THE EFFICACY OF ANXIETY-RELIEF THERAPY AND
SYSTEMATIC DESENSITIZATION IN THE
TREATMENT OF SNAKE-PHOBIC BEHAVIOR

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THE EFFICACY OF ANXIETY-RELIEF THERAPY AND SYSTEMATIC DESENSITIZATION IN THE TREATMENT OF SNAKE-PHOBIC BEHAVIOR

The purpose of this study is to determine the efficacy of anxiety-relief therapy when compared with three other treatment groups (group systematic desensitization; a pseudo-therapy, suggestion, group; and a no-treatment group).

Although anxiety-relief, or aversion-relief, therapy has shown some degree of success in modifying maladaptive behavior, including phobic behavior (Meyer, 1957; Solyom & Miller, 1967; Thorpe, Schmidt, Brown, & Castell, 1964), it still remains for controlled investigations to determine the efficacy of this treatment. One important necessity for controlled investigations into this treatment is the justification of the use of an unpleasant, aversive treatment over those treatments that are less aversive. As Marks (1969) has stated, "To be acceptable clinically an unpleasant method such as aversion relief must have a clear advantage over other forms of treatment [p. 191]."

By comparing the outcome of anxiety-relief therapy with that of the much-researched, well-established technique of systematic desensitization and with two control groups, it is hoped that this study will aid in the determination of any advantages in the anxiety-relief treatment.
Theoretically, anxiety-relief therapy and systematic desensitization have much in common. Basically, systematic desensitization involves a graduated exposure to phobic, or anxiety arousing, stimuli (usually imagined) while the individual is simultaneously experiencing a contrasting response, such as relaxation. One method of anxiety-relief therapy (Solyom & Miller, 1967) has also paired phobic stimuli (in the form of taped anxiety narratives and projected pictures) with relaxation. The main difference in these methods is the manner in which relaxation is induced in the subject, or "patient." The most frequently used method of systematic desensitization utilizes training in muscular relaxation. Jacobson's (1938) method is usually employed. In anxiety-relief therapy, the phobic stimulus is presented to the patient as he presses a button to terminate an aversive electro-shock. The relaxation period is theoretically that period which immediately follows the cessation of the aversive electric shock. The length of time that this relaxation lasts or remains effective has not been determined.

H. J. Eysenck (1960) reports, "It is likely that aversion therapy by itself will be found useful in only a limited and carefully selected number of cases; it is probable that it will be found useful in many more cases if it can be combined with treatment by reciprocal inhibition [p. 277]." The learning theory expressed by both
systematic-desensitization and anxiety-relief theorists has been that of reciprocal inhibition in a respondent-conditioning paradigm. Wolpe's (1958) theory of reciprocal inhibition states that "if a response antagonistic to anxiety can be made to occur in the presence of anxiety-provoking stimuli so that it is accompanied by a complete or partial suppression of the anxiety responses, the bond between the stimuli and the anxiety responses will be weakened [p. 71]." Wolpe's theory of reciprocal inhibition through counter-conditioning is based on his findings that the presentation of a pleasant stimulus (like food or relaxation) could inhibit conditioned avoidance responses until they were gradually extinguished. Solyom and Miller's (1967) learning theory, based on their work with "aversion-relief" therapy, is also reciprocal inhibition through counter-conditioning. They theorize that "anxiety stimuli were paired with a state of relief, or in Wolpeian terms, anxiety was reciprocally inhibited [p. 313]."

It may be concluded that although the methodologies of systematic desensitization and anxiety-relief therapy may differ, the underlying theoretical approaches are similar. Also, the ultimate goals of the two treatments (the suppression of anxiety-eliciting stimuli) are similar in nature. At this point a brief review of the literature and a description of the techniques employed for these two behavior therapies will further clarify the purpose of this study.
Anxiety-relief therapy is one of the newest and perhaps least researched techniques of the aversion-therapy methods. Until recently, investigators have dealt mainly with case studies of the efficacy of this therapy. Meyer (1957) illustrates his technique of anxiety relief with a 42-year-old married man who manifested black-outs, tensions, and fears of crowded places. Phenobarbital and desensitization based on relaxation techniques had been previously employed in this case, and both had failed. It was reasoned that desensitization had failed because this man could not evoke increased anxiety by simply imagining difficult situations. Meyer used an electric current to produce an anxiety effect. At the time the current became unbearable, the man would say aloud "calm yourself," which was the signal for the relief (i.e., the shock was terminated). The man's attitude was reinforced (by the relief), and, thereafter, he practiced the words in situations of increasing anxiety. The learning principles involved in this case study can be seen as a combination of operant and respondent conditioning. A specified verbal response became more probable by reinforcement (relief). This signal also becomes a conditioned stimulus for the conditioned response of relief or relaxation. However, the success in this case cannot be completely attributed to the aversive relief effect alone, as in vivo desensitization was also used when the man was taught to use the conditioned verbal response.
Wolpe and Lazarus (1966) report the use of a similar technique which they have termed "anxiety-relief" therapy. They also used faradic shock as the aversive agent and the word "calm" as the conditioned stimulus for relief from anxiety. Wolpe and Lazarus also varied the type of electro-shock used in their work with different clinical cases. They used steady-shock escape, increasing-shock escape, and shock avoidance. Shock avoidance was used for those individuals who experienced mere relief from sensory discomfort rather than from shock induced anxiety. Also, they report that most of their patients displayed signs of anxiety during the period in which they had the opportunity to avoid the shock. They do not, however, report any measures for this anxiety. Wolpe and Lazarus have found that the word "calm" becomes an effective anxiety-reducing stimulus (by building up "conditioned inhibition") in the life situation of their cases after as few as 30 trials.

This anxiety-relief technique has been used by these therapists as a means to suppress or to counter-condition anxiety in many situations. Although there are reports of successful change for the cases mentioned, no controlled investigations of this method have been reported.

It should be pointed out that the terms anxiety relief and aversion relief have both been used to describe treatments which differ in method. Turnage and Wenrich (1973) attempt to define more clearly these terms in the interest
of clarification. They term procedures in which faradic shock is delivered during periods of no specific stimulation (such as lapses of silence) "anxiety-relief therapy." That is, with anxiety-relief therapy the onset of faradic shock is paired with a neutral stimulus. More simply, there is no punishment paradigm involved in anxiety-relief therapy.

On the other hand, punishment is involved in the aversion-relief technique. In the aversion-relief paradigm, there is an aversive stimulus which signals the onset of faradic shock. The therapist attempts to inhibit a particular response (by punishing with shock) and to make a more appropriate response more probable (by rewarding this response with relief from shock).

Based on this distinction, the treatment used in this study is termed anxiety-relief therapy because faradic shock is paired with a neutral stimulus.

Thorpe et al. (1964) used an aversion-relief procedure in treating cases of homosexuality, fetishes, phobias, depression, and over-eating. A series of words appropriate for the particular case was presented to the patient. The first 23 words signified the behavior to be changed, e.g., "homosexual," and synonyms for patients with homosexual behavior. These 23 words were followed immediately by a punishing shock which was above the patient's pain threshold. The 24th, or last, word signified the appropriate,
or acceptable, behavior, such as "heterosexual." There was no shock following this last word, which also became the signal that the patient had received his last shock. In this method, a "relief response" was produced for whatever relief word had been chosen by the therapist. Thorpe et al. (1964) reports that patients learned to look forward to the appearance of this relief word which they had been told would signify "no more shock." These therapists report six complete or partially successful treatments out of the eight cases studied. However, Rachman and Teasdale (1969) point out that since masturbatory practices were included as part of the Thorpe et al. therapy for sexually disordered patients, the separate contributions (if any) of this aversion-relief therapy remains to be demonstrated. The inclusion of punishment or aversive conditioning into this method also clouds the result of the relief effect.

As previously mentioned, Solyom and Miller's (1967) relief technique more closely resembles the reciprocal inhibition model of systematic desensitization. Solyom and Miller (1967) treated seven phobic patients and one ticqueur. All these patients had been previously treated with psycho-therapy and chemo-therapy and were considered resistant to these procedures. Each patient was asked to prepare a number of written accounts of past and anticipated anxiety-provoking events which were then taped by the patient.
One of the tapes would be presented to the patient through earphones. The text would be interrupted by lapses of silence of 30 seconds in duration which were followed immediately by the administration of an electric shock to the patient's finger. The patient would then press a button to terminate the shock and present another portion of the taped "anxiety stimulus." Anxiety producing pictures were also paired with anxiety relief following the termination of the electric shock.

The intensity of the shock was determined for each patient by selecting the mid-point between his shock perception and shock-tolerance thresholds. Sessions lasted for about half an hour.

Solyom and Miller (1967) report that six of the seven phobic patients were much improved and "free of phobic fears" after treatment, and that this improvement was maintained after follow-ups of ten months and more. However, two of these patients were treated with desensitization along with anxiety relief. Unlike the Thorpe et al. (1964) treatment, the phobic stimuli and the anxiety responses were both treated with reciprocal inhibition. No punishment was received by these phobic patients.

From these case studies, it may be concluded that the high incidence of reported successful treatments by these therapists should be investigated with controlled studies,
using objective methods to measure changes in anxious behavior.

It should also be noted that these anxiety-relief techniques have been dissimilar in method and, to some extent, in theory.

In a more recent controlled study Solyom, McClure, Heselton, Ledwidge, and Solyom (1972) investigate the effectiveness of three different procedure variables within the basic aversion-relief treatment paradigm. The hypotheses that "noxious stimulation rather than aversion relief changed the phobic patient's motivation and led to improvement, and that the repeated tape presentations of a special phobic 'narrative' led to an habituation effect, thence to improvement in phobias [p. 21]" were tested.

The anxiety-relief group was treated with anxiety relief by reciprocal inhibition (relief being paired with anxiety eliciting portions of the taped narratives). The "pseudo-conditioning" group was used as a control for secondary gains and changes in motivation due to the aversive stimulation alone. In this group, shock was administered randomly to parts of the narratives and the relief was not necessarily paired to anxiety eliciting portions of the tape. The third group in this study was used as a control for the "habituation effect" by simply presenting the taped anxiety narratives to the subjects. In this group, 15-second pauses interrupted the narratives
preceding the anxiety producing portions, but no electric shock (hence no "relief" effect) was administered to the subjects. Seven dependent measures were used in this study, based on before-and-after measures of self-ratings, psychiatrists' ratings, and psychometric test scores.

Solyom et al. (1972) conclude from their results that "more subjects in the aversion-relief group benefitted on more variables, and to a greater degree, than subjects in either of the two control groups [p. 26]." For example, on the Fear Survey Schedule a statistically significant improvement was found in the aversion-relief group, while none of the psychometric test changes were significant for the pseudo-conditioning group. In the habituation group there were higher anxiety scores after treatment.

Although significant improvements were found on more variables for the aversion relief group, the differences between the groups on any variable were not statistically significant. With these findings it was concluded that the assumption that aversive stimulation and/or habituation contribute to the decrease in phobic behavior could not be accepted or rejected. The lack of significant differences between the groups was attributed to the random conditioning present in the "pseudo-conditioning group" which produced some improvement in the subjects. Also, the small sample used was listed as a contributor to non-significant results.
Another flaw in Solyom et al.'s study was the fact that no direct behavioral measure was used and that the type of phobia was not held constant. Most of the subjects were agoraphobics, which was defined as "several behaviors for different subjects." This type of phobia was found by Marks (1969) to be the most resistant to behavior therapy. Some of the subjects also had "specific" phobias. Solyom et al. (1972) have pointed out that some of the changes in the "habitation" group should be attributed to rater bias (another reason for the necessity of direct behavioral measures in a study of this type).

Gaupp, Stern, and Galbraith (1972) have found evidence to support the theoretical model of the aversion-relief method. In a study, which replicates and extends the research on "cognitive desensitization," conducted by Valins and Ray (1967), the investigators compare the effects of four treatment groups on snake approach behavior and subjective reports.

Three of these groups saw 10 slides of the word "shock" accompanied by an electric shock, and 10 slides of snake pictures accompanied by no shock. These three groups also heard sounds of heart beats which were varied for each group. One group heard false heart beats which increased to the shock stimuli. This group was told that they would hear their hearts beating. Another group was told to ignore these sounds. A third group heard their actual heart beats...
and were not told to ignore these heart beats. A fourth group was a no-treatment control group.

Gaupp et al. (1972) theorizes that the three treatment groups constitute a "differential classical conditioning" paradigm and represent the aversion relief model, in that the word "shock" was followed by electric shock while the picture of a snake was followed by no aversive stimulation. The cognitions of the subjects were the only independent variables for the different treatment groups.

Gaupp et al. (1972) have found that all three treatment groups "exhibited greater snake intimacy on the post-test measure than on the pre-test measure [p. 17]," and, more importantly, that there were no significant differences between these changes by the various aversion-relief treatment groups. They interpret these findings as supportive of the aversion-relief theory of "differential classical conditioning" and non-supportive of the "cognitive desensitization" model, as outlined by Valins and Ray (1967).

They also have found support for the aversion-relief model in the analysis of the physiological data collected. Both GSR and EKG response data supported the hypothesized non-significant difference in physiological responding between the aversion-relief groups, and, also, the expected differences in physiological responding between the shock stimulus slides and the snake slides. GSR response data also showed a "reduction in physiological responding to
the snake slides across the sequential blocks of data [p. 17]." The latter finding was not replicated with the EKG response data.

In another recent study, Turnage and Wenrich (1973) have compared an anxiety-relief conditioning group with a "pseudo-conditioning group" on behavior approach scores. Both groups were repeatedly exposed to the same phobic, neutral, and shock stimuli. However, one group was exposed to anxiety-relief conditioning while the other was not.

For the anxiety-relief group, neutral slides were paired with the period following a tone of 1.5 seconds. Slides of a pre-defined phobic stimulus (a snake) were then paired with the period immediately following an electric shock of 1.5 seconds.

For the pseudo-conditioning group, the pairings were reversed for the two treatment conditions. In this group the phobic snake slides were paired with the period immediately following the tone, and the neutral slides were paired with the period immediately following the shock.

Turnage and Wenrich (1973) have found that the anxiety-relief conditioning group improved more significantly than did the pseudo-conditioning group, on the behavior-approach test.

The anxiety-relief conditioning procedure used in the present study is very similar to the procedure used by Turnage and Wenrich (1973) in their anxiety-relief group.
Although these controlled studies do show evidence in support of the aversion-relief and anxiety-relief method and theory, there have been no controlled studies dealing with the efficacy of aversion-relief therapy when compared with more established behavior therapies.

In contrast to the small number of research studies reported on aversion-relief and anxiety-relief therapy, a voluminous amount of research has been published dealing with the technique of desensitization. Systematic desensitization has also become an established and accepted behavior-therapy technique in the treatment of anxious behavior. As Marks (1969) states, "Desensitization is probably the commonest way in which phobias are treated today, and has been more thoroughly explored than any other technique [p. 185]."

This is due largely to the early work of Wolpe (1954, 1958) and the writings of Meyer (1957), Rachman (1959), and Eysenck (1960).

Wolpe (1969) defines systematic desensitization as "the breaking down of neurotic anxiety-response habits in piecemeal fashion. A physiological state inhibitory of anxiety is induced in the patient who is then exposed to a weaker anxiety arousing stimulus. The exposure is repeated until the stimulus loses completely its ability to evoke anxiety. Then progressively stronger stimuli are introduced and similarly treated [p. 91]." The basic procedure described by Wolpe (1958, 1961) involves three stages: (a) training
in deep muscle relaxation (with or without the aid of drugs or hypnosis, (b) the construction of anxiety hierarchies, and (c) applying the desensitization procedures by moving through the anxiety hierarchies step by step while counter-acting these anxiety-eliciting stimuli with relaxation. Wolpe (1969) defines an anxiety hierarchy as "a list of stimuli on a common theme ranked in descending order according to the amount of anxiety they evoke [p. 107]."

Variations in this technique revolve mainly around the nature of the anxiety-producing stimuli used in the hierarchy. Wolpe (1969) favors the technique which involves the subjects' reproduction of the anxiety-arousing situations by imagination. This technique is utilized in this study and has the obvious advantage of utilizing a wider range of anxiety-producing stimuli for desensitization. Also, it is more applicable to a clinical or laboratory setting, in that it requires less technology. An alternate procedure, in-vivo desensitization, has also been used by some clinicians. In this technique, the hierarchy consists of real objects or situations which are also arranged according to the amount of anxiety they elicit. An advantage of this method would be the greater assurance that desensitization had generalized to real life situations.

The major rationale for using the imagined technique of desensitization in this study is that this technique has
been used, with favorable outcomes reported, by most clinicians and researchers.

In a review on desensitization techniques, Yates (1970) reports that "the vast majority of SD studies have utilized the SD-I (systematic desensitization-imagined) technique [p. 132]." However, Yates also reports that in recent years "in-vivo desensitization" has been used more frequently than it had been used previously. Yates finds that only one study (Cooke, 1966) has directly compared the imagined desensitization technique with the real, or in-vivo, technique. In this study Cooke finds no difference in the efficacy of the two techniques.

Other variants in the basic systematic-desensitization techniques include automated versus therapist desensitization, group versus individual desensitization, standard versus individually-tailored hierarchies, massed versus spaced desensitization, and accelerated versus prolonged treatments.

Controlled studies (Donner, 1969; Melamed & Lang, 1968) report that desensitization is successful when automated (administered by a tape recorder). Emery and Krumboltz (1968) compare the effects of standard versus individually-tailored hierarchies in students with examination anxiety. They find that subjects improve equally with either type of hierarchy. Desensitization with both types have produced
significantly more reduction in subjective fear than has occurred in the no-treatment control group. Wolpin and Pearsall (1965) find results that indicate that accelerated or "rapid deconditioning" of snake fears may be as effective as Wolpe's cautious, less rapid movement through the anxiety hierarchy. Their findings suggest that the presentation of stimuli that may arouse more anxiety than the subject can tolerate will not, as Wolpe has stressed, increase the strength of the phobia. Ramsay, Barends, Breaker, and Kruseman (1966) find that spaced practice in desensitization (i.e., subjects imagine fear situations 20 times during each 20-minute session given once daily for four days) produced better results than desensitization in massed practice (i.e., 40 imaginations during each of two 40-minute sessions given on days one and four). Both groups have shown significantly reduced subjective fear, but spaced desensitization has yielded significantly greater fear reduction than massed desensitization. It is suggested by these investigators that desensitization sessions should last 25 minutes.

Several controlled studies dealing with the efficacy of group desensitization have shown it to be significantly superior to techniques without desensitization and to be at least equal to individual desensitization results (Donner & Querney, 1969; Katahn, Strenger, & Cherry, 1966; Lazarus, 1961; Paul & Shannon, 1966; Ritter, 1968).
In the present study, an accelerated-individual-desensitization technique is used with an automated, spaced procedure. The relaxation training portion of the desensitization method and the hierarchy scenes were taped. The procedure was also standardized (Nawas, Fishman, & Pucel, 1970).

Outcome studies on the desensitization technique generally have supported the continued use of this procedure in clinical practice. Paul (1968a,b) has published an extensive review of the research on systematic desensitization, listing over 50 case articles (Paul, 1968a) and 20 studies in which control procedures were used. After reviewing the 20 controlled procedures, Paul (1968b) concludes that "the findings were overwhelmingly positive, and for the first time in the history of psychological treatments, a specific therapeutic package was found to reliably produce therapeutic benefits for clients across a broad range of distressing problems where anxiety is of fundamental importance. 'Relapse' and 'symptom substitution' were notably lacking, although the majority of authors were attuned to these problems [p. 303]."

Wolpe (1958) claims that 90% of a consolidated group of 210 mixed neurotic patients were "apparently cured" or "much improved" after an average time of 10 months exposure to his technique of desensitization. Included in the 210 neurotics were 135 anxiety states, including phobias.
Wolpe's criterion for effective improvement was a significant drop in the Willoughby questionnaire score. In another study, Wolpe (1961) has used standard (imagined) desensitization with 39 anxious patients. He reports that 45 of the 68 phobic and anxiety responses shown by the patients were markedly reduced, and 17 were eliminated. Lazarus (1963) has used this same type of technique and has found 62% of the 126 mixed neurotic cases treated to be improved. These studies have been criticized (Marks, 1969; Yates, 1970) for neglecting to measure the strength of the phobia in real-life situations and for the omission of control groups for "spontaneous improvements."

Marks (1969) has reviewed 18 controlled studies in which groups of phobic subjects were treated by desensitization and compared with groups treated with control procedures. Those studies reviewed were reported from 1961 to 1969 and included only those studies dealing with subjects who had "focal fears" and no other problems. The studies were all similar in basic design. Subjects were usually screened by a questionnaire and then subjected to an avoidance test in which they had to approach the phobic stimuli as closely as they could. Subjects were usually chosen from a student population. Subjects who avoided the phobic stimulus were then randomly assigned either to an experimental desensitization-treatment group or to a control group, after which post-treatment measures were
taken. In the 13 studies with volunteers, 8 of these dealt with snake phobia, two with test anxiety, one with stage fright, one with claustrophobia, and one with spiders. Marks reports that the results of these studies show an "impressive uniformity."

Desensitization produced more change in the fear that was treated than did the control procedures used, including relaxation, graduated exposure, flooding (implosion), visualizing non-phobic scenes, suggestion and hypnosis, insight psychotherapy, drug placebo, and no-treatment groups. More change in the desensitization group was found in each study. Marks (1969) concludes from the results of these studies that "there is an impressive overall trend in favor of desensitization in volunteers with minor phobias [p. 202]."

Marks (1969) also reviews the processes which have been compared with the desensitization technique. Only one procedure has been found to be superior to the desensitization technique. Bandura (1968), in a study using volunteers who were afraid of snakes, finds that live modeling combined with exposure to the stimulus along a hierarchy is superior to desensitization in reducing the fear. The desensitization group is improved also. There have been no studies reported in any of these extensive reviews which have compared an aversion-relief, or anxiety-relief, procedure with systematic desensitization.
Several researchers have also reviewed the processes that may hamper progress in desensitization, even in patients with monophobic behavior and no other problems. Most of these factors have been reviewed by Weinberg and Zaslove (1963), Wolpe and Lazarus (1966), and Rachman (1968).

The three main obstacles to desensitization have been listed as (a) difficulties during relaxation (poor concentration, sleepiness, fear of losing control, severe anxiety, and depression), (b) inadequacies of imagery (inability to obtain images, panic produced by intensity of image, dissociation of anxiety from the image, dilution of the image to a more protective setting), and (c) misleading or irrelevant hierarchies. Other difficulties listed have been lack of cooperation, relapse of the desensitized phobia, and life situations which adversely influence the treatment.

If the theory of anxiety relief by reciprocal inhibition has any validity, this technique should prove to be superior to desensitization in that the difficulties in relaxation will be reduced. The therapist will have better control of the relaxation process and will be assured that the subject is actually relaxed when the phobic stimuli are presented. If this is the case, a more adequate and better controlled counter-conditioning procedure may be effective with anxiety-relief therapy.

As Solyom and Miller (1967) state, "In progressive relaxation, even if the patient learns to relax, the degree
of the relaxation cannot be manipulated by the therapist whereas the important variables of the reciprocal inhibition by aversion relief procedure are easy to modify and control. That is, the 'anxiety-stimuli' are presented concomitant with the feeling of relief which immediately follows the termination of an aversive electric shock [p. 322]." 

This theory is, of course, based on the assumption that relaxation does, in fact, follow the aversive electric shock. If this assumption proves to be accurate, then these theorists have a valid point, and reciprocal inhibition by anxiety relief should be more effective in reducing fears than reciprocal inhibition by systematic desensitization.

The use of visual-phobic stimuli (in the form of projected slides) as a part of the anxiety-relief procedure may also add to the superiority of this technique. The visual stimuli may aid in diminishing the great difficulty some subjects have in producing visual imagery by imagination.

Although a number of studies have supported the efficacy of systematic desensitization in reducing anxiety, the processes involved and the theoretical interpretations of the technique are still a matter of dispute. Wolpe (1954) interprets the effectiveness of systematic desensitization as being due to reciprocal inhibition, and several studies
(Davison, 1968; Lang, Lazovik, & Reynolds, 1965; Lomont & Edwards, 1967; Rachman, 1965) have evidence to support the counterconditioning interpretation of systematic desensitization.

A number of theorists are opposed to the counterconditioning model and favor a cognitive, or expectancy, interpretation of systematic desensitization. Valins and Ray (1967) have found that their subjects decreased in phobic behavior more than a control group if these subjects expected (by false heart rate) that they were not responding physiologically to phobic stimuli. Marcia, Rubin, and Efran (1969) have found that their placebo (positive expectancy) group was not significantly different in reduced fear than a traditional systematic-desensitization group. Olineau, Agros, Leitenberg, Moore, and Wright (1969) have found that subjects given systematic desensitization who expected to receive a "therapeutic procedure" showed a greater reduction in avoidance behavior than a group of subjects given systematic desensitization disguised as a procedure being employed in a study of physiological responses.

On the other hand, many investigators have failed to support the cognitive-expectancy model. Paul (1966) has found that his systematic-desensitization group improved significantly more than his placebo group, which was designed to control for nonspecific and expectancy factors. Lang et al. (1965) also have found that their placebo
group (designed to produce therapeutic expectancy) showed significantly less reduction in avoidance behavior than did their desensitization group. McGlynn and Williams (1970) gave three desensitization groups either neutral, positive, or negative suggestions about the effectiveness of the treatment and have found that the groups did not differ among themselves but that all groups did decrease in avoidance behavior. To further complicate the matter, Persely and Leventhal (1972) conclude that their results indicate "evidence for both counterconditioning and expectancy factors within the systematic desensitization technique [p. 417]."

Basically, the cognitive-expectancy model (Marcia, Rubin, & Efran, 1969) of desensitization attributes decreases in avoidance behavior mainly due to changes in the subjects' expectations regarding the phobic stimuli rather than to the conditions of antagonistic responses. To control for the nonspecific effects of being treated and for the effects of suggestion or expectancy, a placebo group was included in this study. The main purpose for this placebo (or nonspecific treatment group) was to hold constant the effects of simply being treated. This group was also given positive suggestions regarding the effectiveness of the placebo treatment to control for "cognitive expectancy," which may be inherent in the systematic-desensitization technique or in the anxiety-relief technique.
A no-treatment group was also included to control for the effects of the passage of time on the re-taking of the phobic measures.

Based on the findings and theoretical implications that have been discussed, the hypotheses for this investigation are

1. The anxiety-relief group will have significantly higher increase scores than the systematic desensitization group in the approach to the feared stimulus.

2. The anxiety-relief group will have a significantly greater decrease in subjective fear scores than the systematic-desensitization group.

3. The anxiety-relief group will have significantly higher increase scores than the pseudo-therapy placebo group in the approach to the feared stimulus.

4. The anxiety-relief group will have a significantly greater decrease in subjective fear scores than the pseudo-therapy placebo group.

5. The anxiety-relief group will have significantly higher increase scores than the no-treatment group in the approach to the feared stimulus.

6. The anxiety-relief group will have a significantly greater decrease in subjective fear scores than the no-treatment group.

7. The systematic-desensitization group will have significantly higher increase scores than the
pseudo-therapy placebo group in the approach to the feared stimulus.

8. The systematic-desensitization group will have a significantly greater decrease in subjective fear scores than the pseudo-therapy placebo group.

9. The systematic-desensitization group will have significantly higher increase scores than the no-treatment group in the approach to the feared stimulus.

10. The systematic-desensitization group will have a significantly greater decrease in subjective fear scores than the no-treatment group.

The 0.05 level of significance was selected to determine all significant differences.

Methods

Measures

Two sets of measures were taken in this study. The 85-item Fear Survey and Schedule (Wolpe and Lang, 1964) was used as a self-report measure for fear of snakes. The Snake Intimacy Test (Gaupp et al., 1972) was used as a behavioral measure for the avoidance of snakes. These measures were used both as screening criteria for snake-phobic subjects and as dependent variables in testing the efficacy of the various treatments.

Item number 64 (fear of harmless snakes) on the Fear Survey and Schedule was used to screen the snake-phobic
subjects and to serve as a self-report dependent variable. Subjects rated their degree of disturbance with harmless snakes on a 5-point scale ranging from not-at-all disturbed to very much disturbed.

The Snake Intimacy Test consists of 10 discreet approach steps arranged in ascending hierarchical order. In the presence of the experimenter, the subjects viewed the snake, a 28-inch king snake, from the door-way of the room. The behavioral tasks were taped. Answers to the subjects' questions were limited to informing the subjects that the snake was harmless. The snake was contained in a glass cage with a removable lid. The cage was placed on a table at the far end of the room. All subjects approached the snake in the same room and heard the same tape both before and after the treatment sessions.

Subjects were given taped instructions to perform the following behavioral tasks—only if they experienced no disturbance or anxiety in performing these tasks: (1) enter the room and look over at the snake; (2) go over to the table on which the snake's cage is sitting; (3) sit down in the chair next to the table; (4) put your hand on the outside portion of the cage next to the snake; (5) stand up, take the lid off the cage and look down at the snake; (6) put your hand over to a level with the top of the cage; (7) put your hand into the cage; (8) touch the snake; (9) pick the snake up a few inches within the
cage; (10) pick the snake up and out of the cage, and hold it. Each subject's behavioral-approach score, as measured by the last behavioral task completed, was recorded.

The identical measures were taken before and after the treatment procedures were administered.

Subjects

Ninety-two undergraduate students at North Texas State University were administered the Fear Survey and Schedule. Those subjects who scored high (a 4, "much," or 5, "very much," response) were scheduled to take the behavior avoidance test. Those subjects who scored lower than a 4 were given research credit and dismissed from the study.

Criteria for snake phobic subjects on the Snake Intimacy Test was based on data collected by Letendre (1972) with 95 female subjects and 58 male subjects. Subjects who fell at least one standard deviation below the mean in their respective sex groupings were chosen for this study. For the females, one standard deviation below the mean was 4.0, and, for the males, it was 6.3. All females who scored above 4, and all males who scored above 6 on the behavioral approach test were given research credit and dismissed from the study.

Snake-phobic subjects are defined in this study as those who report a "very much" or a "much" response to the fear of snakes on the Fear Survey and Schedule, and
those who score 4 or below (for females) and 6 or below (for males) on the Snake Intimacy Test. A total of 40 subjects were selected by these criteria and assigned (by matching subjective fear scores) to the various groups. Subjects were matched on the sex variable and the subjective rating variable in the four treatment groups. There were three males and seven females in each of the four groups. Twenty-eight females and 12 males were selected for this study.

**Apparatus**

In the anxiety-relief condition, a faradic shock was delivered from a Farrall Instruments "Behavior Modifier" Mark II shock apparatus. The amps pulsated at the rate of 14 beats per second.

The phobic stimuli were 15, 35mm color slides projected from a Kodak projector located behind and immediately to the left to the subject who viewed them. The slides were of snakes in various positions including pictures of snakes devouring rats. These snake slides had been previously rated (in terms of the degree of fear each slide elicited) by 42 raters. The entire procedure was automated by LeHigh Valley programming equipment.

A General Electric tape recorder was used in taping and presenting the information in the placebo-control group, the systematic-desensitization sessions, and the pretest and posttest behavior-approach steps.
Procedure

Within three days following the behavior-approach pretest, subjects were scheduled to report for the initial treatment sessions. The same experimenter was involved in administering the three treatment procedures as well as in the collecting of all pretest and posttest measures.

All of the subjects were exposed to five individual treatment sessions within a one-week period. Within one day following the treatments, posttest measures were taken for subjects treated that week.

The four groups were treated as follows:

Anxiety-Relief Therapy (AR).--In this group, subjects were exposed to completely automated anxiety-relief therapy. Electrodes were attached to the right forearm of the subject, and a midpoint between the subject's first perception of the shock stimulus and the tolerance threshold was calculated and recorded. This midpoint was used as the aversive stimulus for the individual subject for each session.

Each subject was then seated facing a screen upon which snake slides were projected. The snake slides had been arranged in hierarchical order from least fear eliciting to most fear eliciting. Electrodes were attached to the right forearm of the subject. The following instructions and rationale were taped and presented to each subject on the initial treatment day:
The method we will be using is called anxiety-relief therapy. This therapy utilizes the relief or relaxation following a mild electric shock. Pictures of feared objects, in your case snakes, will be shown to you during the relief period following the shock. A blank slide will be presented before and during the presentation of the shock. There will be no shock during the time the snake slide is shown. The theory is that the feared object will be paired with the relaxation and the fear will be counter-conditioned. The results of this therapy are, for the most part, undetermined.

Subjects were then instructed to give their attention to the screen that they were facing, and the automated treatment was started. A blank slide was presented to the subject for 13.5 seconds followed by a shock of 1.5 seconds administered to the right forearm. Immediately following the termination of the electric shock, a snake slide was automatically projected upon the screen, replacing the blank slide for 15 seconds. The blank slide then replaced the snake slide, and the same sequence was repeated automatically with the next snake slide in the hierarchy being shown following the shock. Each sequence of blank--shock--snake slide lasted 30 seconds and was immediately followed by the next sequence.

A total of 15 of these sequences with 15 different snake slides in hierarchical order were presented in each session. Sessions lasted 7.5 minutes with each subject receiving 15 shocks per session. Subjects were exposed to five treatment sessions. The same room was used for all subjects in this treatment group.
Standardized-automated-systematic desensitization (SSD).—Subjects in this group participated in automated systematic desensitization to a 20-item snake hierarchy of events. The hierarchy was compiled by the experimenter and was partially based on Wolpe and Lazarus' (1966) hierarchy of fear of specific objects. Treatment of this group followed Wolpe's (1958) procedure, with some exceptions.

The relaxation training instructions and the hierarchy items were pre-recorded, making the procedure completely automated. Also, a "standardized-systematic desensitization" procedure developed by Nawas et al. (1970) was used. With this procedure no instructions for anxiety signalling were given, and the items higher on the hierarchy were presented to the subjects more times for imagination. All subjects in this treatment group listened to the same relaxation tape and the same groups of items to imagine, covering the entire range of the hierarchy in five sessions.

Subjects were told to assume a comfortable position in a reclining chair, and they heard the following taped rationale on the initial treatment day:

The method of therapy we will be using is called systematic desensitization. This method utilizes training in progressive relaxation. Scenes of feared objects (in your case snakes) will be imagined following training in relaxation. The theory is that relaxation will be paired with thoughts of objects that you fear and the fear will be counter-conditioned. The results of this therapy are, for the most part, undetermined.
A taped muscle-relaxation procedure (Jacobson, 1938) was played for the first 20 minutes of each of the five sessions. Subjects then heard taped instructions to relax and to imagine two peaceful images similar to those listed by Wolpe and Lazarus (1966) as anxiety inhibitors. The peaceful scenes imagined were (a) "Imagine that on a calm summer's day you lie on your back on a soft lawn and watch the fleecy cumulus clouds move slowly overhead," and (b) "Imagine that near a river's bank you see a leaf moving erratically on the little waves." Each of these scenes were followed by a 15-second pause in the tape.

Following the presentation of these scenes, the subjects heard instructions to imagine the items on the snake hierarchy. A pause of 15 seconds followed the reading of each hierarchical item. This pause in the tape was followed by taped instructions for the subject to continue relaxing. Subjects continued to relax for 10 seconds before the next item was read.

The schedule of hierarchical presentations and the number of times they were presented by tape was as follows: On the first day, items 1-5 were presented twice each; on the second day, items 6-10 were presented twice each; on the third day, items 11-14 were presented three times each; on the fourth day, items 15-17 were presented three times each; and, on the fifth day, items 18-20 were presented four times each. Sessions lasted approximately 30 minutes.
All subjects heard the tapes in the same room and in the same chair. The experimenter was present only to turn the tape recorder on and off and to set up the next appointment with the subject.

**Placebo-control group, positive suggestion (PC).**--This treatment group was designed to control for the effects of being treated and for any positive expectancy which might occur as a result of having been treated in any way. Treatment consisted of a "rational" approach to overcoming the fear of snakes.

Subjects were told that a re-evaluation or a new learning experience would take place as a result of this treatment, and that all people who are afraid of snakes should benefit from this treatment.

Positive instructions were presented at the beginning of each of the five treatment sessions. The following instructions have been stated in part by Paul (1966) and were presented on tape to the subjects in this group:

The emotional reactions which you experience are a result of your previous experience with snakes, oftentimes leading to feelings of anxiety or tenseness that are really inappropriate. Generally, these reactions are like those engendered by any stressful situation, and your body reacts in such a way to prepare for either flight or fight. When your body reacts in this way, you can become flustered or mentally confused.

Since these reactions, like the ones you experience in connection with snakes, are largely the result of a low tolerance for this kind of stress, we can work to overcome these reactions
right here in this room by training you to work and think effectively under stress. The specific technique we will be using is called snake re-training, and it will reduce your anxiety by increasing your ability to function in a rational manner when you are around harmless snakes.

Following these positive instructions, taped lectures dealing with general information about snakes were presented to the subject. Information such as the benefits of snakes to man, distinguishing harmless snakes from poisonous snakes, specific types of harmless snakes, facts versus superstitions regarding snakes, et cetera were presented.

At the close of each session the group was told to "think about these fears on your own, and try to re-evaluate your fear of snakes." Sessions lasted approximately 20 minutes.

No-treatment control group (NT).--In this group pre-test and posttest measures were taken but no treatment of any kind was given during the one-week period.

After taking the pretest measures these subjects were re-scheduled to take posttest measures one week later.

Results

Subjective Fear Rating Criterion

Table 1 lists the pretest and posttest scores obtained by 40 subjects on item number 64 of the Fear Inventory Survey and Schedule (Wolpe and Lang, 1964). The raw scores listed are subjective ratings on a 5-point scale (1,
not-at-all; 5, very much) of each subject's degree of fear of harmless snakes. Pretest and posttest scores are listed in the same row for each subject in each corresponding treatment group.

TABLE 1
Raw Scores of Pretest and Posttest Subjective Ratings of Snake Fear

<table>
<thead>
<tr>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR</td>
<td>SSD</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
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<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

\(a\) AR-anxiety-relief treatment
\(b\) SSD-standardized-systematic desensitization
\(c\) PC-placebo-control group
\(d\) NT-no-treatment group

Inspection of Table 1 reveals that only one subject (in the placebo-control group) reported a not-at-all response to the fear of harmless snakes item after treatment was completed.

Table 2 presents the group means and standard deviations for pretest, posttest, and difference (between posttest and pretest) scores for the subjective fear of
snakes rating. The lower the score, the less degree of fear of snakes is reported.

**TABLE 2**

Means and Standard Deviations of Pretest, Posttest, and Difference Scores (Pretest Minus Posttest) for the Subjective Rating Criterion

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest Mean</th>
<th>Pretest Standard Deviation</th>
<th>Posttest Mean</th>
<th>Posttest Standard Deviation</th>
<th>Difference Score Mean</th>
<th>Difference Score Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR</td>
<td>4.50</td>
<td>0.53</td>
<td>3.40</td>
<td>1.08</td>
<td>1.10</td>
<td>0.88</td>
</tr>
<tr>
<td>SSD</td>
<td>4.50</td>
<td>0.53</td>
<td>2.60</td>
<td>0.84</td>
<td>1.90</td>
<td>0.99</td>
</tr>
<tr>
<td>PC</td>
<td>4.50</td>
<td>0.53</td>
<td>3.40</td>
<td>1.08</td>
<td>1.10</td>
<td>0.99</td>
</tr>
<tr>
<td>NT</td>
<td>4.50</td>
<td>0.53</td>
<td>4.30</td>
<td>0.68</td>
<td>0.20</td>
<td>0.42</td>
</tr>
</tbody>
</table>

Inspection of pretest mean scores indicate that the four groups were evenly matched on the degree of subjected fear reported.

To assess the efficacy of the treatments for the subjective rating criterion, an analysis of variance, repeated measures design for matched groups, was computed on the posttest scores. As may be seen in Table 3, the analysis yielded significant results ($F = 12.09$, $df = 9/30$, $p < 0.001$).
TABLE 3
Repeated-Measures Analysis of Variance of Subjective-Fear Rating Posttest Scores for All Groups

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subject</td>
<td>9</td>
<td>20.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Subjects</td>
<td>30</td>
<td>25.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A (Treatments)</td>
<td>3</td>
<td>14.48</td>
<td>4.83</td>
<td>12.09*</td>
</tr>
<tr>
<td>Residual</td>
<td>27</td>
<td>10.78</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>45.78</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.01

Individual comparisons of mean posttest scores for each group appear in Table 4. Tukey's range test was used for this purpose. The lower the score, the less degree of fear reported.

TABLE 4
Individual Mean Difference Comparisons of Posttest on the Subjective-Fear Rating Criterion

<table>
<thead>
<tr>
<th>Groups Compared</th>
<th>Ranked Means</th>
<th>Mean Difference</th>
<th>Tukey's Range Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT-SSD</td>
<td>4.3-2.6</td>
<td>1.7</td>
<td>0.767*</td>
</tr>
<tr>
<td>NT-PC</td>
<td>4.3-3.4</td>
<td>0.9</td>
<td>0.732*</td>
</tr>
<tr>
<td>NT-AR</td>
<td>4.3-3.4</td>
<td>0.9</td>
<td>0.672*</td>
</tr>
<tr>
<td>AR-SSD</td>
<td>3.4-2.6</td>
<td>0.8</td>
<td>0.732*</td>
</tr>
<tr>
<td>AR-PC</td>
<td>3.4-3.4</td>
<td>0.0</td>
<td>0.672</td>
</tr>
<tr>
<td>PC-SSD</td>
<td>3.4-2.6</td>
<td>0.8</td>
<td>0.672*</td>
</tr>
</tbody>
</table>

*p < 0.05

As Table 4 shows, the anxiety-relief-treatment group, the systematic-desensitization group, and the placebo-control
group each differed significantly (with less posttest subjective fear reported) from the no-treatment group. Also, the systematic-desensitization group's posttest mean score differed significantly from the anxiety-relief and placebo-control groups’ mean posttest scores. The systematic-desensitization group reported significantly less subjective fear of snakes than the anxiety-relief group and the placebo-control group, as evidenced by significantly lower mean posttest scores for the systematic-desensitization group. The anxiety-relief-treatment group did not differ significantly from the placebo-control group in subjective fear reported on the posttest.

Behavior Approach Criterion

Table 5 lists the pretest and posttest scores obtained by 40 subjects on the 10-point behavior approach test (Gaupp et al., 1972). The higher the score, the greater is the approach behavior.

Inspection of Table 5 reveals that three subjects in the systematic-desensitization group lifted the snake out of the cage (step 10) after five treatment sessions.
### TABLE 5
Raw Scores on Behavior-Approach Test Obtained by 40 Subjects

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR</td>
<td>SSD</td>
<td>PC</td>
</tr>
<tr>
<td>0</td>
<td>2 3 3 3</td>
<td>2 4 4 3</td>
</tr>
<tr>
<td>2</td>
<td>3 3 3 3</td>
<td>2 4 3 4</td>
</tr>
<tr>
<td>3</td>
<td>3 4 4 4</td>
<td>3 5 4 5</td>
</tr>
<tr>
<td>4</td>
<td>4 4 4 4</td>
<td>4 6 4 6</td>
</tr>
<tr>
<td>4</td>
<td>4 4 5 5</td>
<td>4 7 4 7</td>
</tr>
<tr>
<td>4</td>
<td>5 5 5 5</td>
<td>5 8 5 8</td>
</tr>
<tr>
<td>5</td>
<td>6 6 6 6</td>
<td>6 9 6 9</td>
</tr>
</tbody>
</table>

Table 6 presents the group means and standard deviations for pretest, posttest, and difference (between pretest and posttest) scores for the behavior approach test scores.

### TABLE 6
Means and Standard Deviations of Pretest, Posttest, and Difference Scores (Posttest minus Pretest) for the Behavior-Approach Test

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest Mean</th>
<th>Standard Deviation</th>
<th>Posttest Mean</th>
<th>Standard Deviation</th>
<th>Difference Score Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR</td>
<td>3.20</td>
<td>1.48</td>
<td>6.10</td>
<td>2.13</td>
<td>2.90</td>
<td>1.20</td>
</tr>
<tr>
<td>SSD</td>
<td>3.80</td>
<td>1.14</td>
<td>7.10</td>
<td>2.28</td>
<td>3.30</td>
<td>1.95</td>
</tr>
<tr>
<td>PC</td>
<td>4.10</td>
<td>0.99</td>
<td>5.00</td>
<td>1.63</td>
<td>0.90</td>
<td>0.88</td>
</tr>
<tr>
<td>NT</td>
<td>4.10</td>
<td>0.88</td>
<td>4.60</td>
<td>1.08</td>
<td>0.50</td>
<td>0.53</td>
</tr>
</tbody>
</table>
An analysis of variance on pretest scores indicates that the groups do not differ significantly on their approach behavior to the live snake ($F = 1.38$, df = 3/36, $p > 0.26$).

To assess the efficacy of treatments, an analysis of covariance for matched groups was computed using the pretest and posttest scores of all four groups, with the pretest as the co-variant (or control variable).

As may be seen in Table 7, the analysis of covariance yielded highly significant results ($F = 13.01$, df = 3/35, $p < 0.001$).

**TABLE 7**

Analysis of Covariance of Behavior-Approach Scores for All Groups

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>38</td>
<td>115.32</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>Within</td>
<td>35</td>
<td>54.52</td>
<td>1.56</td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>3</td>
<td>60.80</td>
<td>20.27</td>
<td>13.01*</td>
</tr>
</tbody>
</table>

*p < 0.001

Individual comparisons of mean scores for each group on the behavior approach test appear in Table 8. A Tukey's range test was used to compare differences among adjusted posttest mean scores of the four groups. The higher the score, the greater the mean approach to the feared stimulant.
TABLE 8

Adjusted Individual Mean Comparisons of Behavior-Approach Scores, Using Tukey's Test

<table>
<thead>
<tr>
<th>Groups Compared</th>
<th>Adjusted Posttest Means</th>
<th>Adjusted Mean Difference</th>
<th>Tukey's Range Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSD-NT</td>
<td>7.10-4.24</td>
<td>2.86</td>
<td>7.11*</td>
</tr>
<tr>
<td>SSD-PC</td>
<td>7.10-4.64</td>
<td>2.46</td>
<td>6.12*</td>
</tr>
<tr>
<td>SSD-AR</td>
<td>7.10-6.82</td>
<td>0.28</td>
<td>0.70</td>
</tr>
<tr>
<td>AR-NT</td>
<td>6.82-4.24</td>
<td>2.58</td>
<td>5.42*</td>
</tr>
<tr>
<td>AR-PC</td>
<td>6.82-4.64</td>
<td>2.18</td>
<td>6.42**</td>
</tr>
<tr>
<td>PC-NT</td>
<td>4.64-4.24</td>
<td>0.40</td>
<td>0.99</td>
</tr>
</tbody>
</table>

*p < 0.01

**p < 0.05

The Tukey's range test on adjusted mean posttest scores for the behavior-approach criterion indicates that the systematic-desensitization group and the anxiety-relief treatment group each differed significantly at the .05 level from both the placebo-control group and the no-treatment group. The mean increase in behavior approach was significantly greater for the systematic-desensitization group and the anxiety-relief group, when they were compared with either control group.

The adjusted-mean posttest score for the anxiety-relief group did not differ significantly from the adjusted-mean posttest score of the systematic-desensitization group. Also, the control groups did not differ significantly between each other on the behavior-approach criterion.
Discussion

Studies cited in the introduction of this paper have strongly suggested that systematic desensitization has been an effective technique in suppressing anxiety responses. The standardized systematic-desensitization procedure used in this study has also produced results equal to those of conventional techniques of systematic desensitization (Nawas et al., 1970). Relatively few controlled studies have tested the efficacy of anxiety-relief therapy. However, reported clinical applications of anxiety-relief therapy and several studies have produced results which warrant further investigation. The purpose of this study was to compare the outcomes of these two behavior therapies in an effort to determine the efficacy of anxiety-relief therapy.

The hypothesis that the group treated with anxiety-relief therapy would decrease more than the systematic-desensitization group on the rating of subjective fear was not confirmed. There was a significant change between the groups, but the mean subjective fear decrease was greater for the systematic-desensitization group. The hypothesis that the increase in the approach to the feared object would be greater for the anxiety-relief group was also not confirmed. No significant difference was found between the mean increases of the systematic-desensitization
group and the anxiety-relief group in the approach to the feared object.

The hypotheses that the changes in the systematic-desensitization group would be significantly greater than the changes in the no-treatment group were verified for both criteria. The hypothesis that the systematic-desensitization-group change in approach behavior would increase more than the placebo-group change in approach behavior was also confirmed. This hypothesis was also confirmed for the subjective-rating criterion, as there was a significant difference between the desensitization group and the placebo group in the decrease in subjective fear.

The hypotheses that the anxiety-relief change scores would be significantly greater than the no-treatment-change scores were confirmed for both criterion measures. The hypothesis that the anxiety-relief-change scores would be significantly greater than the placebo-change scores was confirmed for the behavior-approach criterion, but not for the subjective-rating criterion.

The greater decrease in subjective fear reported by the systematic-desensitization group may have been due to the fact that these subjects were more involved in the treatment procedure. The systematic-desensitization treatment sessions were longer than the anxiety-relief sessions, and the subjects in the systematic-desensitization
group were requested to perform more specific behaviors (i.e., tightening of muscles, learning to relax, imagining scenes) than the anxiety-relief subjects, who had only to sit in a chair and view slides. This distinction in treatment involvement may have introduced an intervening variable into the systematic-desensitization procedure which was not present in the anxiety-relief treatment.

Further speculation as to the cause of subjective rating differences leads to an examination of the manner in which the phobic stimuli was presented to the respective treatment groups. In the systematic-desensitization group there may have been a greater probability for sub-verbal conditioning to take place. Systematic-desensitization subjects imagined snake scenes while relaxed. Anxiety-relief subjects viewed slides during the relief period and were not requested to perform any sub-verbal behavior during the assumed counterconditioning portion of the treatment. The greater exposure to responding sub-verbally to the feared object while the subjects were relaxed may have produced the greater decrease in the verbal (written) account of fear of snakes. These assumptions would, of course, be difficult to prove, as the actual sub-verbal (imagination) behavior of the subjects would be impossible to measure objectively.

All treatment groups, including the placebo-control group, differed significantly (with higher mean changes)
from the no-treatment group in subjective fear decrease. This indicates that the fear reported by the subjects in the anxiety-relief group did decrease more than in a group that was not treated at all.

The decrease in subjective fear reported by the subjects in the placebo group was not significantly different from the decrease reported by anxiety-relief subjects. Subjects in the placebo group also reported significantly less fear than subjects in the no-treatment group. These findings lend some support to the view that positive expectancy of therapeutic change may aid in decreasing the amount of fear reported by subjects.

However, in terms of actual behavior approach to the phobic object, the subjects in the placebo group did not improve significantly when compared with the other groups. No significant difference was found between the placebo group and the no-treatment group in approach scores. Positive expectancy alone may not be effective enough to change approach behavior to a phobic stimulus.

An important finding of this investigation was that the systematic-desensitization group did not differ significantly in the approach to the feared object when compared with the anxiety-relief-treatment group. Both treatment groups increased in behavior approach significantly more than either control group did.
These findings present both theoretical and applied implications. The fact that the group means for the behavior-approach score did not differ would suggest that a similar learning process may have resulted from the two treatments. This investigation was not designed to assess the learning processes involved in these two treatments, but, from the results found, the theory of anxiety-relief conditioning by reciprocal inhibition cannot be discounted. Future research involving more controlled variables is needed to test the reciprocal-inhibition theory.

These findings also present implications for the future clinical applications of anxiety-relief therapy. Since anxiety-relief therapy did not produce greater changes in subjective fear reported or in approach to the feared object, it may be argued that the non-aversive treatment (systematic desensitization) should be used in the treatment of phobias. That is, an aversive procedure, such as anxiety-relief therapy, should not be applied in clinical cases until it has been found to produce better results than non-aversive treatments.

However, since anxiety-relief therapy has been found to increase approach behavior to phobic stimuli when compared with a no-treatment group, a placebo group, and a pseudo-conditioning group (Turnage & Wenrich, 1972), the procedure should not be completely disregarded. At the present time, non-aversive treatments that have been
shown to be effective, such as systematic desensitization, should be given first consideration in the treatment of phobic behavior. Anxiety-relief therapy should be used as a "last resort" when other therapies have failed to reduce anxiety in individual cases.

Further process research should be performed to determine the maximum effectiveness of the anxiety-relief technique. Variables within the treatment procedure such as timing, shock intensity, number of treatments, and phobic stimuli should be manipulated to determine the most adequate treatment plan. Future research should also determine the limit of the types of behavior that can be changed through the use of this technique.

The technique should also be compared with other treatments that have been found to be effective in reducing anxiety. Controlled outcome studies are needed to determine the efficacy of an aversive treatment in order to justify its clinical application.
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Appendix

Snake Hierarchy

1. You read a magazine article about the contributions of harmless snakes to the balance of nature. They eat insects, rodents, etc.

2. You see a picture of a small harmless grass snake in a magazine.

3. You see a picture of a large king snake in a magazine.

4. The word SNAKE.

5. You see a harmless snake on TV.

6. You see a rubber snake on the counter at the news stand.

7. You pick up the rubber snake.

8. You go for a ride in the country and see a snake that is high in a tree.

9. You are riding in your car and you see a large harmless snake on the highway.

10. You go to the zoo and see a large harmless snake in a cubicle.

11. You attend a show at an amusement park where a man allows several harmless snakes to wrap themselves around his body.

12. You get out of your car and walk towards an area where harmless grass snakes have been found in the foliage.

13. You walk into a room where your friend is holding a medium sized harmless snake.

14. He asks you if you would like to hold the snake.

15. He releases the snake and it crawls toward you.

16. The snake crawls up your chair and coils up on your lap.
17. You touch the snake and hold him in your hands.

18. Your friend brings you three other harmless snakes from his collection.

19. One harmless snake crawls up your left arm; one hangs across your shoulder and is touching your chest and back; one snake rests in your lap and another is crawling on your leg.

20. You can feel the cool clammy sensation of the snakes as they crawl all over your body.