairman I would be
a. Excellent b. Good c. Fair d. Poor
4. Have you ever handled high explosives like nitroglycerine
A. Never B. Once C. A few times D. Often
If the need to do so arose, I think I would do the job
a. Very poorly b. Poorly c. Satisfactorily d. Good
5. Have you ever tried modeling in clay?
A. Often B. Sometimes C. Rarely D. Never
With practice, how good a sculptor could you become?
a. Brilliant b. Very good c. Average c. Poor
6. I have been a contestant on a quiz program
A. Never B. Once or twice C. Fairly often D. Often
If I put my mind to it, on a quiz program I could win;
a. a lot. b. an average amount. c. a little. d. practically nothing.
7. Have you ever run for election for a club or political office?
A. Never B. Once or twice C. Several times D. Often
If you put you mind to it what would be your chances of
getting elected to a club office?
a. No chance b. A slight chance c. A good chance d. A very good chance

IPAT EIGHT PARALLEL FORM BATTERY

Form B
Comments

Here are some statements about some past events and some events which could possibly happen in the future. It's the kind of thing you'd read about in the newspaper. There are three possible comments given on each "news item." Choose the one that comes closest to being how you'd react to this news item.

1. The Johnsons are getting a divorce
 - a. Too bad. Their fights used to make such wonderful gossip. _____
 - b. Neither of them was much of a prize anyhow. _____
 - c. Perhaps there is still some chance of a settlement. _____

2. Admission of patients to mental hospitals has doubled since 1910.
 - a. This is mighty alarming. _____
 - b. We need more research to check on the facts. _____
 - c. That shows what wars and depressions will do. _____

3. The X party won the Election.
 - a. A lot of people will be happier. _____
 - b. A d----d good change. _____
 - c. Perhaps we'll see a change now. _____

4. One hundred young ladies will make their debut into society tonight at a grand ball.
 - a. What a waste of time and Money! _____
 - b. I'm sure this will be of interest to many people _____
 - c. Anyone for pinochle? _____

IPAT EIGHT PARALLEL FORM BATTERY

Form B
Checklist

Each of the characteristics in the list below are things some people have more than others. For each characteristic, let us know how you stand on this characteristic. If you have it, do it, or experience it more than most people your age and sex, check "more than most." If you're average in this respect, check "average"; if below average (compared to others your age and sex), check "less than most." Don't spend a lot of time thinking about each one. The first answer that comes to mind is usually the best and most natural for you.

	<u>Less than Most</u>	<u>Average</u>	<u>More Than Most</u>
1. Feel depressed or despondent	_____	_____	_____
2. Have nightmares	_____	_____	_____
3. Feel faint or weak	_____	_____	_____
4. Have gas in stomach	_____	_____	_____
5. Have backaches	_____	_____	_____
6. Laugh suddenly or explosively	_____	_____	_____
7. Get cramps in arms or legs	_____	_____	_____
8. Jumpy, nervous	_____	_____	_____

IPAT EIGHT PARALLEL FORM BATTERY

Form B.

Embarassing Circumstances

Everyone knows that some things embarrass him more than others, that is, make him blush or be uncomfortable. Here below is a list of some happenings. For each one tell us whether you would find it not embarrassing, somewhat embarrassing, or very embarrassing.

	<u>Not</u> <u>Embarrassing</u>	<u>Somewhat</u> <u>Embarrassing</u>	<u>Very</u> <u>Embarrassing</u>
1. Showing fear in front of friends	_____	_____	_____
2. Getting a low mark in a school course	_____	_____	_____
3. Someone insults you and challenges you to fight but you do not	_____	_____	_____
4. A policeman gives you a ticket for speeding	_____	_____	_____
5. Being laughed at by friends	_____	_____	_____
6. Forgetting you lines in a play	_____	_____	_____
7. You discover a rip in the seat of your clothes while in a large group of men and women	_____	_____	_____

SELF REPORT QUESTIONNAIRE
(Physiological questionnaire) TRIAL

DIRECTIONS: Read each statement and then circle the appropriate number to the right of it to indicate how you feel AT THIS MOMENT, IRREGARDLESS OF HOW YOU MAY HAVE RESPONDED BEFORE. Do not spend too much time on any one statement, but give the answer which seems to best describe your present feelings.

	<u>NOT AT ALL</u>				<u>VERY MUCH SO</u>		
	1	2	3	4	5	6	7
1. My hands are dry and comfortable.							
2. I can swallow with no difficulty.	1	2	3	4	5	6	7
3. I feel my heart beating faster.	1	2	3	4	5	6	7
4. I feel moisture at my forehead.	1	2	3	4	5	6	7
5. My pulse seems normal such that I am not aware of it.	1	2	3	4	5	6	7
6. I feel as if I have to urinate.	1	2	3	4	5	6	7
7. My mouth feels dry.	1	2	3	4	5	6	7
8. My stomach feels comfortable and calm.	1	2	3	4	5	6	7
9. I feel more alert than usual.	1	2	3	4	5	6	7
10. Presently my bowels are controlled and normal.	1	2	3	4	5	6	7
11. My eyes are relaxed and unstrained.	1	2	3	4	5	6	7
12. I have a full feeling in my stomach.	1	2	3	4	5	6	7
13. I am short of breath.	1	2	3	4	5	6	7
14. I feel myself blushing.	1	2	3	4	5	6	7
15. It would be accurate for me to say that my limbs are not trembling.	1	2	3	4	5	6	7
16. I feel somewhat nauseous.	1	2	3	4	5	6	7
17. I am breathing faster and harder	1	2	3	4	5	6	7
18. My reflexes seem somewhat sharper and quicker than usual.	1	2	3	4	5	6	7
19. I feel calm.	1	2	3	4	5	6	7
20. It would be inaccurate to describe me as fidgety and restless.	1	2	3	4	5	6	7

ORIENTATION AND WAIVER FORM

For the advancement of science and for the monetary compensation paid me, I hereby express my desire to voluntarily participate in research conducted by Mr. Lawrence J. Ryan. The said research, conducted on my own school's campus, and with the approval of its administration, will involve the picking up or the attempt to pick up a white laboratory rat. I understand that I am free at all times to pick it up or not to do so, as I solely choose. The research also involves the taking of several paper and pencil psychological tests and listening to a tape recording. I am absolutely free to participate or not to participate in any or all parts of the study. However, I do understand that I will receive monetary compensation of three dollars only if I participate in all parts of the study.

I hereby also release Mr. Ryan and any agency or university which he represents, from any responsibility for any accident, injury or other unlikely occurrence that might be sustained by me in the course of the experiment or thereafter.

I hereby acknowledge that I have read and understand the above and that I am familiar with the nature of the research that I am voluntarily undertaking.

Signature _____

On the Campus of _____
(name of school)

Date _____

APPENDIX B

TABLE B.1

SCRIPTS OF STANDARDIZED INSTRUCTIONS

Prescreening

We are conducting some research that deals with common fears and the way individuals imagine. Your cooperation in completing the inventories will help us to obtain college norms for them. If you are interested in participating in a further phase of this research for which you will be paid, please fill out the data called for under the dotted line on the information sheet so that we may contact you at a later date. The information sheet is located first in the manilla folder.

Each of you has been given a manilla folder with a number of inventories inside. Please note the number written on the upper right hand corner of the front cover of the folder. To assure your anonymity and confidentiality, this number will be used in the scoring of the inventories. Be sure to place this number on the inventories and answer sheets where it is called for. Read and fill out the data requested on the information sheet. (pause for one minute)

The inventories are arranged in the folder in the order in which you should complete them. As you complete each one, place it face down on the left side of the folder. The first inventory marked ITB Form Board Test, is the only timed item, for which you will have eight minutes. The answer sheet proceeds the inventory. Record you answers in the top section of this answer sheet. Now take a minute to read the directions and work the practice problems for the Form Board Test. (pause for one minute) You will have eight minutes to work on this test. Begin (eight minutes elapsed timed with a stopwatch)

Stop! Now turn to the next inventory and respond to all of the items on it. Be sure to read the directions carefully for each inventory and place your number on it. Return the manilla folder when you have finished.

Pretherapy

As you know we are conducting some research dealing with some fears that you reported during the prescreening phase. This study deals with the fear of rats that you mentioned. In the course of the experiment we will be doing basically three different things. You will be completing more questionnaires similar to the ones you responded to before to allow you a chance to express your feelings at particular points in the study. You will be listening to a tape about rats. Also you will be given the opportunity to pick up a live laboratory rat. We want to emphasize that you are free to pick up or not pick up the rat as you and only you choose. If you are still interested in participating, please read and sign this form. (Orientation and waiver of responsibility form is given to S.)

The first thing we will do is give you the opportunity to pick up the rat. (E and S proceed to the experimental room) As you can see at the end of the track is a cage on wheels. In the cage are

two live white rats. The rope is connected to the cage. When I say begin, I want you to pull the cage down the track to this mark on the dock. When you have done this, I want you to open the cage and pick up one of the rats. Begin. (Behavioral avoidance data was recorded)

Now respond to these questionnaires to indicate how you felt in your attempt to pick up the rat. (The S was seated at an adjacent table and the pretherapy self report battery was administered)

Implosive therapy 1

Now you are going to be listening to a tape about rats. We want you to follow the directions as closely as possible (E and S. returned to the office. The headphones were fitted) I will be interrupting in the middle of the tape for another questionnaire. We will begin the tape now. (At the predesignated point the tape was stopped) Now respond to these questionnaires to indicate how you feel at this point. (The implosive therapy 1 self report battery was administered)

Implosive therapy 2

Now we will continue the tape. (At the conclusion of the tape the S removed the headphones as instructed by the tape) Now respond to these questionnaires to indicate how you feel at this point. (The implosive therapy 2 self report battery was administered)

Posttherapy

Now you have going to have another opportunity to pick up the rat. (E and S returned to the experimental room) The instructions are the same as before. When I say begin, pull the cage down the track, open the cage and pick up one of the rats. (Behavioral avoidance data was recorded) Now respond to these questionnaires to indicate how you felt in your second attempt to pick up the rat. (The posttherapy self report battery was administered)

We want to thank you for your cooperation. Here is your three dollars for participating. Also we would appreciate you filling out this form in your spare time which asks for your comments and criticisms concerning the experiment. Be sure not to discuss the exact nature of the experiment with your friends. Sometime later in the semester we will be mailing to you a description of the results.

APPENDIX C

RELIABILITY AND VALIDITY OF THE PHYSIOLOGICAL QUESTIONNAIRE

The physiological questionnaire was constructed by the present author for use in this study to provide a quick and easily administered measure of the self report of physiological reactivity to anxiety. The questionnaire was used both in the screening and experimental phases of the study along with other measures of anxiety that were previously described. The need for the measure arose when a survey of the literature concluded that actual physiological measures of anxiety such as the Galvanic Skin Response, the electroencephalogram and the Palmar Sweat Index were somewhat unreliable, burdensome to use and easily effected by irrelevant variables such as motivation, disposition, movement and fatigue. Other psychometric measures of anxiety were only minimally concerned with physiological reactivity and primarily concerned with the subjective report of inner feelings of calmness, control and comfort. Required for the present study was a short, quick questionnaire reflecting the immediate state of physiological reactivity to various levels of anxiety arousal.

The items of the physiological questionnaire were developed from a surveyal of several other anxiety measures. These included the Manifest Anxiety Scale (Taylor, 1953), the S-R Inventory of Anxiousness (Endler et al., 1962), the Affect Adjective Check List

(Zuckerman, 1960), as well as the Minnesota Multiphasic Personality Inventory (Dahlstrom and Welsh, 1960). The monographs of Cattell and Scheier (1961) were also consulted to derive the physiological oriented variables that were closely related to the U. I. 24 anxiety factor.

A list of the physiological manifestations of anxiety was compiled from all of the mentioned sources and a rating scale format was adopted. On the scale the S chose a number from one (not at all) to seven (very much so) to indicate his response to each of the items. Included in the questionnaire were 20 items, 9 of which were stated in reversed order to control for acquiescence. The questionnaire was administered both during the neutral set of the prescreening battery as well as several times under the varying levels of anxiety of the experimental phase.

High levels of internal consistency were found both on the prescreening administration as well as on each of the four experimental administrations. Table XV contains the K-R 20 reliability coefficients (measure of internal consistency) as well as means and standard deviations for each administration of the physiological questionnaire.

Both divergent and convergent validity were evident when the scores of the physiological questionnaire were compared with other measures employed in the study. Convergent validity was manifested in both the prescreening and experimental phases. In the prescreening phase the physiological questionnaire correlated significantly with

TABLE XV
 K-R 20 RELIABILITY COEFFICIENTS, MEANS AND STANDARD DEVIATIONS FOR
 VARIOUS ADMINISTRATIONS OF THE PHYSIOLOGICAL QUESTIONNAIRE

Experimental stage	N	K-R 20	Mean	Standard Deviation
Prescreening	214	.71	48.93	13.58
Pretherapy	60	.77	58.59	14.54
Implosive therapy 1	60	.82	81.54	16.81
Implosive therapy 2	60	.89	71.24	20.99
Posttherapy	60	.87	63.26	20.45

the State Anxiety Inventory ($r=.490$ $p < .01$ $df=200$) and the Trait Anxiety Inventory ($r=.353$ $p < .01$ $df=200$). In the experimental stage convergent validity was demonstrated by significant correlations of the physiological questionnaire at various points with other anxiety measures. At no time did the physiological questionnaire demonstrate a significant correlation with any variable other than another anxiety measure. No significant relationship was found between the physiological questionnaire and any of the subject variables such as age, grade point average, or imagery ability. The above constituted a demonstration of divergent validity.

Discriminative validity was demonstrated at the implosive therapy 2 administration of the physiological questionnaire. At this point the physiological questionnaire manifested a significant difference at the .05 level between the high and low imagery groups. While the evidence is limited, it does appear that the physiological questionnaire is a sensitive measure of self report of physiological reactivity to anxiety with sufficient reliability and validity data to warrant its use with other samples.

VITA

Lawrence Ryan was born on October 22, 1944 in Toledo, Ohio. He received the B. A. degree in 1966 from John Carroll University, University Heights, Ohio with a major in psychology. In 1968 he was awarded the M. A. degree in clinical psychology from East Carolina University, Greenville, North Carolina. Since September, 1968 he has been a candidate for the doctorate degree in psychology at the University of Windsor.

Mr. Ryan has held internship positions at the Wake County Mental Health Center in Raleigh, North Carolina, the Northeast Child Guidance Clinic in Detroit, Michigan and the Kennedy Child Study Center in Manhattan, New York. Since the fall of 1969 he has served as a staff psychologist at the Children's Center of Wayne County in Detroit. In the spring of 1971 he taught part-time in the department of psychology at Marygrove College also in Detroit.