1970

The use of actual and imaginary fear stimuli in the behavior modification of a simple fear with covert reinforcement.

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THE USE OF THE ACTUAL AND IMAGINARY FEAR STIMULI IN THE BEHAVIOR MODIFICATION OF A SIMPLE FEAR WITH COVERT REINFORCEMENT

By

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M.A., Boston College, 1967

A Dissertation
Submitted to the Faculty of Graduate Studies through the
Department of Psychology in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy at the
University of Windsor

Windsor, Ontario, Canada
1970

PREFACE

My first thoughts of appreciation go to my committee chairman Dr. W. G. Bringmann, Director of the Psychology Clinic, who suggested the general topic area of "in vivo" therapy, and whose guidance with historical content and literary style were most helpful. I am grateful to Dr. W. Balance for his comments on the nature of the relationship of laboratory experience and actual clinical setting and for his help with the literary revision of the manuscript. To Dr. Namikas I am indebted for help with general experimental design in learning theory. Dr. Cohen provided invaluable assistance with statistics and with the clarifying of the expression for these findings in the final manuscript. To Dr. Neil Holland and Dr. Ray Daly I am indebted for refinement in the theory, design, and precision of this experiment.

A special note of thanks is reserved for Dr. Joseph Cautela. without his support this study would not have been possible. He not only taught me his procedure, but made his laboratory facilities available to me.

To those student nurses who came faithfully in the evenings and under adverse winter conditions I am sincerely grateful.

Finally, this dissertation owes its existence to the woman to whom it is dedicated, my wife Georgina. For it has been the loyal and warm support of my wife that has made the research meaningful, and the fruits of its completion more enjoyable.

Raymond B. Flannery, Jr.
Autumn, 1970

ABSTRACT

The present study was concerned with the actual versus imagined fear stimuli in the behavior modification of fear of laboratory rats by covert reinforcement.

It was predicted that (a) both treatment groups would exhibit greater fear reduction than the control group for which no predictions were made; (b) both treatment groups would exhibit greater fear reduction than the control group; (c) that the treatment group presented with the actual fear stimulus would reveal greater reductions in fear than the treatment group presented with the fear stimulus in imagination; (d) that transfer of training would occur in a substantially altered environment.

Forty-five student nurses from Boston College were assigned to the two treatment and one control groups. Baseline data on three behavioral measures (approach, stroke, hold), and two self-report measures (fear intensity scale; fear survey schedule) were obtained before all subjects were trained in covert reinforcement. During the experimental stage, one treatment group was presented the actual fear stimulus paired with covert reinforcement, the second treatment group was presented with the fear stimulus in imagination; the control group talked about rats. All measures were repeated after experimental sessions, and again in the transfer setting.

The main findings were (a) both treatment groups did exhibit significantly greater reductions in fear while the control group showed

no changes; (b) both treatment groups did reveal significantly greater fear reductions than the control group; (c) the group presented with the actual fear stimulus had significantly greater fear reductions than the group presented with the fear stimulus in imagination; (d) transfer of training did occur.

These results were consistent with previously reported behavior modification research. The implications for future research were discussed.

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Chapter I

Introduction and Background

Behavior modification is a school of thought regarding psychotherapy which can be distinguished from classical approaches in that it has attempted to apply systematically the empirical data and theory derived from application of the experimental method to explain, change, and prevent behavior disorders (Yates, 1970). Although behavior therapies have been applied to a wide variety of behavioral problems (Franks, 1969; Yates, 1970), behavior modification techniques have been especially helpful in dealing with specific focused fears (Wolpe & Lazarus, 1966). Since the present study deals with specific focused fears, two of the most effective methods for dealing with this issue will be dealt with in some detail: these two methods are operant conditioning (Skinner, 1938) and systematic desensitization (Wolpe, 1958).

Operant Conditioning

The principles which describe the functioning of operantly learned behavior have emerged from the research and thought of Skinner and several colleagues (Skinner, 1938, 1953; Ferster, 1958, 1965; Honig, 1966; Sidman, 1962). An operant is any behavior which is controlled by its consequences, that is, the events which follow the behavior influence the frequency and probability of a reoccurrence of the response in the same or similar situation.

Positive reinforcement and the shaping of behavior by the method of successive approximation are two important principles in the operant

framework. A positive reinforcer is any stimulus which increases the probability of a reoccurrence of the immediately preceding response. Shaping is a procedure for developing desired goal behavior by reinforcing responses which may initially be quite dissimilar but contain elements of the response goal and subsequently reinforcing response characteristics which are closer and closer approximations to the goal behavior.

Because of the radical empiricism of operant research, the clinical application in this area has been by definition in vivo, that is, actual behavior and actual stimuli are used as reinforcers. The research below is important to the present study because in these investigations the actual fear stimulus was presented and operant procedures were used to reduce these fears.

Levy (1939) reported a series of case studies dealing with children who had specific fears. His release therapy was an early operant technique of assertive responding. Reinforcement was provided by the therapist's social approval. Jersild and Holmes (1935) in another early paper dealing with children's fears discussed two cases of children who overcame imaginary fears by being taught in successive approximations how to cope with these situations. The rewards were adult social praise and learning in the form of games.

Straughan (1964) instructed the mother of a child how to approach her child who was afraid of her. The mother approached in successive steps, and after each step the child was rewarded with doll play. Hamblin, Buckholdt, Bushell, Ellis, and Ferritor (1969) were able to shape the behavior of a shy withdrawn child in a classroom by providing reinforcement for successive approximations to the goal behavior.

Lazarus (1960) used shaping procedure with a child who avoided riding in automobiles. The child was rewarded with candy for first making positive comments about vehicles, then for playing with toy cars, and finally for riding in a car. Finally, the operant method has been used with adults. Garfield, McBreaty, and Dichter (1968) have reported a case of a man impotent for a year who was successfully treated in part by sexual assertive training.

The research employing shaping procedures and positive reinforcement have strongly supported the effectiveness of operant conditioning methods for reducing specific focused fears.

Systematic Desensitization

Systematic desensitization is a series of experimental procedures introduced by Wolpe (1958). Wolpe has the client construct a list of related fears hierarchically ordered on a dimension from least fear-arousing to most fear-arousing. Additionally, the client is taught a series of exercises to enable him to discriminate muscular tension from muscular relaxation and to relax muscles voluntarily (Wolpe & Lazarus, 1966). When both of these steps are completed desensitization proper begins.

Wolpe instructs the client to place himself in deep muscular relaxation as he has been taught, then he asks the client to vividly imagine the least fear provoking item on the hierarchy. This item is repeated until the client experiences no fear. The client repeats this process for all of the items in the hierarchy in this same manner, proceding sequentially from one item to the next until he can imagine the most fear provoking item without disturbance.

Wolpe's theoretical rationale stems from varied sources (Guthrie 1935; Hull, 1943). According to Wolpe (1958), desensitization is fundamentally based on the principle of conditioned inhibition brought about by his reciprocal inhibition procedure of muscle relaxation. An important influence of Hull (1943) is seen here in the use of the construct, conditioned inhibition, which refers to an incompatible active state of not responding. In the reciprocal inhibition procedure, the muscular relaxation of the subject is the active process which inhibits anxiety. For Wolpe, muscular relaxation and anxiety are incompatible responses because relaxation decreases sympathetic activity and increases parasympathetic activity; whereas, anxiety does just the reverse. The influence of Guthrie (1935) is evident in a second basic procedure in systematic desensitization, the procedure of building the hierarchy. In Guthrie's theory to change a response it is necessary only to cause other movements to occur in the presence of the cues for a particular habit. One way he suggested was to present a stimulus in a faint degree so that it is just noticeable, and then increase its intensity so that a new response may become attached. Wolpe has made apparent use of this method in constructing hierarchies.

The results of the studies pertaining to systematic desensitization (Wolpe, 1958) were based on two general types of outcome measures, both of which were included in the present survey. The first type of outcome measures are objective ones, that is, observations about the subject by someone other than the subject. One commonly used method has been overt approach behavior, for example, the abilities to move toward, stroke, and hold feared objects. Some studies have added physiological measures such as the Galvanic Skin Response.

Subjective measures on the other hand, are based on self-reports from the subjects. One type of measure has been rating scales of the intensity with which specific fears are reported by the subject. A second type of measure has been inventories which survey a wide variety of fear evoking stimuli which may affect a particular subject. A third measure used at times has been the written self-report or verbal report given by the client to the therapist about the client's ability to deal with the fear stimulus outside of the therapeutic session.

The literature based on the outcome measures listed above has reported high efficiency in relieving specific focused fears when systematic desensitization procedures have been used (cf. reviews by Lang, 1969; Lazarus, 1963a; Rachman, 1968; Wolpe, 1958).

There have been two favored methods of presenting the fear stimulus in systematic desensitization (Wolpe, 1958). One has been the presentation of fear stimuli in imagination; the other has been the presentation of actual fear evoking objects. The more common method has been to present the stimulus in imagination. Controlled studies on normal student populations which used systematic desensitization to reduce fear of snakes (Davison, 1965; Lang and Lazovik, 1963), laboratory rats (Cooke, 1966), public speaking (Paul, 1966), have attested to the effectiveness of these procedures when the fear stimulus is presented in imagination. In addition, this same method of presentation has been used in a wide variety of clinical problems (Eysenck, 1964; Lazarus, 1963; Rachman, 1965; Wolpe, 1958) with similar successful results.

The in vivo presentation of the actual fear stimulus has been used successfully to overcome a woman's fear of going out alone

(Meyer, 1957); to enable a store manager to no longer fear social situations such as entering a department store (Walton and Mather, 1963); and to enable a woman to overcome her fear of earthworms (Murphy, 1964). Moreover, Cooke (1966), Garfield, Darruin, Singer and McBreaty (1967), and Barlow, Leitenberg, Agras, and Wincze (1969) have undertaken laboratory comparisons employing the presentation of actual fear stimuli as opposed to the presentation of fear stimuli in imagination. Each of these studies used systematic desensitization procedures (Wolpe, 1958).

Cooke (1966) worked with subjects who were afraid of laboratory rats. He employed two treatment groups for his desensitization process: "Direct Treatment" in which the fear stimulus was actually presented; "Indirect Treatment" where the subjects imagined the fear stimulus. He also included a no treatment control group. Systematic desensitization procedures (Wolpe, 1958) were used in both treatment groups. Again the effectiveness of desensitization procedures are verified for both treatment groups. In addition, the "Direct Treatment" (in vivo) group exhibited greater fear reduction than the "Indirect Treatment" group. Although the latter finding represented a substantial reduction in fear, it did not attain statistical significance.

The second study by Garfield et.al. (1967) had two groups of subjects who were desensitized to their fear of snakes. Both groups received systematic desensitization (Wolpe, 1958); however, one group of subjects had exposure trials to the actual fear stimulus in addition to the regular sessions in which the fear stimulus was presented in imagination. Although Garfield et.al.(1967) noted the better facilitation of desensitization with in vivo training, the groups were not equated in the amount of exposure they had to the fear stimulus.

The most ambitious study to date has been that of the Barlow et.al. (1969) research. In this study Barlow replicated the basic Cooke design (1966), but with a larger number of subjects. He did find significant differences between the treatment groups. The group which worked with the actual fear stimulus (snake) showed more approach behavior and greater reductions in fear as measured by the Galvanic Skin Response. In this study, the pre-treatment data gathering is weak in that the subjects were told that it was a study in fear, therefore fear and possible shame effects may have been confounded.

In summary, the studies which have employed systematic desensitization (Wolpe, 1958) to reduce fear have offered strong support for its effectiveness whether the fear reduction has been assessed by self-reports, physiological measurements, or overt approach behavior. Moreover, systematic desensitization has been demonstrated to be effective whether subjects are presented with fear stimuli in imagination or whether the fear objects are actually presented. Studies have also been conducted whose results suggest that the combination of in vivo feared objects with imaginary fear stimuli provides a facilitation effect for fear reduction. Lastly, the issue has been broached whether in vivo presentations or imaginary fear stimuli result in greater fear reduction. The evidence to date suggests that in vivo presentations may result in greater fear reduction.

Covert Reinforcement

In addition to the use of imagined stimuli as a substitute for the presentation of actual fear objects, Cautela (1970) has innovated an operant procedure whereby the reinforcing stimulus is presented in

imagination. He refers to this procedure as "covert reinforcement". Typically, this method begins with the discovery of possible reinforcers. There are several ways in which this can be done, but most often the reinforcement survey schedule (Cautela and Kastenbaum, 1967) is administered. This survey obtains information about what situations and objects are regarded as strongly rewarding by a particular subject. The imaginary reproductions of these rewards are referred to as "reinforcing scens" by Cautela (1970). It is particularly important to teach the subject to think of these scenes with a good deal of clarity and vividness. Next, the experimental subject is instructed to pair the reinforcing scene with the word, reinforcement.

Two learning principles have been assumed as the basis of this procedure. The first is the functional equivalence of imagined stimuli which under certain conditions act as representatives of external stimuli, that is, that the same principles which determine overt processes also determine covert processes. Skinner (1953) maintained that covert events obey the same laws of contingency as overt processes. Homme (1965) has taken the same position more recently. Further support for this assumption has been summarized by Kimble (1961).

A second important assumption has been that covert processes can influence overt processes in a predictable manner. In the field of behavior modification it has been shown that covert events can affect overt maladaptive behavior using systematic desensitization (Barlow et. al., 1969; Lang and Lazovik, 1963; Lazarus, 1963b; Paul, 1966), covert sensitization (Anant, 1966; Cautela, 1966, 1967; Stuart, 1967), and implosive therapy (Stampfl and Levis, 1967).

A recent experiment by Wish, Cautela, and Steffen (1970) tested the procedure of covert reinforcement to determine if reinforcement presented in imagination can be used for shaping overt responses. The responses to be altered were the over - or underestimation of the diameters of six circles. The results indicated that the covert reinforcement groups showed significantly greater increases in errors of size estimation. Additionally, Cautela (1969, 1970) has presented several clinical cases in which covert reinforcement methods were successfully employed. For example a young mother was relieved of a compulsion to fold clothes. Finally, a study of attitude change towards the elderly (Cautela & Wisocki, 1969) indicated that subjects, who were taught to imagine that an older person assisted them after an automobile accident, reported subsequently more positive attitudes towards older people.

In conclusion, initial studies of covert reinforcement have supported its effectiveness for modifying overt behavior. However, in contrast to the wealth of experimental data demonstrating the usefulness of operant conditioning and systematic desensitization techniques for the reduction of specific fears, the potential usefulness of covert reinforcement for this purpose has been suggested by clinical evidence and no study was found which presented experimental verification. In addition, all of the reported case studies dealt with the presentation of fear stimuli in imagination; therefore, the usefulness of covert reinforcement procedures to reduce fears when an actual fear object is presented, remained to be explored.

Chapter II

Statement of the Problem

As stated earlier, behavior modification techniques have been especially useful for reducing specific fears. The review of studies which utilized operant conditioning (Lazarus, 1960; Straughan, 1964) and desensitization techniques (Paul, 1966; Wolpe and Lazarus, 1966) demonstrated their effectiveness for the reduction of specific focal fears. Moreover, conditioning techniques have been demonstrated to be effective whether subjects are presented actual fear evoking stimuli (Meyer, 1957; Murphy, 1964) or whether the feared stimuli are presented in imagination (Wolpe and Lazarus, 1966). Studies have also suggested that the presentation of the actual fear stimulus is more effective for this purpose than the presentation of the fear stimulus in imagination (Barlow et.al., 1969; Cooke, 1966; Garfield et.al., 1967). Recently an operant procedure has been innovated wherein reinforcement is presented in imagination. This procedure is referred to as covert reinforcement (Cautela, 1970). Although covert reinforcement has been demonstrated to be effective for the modification of overt responses, it has not been applied to the reduction of specific focal fears within the context of an experimental study.

This experiment utilized covert reinforcement for the reduction of a specific focal fear. Secondly, this study investigated the issue of whether fear reduction is greater when the fear evoking stimulus is actually presented as opposed to its presentation in imagination. Three

groups of subjects were used in this study. The first group was presented an actual fear stimulus, which was paired with covert reinforcement. The second group was presented with the fear stimulus in imagination, which was paired with covert reinforcement. The third group functioned as a control for attention effects.

The specific fear used was the fear of white laboratory rats. Three overt behavioral measures were used to assess intensity of fear. These were the subject's ability to approach, stroke, and hold the rat. Two self-report measures were used: a fear survey schedule to assess the level of general fear and a fear intensity scale to assess subject's specific fear of white laboratory rats.

All assessment procedures were administered to all subjects prior to the experiment to provide baseline measurements, and repeated for all subjects to test experimental effects. The difference between pre- and post tests were used to measure the amount of fear reduction.

A classical problem for psychotherapy in general is whether treatment effects are transferred outside the treatment situation (Goldstein, Heller, and Sechrest, 1966). For this reason, all measurements of the specific fear of white laboratory rats were repeated again outside of the original experimental setting in a substantially altered physical environment.

It was hypothesized that within each treatment group, subjects' fears of white laboratory rats would be reduced. This fear reduction was measured by increases in the ability to approach, stroke, and hold the animal and by a lowering of their scores on the fear intensity scale and the fear survey schedule. No specific predictions were made for changes within the control group.

Secondly, it was hypothesized that each treatment group would exhibit greater fear reduction than the attention control group.

Thirdly, it was hypothesized that the group presented with the actual fear evoking stimulus would exhibit greater fear reduction than the group presented with the fear stimulus in imagination on each of the above measurements.

Fourthly, it was hypothesized that transfer of training would occur; that is, all groups would maintain experimental effects in a substantially altered physical environment. This was assessed by readministration of all of the above measurements except the fear survey schedule in the new setting.

Chapter III

Method

Subjects

Forty-five students of the Boston College School of Nursing who had reported strong aversions to laboratory rats comprised the experimental population. A description of the sample is presented in Table 1 where it may be seen that the two treatment groups and the control group were well matched with respect to age and educational level. Each participant was paid $5.00 for her efforts.

Instruments

Fear of Laboratory Rat Survey: This survey (see Appendix A) was constructed by the author for the initial selection of experimental subjects. Each subject was asked to indicate the degree of her aversion to laboratory rats on a five-point rating scale extending from no fear (i.e. "I could calmly walk up to a live laboratory rat roaming freely on a platform, and calmly pick up and hold this squirming animal for three minutes in my hand.") to very intense fear (i.e. "I could stand 10 feet from a live laboratory rat moving about in a cage on the floor, provided that there was a door between us which was securely closed.").

Fear Intensity Scale: A scale of this type (see Appendix B) was originally used by Lang and Lazovik (1963) and served in the present investigation to assess the intensity of the subjects' fear of the laboratory rats, which served as actual fear stimuli.

Table 1

Description of Treatment and Control Groups

Group	N	Age	Educational Level
Actual Fear Stimulus	15	19.1 (.73)	2.0 (.65)
Imaginary Fear Stimulus	15	19.00 (.85)	2.10 (.51)
Attention	15	18.73 (.61)	1.9 (.51)

Fear Survey Schedule: Wolpe and Lang (1964) developed this 72 - item checklist (see Appendix C) to tap a wide range of fear-arousing stimuli and situations in their clinical work and research. A reasonable amount of validity and reliability data is available (Geer, 1965; Grossberg and Wilson, 1965).

Five white male laboratory rats bred for research purposes were used as actual fear stimuli. The animals were two months old at the beginning of the study. They were housed and fed in individual cages at the animal colony of Boston State Hospital and transported each time to the location of the experiment by the experimenter in a heated car. The animal to be employed as actual fear stimulus for a specific day was chosen at random. In order to protect the nursing students from a possible augmentation of their fear of laboratory rats, the five animals were first subjected to an extensive taming program (see Appendix D). As a result, the rats became exceedingly tame and throughout the study no person was bitten or otherwise attacked.

The animals were exposed to the subjects on a 4ft. high wooden stand topped by a 1 sq.ft. platform. To prevent the escape of the animals, a 1in. border was placed around the platform. The platform was always covered with standard commercial tinfoil which was changed after each of the infrequent soiling incidents.

Two new pairs of heavy duty leather work gloves with four inch nylon cuffs (Sears & Roebuck, 1970) were used by the experimenter and subjects in the handling of the animals at all times.

Standard white 1/2in. wide adhesive tapes were attached to the floor in ten one foot intervals between the starting point and the

animal platform to measure approach behavior. The tapes were changed whenever they became dirtied from walking across them.

The experiment was carried out in the new social science building of Boston College. The research area included a small interview room, a large hallway and laboratory for the experiment proper, and a second hallway for the assessment of transfer of training. The interview room was a standard faculty office furnished with a metal desk and two metal office chairs with padded seat and shoulder rest. A detailed floor plan of the facilities can be found in Appendix E.

Procedure

Pre - experimental stage. An initial pool of subjects was obtained by administering the fear of laboratory rat survey to a total of 568 students at the Boston College School of Nursing at the end of one class hour of required courses in biochemistry and anatomy. The 264 students who reported intense or very intense fears of laboratory rats were contacted individually by telephone and invited to take part in the research. Each of 108 nursing students who were able to schedule the laboratory appointments were then individually administered Wolpe's (1964) fear survey schedule. Immediately afterwards they were taken to the laboratory and asked to approach the experimental animal, stroke it twice from head to tail, and then to pick it up and hold it for three minutes. Still in the presence of the actual fear stimulus they completed the fear intensity scale.

Forty-five individuals were selected on the behavioral approach, stroke, hold measures, and the self-report fear survey schedule and the fear intensity scale, such that all groups were equated. The

subjects were assigned randomly to three experimental conditions: two treatment groups (actual versus imagined fear stimulus condition) and one control group for attention effects.

The final stages of the pre-experimental phase involved teaching the 45 females the necessary procedures for covert reinforcement (Cautela, 1970). The full instructions can be found in Appendix F.

Experimental stage. During this phase of the study each subject was seen for three fifty-five minute sessions within a seven day period. Each session started with a ten minute practice session in covert reinforcement procedures. Immediately afterwards each subject was taken to the laboratory and placed at the tape mark 10 ft. away from the platform with the experimental animal. The experimenter then instructed the subject to concentrate on the actual environment, while he read to her the first step of the hierarchy (see, also, Appendix F). The subjects were further instructed to close their eyes upon hearing the experimenter say the word "reinforcement" and to imagine their respective reinforcing scenes for thirty seconds. The subjects were then given the choice of either remaining where they were and repeating the same step, or, of moving one foot closer to the animal platform. The sequence of presentation of the hierarchy, reinforcement with imagined rewarding scenes, and movement in the direction of the actual fear object was then continued by each subject for the remainder of each of the three experimental sessions. Any subject who reached the last step of the hierarchy where she would stroke and hold the animal was then asked to complete once more the fear intensity index.

The same procedures as above were followed in the case of the subjects exposed to the fear stimulus only in imagination, with one exception. Instead of actually entering the laboratory etc., they were asked

to imagine carrying out all these activities in ther imagination only.

The attention control group likewise was given a brief practice session in covert reinforcement procedures. Following this, however, the remainder of the three sessions was spent discussing with them their fears of laboratory rats.

Post-Treatment stage. At the end of the third and last experimental session, all subjects were submitted once more to the three behavioral tests - approach, stroke, and hold - and asked to complete the fear intensity index in the laboratory. The fear survey schedule was completed in the office.

Finally, each subject was asked to go to another nearby corridor containing only the platform with the experimental animal and complete once more the three behavioral tests as well as the fear intensity scale.

After the experiment, subjects were urged not to discuss the study and their own part in it with anybody, were thanked for their efforts, and paid. One month after the last subject was tested all persons who had taken part in the research, were invited to a debriefing session in which the general purpose, results, and implications of the study were presented in a lecture.

Measures and Statistics

Three overt behavior measures were computed for each subject throughout this study; Approach, Stroke and Hold. The approach measure consisted of the number of adhesive tape strips which were crossed when a subject moved towards the animal platform. A subject who stopped at a point between two tape segments was given credit for an additional interval if, upon some slight prompting, she moved on to the next marker. Otherwise, the number of the preceding marker was recorded. To measure the second index of a subject's fear of laboratory rats - stroke - the subject was asked to touch the rat and stroke its back

twice from head to tail. This task was scored in a dichotomous fashion. A subject was given credit for the last behavioral task - hold,- if she was able to pick up and hold the actual fear object for three minutes. Again, the scoring was on a "yes" or "no" basis.

The scoring of the self-report measures of fear were obtained in the following manner. For the fear of laboratory rat survey (Appendix A), the subject simply checked one of 5 categories of fear stimuli conditions. For the fear intensity scale, the subject circled one of seven points on a scale of fear from "no fear" (1) to "very intense fear" (7). A score of 4 indicated average fear. The fear survey schedule was scored following the instructions by Wolpe and Lang (1964) with one global score consisting of the weighted scores for each fear checked. The possible range of scores was 72 to 360.

The present study relied primarily on 3 x 2 analyses of variance (Winer, 1962) to evaluate performance differences among the three groups with regard to the behavioral approach measure, the fear intensity scale, and the fear survey schedule. The Newman-Keuls procedure was used to test differences between and within groups. For the nominal outcome measures of stroke and hold, McNemar's test (Siegel, 1956) and Fisher's exact probabilities test (Siegel, 1956) were computed.

Chapter IV

Results

Behavioral Indices

As seen in Tables 2 and 3, both treatment groups showed decreases in fear toward the actual fear stimulus (the rat) after the treatment as indicated by the approach, stroke, and hold measures, that is, subjects approached the rat more closely after treatment, and more subjects in these two groups stroked the rat and held it after the treatment than before treatment. No appreciable change in these three measures was observed for the attention control group. It continued to show the same amount of fear as all subjects had during the initial exposure to the rat. Furthermore, the treatment group presented the actual fear stimulus during treatment session (T_1) appeared to decrease its fear more than the treatment group presented the fear stimulus only in imagination (T_2).

A repeated measures analysis of variance for the approach measure and non parametric tests for the stroke and hold measures were carried out to determine the significance of the observed differences. As seen in Table 4, significant main and interaction effects beyond the .001 critical level were found for groups ($F = 14.68$, df 2/42), the repeated factor (pre- and post treatment)($F = 167.89$, df 1/42) and the double interaction ($F = 31.26$, df 2/42). As in the rest of the study, individual comparisons of parametric data were carried out by the more conservative post hoc Newman-Keuls procedure. As seen in Table 4C, each

treatment group significantly increased the number of feet approached to the fear stimulus ($p < .01$). The control group did not significantly change its approach measure. It should be noted that all groups had been equated for the initial approach measure so that differences in rate of fear reduction, i.e. rate of increase in approach, would also reflect differences in final fear of the rat. Each treatment group signficantly increased its approach to the rat more than the control group ($p < .01$). No significant difference in rate of fear reduction was found however between the two treatment groups.

For the two other behavioral measures, stroke and hold, non-parametric tests measuring the number of subjects reducing their fear were carried out. To measure within group changes, McNemar's Test (Siegel, 1956) was used. All groups at first displayed the same fear or inability to stroke and hold the animal. In T_1, 14 subjects changed from not being able to stroke the animal to stroking it. The one subject who initially stroked the rat continued to do so. This change was significant ($\chi^2 = 12.07$, df. = 1, $p < .001$). Similarly, 11 of these subjects held the rat who had refused to do so previously. Four subjects continued to refuse to hold the animal. This increase in the number of subjects reducing their fear was also significant ($\chi^2 = 7.14$, df = 1 $p < .01$). In the T_2 group, reduction of fear was only seen for the stroke measure. One subject stroked the animal both before and after the treatment, 7 subjects refused to do so at either time, and 7 subjects who initially refused to stroke the animal did so after treatment. The number of subjects changing in stroking the rat almost reached significance (observed $\chi^2 = 3.5$, df = 1, expected $\chi^2 = 3.84$ for .05 critical level). Only one T_2 subject decided to hold the rat

after treatment, whereas the remaining 14 subjects continued to refuse to hold the animal. Thus there was no significant change in the number of subjects reducing their fear of the rat for the hold measure. In the control group, no significant change in the number of subjects unable to initially stroke or hold the rat was found. In fact, only one subject who was able to initially stroke the rat refused to do so after treatment.

Fisher exact probabilities tests (Siegel, 1956) were carried out in comparing differences between groups for the number of subjects that reduced their fear as measured by the stroke and hold measures. Significantly more T_1 subjects decreased their unwillingness to stroke or hold the rat than control group subjects ($p < .005$). For both measures, signficantly more T_1 than T_2 subjects changed their initial unwillingness to stroke and hold the rat ($p < .05$).

Thus both treatment groups reduced their fear as measured by the approach and stroke measures and reduced this fear more than the control group. It should be noted that the hold measure as a fear indicator only showed fear reduction for the T_1 group. Presenting the actual stimulus during treatment had a greater effect for reducing the fear as measured by the stroke and hold measures than the other two types of groups in this study.

Subjective Measures

The results of the two subject self-report measures are shown on table 2. There appeared to be slight decreases in fear measures on the fear intensity scale and fear survey schedule for both treatment groups Only on the fear survey schedule did the control group show any

Table 2

Mean Number of Feet Approached to Fear Stimulus and Mean Scores on the Self-report Fear Measures For Pre and Post Treatment (SD in Parentheses)

Measures	Groups					
	T_1		T_2		C	
	Pre Treatment	Post Treatment	Pre Treatment	Post Treatment	Pre Treatment	Post Treatment
Approach	4 (1.99)	10 (0.00)	4 (1.99)	9 (.77)	4 (1.99)	5 (2.04)
Fear Intensity Scale	5 (.82)	2 (1.71)	5 (.82)	4 (1.45)	5 (.82)	5 (.77)
Fear Survey Schedule	181 (28.43)	167 (27.49)	181 (36.02)	178 (36.34)	180 (20.73)	176 (26.61)

Table 3

Number of Subjects who Stroked and Held Fear Stimulus on Pre-treatment and Post-treatment Conditions

Measures	Groups					
	T_1		T_2		C	
	Pre Treatment	Post Treatment	Pre Treatment	Post Treatment	Pre Treatment	Post Treatment
Stroke	1	15	1	8	1	0
Hold	0	11	0	1	0	0

Table 4

Analysis of Variance of Approach Measures
A(Groups) X B(Pre and Post treatment - Repeated Measure)

A. AB Summary Table

	b_1	b_2
T_1	66	150
T_2	66	138
C	66	74

B. Analysis of Variance - Main Effects

Source	SS	df	MS	F
Groups (A)	111.29	2	55.65	14.68***
Subjects within Groups	159.42	42	3.79	
Pre and Post Test Treatment Scores (B)	298.85	1	298.85	167.89***
AB	111.29	2	55.65	31.26***
B X Subjects within Groups	74.86	42	1.78	

*** = .001

C. Individual Comparisons - Newman-Keuls

a. Pre vs. Post Test Scores for Each Group

			Pre	Post	Total
	N = 2	T_1	66	150	+84**
.95	14.79	T_2	66	138	+72**
.99	19.47	C	66	74	+ 8 m.s.

MS Within Error = 5.17

b. Rate of Change

	N = 2	r = 3
.95	18.46	22.22
.99	25.36	28.23

Pooled MS Error = 6.46

Differences	C_1 +8	T_2 +72	T_1 +84
C_1 +8	-	**	**
T_2 +72		-	N.S.
T_1 +84			-

decrease.

A repeated measures analysis of variance for the fear intensity scale and a repeated measures analysis of variance for the fear survey schedule were carried out to determine the significance of the observed differences. As seen in Table 5, significant main and interaction effects beyond the .001 critical level were found for groups ($F = 11.77$; $df = 2/42$), the repeated factor (pre and post treatment scores) ($F = 35.49$; $df = 1/42$), and the double interaction ($F = 15.55$; $df = 2/42$). Individual comparisons of this parametric data were carried out by the more conservative post hoc Newman-Keuls procedure. As seen in Table 5C, each treatment group significantly decreased their subjective fear to the actual fear stimulus ($p < .01$). The control group did not change its level of fear intensity significantly. It should be noted that all groups had been equated for the initial fear intensity measure so that differences in rate of fear reduction, i.e. rate of decrease in intensity of self reported fear to the actual fear stimulus, would also reflect differences in final fear of the rat. Each treatment group significantly decreased its subjective fear intensity to the animal more than the control group ($p < .01$). In addition, in the T_1 group there was a significantly greater reduction in intensity of fear than in T_2 group ($p < .01$).

The second self-report measure was the fear survey schedule. Again, a repeated measures analysis of variance was computed. As seen in Table 6, there were no significant main or interaction effects for groups ($F = .169$; $df = 2/42$) the repeated factor (pre and post treatment scores ($F = 3.02$; $df = 1/42$) or the double interaction ($F = 2.35$; $df = 2/42$).

Table 5

Analysis of Variance of Fear Intensity Scale
A(Groups) X B(Pre and Post-Treatment - Repeated Measure)

A. AB Summary Table

	b_1	b_2
T_1	70	27
T_2	70	52
C	70	72

B. Analysis of Variance - Main Effects

Source	SS	df	MS	F
Groups (A)	33.89	2	16.95	11.77***
Subjects within Groups	60.60	42	1.44	
Pre and Post-Test Treatment Scores	38.68	1	38.68	35.49***
AB	33.89	2	16.95	15.55***
B X Subjects within Groups	45.93	42	1.09	

*** = .001

Table 6

Analysis of Variance of Fear Survey Schedule
A(Groups) X B(Pre and Post Treatment - Repeated Measure)

A. AB Summary Table

	b_1	b_2
T_1	2717	2511
T_2	2716	2678
C	2702	2644

B. Analysis of Variance - Main Effects

Source	SS	df	MS	F
Groups (A)	468.89	2	242.24	.169 m.s.
Subjects within Groups	60,380.47	42	1,437.63	
Pre and Post Test Treatment Scores (B)	1,013.38	1	1,013.38	3.02 m.s.
AB	1,574.80	2	787.40	2.35 m.s.
B X Subjects within Groups	14,100.20	42	335.72	

C. Individual Comparisons - Newman Keuls

a. Pre and Post Test Scores for Each Group

	N = 2		Pre	Post	Total
		T_1	70	27	+43**
.95	11.55	T_2	70	52	+18**
.99	15.43	C	70	72	- 2 m.s.

MS within error = 4.04

b. Rate of Change

	N = 2	r = 3
.95	12.44	14.96
.99	16.62	19.01

	C_1	T_2	T_1
	-2	+18	+43
C_1 - 2	-	**	**
T_2 +18		-	**
T_1 +43			-

Pooled MS error = 4.35

Thus, both treatment groups significantly reduced their fear as measured by the fear intensity scale more than the control group did. Presenting the actual fear stimulus during treatment had a greater effect in the reduction of fear than the other two types of treatment in this study.

Transfer Data

To test the transfer of treatment effects in a substantially altered physical setting, the behavioral measures approach, stroke, hold, and self-report fear intensity scale were administered again.

There appeared to be no significant changes on the stroke and hold measure for any group. As seen in Table 7, there did not appear to be any appreciable change in the number of feet approached to the rat by either treatment group. Control subjects however appeared to decrease their approach to the rat in the transfer situation. All groups did not appear to change their self-reported fear from the post treatment measure. A repeated analysis of variance for the approach measure (Table 8) revealed significant main effects beyond the .001 critical level for groups ($F = 70.41$; $df = 2/42$), for the repeated factor (post-treatment and transfer) ($F = 5.49$; $df = 1/42$) at the .05 level, and a significant double interaction effect ($F = 4.00$; $df = 2/42$) at the .05 level. Individual comparisons of this parametric data were again carried out by the more conservative post hoc Newman-Keuls procedure. As seen in Table 8C, there was no significant changein the number of feet approached to the fear stimulus within each treatment group. However, the control group did reveal a significant decrease in the number of feet approached to the rat ($p < .01$).

Table 7

Mean Number of Feet Approached to Fear Stimulus and Mean Scores on the Self-Report Fear Measures For Post-Treatment and Transfer (SD in Parentheses)

Measures	Groups					
	T_1		T_2		C	
	Post Treatment	Transfer	Post Treatment	Transfer	Post Treatment	Transfer
Approach	10.00 (0.00)	10.00 (0.00)	9 (.77)	9 (1.03)	5 (2.04)	4 (2.91)
Fear Intensity Scale	2 (1.71)	2 (2.9)	4 (1.45)	4 (1.45)	5 (.77)	5 (3.04)

Number of Subjects who Stroked and Held Fear Stimulus on Post-test and Transfer Conditions

Measures	Groups					
	T_1		T_2		C	
	Post Treatment	Transfer	Post Treatment	Transfer	Post Treatment	Transfer
Stroke	15	15	8	9	0	0
Hold	11	11	1	2	0	0

Table 8

Analysis of Variance of Approach Measure

A(Groups) X B(Post-Treatment and Transfer - Repeated Measure)

A. AB Summary Table

	b_1	b_2
T_1	150	150
T_2	138	136
C	74	56

B. Analysis of Variance - Main Effects

Source	SS	df	MS	F
Groups (A)	559.03	2	279.51	70.41***
Subjects within Groups	167.13	42	3.97	
Post-test and Transfer Scores	4.45	1	4.45	5.49*
AB	6.48	2	3.24	4.00*
B X Subjects within Groups	34.07	42	.81	

*** = .001
* = .05

C. Individual Comparisons - Newman-Keuls

a. Post-test vs. Transfer Score for Each Group

	N = 2		Post	Transfer	Total
		T_1	150	150	0 m.s.
.95	9.98	T_2	138	136	- 2 m.s.
.99	13.33	C	74	56	-18**

MS within error = 3.49

For the remaining behavioral measures stroke and hold, no substantially significant changes occurred in the altered physical environment. In the T_1 group, all subjects maintained their willingness to stroke the rat; in the control group all subjects still maintained their unwillingness to stroke the animal. In the T_2 group however, one more subject indicated her willingness to stroke the animal along with the eight subjects who maintained their willingness in the altered setting. For the measure hold, in the T_1 group, all 11 subjects maintained their willingness to hold the fear stimulus; whereas the 4 subjects unwilling to hold the rat continued to refuse to do so. Again all subjects in the control group refused to hold the rat. In the T_2 group, one additional subject indicated her willingness to hold the animal with the one other subject in this group who maintained her willingness to hold the rat.

Thus both treatment groups maintained their reduced fear as measured by the approach and stroke measures. The control group had a significant increase in fear on the approach measure. It should be noted that the hold measure as a fear indicator only showed fear reduction for the T_1 group. The group presented with the actual fear stimulus maintained its greater reductions in fear on the stroke and hold measures than the other two types of groups in this study.

As seen in Table 9, a repeated measures analysis of variance for the fear intensity scale revealed a significant main effect for groups ($F = 26.89$; $df = 2/42$) was found beyond the .001 critical level. Individual comparisons of this parametric data were carried out by the more conservative post hoc Newman-Keuls procedure. As seen in Table 5C, there were no significant changes in fear intensity reduction in any

Table 9

Analysis of Variance of Fear Intensity Scale

A(Groups) X B(Post-Treatment and Transfer - Repeated Measure)

A. AB Summary Table

	b_1	b_2
T_1	27	22
T_2	52	54
C	72	71

B. Analysis of Variance - Main Effects

Source	SS	df	MS	F
Groups (A)	149.49	2	74.75	26.89***
Subjects within Groups	116.80	42	2.78	
Post test and Transfer Scores	.18	1	.18	.47 m.s.
AB	.82	2	.41	1.07 m.s.
B X Subjects within Groups	16.00	42	.38	

*** = .001

C. Individual Comparisons - Newman-Keuls

a.

	N = 2		Post	Transfer	Total
		T_1	27	22	+5 m.s.
.95	6.84	T_2	52	54	-2 m.s.
.99	9.13	C	72	71	+1 m.s.

MS within error = 2.39

group.

Thus under transfer conditions both treatment groups maintained their behavior and subjective measures of fear as seen in the post treatment measurement, but the control group had a greater decrease in approach behavior. Thus it can be concluded that for the approach, stroke, and fear intensity scale indices of fear, both treatment groups continued to show less fear than the control group. For the hold and fear intensity scale T_1 again showed less fear than T_2. For the stroke measure this difference between T_1 and T_2 was maintained, but since one more subject in T_2 now stroked the animal, this difference was not significant ($\chi^2 = 7$; df = 1).

Chapter V

Discussion

The first hypothesis of the present experiment stated that within each treatment group (actual vs. imagined fear stimulus) subject's fears of white laboratory rats would be reduced on three behavioral (approach, stroke, and hold) and two self-report measures (fear intensity scale and fear survey schedule). No specific predictions were made for changes within the attention control group. This prediction was supported by all data except the fear survey schedule (Wolpe and Lang, 1964). These results are in agreement with several previous investigations (Eysenck, 1964; Lang, 1969; Lazarus, 1963a; Paul, 1966; Wolpe and Lazarus, 1966), which have shown adaptive changes of focused fears when a learning theory paradigm of psychotherapy was used. The present findings are also in support of the effectiveness of covert processes in changing focal fears (Cautela, 1966b; Garfield et.al., 1967; Hogan and Kirchner, 1967; Lang and Lazovik, 1963; Wolpe, 1958). It was concluded from these results that the use of imagery in an operant paradigm - covert reinforcement (Cautela, 1970) is about as effective as the use of imagery in systematic sensitization (Wolpe, 1958).

The second prediction was that each treatment group would exhibi t greater fear reduction than the control group. Again, this hypothesis was supported with the sole exception of the measure of general fear. These results are in line with the experience of a number of investigators (Cooke, 1966; Lang and Lazovik, 1963; Paul, 1966; Ritter, 1969). It is

suggested by all these studies that attention alone for any particular subject is not a sufficient condition for the successful treatment of focal fears.

The third hypothesis stated that the group presented with the actual fear stimulus would show greater fear reduction than the group presented with the imagined fear stimulus only. Again this prediction was confirmed for all measures except the fear survey schedule. Moreover, the group presented with the live laboratory rat showed the greatest increase in approach behavior and the largest reduction of reported fears. The present finding appears to be a novel one as far as operant research with covert reinforcement is concerned. However, the superiority of the actual fear stimulus group is in good agreement with a number of respondent studies (Barlow et.al., 1969; Garfield et.al., 1967). Thus, it was concluded that the utilization of in vivo stimulus conditions may augment the effectiveness of covert reinforcement procedures substantially. It seems quite possible that the reason for the increased effectiveness may in fact be due to the intensity and perceptual vividness of the fear object.

The final prediction was that transfer of training would occur; that is all groups would maintain experimental effects in a substantially altered physical environment. This hypothesis was supported by the performance of both treatment groups but the control subjects showed a marked and highly significant decrease of approach behavior. While no previous experiment in behavior modification has included a test for transfer of training, the present findings are consistent with stimulus generalization research across species which has been extensively reviewed in Kimble (1961). There was one notable exception to the

confirmation of the fourth hypothesis, and it was the attention control group significantly marked decrease on the approach measure. A tempting speculation is that this control group having been exposed to the actual fear stimulus at the beginning of the study in the same situation in which the post-treatment tests were carried out, underwe t an extinction of fear without the consequence of punishment. However, this extinction did not generalize to the transfer setting with the altered physical environment. One cannot ignore that these subjects did discuss their fear of the rat during experimental sessions and this may possibly have had effects upon subsequent responses; however, such effects, if any, do not appear relatable to the pattern of experimental results.

That more of the hypotheses were supported by the fear survey schedule is consistent with reported research (Cooke, 1966; Garfield et.al., 1967). Since this study dealt with a focal fear with normal subjects who had only four experimental sessions, it was not surprising that there were no changes in their level of general fear in such a short time period. Further, Lang (1969) has pointed out that, because of the factorial complexity of fear, differences in level of fear as measured by the fear survey schedule really require item analysis to be detected.

Since this study is one of the first in this area, much research remains to be done.

An immediate study should concern itself with isolating the effects of the hierarchy from covert reinforcement, and should include a comparison of four experimental treatment groups; one with the actual fear stimulus and covert reinforcement, one with the actual fear stimulus

without covert reinforcement, one with the fear stimulus presented in imagination and covert reinforcement, and one with the fear stimulus presented in imagination without covert reinforcement. This would attempt to separate the effects of covert reinforcement from the two types of presentation of the fear stimulus alone. Another study might be designed to determine whether or not a hierarchy is needed.

Another issue that merits further investigation is the experimenter's handling of the actual fear stimulus. In reference to this, there are different theoretical positions. Ritter (1968; 1969a,b), Barlow et.al., (1969), and Bandura (1965), and Goer and Turtletaub (1967) have argued that the therapist's handling of the animal reduces the fear of the subject either by using imitation to shape the desired goal response or by modeling. More recently, however, Wolpe (1969) and Davison and Valins (1970) have stated that for the results of an experiment which attempts to modify fear to be valid, the rational fear component of the stimulus must be removed. In this experiment, an attempt to remove the rational fear component was done by having the experimenter handle the actual fear stimulus; however a future study could attempt to isolate the effects of modeling by comparing one group which sees the experimenter handle the fear stimulus and then is told to approach the animal with a second group which is given a pair of gloves and told to approach the animal.

Since this study was a laboratory experiment, it is important now to see if the results of this research can be useful in clinical settings. A variety of studies remain to be done on various types of maladaptive behavior presented by differing population samples. Particular attention should be paid to the parameters of the covert

reinforcement procedure as well as the variables for individual differences (age, sex, level of intelligence, general level of fear or stress). In addition, future studies should be made comparing the covert reinforcement procedure with other behavior modification procedures such as systematic desensitization (Wolpe, 1958). Finally, since the present study, along with previous research (Garfield et.al., 1967; Barlow et.al., 1969), tended to support the hypothesis that the actual fear stimulus facilitates learning, the covert reinforcement procedure should be incorporated clinically, and clinically tested as *in vivo* procedure, and as a method of self-control. When research such as this has been reported, and evaluated, the procedure should then be considered for its potential in being taught to paraprofessionals as one way of meeting the growing demands for clinical services.

APPENDIX A

FEAR OF LABORATORY RAT SURVEY

At one time or another almost everyone associates unpleasantness with certain objects or experiences. We know from Science that there are many women who for one reason or another have developed a fear of laboratory rats. Understandably, for many this is an intensely frightening experience; for others, the fear may be less intense or not present at all. This survey is an attempt to estimate the number of college women who have this fear, and with what degree of intensity they experience it.

This survey is part of an on-going series of university affiliated research projects for the study of the behavioral fear of laboratory rats. We are also interested in knowing if you would be willing to participate further in this research project outside of class time.

Please place yourself in one of the following five categories:

____ No Fear: I could calmly walk up to a live laboratory rat roaming freely on a platform, and calmly pick up and hold this squirming animal for three minutes in my hand.

____ Moderate Fear: I could calmly stand within 2 feet of a live laboratory rat roaming freely on a platform.

____ Strong Fear: I could stand at the threshold of an open door 5 feet from a platform on which a live laboratory rat was freely roaming.

____ Intense Fear: I could stand 10 feet from a live laboratory rat roaming freely on a platform provided I was gazing across the threshold of an open door which could be quickly closed.

____ Very Intense Fear: I could stand 10 feet from a live laboratory rat moving about in a cage on the floor, provided that there was a door between us which was securely closed.

Please check one:

_____ I am not willing to participate outside of class time.

_____ I am willing to participate outside of class time, and may be reached at the following:

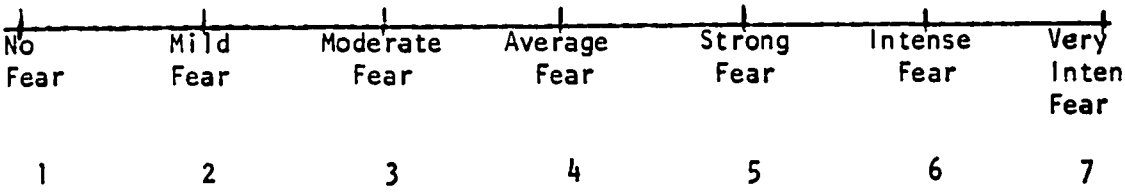
NAME_____

ADDRESS_____

PHONE_____

APPENDIX B

FEAR INTENSITY SCALE



APPENDIX C

FEAR SURVEY SCHEDULE (FSS_III)

The items in this questionnaire refer to things and experiences that may cause fear or other unpleasant feelings. Please check as to how each one applies to you.

	Not at all	A little	A fair amount	Much	Very much
1. Noise of vacuum cleaners (F)					
2. Open wounds (I)					
3. Being alone (C)					
4. Being in a strange place (A)					
5. Loud voices (B)					
6. Dead people (I)					
7. Speaking in public (S)					
8. Crossing streets (C)					
9. People who seem insane (I)					
10. Falling (A)					
11. Automobiles (C)					
12. Being teased (S)					
13. Dentists (I)					
14. Thunder (C)					
15. Sirens (A)					
16. Failure (B)					
17. Entering a room where other people are already seated (S)					
18. High places on land (C)					
19. People with deformities (I)					
20. Worms (A)					
21. Imaginary creatures (A)					
22. Receiving injections (I)					
23. Strangers (S)					

	Not at all	A little	A fair amount	Much	Very Much
24. Bats (A)					
25. Journeys (C)					
a - Train					
b - Bus					
c - Car					
26. Feeling angry (E)					
27. People in authority (S)					
28. Flying insects (A)					
29. Seeing other people injected (T)					
30. Sudden noises (E)					
31. Dull weather (S)					
32. Crowds (S)					
33. Large open spaces (C)					
34. Cats (A)					
35. One Person bullying another (T)					
36. Tough looking people (S)					
37. Birds (A)					
38. Sight of deep water (C)					
39. Being watched working (S)					
40. Dead animals (T)					
41. Weapons (E)					
42. Dirt (C)					
43. Crawling insects (A)					
44. Sight of fighting (T)					
45. Ugly people (S)					
46. Fire (C)					
47. Sick people (T)					
48. Dogs (A)					
49. Being criticised (S)					

	Not at all	A little	A fair amount	Much	Very Much

50. Strange shapes (F) _____

51. Being in an elevator (C) _____

52. Witnessing surgical operations (F) _____

53. Angry people (S) _____

54. Mice. (A) _____

55. Blood (F)
a- Human _____
b -Animal _____

56. Parting from friends (S) _____

57. Enclosed places (C) _____

58. Prospect of a surgical operation (F) _____

59. Feeling rejected by others (S) _____

60. Airplanes (C) _____

61. Medical odors (F) _____

62. Feeling disapproved of (S) _____

63. Harmless snakes (A) _____

64/ Cemeteries (F) _____

65. Being ignored (S) _____

66. Darkness (C) _____

67. Premature heart beats
(missing a beat) (F) _____

68. (a) Nude men (S) _____

(b) Nude women _____

69. Lightning (C) _____

70. Doctors (F) _____

71. Taking mistakes (S) _____

72. Looking foolish (S) _____

APPENDIX D

PROCEDURE FOR THE TAMING OF THE ANIMALS

To insure that the outcome measures reflected changes in the subjects irrational fear of the animal, and not a rational fear if the animal became agitated, an extensive taming program was begun so that the animals would not become agitated during experimental stimulus conditions.

1. First Week - The animals were 70 days old when the training was begun. The laboratory assistant at the animal colony began the initial taming. Each day he handled each animal for 5 minutes when the organism was feeding. The trainer also periodically held each animal daily at some other time besides feeding. For the duration of the experiment, the animals were fed 15 grams of Laboratory Purina Chow at 3 p.m.; they were always handled by gloved hands; and they always had free access to water.

2. Second Week - The taming program continued on the same schedule as the first week. However, during this week the experimenter began to hold each animal in addition to the two holdings of the laboratory assistant. All animals were docile at the end of 14 days.

3. Third Week - During this week the animals in addition to being held were placed on the animal stand for 15 minutes each day. The animal was held for 5 minutes as he was being fed, and then placed on the stand for 15 minutes. At no time did any animal jump off the

stand. During this week, also, two females held the animals in an attempt to have the animals held by several people to enhance reduction of the animal's fear.

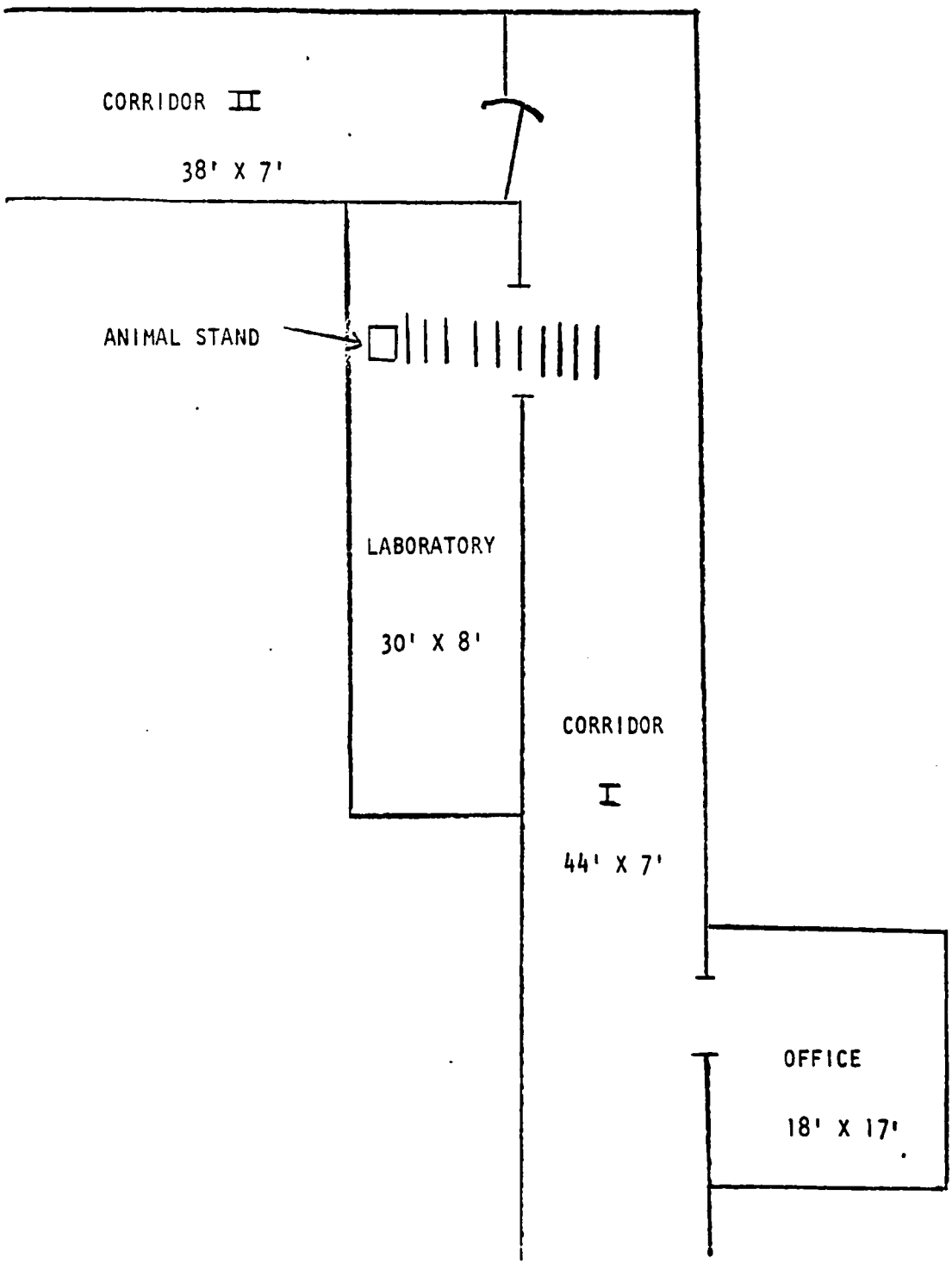
4. Fourth Week - The taming program proceeded in the same manner as week three. However, each animal was now left on the stand for one hour (the length of the experimental treatment session). No animal jumped off the stand. Animal waste matter on the stand was negligible, and the animals seemed habituated to the stand and to several people.

5. Fifth Week - The animals were taken to the laboratory at Boston College. They were each placed on the stand, and soon habituated to their new experimental environment. The animals were handled by several people not part of the experiment.

Throughout this taming procedure, no animal bit anyone; no animal ever jumped off the stand; and no animal ever became viscious, not even when they were held firmly in cupped hands for three minutes. Appendix F contains the exact weight of each animal at several time intervals in the course of their lives during the experiment. No animal was ever drugged or shocked. The use of the animals in pre- and post-treatment data gathering as well as through each day of the experiment itself was randomized.

APPENDIX E

FLOOR PLAN OF RESEARCH FACILITIES AT BOSTON COLLEGE



APPENDIX F

PROCEDURE FOR TRAINING IN IMAGERY

All subjects were equated for training in imagery in their first session, and all were taught the basic process of Covert Reinforcement procedure. During the first 55 minute session in the office, each subject was asked to complete the Reinforcement Survey Schedule (Cautela and Kastenbaum, 1967). When this was completed, the subject was asked first to list the 10 most meaningful reinforcers she had checked; second, to star the three most enjoyable of the 10 she had just listed.

The remainder of the session was devoted to visualizing each subject's three most reinforcing scenes. The experimenter read the following instructions:

> For the remainder of the hour I would like you to practice using your ability for imagery. Specifically, I want you to practice imagining the three scenes that you have indicated make you happy. You will find the scenes easier to imagine and much clearer if you include your five sensory modalities as they would be applicable in each scene. I will not ask you the content of your imagery, but make it pleasant for yourself. Always use the same image for each individual reinforcing scene that you practice; three scenes, three images. Finally your index finger will serve as our communication system. When an image is clear to you, raise your index finger. Are there any questions?

Then the experimenter gave an example of how a person's five sensory modalities could be included in imagery. The subject was then asked to close her eyes, imagine the first reinforcing scene, and signal with her index finger when it was clear. The reinforcement stimulus was

then presented for 30 seconds. After an intertrial interval of 60 seconds, the subject was asked to imagine the same image again for 30 seconds. Next, after an intertrial interval of 60 seconds, the subject was instructed to blank her mind and imagine the reinforcement scene as soon as the subject heard the experimenter speak the word "reinforcement". There were two more similar pairings of the first reinforcing scene and the word "reinforcement".

The second and third reinforcing scenes were practiced in the same manner - two practice images and three pairings of the word "reinforcement", and the appropriate reinforcing scene.

The last step of the training in imagery consisted in pairing combinations of three neutral images (a leaf floating on water, sunny sky on a clear day, panorama of trees changing color in the fall) with the three reinforcing scenes that had been practiced. The pairing of neutral scenes with reinforcing scenes was included to insure that each subject understood the basic Covert Reinforcement procedure. The subject was instructed to imagine the first neutral scene, raise her index finger when it was clear, hold that neutral image until she heard the word "reinforcement". She then erased the first image; imagined one of the reinforcing scenes agreed upon beforehand; and raised her index finger when this image was clear. Each subject practiced six combinations. The neutral image was presented for 30 seconds, and the reinforcement stimulus was presented for 30 seconds. Each intertrial interval was 60 seconds. Each subject was instructed not to practice this method between sessions.

ESO-1529

REINFORCEMENT SURVEY SCHEDULE

The items in this questionnaire refer to things and experiences that may give joy or other pleasurable feelings. Check each item in the column that describes how much pleasure it gives you nowadays.

SECTION I

	NOT AT ALL	A LITTLE	A FAIR AMOUNT	MUCH	VERY MUCH	
1. EATING						1.
a. Ice Cream						a.
b. Candy						b.
c. Fruit						c.
d. Pastry						d.
e. Nuts						e.
f. Cookies						f.
2. BEVERAGES						2.
a. Water						a.
b. Milk						b.
c. Soft drink						c.
d. Tea						d.
e. Coffee						e.
3. ALCOHOLIC BEVERAGES						3.
a. Beer						a.
b. Wine						b.
c. Hard liquor						c.
4. BEAUTIFUL WOMEN						4.
5. HANDSOME MEN						5.
6. SOLVING PROBLEMS						6.
a. Crossword puzzles						a.
b. Mathematical problems						b.
c. Figuring out how something works						c.

SECTION II

	NOT AT ALL	A LITTLE	A FAIR AMOUNT	MUCH	VERY MUCH	
12. READING						12.
a. Adventure						a.
b. Mystery						b.
c. Famous People						c.
d. Poetry						d.
e. Travel						e.
f. True Confessions						f.
g. Politics & History						g.
h. How to-do-it						h.
i. Humor						i.
j. Comic Books						j.
k. Love Stories						k.
l. Spiritual						l.
m. Sexy						m.
n. Sports						n.
o. Medicine						o.
p. Science						p.
13. LOOKING AT INTERESTING BUILDINGS						13.
14. LOOKING AT BEAUTIFUL SCENERY						14.
15. T.V. MOVIES OR RADIO						15.
16. LIKE TO SING						16.
a. Alone						a.
b. With Others						b.
17. LIKE TO DANCE						17.
a. Ballroom						a.
b. Discotheque						b.
c. Ballet or Interpretative						c.
d. Square Dancing						d.
e. Folk Dancing						e.

SECTION II

	NOT AT ALL	A LITTLE	A FAIR AMOUNT	MUCH	VERY MUCH	
18. PERFORMING ON A MUSICAL INSTRUMENT						18.
19. PLAYING SPORTS						19.
a. Football						a.
b. Baseball						b.
c. Basketball						c.
d. Track & Field						d.
e. Golf						e.
f. Swimming						f.
g. Rugging						g.
h. Tennis						h.
i. Pool						i.
j. Bowling						j.
k. Judo or Karate						k.
l. Fishing						l.
m. Skin-diving						m.
n. Auto or Cycle racing						n.
o. Hunting						o.
p. Other						p.
20. SHOPPING						20.
a. Clothes						a.
b. Furniture						b.
c. Auto parts & Supply						c.
d. Appliances						d.
e. Food						e.
f. New Car						f.
g. New Place to live						g.
h. Sports Equipment						h.
21. GARDENING						21.
22. PLAYING CARDS						22.
23. HIKING OR WALKING						23.
24. COMPLETING A DIFFICULT JOB						24.

SECTION II

	NOT AT ALL	A LITTLE	A FAIR AMOUNT	MUCH	VERY MUCH	
25. CAMPING						25.
26. SLEEPING						26.
27. TAKING A BATH						27.
28. TAKING A SHOWER						28.
29. BEING RIGHT						29.
a. Guessing what somebody is going to do						a.
b. In an argument						b.
c. About your work						c.
d. On a bet						d.
30. BEING PRAISED						30.
a. About your appearance						a.
b. About your work						b.
c. About your hobbies						c.
d. About your Physical strenght						d.
e. About your Athletic Ability						e.
f. About your mind						f.
g. About your personality						g.
h. About your Moral Strength						h.
i. About your understanding of others						i.
31. HAVING PEOPLE SEEK YOU OUT FOR COMPANY						31.
32. FLIRTING						32.
33. HAVING SOMEBODY FLIRT WITH YOU						33
34. TALKING WITH PEOPLE WHO LIKE YOU						34.

SECTION II

	NOT AT ALL	A LITTLE	A FAIR AMOUNT	MUCH	VERY MUCH	
35. MAKING SOMEBODY HAPPY						35.
36. BABIES						36.
37. CHILDREN						37.
38. OLD MEN						38.
39. OLD WOMEN						39.
40. HAVING PEOPLE ASK YOUR ADVISE						40.
41. WATCHING OTHER PEOPLE						41.
42. SOMEBODY SMILING AT YOU						42.
43. MAKING LOVE						43.
44. HAPPY PEOPLE						44.
45. BEING CLOSE TO AN ATTRACTIVE MAN						45.
46. BEING CLOSE TO AN ATTRACTIVE WOMEN						46.
47. TALKING ABOUT THE OPPOSITE SEX						47.
48. TALKING TO FRIENDS						48.
49. BEING PERFECT						49.
50. WINNING A BET						50.
51. BEING IN CHURCH OR TEMPLE						51.
52. SAYING PRAYERS						52.
53. HAVING SOMEBODY PRAY FOR YOU						53.
54. PEACE AND QUIET						54.

-7-

SECTION III - SITUATION I WOULD LIKE TO BE IN--

How much would you enjoy being in each of the following situations?

1. You have just completed a difficult job. Your superior comes by and praises you highly for "a job well done." He also makes it clear that such good work is going to be rewarded very soon.

   NOT AT ALL ( ) A LITTLE ( ) A FAIR AMOUNT ( ) MUCH ( ) VERY MUCH ( )

2. You are at a lively party. Somebody walks across the room to you, smiles in a friendly way, and says, "I'm glad to meet you. I've heard so many good things about you. Do you have a moment to talk?"

   NOT AT ALL ( ) A LITTLE ( ) A FAIR AMOUNT ( ) MUCH ( ) VERY MUCH ( )

3. You have just led your team to victory. An old friend comes over and says, "You played a terrific game. Let me treat you to dinner and drinks."

   NOT AT ALL ( ) A LITTLE ( ) A FAIR AMOUNT ( ) MUCH ( ) VERY MUCH ( )

4. You are walking along a mountain pathway with your dog by your side. You notice attractive lakes, streams, flowers and trees. You think to yourself, "It's great to be alive on a day like this, and you have the opportunity to wander alone out in the countryside."

   NOT AT ALL ( ) A LITTLE ( ) A FAIR AMOUNT ( ) MUCH ( ) VERY MUCH ( )

5. You are sitting by the fireplace with your loved one. Music is playing softly on the phonograph. Your loved one gives you a tender glance and you respond with a kiss. You think to yourself how wonderful it is to care for someone and have somebody care for you.

   NOT AT ALL ( ) A LITTLE ( ) A FAIR AMOUNT ( ) MUCH ( ) VERY MUCH ( )

6. As you are leaving your place of worship, a woman turns to you and says, "I want you to know how much we appreciate all that you did for us in our time of trouble and misery. Everything is wonderful now. I'll always remember you in my prayers."

   NOT AT ALL ( ) A LITTLE ( ) A FAIR AMOUNT ( ) MUCH ( ) VERY MUCH

A. NOW PLACE A CHECK NEXT TO THE NUMBER OF THE SITUATION THAT APPLIES TO YOU MOST.

SECTION IV

List things you do or think about more than:

5	10	15	20 times a day

APPENDIX G

THE STANDARD HIERARCHY

Step 1. You are now standing in the corridor outside the laboratory. The walls of the corridor are pale yellow on three sides, and grey brick on one. To your left on one wall is a green bulletin board with notices both in white and several assorted colors. The ceiling is white asbestos with incandescent yellow lighting. The floor is a white tile with a grey fleck. To your left and right at each end of the corridor are oak doors with brass name plates and silver door handles. On the floor before you are one inch wide white tapes one foot from each other.

Listening, you can hear the rhythm of the heating and air conditioning systems; the possible sound of the elevator bell should the car reach this floor, and the usual muffled sound of students and professors in and about a building such as this. The corridor is pleasantly at room temperature, and you should be able to feel the roughness of the suede and the heat from the gloves on your hands. You may be able to smell the scent of pine in the air.

Now look across the threshold into the laboratory and focus your attention only on the newly made unpainted wooden stand. It is four feet high, and topped by a platform one square foot wide and covered with aluminum foil. You are now 10 feet from that stand. It is held firmly upright by the grey brick to the left of the base of the platform. It can not topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws; he may lay down and rest; he may defecate, and these will appear as small black eggs. In any case, the animal will not bite through your gloves; and the animal will not, repeat will not jump off the stand.

Step 2. You are now standing in the corridor outside the laboratory. The walls of the corridor are pale yellow on three sides, and grey brick on one. To your left on one wall is a green bulletin board with notices both in white and several assorted colors. The ceiling is white asbestos with incandescent yellow lighting. The floor is a white tile with a grey fleck. To your left and right at each end of the corridor are oak doors with brass name plates and silver door handles. On the floor before you are one inch wide white tapes one foot from each other.

Listening, you can hear the rhythm of the heating and air conditioning systems; the possible sound of the elevator bell should the car reach this floor, and the usual muffled sounds of students and professors in and about a building such as this. The corridor is

pleasantly at room temperature, and you should be able to feel the roughness of the suede and the heat from the gloves on your hands. You may be able to smell the scent of pine in the air.

Now look across the threshold into the laboratory and focus your attention only on the newly made unpainted wooden stand. It is four feet high, and topped by a platform one square foot wide and covered with aluminum foil. You are now 9 feet from that stand. It is held firmly upright by the grey brick to the left of the base of the platform. It can not topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws; he may lay down and rest; he may defecate, and these will appear as small black eggs. In any case, the animal will not bite through your gloves; and the animal will not, repeat will not jump off the stand.

Step 3. You are now standing in the corridor outside the laboratory. The walls of the corridor are pale yellow on three sides, and grey brick on one. To your left on one wall is a green bulletin board with notices both in white and several assorted colors. The ceiling is white asbestos with incandescent yellow lighting. The floor is a white tile with a grey fleck. To your left and right at each end of the corridor are oak doors with brass name plates and silver door handles. On the floor before you are one inch wide tapes one foot from each other.

Listening, you can hear the rhythm of the heating and air conditioning systems; the possible sound of the elevator bell should the car reach this floor, and the usual muffled sounds of students and professors in and about a building such as this. The corridor is pleasantly at room temperature, and you should be able to feel the roughness of the suede and the heat from the gloves on your hands. You may be able to smell the scent of pine in the air.

Now look across the threshold into the laboratory and focus your attention only on the newly made unpainted wooden stand. It is four feet high, and topped by a platform one square foot wide and covered with aluminum foil. You are now 8 feet from that stand. It is held firmly upright by the grey brick to the left of the base of the platform. It can not topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws; he may lay down and rest; he may defecate, and these will appear as small black eggs. In any case, the animal will not bite through your gloves; and the animal will not, repeat will not jump off the stand.

Step 4. You are now standing in the corridor outside the laboratory. The walls of the corridor are pale yellow on three sides, and grey brick on one. To your left on one wall is a green bulletin board with notices both in white and several assorted colors. The ceiling is white asbestos with incandescent yellow lighting. The floor is a white tile

with a grey fleck. To your left and right at each end of the corridor are oak doors with brass name plates and silver door handles. On the floor before you are one inch wide tapes one foot from each other.

Listening, you can hear the rhythm of the heating and air conditioning systems; the possible sound of the elevator bell should the car reach this floor, and the usual muffled sounds of students and professors in and about a building such as this. The corridor is pleasantly at room temperature, and you should be able to feel the roughness of the suede and the heat from the gloves on your hands. You may be able to smell the scent of pine in the air.

Now look across the threshold into the laboratory and focus your attention only on the newly made unpainted wooden stand. It is covered with aluminum foil. You are now 7 feet from that stand. It is held firmly upright by the grey brick to the left of the base of the platform. It can not topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may lay down and rest; he may defecate, and these will appear as small black eggs. In any case, the animal will not bite through your gloves; and the animal will not, repeat will not jump off the stand.

Step 5. You are now standing in the laboratory. Here the walls are a brighter yellow. The ceiling is white asbestos with white fluorescent lighting. The floor is now a yellow tile with a greyish-brown fleck. Again, there are the remaining one inch wide white tapes on the floor. To your right is an oak door with a silver door handle and a brass insignia saying "430 Perception Lab". To your left at the far end of the laboratory is some stored equipment in cartons and bulk which belong to the Department.

Again, you can hear the rhythm of the heating and air conditioning systems, the possible sounds of the elevator bell, and the usual sounds of students and professors in and about the building. You may hear the occasional footsteps of the animal on the platform. The laboratory is somewhat warmer than room temperature, but not unpleasant. You should be able to feel the suede of and some heat from your gloved hands. The scent of pine should be clearer to you now.

Now focus your attention on the animal stand. It is four feet high, and topped by a platform one square foot wide. The platform is covered with aluminum foil. You are now standing 6 feet from the stand. The stand is held firmly upright by the grey brick to the left of the base of the platform. It cannot topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws; he may lay down and rest; he may defecate. In any case, the animal will not bite through your gloves; and the animal will not, repeat, will not jump off the stand.

Step 6. You are now standing in the laboratory. Here the walls are a brighter yellow. The ceiling is white asbestos with white fluorescent lighting. The floor is now a yellow tile with a greyish-brown leck. Again, there are the reminaing one inch wide white tapes on the floor. To your right is an oak door with a silver door handle and a brass insignia saying "430 Perception Lab". To your left at the far end of the laboratory is some stored equipment in cartons and bulk which belong to the Department.

Again, you can hear the rhythm of the heating and air conditioning systems, the possible sounds of the elevator bell, and the usual sounds of students and professors in and about the building. You may hear the occasional footsteps of the animal on the platform. The laboratory is somewhat warmer than room temperature, but not unpleasant. You should be able to feel the suede of and some heat from your gloved hands. The scent of pine should be clearer to you now.

Now focus your attention on the animal stand. It is four feet high, and topped by a platform one square foot wide. The platform is covered with aluminum foil. You are now standing 5 feet from the stand. The stand is held firmly upright by the grey brick to the left of the base of the platform.. It cannot topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws; he may lay down and rest; he may defecate. In any case, the animal will not bite through your gloves; and the animal will not, repeat, will not jump off the stand.

Step 7. You are now standing in the laboratory. Here the walls are a brighter yellow. The ceiling is white asbestos with white fluorescent lighting. The floor is now a yellow tile with a greyish-brown fleck. Again, there are the remaining one inch wide white tapes on the floor. To your right is an oak door with a silver door handle and a brass insignia saying "430 Perception Lab". To your left at the far end of the laboratory is some stored equipment in cartons and bulk which belong to the Department.

Again, you can hear the rhythm of the heating and air conditioning systems, the possible sounds of the elevator bell, and the usual sounds of students and professors in and about the building. You may hear the occasional footsteps of the animal on the platform. The laboratory is somewhat warmer than room temperature, but not unpleasant. You should be able to feel the suede of and some heat from your gloved hands. The scent of pine should be clear to you now.

Now focus your attention on the animal stand. It is four feet high, and topped by a platform one square foot wide. The platform is covered with aluminum foil. You are now standing 4 feet from the stand. The stand is held firmly upright by the grey brick to the left of the base of the platform. It cannot topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws; he may lay

down and rest; he may defecate. In any case, the animal will not bite through your gloves; and the animal will not, repeat, will not jump off the stand.

Step 8. You are now standing in the laboratory. Here the walls are a brighter yellow. The ceiling is white asbestos with white fluorescent lighting. The floor is now a yellow tile with a greyish-brown fleck. Again, there are the remaining one inch wide white tapes on the floor. To your right is an oak door with a silver door handle and a brass insignia saying "430 Perception Lab". To your left at the far end of the laboratory is some stored equipment in cartons and bulk which belong to the Department.

Again, you can hear the rhythm of the heating and air conditioning systems, the possible sounds of the elevator bell, and the usual sounds of students and professors in and about the building. You may hear the occasional footsteps of the animal on the platform. The laboratory is somewhat warmer than room temperature, but not unpleasant. You should be able to feel the suede of and some heat from your gloved hands. The scent of pine should be clearer to you now.

Now focus your attention on the animal stand. It is four feet high, and topped by a platform one square foot wide. The platform is covered with aluminum foil. You are now standing 3 feet from the stand. The stand is held firmly upright by the grey brick to the left of the base of the platform. It cannot topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws; he may lay down and rest; he may defecate. In any case, the animal will not bite through your gloves; and the animal will not, repeat, will not jump off the stand.

Step 9. You are now standing within 2 feet of the animal. If you should decide to go forward, I want you to know that there is a built in safety factor to protect your clothing. I will keep the animal from your clothing should he come near it while you are concentrating on the laboratory environment. Further, I will hold the animal firmly on the platform after I have said the word "reinforcement" so that he will not bother your clothing then. Again, should you decide to move forward, please make your decision based on your fear of the animal and not on your fear of the animal bothering your clothing. Your clothing will be protected.

You are now standing in the laboratory. Here the walls are a brighter yellow. The ceiling is white asbestos with white fluorescent lighting. The floor is now a yellow tile with a greyish-brown fleck. Again, there are the remaining one inch wide white tapes on the floor. To your right is now a yellow wall since you have passed the door. To your left remains the stored laboratory equipment in cartons and bulk which belong to the Department.

Again, you can hear the rhythm of the heating and air

conditioning systems, the possible sounds of the elevator bell and the usual sounds of students and professors in and about the building. You may hear the occasional footsteps of the animal on the platform. The laboratory is somewhat warmer than room temperature, but not unpleasant. You should be able to feel the suede of and some heat from your gloved hands. The scent of pine should be clearer to you now.

Now focus your attention on the animal stand. It is four feet high, and topped by a platform one square foot wide. The platform is covered with aluminum foil. You are now standing 2 feet from the stand. The stand is held firmly upright by the grey brick to the left of the base of the platform. It cannot topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws; he may lay down and rest; he may defecate. In any case, the animal will not bite through your gloves; and the animal will not, repeat, will not jump off the stand.

Step 10. You are now standing within 1 foot of the animal. If you should decide to go forward, I want you to know that there is a built in safety factor to protect your clothing. I will keep the animal from your clothing should he come near it while you are concentrating on the laboratory environment. Further, I will hold the animal firmly on the platform after I have said the word "reinforcement" so that he will not bother your clothing then. Again, should you decide to move forward, please make your decision based on your fear of the animal, and not on your fear of the animal bothering your clothing. Your clothing will be protected.

You are now standing in the laboratory. Here the walls are a brighter yellow. The ceiling is white asbestos with white fluorescent lighting. The floor is now a yellow tile with a greyish-brown fleck. Again, there are the remaining one inch wide white tapes on the floor. To your right is now a yellow wall since you have passed the door. To your left remains the stored laboratory equipment in cartons and bulk which belong to the Department.

Again, you can hear the rhythm of the heating and air conditioning systems, the possible sounds of the elevator bell, and the usual sounds of students and professors in and about the building. You may hear the occasional footsteps of the animal on the platform. The laboratory is somewhat warmer than room temperature, but not unpleasant. You should be able to feel the suede of and some heat from your gloved hands. The scent of pine should be clearer to you now.

Now focus your attention on the animal stand. It is four feet high, and topped by a platform one square foot wide. The platform is covered with aluminum foil. You are now standing 1 foot from the stand. The stand is held firmly upright by the grey brick to the left of the base of the platform. It cannot topple over.

On the platform is a tamed white laboratory rat who is six

inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws; he may lay down and rest; he may defecate. In any case, the animal will not bite through your gloves; and the animal will not, repeat, will not jump off the stand.

Step 11. You are now standing next to the stand. Your right hand and forearm which are covered by the glove are up against the front edge of the stand. Again, should the animal climb up on your gloved hand I will place him on the platform so that he will not bother your clothing. I will also hold him on the platform when I say the word "reinforcement" for the same reason.

You are now standing in the laboratory. Here the walls are a brighter yellow. The ceiling is white asbestos with white fluorescent lighting. The floor is now a yellow tile with a greyish-brown fleck. Again, there are the remaining one inch wide white tapes on the floor. To your right is now a yellow wall since you have passed the door. To your left remains the stored laboratory equipment in cartons and bulk which belong to the Department.

Again, you can hear the rhythm of the heating and air conditioning systems, the possible sounds of the elevator bell, and the usual sounds of students and professors in and about the building. You may hear the occasional footsteps of the animal on the platform. The laboratory is somewhat warmer than room temperature, but not unpleasant. You should be able to feel the suede of and some heat from your gloved hands. The scent of pine should be clearer to you now.

Now focus your attention on the animal stand. It is four feet high, and topped by a platform one square foot wide. The platform is covered with aluminum foil. You are now standing next to the stand. The stand is held firmly upright by the grey brick to the left of the base of the platform. It cannot topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws; he may lay down and rest; he may defecate. In any case, the animal will not bite through your gloves; and the animal will not, repeat, will not jump off the stand.

Step 12. You are now standing in the laboratory. Your right forearm is up against the front edge of the stand. The walls of the laboratory are a brighter yellow. The ceiling is white asbestos with white fluorescent lighting. The floor is now a yellow tile with a greyish-brown fleck. Again, there are the remaining one inch wide white tapes on the floor. To your right is now a yellow wall since you have passed the door. To your left remains the stored laboratory equipment in cartons and bulk which belong to the Department.

Now focus your attention on the animal stand. It is four feet high, and topped by a platform one square foot wide. The platform

is covered with aluminum foil. You are now standing next to the stand. The stand is held firmly upright by the grey brick to the left of the base of the platform. It cannot topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may stand on his hind legs and sniff; he may peek over the edge; he may wash his face with his paws. He may lay down and rest; he may defecate. In any case, the animal will not bite through your gloves; and the animal will not, repeat, will not jump off the stand.

Now I want you to stroke the back of the animal twice from head to tail as I am now demonstrating. Expect him to move slightly. When you have finished this, again place your gloved hand against the front edge of the stand. I will be holding the animal on the platform when you hear the word "reinforcement."

Step 13. You are now standing in the laboratory. Your right forearm is up against the front edge of the stand. The walls of the laboratory are a brighter yellow. The ceiling is white asbestos with white fluorescent lighting. The floor is now a yellow tile with a greyish-brown fleck. Again, there are the remaining one inch wide tapes on the floor. To your right is now a yellow wall since you have passed the door. To your left remains the stored laboratory equipment in cartons and bulk which belong to the Department.

Now focus your attention on the animal stand. It is four feet high, and topped by a platform one square foot wide. The platform is covered with aluminum foil. You are now standing next to the edge of the stand. The stand is held firmly upright by a grey brick to the left of the base of the platform. It cannot topple over.

On the platform is a tamed white laboratory rat who is six inches long, and has pink eyes and ears. He may or may not roam around the platform; he may wash his face with his paws; he may lay down and rest; he may defecate. In any case, the animal will not bite through your gloves; and the animal will not, repeat, will not jump off the stand.

Now I want you to pick up the animal, and hold him for as long as you can. Using your gloved hand (remember the animal cannot bite through this glove) reach behind his forepaws and pick him up. With your second hand scoop up his tail and hindlegs. Hold him over the platform in case he defecates. He will squirm somewhat, and you are free to pet him as you hold him. Let me demonstrate briefly the proper way to hold the animal as I just described it (short pause). When you put the animal back on the platform, I will be holding him on it when you hear the word "reinforcement."

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #1

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	190	175	----
Approach Measure	0	10	10
Fear Intensity Scale	6	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #2

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	182	154	------
Approach Measure	0	10	------ 10
Fear Intensity Scale	6	7	4
Stroke Measure	NO	YES	YES
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #3

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	177	167	------
Approach Measure	4	10	-10---
Fear Intensity Scale	3	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #4

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Subscale	201	190	------
Approach Measure	4	10	10
Fear Intensity Scale	4	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #5

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	152	139	------
Approach Measure	4	10	------ 10
Fear Intensity Scale	5	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #6

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	187	176	------
Approach Measure	4	10	------ 10
Fear Intensity Scale	5	3	3
Stroke Measure	NO	YES	YES
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #7

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	236	240	------
Approach Measure	4	10	------ 10
Fear Intensity Scale	6	2	2
Stroke Measure	NO	YES	YES
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #8

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	191	156	------
Approach Measure	5	10	------ 10
Fear Intensity Scale	4	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #9

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	157	180	------
Approach Measure	5	10	------ 10
Fear Intensity Scale	5	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #10

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	148	162	------
Approach Measure	6	10	10
Fear Intensity Scale	4	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #11

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	154	151	------
Approach Measure	6	10	"10"--
Fear Intensity Scale	4	4	2
Stroke Measure	NO	YES	YES
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #12

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	194	161	------
Approach Measure	6	10	"10"
Fear Intensity Scale	4	1	1
Stroke Measure	YES	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #13

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	180	161	------
Approach Measure	6	10	--10---
Fear Intensity Scale	5	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #14

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	138	115	------
Approach Measure	6	10	10
Fear Intensity Scale	5	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group ACTUAL FEAR STIMULUS

Subject #15

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	230	184	------
Approach Measure	6	10	--10---
Fear Intensity Scale	5	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #1

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	231	220	------
Approach Measure	0	9	------ 8
Fear Intensity Scale	5	5	5
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #2

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	144	130	------
Approach Measure	0	10	10
Fear Intensity Scale	6	1	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	YES	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #3

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	186	182	------
Approach Measure	4	9	9
Fear Intensity Scale	3	3	2
Stroke Measure	NO	NO	YES
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #4

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	233	233	------
Approach Measure	4	9	------ 10
Fear Intensity Scale	4	4	4
Stroke Measure	NO	YES	YES
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #5

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	160	151	------
Approach Measure	4	9	9
Fear Intensity Scale	5	2	3
Startle Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #6

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	182	194	------
Approach Measure	4	4	------ 9
Fear Intensity Scale	5	4	5
Stroke Measure	NO	YES	YES
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #7

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	150	158	------
Approach Measure	4	9	------ 9
Fear Intensity Scale	6	4	4
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #8

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Subscale	242	236	------
Approach Measure	5	10	"10"
Fear Intensity Scale	4	6	6
Strole Measure	NO	YES	YES
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #9

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	233	228	------
Approach Measure	5	7	------ 7
Fear Intensity Scale	5	5	4
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #10

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	155	140	------
Approach Measure	6	10	--10---
Fear Intensity Scale	4	2	1
Stroke Measure	NO	YES	YES
Hold Measure	NO	NO	YES

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #11

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	177	160	------
Approach Measure	6	10	-10---
Fear Intensity Scale	4	2	4
Stroke Measure	NO	YES	YES
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #12

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	161	168	------
Approach Measure	6	9	--9--
Fear Intensity Scale	4	2	3
Stroke Measure	YES	YES	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #13

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	168	138	------
Approach Measure	6	9	9
Fear Intensity Scale	5	3	3
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #14

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	156	186	------
Approach Measure	6	9	------ 7
Fear Intensity Scale	5	4	5
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group IMAGINED FEAR STIMULUS

Subject #15

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	138	154	------
Approach Measure	6	10	------ 10
Fear Intensity Scale	5	5	4
Stroke Measure	NO	YES	YES
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #1

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	201	201	------
Approach Measure	0	0	------ 1
Fear Intensity Scale	5	6	5
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #2

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	193	136	-------
Approach Measure	0	2	------ 0
Fear Intensity Scale	6	4	5
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #3

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	191	181	------
Approach Measure	4	3	--0---
Fear Intensity Scale	3	5	5
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #4

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	204	145	------
Approach Measure	4	6	---2---
Fear Intensity Scale	4	4	4
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #5

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	200	145	------
Approach Measure	4	5	------ 4
Fear Intensity Scale	5	5	5
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #6

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	160	171	------
Approach Measure	4	5	------ 5
Fear Intensity Scale	5	5	5
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #7

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	165	178	------
Approach Measure	4	7	------ 7
Fear Intensity Scale	6	4	4
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #8

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	183	182	------
Approach Measure	5	6	--7---
Fear Intensity Scale	4	4	3
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #9

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	160	157	------
Approach Measure	5	6	------ 7
Fear Intensity Scale	5	4	4
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #10

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	169	192	------
Approach Measure	6	5	------ 4
Fear Intensity Scale	4	5	6
Stroke Measure	YES	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #11

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	189	202	------
Approach Measure	6	4	------ 1
Fear Intensity Scale	4	6	7
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #12

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	156	150	------
Approach Measure	6	7	------ 1
Fear Intensity Scale	4	4	5
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #13

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	144	236	------
Approach Measure	6	4	------ 2
Fear Intensity Scale	5	5	4
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #14

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	173	185	------
Approach Measure	6	7	------ 8
Fear Intensity Scale	5	6	5
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

APPENDIX H

RAW DATA SUMMARY SHEET

Group ATTENTION CONTROL

Subject #15

Outcome Measure	Pre-Test Score	Post Test Score	Stimulus Generalization Score
Fear Survey Schedule	214	183	------
Approach Measure	6	7	------ 7
Fear Intensity Scale	5	5	4
Stroke Measure	NO	NO	NO
Hold Measure	NO	NO	NO

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