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STIMULI ON RESULTING LEVEL OF
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A COMPARISON OF THREE METHODS OF PRESENTATION OF ANXIETY-ELICITING
STIMULI ON RESULTING LEVEL OF AUTONOMIC AROUSAL

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the
degree of

DOCTOR OF PHILOSOPHY

BY

ROBERT A. de CSIPKES

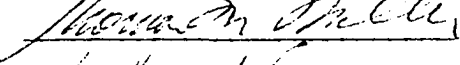
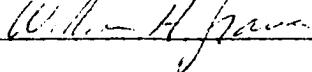
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APPROVED BY



DISSERTATION COMMITTEE

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R. A. de C.
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Three Methods of Presentation of Anxiety-Eliciting
Stimuli and Level of Autonomic Arousal

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Running Head: Effects of method of presentation on arousal

Abstract

This study investigates whether variations in method of presentation of anxiety items (experimenter's voice, experimenter's taped voice, subject's taped voice) will result in differences in autonomic arousal (as measured by self-report, galvanic skin response, cardiac rate, blood pressure). Ss were 24 Naval Academy midshipmen. The procedure involved (1) training in deep muscle relaxation, and (2) measuring arousal following the presentation of anxiety-eliciting stimuli. Statistical analysis indicated that the influence of method of presentation was significant for galvanic skin response and self-reported anxiety. Comparison of cell means showed that verbal presentations were more effective in eliciting autonomic arousal than taped presentations.

Three Methods of Presentation of Anxiety-Eliciting Stimuli and Level of Autonomic Arousal

Systematic desensitization has shown itself to be effective in numerous experimental and clinical investigations as a method of treatment designed to help overcome fear reactions to specific objects or situations (Bandura, 1969; Wolpe, 1973). With its effectiveness having been well documented, the current trend in research appears focused upon delineating the most efficient and effective time and technique parameters (Karlovy, 1974; Paul, 1966; Wolpe, 1973). One promising direction has been the use of tape-recorders. Recent research has indicated that tape-recorded instructions for relaxation training and for the presenting of standardized hierarchies have been effective in reducing anxieties associated with phobias (Denholtz, 1970; Donner and Guernsey, 1969; Kahn and Baker, 1968; Lang, 1964; Migler and Wolpe, 1967). Although treatment successes have been demonstrated for tape-recorded desensitization, there had not been any research which investigates whether this modification has had any positive or negative effects upon the basic systematic desensitization paradigm.

The degree to which an individual is able to visualize the imaginal anxiety stimulus appears to be positively related to overall treatment effectiveness and the generalization of treatment effects to real life (Bandura, 1969; Sherman, 1973). Further, it

has been suggested that differences in degree of visualization could explain why social phobias are less responsive to desensitization than are focused fears (Lang et al., 1970). Since visualization does appear to be an important variable within the desensitization process, this study will examine whether tape-recorded presentations of anxiety hierarchy items has an effect on the subject's ability to imagine the stimuli (as measured by differences in autonomic arousal).

The present study is an investigation of whether variations in method of presentation of anxiety hierarchy items (experimenter's voice, experimenter's taped voice, subject's taped voice) will result in differences in degree of autonomic arousal.

Method

Subjects

The subjects were 24 second-year students at the United States Naval Academy. They were randomly selected from the total number (N= 236) of second-year students who had scored six to nine (range= 1 to 10) on the anxiety scale of the 16 Personality Factors Test (Cattell and Eber, 1964). The subjects were all males with a mean age of 19.

Instruments

- (1) A reel to reel tape recorder, Wollensach model T 1600.
- (2) A 20 minute progressive muscle relaxation training tape copied verbatim from Krumboltz and Thoresen (1969).

(3) A galvanic skin response amplifier, Model 201, Bio-Physical Research Instruments Corporation. This equipment was calibrated prior to and throughout the course of the study.

(4) A dual channel recorder, Model 301, Texas Instruments Corporation.

(5) A standard blood pressure cuff and manometer.

(6) A stethoscope, modified with two additional feet of latex tubing (to facilitate measuring without disturbing the subject).

(7) A metal examining table with a 2 inch thick foam rubber pad. The table was adjusted in such a way that the subject's head would be supported in a slightly raised position.

Procedure

The research design employed in this study was the Simple Repeated Measures design (Kirk, 1968). Consequently, each subject was repeatedly exposed to each of the three levels of the treatment variable (experimenter's voice, experimenter's taped voice, subject's taped voice). Since it was thought that order of presentation of levels of the treatment variable would probably cause a confounding sequence effect, order was completely counterbalanced. The procedure required that the experimenter initially meet with the subjects in small groups and, then, later meet individually with each subject for two additional sessions.

Initial group session. Subjects were given an orientation concerning the study and were told what their participation

generally involved. Following this introductory briefing, the Fear Survey Schedule (Wolpe, 1973) was distributed to the members of the group; and they were instructed to fill it out. The purpose of this survey was to assist the experimenter in his task of identifying a relevant focused fear for each subject.

Initial individual session. At the beginning of this session, the experimenter and subject worked together to select and describe a stimulus item of moderate to high anxiety-eliciting potential associated with a previously designated focused fear. Once this was accomplished, the subject was asked to record that stimulus item on the tape recorder. The subject was then instructed to make himself comfortable on the table and was given taped instructions in deep muscle relaxation. Following this session and prior to the experimental session, the experimenter recorded the same stimulus item on the tape recorder.

Experimental session. Initially, the subject was asked to loosen any tight clothes, remove his shoes and make himself comfortable upon the examining table. At this point, the stethoscope was fastened to the subject's chest with adhesive tape, so as not to disturb him once he had become relaxed. He was then given the taped instructions in deep muscle relaxation. While continuing to relax following the relaxation instructions, the subject was attached to the other physiological measuring devices (galvanic skin response electrodes were slipped onto the index and ring fingers of his left hand; the blood pressure cuff was wrapped around his left

arm). Once the subject had resumed a relaxed state (as evidenced by a flattened galvanic skin response reading), the subject was presented the first of three levels of the treatment variable. Following the presentation and while the subject was continuing to imagine the stimulus item, the experimenter measured the three indices of autonomic arousal. Galvanic skin response was measured concurrently with cardiac rate for a 30 second interval. Systolic blood pressure was measured last due to the active nature of its measurement procedure. Following this measurement, the subject was instructed to relax and concentrate on a pleasant and peaceful scene. The other two presentations were made in the same manner. After the final presentation, the subject was asked to rank order the three methods of presentation with regard to level of anxiety or vividness of image. Lastly, the subject was debriefed, thanked for his participation and dismissed.

Results

Following the collection of data, individual measures were compiled and assigned to their respective levels of the treatment variable. Direct interpretation of raw scores was possible for all measures, with the exception of galvanic skin response. For that measure, the data consisted of a continuous recording of level of conductivity over 30 second intervals (range= 0.0 to 1.0). In order to provide a more interpretable measure, the level of conductivity was measured at 3 second intervals and then summed.

Consequently, each galvanic skin response score constitutes a cumulative index resulting from the addition of 10 recorded levels within a 30 second interval (maximum score= 10.00). Table 1 represents the means and standard deviations (SDs) which were computed from the raw data.

Place Table 1 about here

Next, a two-way analysis of variance (mixed model) was performed on the physiological measures of autonomic arousal and, for galvanic skin response, yielded significant differences ($F = 4.42$, 2/46 df, $p < .05$). The differences in heart rate and systolic blood pressure were found to be non-significant ($F = .59$ and $F = .60$, respectively). Since the galvanic skin response differences were found to be significant, the Geisser-Greenhouse Conservative F test was used to correct for a possible liberal alpha level resulting from the Repeated Measures design (Kirk, 1968). Despite this reduced degrees of freedom and its higher F score, the galvanic skin response differences continued to be significant at the .05 level.

Post hoc comparisons of cell means were conducted using the Tukey method to determine the influence of the various methods of presentation on galvanic skin response. Table 2 indicates mean comparisons as a function of method presentation. This analysis found the comparison between presentation by experimenter's voice

and the subject's taped voice to be significant ($t = 4.19$, 3/69 df, $p \leq .05$). Neither of the other comparisons were statistically significant.

Place Table 2 about here

The analysis of the subjects' ranking of type of presentation according to the extent of perceived autonomic involvement was accomplished by using the Friedman two-way analysis of variance by ranks (Kirk, 1968). This nonparametric analysis indicated significant differences for the rankings ($\chi^2_r = 6.71$, 2 df, $p \leq .05$). With this information and reference to Table 1, one is able to conclude that the experimenter's verbal presentation was ranked significantly more effective in inducing higher levels of self-reported anxiety than either of the taped presentations.

Discussion

These analyses appear to provide partial evidence for the enhanced effectiveness of actual verbal presentations of imaginal stimuli, in comparison to taped presentations, on the individual's ability to visualize that stimuli (as measured by degree of galvanic skin response). Two of the four indices of arousal employed in this study, i.e., galvanic skin response and self-report, were significantly influenced by variations of the treatment variable. More specifically, experimenter's verbal presentations of anxiety-eliciting stimuli resulted in greater levels on two indices of arousal than were found for the two

taped methods of presentation.

The results of this study appear to support the conventional form of systematic desensitization as more effective than the newer automated or taped versions. This study provides partial evidence that tape recorded presentations of anxiety hierarchy items are less effective than actual verbal presentations in eliciting autonomic responses to the stimuli. This decreased intensity of imagery could result in treatment failure, less generalization of treatment effects to real-life situations and may present specific problems in treating social fears. Although self-desensitization continues to be an appealing alternative due to certain practical considerations, such as reduction in amount of time spent with the client and subsequent increase in the number of clients that can be treated, these benefits seem to be accrued at a cost of apparent decreased effectiveness. According to the findings of this study, therapist presented imaginal stimuli is the more powerful and effective form of presentation and, given the relationship between intensity of imagery and successful desensitization, contributes to a more effective treatment package.

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TABLE 1

Means and Standard Deviations (SDs) of Measures of Autonomic
Arousal for Variations in Method of Presentation

Measure	Method of Presentation ^a					
	EV		ET		ST	
	Mean	SD	Mean	SD	Mean	SD
Galvanic Skin Response	2.93	2.67	2.08	2.71	1.41	1.36
Heart Rate	34.88	5.67	34.54	5.45	34.25	5.49
Blood Pressure	138.00	10.77	138.08	11.90	137.00	8.66
Self-Report	1.75	.80	2.21	.76	2.08	.70

^aEV= experimenter's voice, ET= experimenter's taped voice, ST= subject's taped voice.

TABLE 2

Mean Galvanic Skin Response as a Function
of Method of Presentation

Comparisons in Method of Presentation	
Experimenter's voice to Experimenter's taped voice	2.36
Experimenter's voice to Subject's taped voice	4.19*
Experimenter's taped voice to Subject's taped voice	1.83

*p $\leq$.05

APPENDIX A

Prospectus

A Comparison of Three Methods of Presentation of Anxiety-Eliciting
Stimuli on Resulting Level of Autonomic Arousal

CHAPTER I

Introduction

Systematic desensitization is a method of treatment designed to help a person overcome fear reactions to specific objects or situations. This approach to therapy has been shown to be effective in numerous experimental and clinical investigations. However, some research evidence seems to indicate that the effectiveness of this treatment package depends on the extent to which the imagined stimuli are experienced as comparable to the actual environmental stimuli. This study will investigate a variation of the usual systematic desensitization procedure which may enhance the individual's ability to visualize the imaginal, anxiety-eliciting stimuli (that is, to increase the extent of autonomic involvement).

Statement of the Problem

The purpose of this study is to ascertain whether variations in method of presentation of anxiety hierarchy items (experimenter's voice, experimenter's taped voice, subject's taped voice), within a laboratory analog of the systematic desensitization paradigm, will result in differences in degree of autonomic arousal. The dependent

variation in this study, autonomic arousal, will be measured by (1) the subject's self-report of arousal or anxiety and (2) several physiological measures of autonomic arousal. It is hypothesized that level of autonomic arousal will be significantly effected by variations in method of presentation of anxiety hierarchy items. More specifically, it is thought that the level of autonomic arousal will be greatest in the taped subject condition and least in the taped experimenter condition.

Limitations of the Study

1. Ideally, the dependent variable of this study would directly relate to treatment outcome. However, such a study might prove to be unwarranted, depending upon the nature of the results to be obtained by the present study. If the findings are in agreement with the hypothesized relationship, then, a more elaborate and extensive study, using objective evidence of treatment success, would indeed be appropriate.

2. Problems appear to be inherent in attempts at measuring fear or anxiety. According to Lang (1964), the concept of fear or anxiety is associated with three measurable behaviors--verbal, motor, and somatic. No one of these behaviors is fear and any particular sector may provide a false lead. Although all three sectors of the behavior should optimally be evaluated, this study will employ only two (verbal and somatic).

Significance of the Problem

Since the technique of systematic desensitization has proven to be an effective counseling strategy, it would seem to be a worthwhile endeavor to explore certain variations of the standard procedure. According to Paul (1966), "having established the effectiveness of systematic desensitization, future research may well focus upon delineating the most effective time and technique parameters (Paul, 1966, p. 154)." Such exploration may well result in the in the establishment of specific procedural modifications demonstrating enhanced therapeutic effectiveness.

Of particular interest to this study, is whether hearing one's own taped, verbal presentation of an anxiety-eliciting stimulus will result in enhanced visualization of that stimulus as evidenced by an increase in autonomic arousal above that level resulting from the usual form--the therapist's verbal presentation. The reason that one might suspect the existence of such a relationship is related to the research currently being conducted by Hosford (note 3). Initial findings appear to indicate that superior treatment successes have been achieved by using the client as his own model in learning new, more appropriate behavior. It is conjectured that perhaps this same influence may be found to operate within a systematic desensitization paradigm to enhance client arousal to anxiety stimuli and, thereby, result in increased treatment effectiveness.

If this influence is found to exist, then this modification could serve several functions. Obviously, enhanced visualization

would assist those individuals (approximately 10% according to Wolpe and Lazarus, 1966) who are unable to vividly visualize the threatening stimuli, or for whom imagined scenes fail to elicit emotional reactions. Further, it is felt that this increase in arousal-eliciting potential would directly influence effective transfer of treatment effects to real-life situations, since research evidence has shown that the more imagined treatment stimuli differ from their actual counterparts the greater will be the transfer decrements (Bandura, 1969). It would seem to follow that the more vivid the imagined stimuli, the more similar they are to their actual counterparts in the environment. Finally, Lang, Melamed and Hart (1970) have speculated that differences in visualization have caused persons with social phobias to be less responsive to desensitization than persons with the more focused phobias. If that view is correct, then enhanced autonomic involvement could result in more effective treatment for persons suffering from the less specific, social fears.

Definitions of Terms Used

Anxiety or fear. A complex pattern of responses characterized by subjective feelings of apprehension and tension accompanied by or associated with physiological activation or arousal.

Anxiety hierarchy. A graded list of anxiety-eliciting, imaginal stimuli, typically falling along the primary or secondary stimulus generalization gradient of the most intense stimulus complex operative in the client's current life environment.

Phobia. A term applied to anxiety which is elicited by environmental stimuli which do not involve the real possibility of danger or pain.

Reciprocal inhibition. The concept that "ability of given stimuli to elicit anxiety will be permanently weakened if a response antagonistic to anxiety can be made to occur in the presence of anxiety-eliciting stimuli so that it is accompanied by a complete or partial suppression of the anxiety responses (Wolpe, 1958, p. 71)."

Relaxation training. A much abbreviated version of Jacobson's (1938) progressive relaxation training. Essentially, the client is taught to relax by successively tensing and releasing gross muscle groups throughout the body on instruction from the counselor, while aided by suggestions of warmth, relaxation and calmness. A sample of the instructions to be used in this study can be found in Krumboltz and Thoresen (1969).

Systematic desensitization. A treatment package which systematically includes: (1) relaxation training; (2) construction of anxiety hierarchies; and (3) desensitization proper--the graduated pairing, through imagery, of anxiety-eliciting stimuli with the relaxed state.

Hypotheses

1. It is hypothesized that level of autonomic arousal will be significantly effected by variations in method of presentation of anxiety hierarchy items (that is, that there will be significant differences in mean scores between levels of the treatment variable).

2. It is hypothesized that level or magnitude of autonomic arousal will be greatest in the taped subject level of the treatment variable and least in the taped experimenter level.

CHAPTER II

Related Literature

Since this study is concerned with a modification of the systematic desensitization technique, the review of the literature will begin with a discussion of that treatment package. Essentially, this method, which was developed by Joseph Wolpe, stems from the conception that neuroses are persistent, unadaptive habits that have been conditioned. It logically follows that if this conception is correct, then the overcoming of a neurosis should involve the deconditioning or undoing of the relevant habit patterns. In other words, recovery from neuroses is achieved by applying the learning process in a reverse direction (i.e., whatever undesirable behavior has been learned may be unlearned or extinguished). This is precisely the function of systematic desensitization.

Anxiety is viewed as the most characteristic and common feature of neurotic habits. Wolpe (1958) defines anxiety in terms of the over-reactivity of the sympathetic division of the autonomic nervous system. According to Wolpe, "there is persuasive evidence, both experimental and clinical, that the great majority of neuroses are fundamentally conditioned autonomic responses (Wolpe, 1958, p. 9-10)." Simply stated, this method of treatment attempts the substitution of parasympathetic responsiveness (muscle relaxation) for sympathetic responsiveness (anxiety). It is assumed that these processes are physiologically antagonistic.

The essence of systematic desensitization is the principle of reciprocal inhibition. This concept was extrapolated from the work of Sherrington (1906). Wolpe's definition of this term is as follows:

The ability of given stimuli to evoke anxiety will be permanently weakened, if a response antagonistic to anxiety can be made to occur in the presence of anxiety-evoking stimuli so that it is accompanied by a complete or partial suppression of the anxiety responses (Wolpe, 1958, p. 71).

Since this treatment approach is largely based on the classical conditioning viewpoint, the focus of therapy is upon the environmental stimuli which elicit anxiety responses. These stimuli are considered phobic, since the possibility of real danger or pain is viewed as remote. Consequently, the resulting patterns of avoidance behavior are in most instances unadaptive.

The result of this theorizing is a treatment package which includes: (1) training in deep muscle relaxation; (2) construction of hierarchies of anxiety-eliciting stimuli; and (3) desensitization proper--the graduated pairing, through imagery, of anxiety-eliciting stimuli with the relaxed state. The form of muscle relaxation chosen for use in treatment was an abbreviated version of Jacobson's progressive relaxation training (1938). Imaginal stimuli, instead of the actual, environmental stimuli, were paired with relaxation. In most cases, the utilization of real stimuli within the

desensitization session would prove most difficult and impractical. The need for the use of real stimuli seems unnecessary, according to Lang (1969), since these imaginal stimuli are capable of eliciting the same autonomic responses resulting from exposure to the actual stimuli.

Research evidence appears to show that the role of relaxation in the desensitization process is an important one. Van Egeren (1970) reports that, with repeated exposure to phobic stimuli, relaxed subjects' reactions progressively decreased in magnitude, while unrelaxed subjects' reactions remained much the same. Also, Van Egeren, Feather and Hein (1971) have observed that relaxed subjects exhibit less decrease in skin resistance when exposed to phobic stimuli than did those subjects who were not relaxed. Similar findings have been obtained in numerous other clinical and experimental studies (Davison, 1968; Farmer and Wright, 1971; Paul, 1969; Rachman, 1965; and Wolpe and Flood, 1970). In general, it has been shown that more improvement is obtained by those subjects who receive the whole desensitization sequence of procedures, than those subjects who either receive relaxation training without scene presentations or to whom scenes are presented without relaxation. However, other studies (Crowder and Thornton, 1970; Waters, McDonald and Koresko, 1972; and Yulis, Brahm, Charnes, Jacard, Picota and Rutman, 1975) have seriously questioned whether training in muscle relaxation is an essential factor. The results of these studies found that the elimination of relaxation from the systematic desensitization

procedure did not significantly influence the effectiveness of the treatment. At this time, the issue appears to remain open and unresolved.

In addition to the factor of relaxation, it is also very important from the counterconditioning point of view, that the visualized, imaginal scenes elicit those physiological responses associated with anxiety or fear. According to Bandura (1969), "individuals who are unable, for one reason or another, to visualize threatening stimuli vividly, or for whom imagined scenes fail to evoke emotional reactions will most likely derive little benefit from an exclusively cognitive form of counterconditioning treatment (Bandura, 1969, p. 473)." Sherman (1973) states that "the effectiveness of the imaginal desensitization methods depends on the extent to which the imagined situations are experienced as comparable to the real ones (Sherman, 1973, p. 74)." The emotional reactions which need to be experienced are indicated by "increases in muscular tension and cardiac rate, and a sharp decrease in skin resistance (Lang, 1964, p. 48)."

The specific cause-effect relationship between systematic desensitization and reduction in intense phobic reactions seems solidly established by numerous experimental investigations (Davison, 1968; Lang, 1964, Note 4; Lang and Lazovik, 1963; Lang, Lazovik and Reynolds, 1965; Moore, 1965; and Paul, 1966, 1967). According to Paul (1966), "having established the effectiveness of systematic desensitization, future research may well focus upon

delineating the most effective time and technique parameters (Paul, 1966, p. 154)." In agreement with Paul's statement, this study proposes to investigate a specific variation of the usual, systematic desensitization procedure.

Wolpe and Lazarus (1966) have indicated that only 10 per cent of all patients are unable to project themselves into the imagined, anxiety-generating situations in a way that evokes something of the reality of the situations and a corresponding amount of autonomic arousal. They do, however, admit that the 10 per cent figure may be inaccurate and that the true percentage may be considerably larger. Meyer (Note 5) has presented data which tends to corroborate this higher percentage. Since the elicitation of autonomic arousal in conjunction with exposure to imagined, anxiety hierarchy items is viewed as essential to treatment outcome, a variation of the usual procedure which results in enhanced anxiety arousal or visualization would seem most beneficial. It is the purpose of this study to explore such a variation in procedure.

In addition to benefiting those persons who are unable to sufficiently visualize the imaginal stimuli (and thereby unable to evoke adequate autonomic arousal), such a variation may also result in enhanced treatment effects for the estimated 90 per cent who are able to adequately project themselves into the imagined situations. Bandura (1969) states that the more the imagined stimuli differ from their actual counterparts in the environment, the greater will be the transfer decrements. According to Sherman (1973), "there may be

differences between imagery and reality which limit the amount of improvement that transfers from the imagined to the real situations (Sherman, 1973, p. 74)." It would seem to logically follow that the greater the extent of autonomic arousal to the imaginal stimuli, the greater the generalization of treatment effects to real life. As autonomic arousal increases, the perceived similarity between imagined and actual stimuli also increases. Therefore, by increasing the autonomic arousal potential of anxiety hierarchy items, one should affect the enhancement of therapeutic success.

Further, it is thought that this enhanced visualization could result in increased treatment success with those persons who suffer from the less specific social phobias. Several studies (Lader, 1967; and Lader, Gelder and Marks, 1967) have demonstrated that persons with social phobias are less responsive to desensitization than are persons with more focused fears (such as, snakes and spiders). A proposed explanation of this finding expressed by Lang, Melamed and Hart (1970) is as follows:

It is possible that true differences in visualization (the adequacy of CS representation and/or the extent of autonomic involvement) distinguish these two populations. One is prompted to speculate that the ability to visualize stimuli facilitates habituation. It may reflect an assimilation of the stimulus in the sense that Sokolov (1963) describes--that is, the matching of an input to a previously formed neuronal model, which then is less

likely to prompt an orienting (or defensive?) response on a subsequent presentation. In any event, it seems reasonable to identify both visualization and habituation as important interacting variables in the desensitization process (Lang, Melamed and Hart, p. 233).

Since visualization is considered to be an important factor in the desensitization process, it would therefore seem to be of value to explore whether certain procedural variations might result in the enhancement of this factor.

Of course, the importance of relaxation and autonomic arousal to the desensitization procedure depends on the assumption that reciprocal inhibition is, in fact, the principle at work in this treatment package. Numerous critics have voiced the opinion that instead of reciprocal inhibition, it is actually some other factor or process which is responsible for the obtained success of this form of therapy. Valins and Ray (1967) have proposed the view that the actual basis for desensitization may be the changing of subject's cognitions concerning their internal reactions to the feared objects rather than an emotional reconditioning. This particular hypothesis was generated from a study which had some success in desensitizing snake phobic subjects. Their subjects received false heart-rate feedback while observing slides of snakes. Unfortunately for the cognitive view, more recent and better controlled replications of this study have failed to demonstrate significant treatment effects (Kent, Wilson and Nelson, 1972; and Sushinsky and Bootzin,

1970). Other criticism focuses on whether the success of desensitization depends on the factor of therapeutic instructions (Leitenberg, Agras, Barlow and Oliveau, 1969; and Oliveau, Agras, Leitenberg, Moore, and Wright, 1969). These two studies found that subjects who believed that they were being therapeutically desensitized improved significantly more than did those subjects who thought they were involved in a non-therapeutic, physiological study. Once more, the findings were not replicated in a subsequent study (McGlynn, Reynolds and Linder, 1971). Finally, other peripheral factors which have appeared in the literature and have been proposed as being important to the desensitization process are suggestion (Efram and Marcia, Note 2; McGlynn and Williams, 1970) and real-life exposure (Sherman, 1972). According to Wolpe (1973), "these studies should be viewed with considerable reserve since they deal with relatively weak fears (Wolpe, 1973, p. 102)." It appears that the challenges which have been leveled at the concept of reciprocal inhibition have yet to seriously threaten its firm position as the explanation for what actually takes place during desensitization.

The specific variation of the systematic desensitization procedure which will be the concern of the present investigation is the method of presentation of the imaginal stimulus. The usual procedure involves the therapist verbally presenting the stimulus situation to the resting client. The variation of interest in this study, which will be compared to the usual method, involves the

client audiotaping the stimulus item; and then later, hearing this taped version of the item during the desensitization session. One could reasonably question, why this variation in procedure is thought to bring about the enhanced visualization of stimulus items (and therefore, increase the extent of autonomic involvement).

To begin with, Wolpe and Lazarus (1966) have indicated that a common procedure employed in those cases when the client is unable to vividly imagine the stimulus situation is to have him describe, in his own words, what he imagines. This deliberate training of the capacity to more realistically imagine was described by Phillips (1971). In support of this procedure, Darwin and McBrearty (1969) found that significantly more progress was obtained for speech phobic subjects, if the subjects described the scenes rather than merely imagining them. If this procedure is effective as a remedial strategy, then perhaps it should be built into the usual structure.

Another reason for suspecting that the visualization of anxiety-eliciting stimuli may be enhanced by hearing one's own verbal presentation is related to the research currently being conducted by Hosford (Note 3) on the subject of "self as model." The initial data, which has been generated in this area of study, seems to indicate that significant treatment gains have been achieved by using the client as his own model in learning new and more desirable behavior. These results are consistent with Bandura's findings in social learning which have indicated that similarity between

observer and model in such characteristics as age, sex, race and socio-economic status promotes imitative learning (Bandura, 1969). It follows that a highly similar model is the person, himself. Perhaps, this same increased effectiveness can be found to operate within the systematic desensitization paradigm and that hearing one's own verbal presentation of a feared situation will enhance the ability to visualize that stimulus situation.

Since this study concerns itself with a variation of the conventional systematic desensitization procedure, it seems appropriate to comment upon other variations of the basic process which have already been formulated or proposed. Since Wolpe (1973) states that the essence of systematic desensitization is (1) the presentation of graded imaginal stimuli to (2) a relaxed subject, this discussion will only include those variations which do not remove or substitute for those two basic elements. According to Wolpe (1973), "there are ways of carrying it out that reduce the amount of time the therapist has to spend with his patients, and increase the number he can see. One way is to automate some of the procedures so that they do not need the physical presence of the therapist. The second consists of desensitizing patients with similar neurotic fears in groups (Wolpe, 1973, p. 141-142)."

With regard to automated or self-desensitization, Lang (1964) was the first to demonstrate that this process could be accomplished by a machine. He used two tape recorders, controlled by the subject,

to overcome snake phobias. One of the tape recorders carried the hierarchy items, while the other contained the relaxation instructions. In a follow-up study, Migler and Wolpe (1967) employed a single, specially modified tape recorder to treat a public speaking phobia. In this study, the subject recorded his own hierarchy items and relaxation instructions and successfully desensitized himself in his own home. Similarly, Kahn and Baker (1968) devised a phonograph recording which could be used at home for any type of hierarchy. Finally, Denholtz (1971) has described in detail the home use of tape recorders for both relaxation training and the presentation of hierarchy items. Since it has already been shown that successful desensitization has occurred when subjects have tape recorded their own hierarchy items, it is now appropriate to consider what influence this change has caused? More specifically, has it enhanced or taken away from the subject's ability to visualize the imaginal stimuli?

The other variation which Wolpe addressed himself to was group desensitization. On this subject, Wolpe (1973) has stated that "if several patients suffer from the same phobia, it is reasonable to expect that, after having been trained to relax, they might be desensitized simultaneously, even if the slopes of their hierarchies are not identical, provided that the therapist ensures that each scene has ceased to evoke anxiety in every patient before proceeding to the next scene (Wolpe, 1973, p. 144-145)." Numerous therapists

have reported successful treatment in group settings for a variety of phobias (Cohen and Dean, Note 1; Donner and Guernsey, 1969; Donner and Wolpe, 1971; Ihli and Garlington, 1969; Paul and Shannon, 1966; and Robinson and Suinn, 1969). Interestingly, Donner and Guernsey (1969) reported success when using an automated technique within the group setting. In a one year follow-up study, Donner (1970) found that the gains had been maintained. It would appear that both of these economical variations are not only successful in and by themselves, but rather can also be combined to effect further treatment enhancement.

Now, with regard to the dependent variable, this study is interested in or requires a measure of anxiety or fear behavior. As was previously mentioned, Lang (1969) conceptualizes anxiety or fear as being associated with three measurable behaviors: verbal, motor, and somatic. No one of these behaviors is fear. According to Lang (1969), "the somatic sector of fear behavior is betrayed by alterations in respiration, cardiac rate, and blood pressure, and by a decrease in skin resistance and an increase in electromyographic levels (Lang, 1969, p. 41)." Perhaps as important as degree of or alterations in reactivity are the well organized, individual patterns of autonomic responses to stress (Lacey, 1950). Further, it has been shown that the autonomic effects that accompany deep relaxation are contrary to those of anxiety. Jacobson (1938, 1940) has demonstrated that pulse rate and blood pressure are diminished by deep muscle relaxation. Also, later studies (Clark, 1963; and Wolpe,

1964) found that skin resistance increases and respiration becomes slower and more regular during relaxation. This antagonistic relationship between anxiety and relaxation is in accordance with the basic assumptions of the systematic desensitization approach. In this study, the dependent variables will include the verbal and somatic components of fear behavior (subject's self-report or rating and several physiological measures).

In summary, this study will investigate the effect of a variation in the systematic desensitization procedure upon the resulting level of autonomic arousal. The research question which this study will attempt to answer is whether the influence of hearing one's own, audiotaped presentation of an anxiety hierarchy item will result in enhanced visualization of the imaginal stimulus. If such an influence were found to exist, this variation could prove beneficial to those persons who are unable to visualize imagined stimuli under the usual procedures, clients who suffer from the less specific, social phobias and might also provide an overall increase in treatment effects due to greater perceived similarity between the imagined and actual anxiety situation. This study will solely concern itself with increases in autonomic arousal. However, if the resulting data support the present hypothesis, then a follow-up study would be warranted. Such a study would experimentally investigate whether increases in autonomic arousal potential will result in greater treatment effectiveness in comparison to the usual procedure.

CHAPTER III

Procedure and ConclusionsSource of Data

The subjects (Ss) for this study will be non-psychiatric patients or staff volunteers at the National Naval Medical Center in Bethesda, Maryland. Prior to selecting the Ss, the Fear Survey Schedule (Wolpe, 1973, p. 283-286) will be distributed to the total number of available Ss. In filling out this fear inventory, each volunteer will check off those fears which he experiences that do not involve the real possibility of danger or pain (a phobia). The Ss will then be grouped according to those phobias which they have listed. Whichever phobia is listed most often will be selected and used in this study. The Ss, a total of 12, will be randomly selected from the total number of individuals listed for that particular phobia.

Basic Design

	T ₁ *	T ₂ *	T ₃ *	
S ₁	-	-	-	T ₁ = Experimenter's voice
S ₂	-	-	-	T ₂ = Experimenter's taped voice
"	-	-	-	T ₃ = Subject's taped voice
"	-	-	-	
"	-	-	-	* order of treatments completely counterbalanced
S ₁₂	-	-	-	

Method of Collecting Data

The research design to be employed in this study is the Simple Repeated Measures Design (Kirk, 1968). Each S will be repeatedly exposed to each of the three levels of the treatment variable (experimenter's voice, experimenter's taped voice, subject's taped voice). Since it is thought that order of presentation of levels of the treatment variable would probably cause a confounding sequence effect, order will be completely counterbalanced.

The experimenter (E) will be uninformed concerning the study's hypotheses in an effort to avoid experimenter bias. The procedure will require the E to individually meet with each S on two separate occasions. The initial meeting will involve (1) general instructions and orientation concerning subsequent participation and physiological apparatus; (2) instructions in deep muscle relaxation (Wolpe and Lazarus, 1966); (3) selection of a stimulus item of moderate to high anxiety-eliciting potential; and (4) the S taping the stimulus item. The second session will include (1) the S being attached to the physiological apparatus; (2) instructions given in deep muscle relaxation; and (3) being presented each of the three levels of the treatment variable. Between each presentation of a stimulus item, the S will be given additional suggestions in relaxation. Following the final presentation or trial, the S will be asked to rank order the different methods of presentation with regard to the level of anxiety which was experienced. Lastly, the physiological measures (GSR, cardiac rate, and blood pressure) will be recorded.

Organization and Analysis of Data

The resulting data, four indices of autonomic arousal, will be collected for each S and analyzed by the two-way, mixed effects, Analysis of Variance (ANOVA). The breakdown of variation and degrees of freedom are as follows:

<u>Source of Variation</u>	<u>Degrees of Freedom</u>
Treatment Variable	$(k-1) = 2$
Subject Variable	$(n-1) = 11$
Error Variable	$(k-1)(n-1) = 22$
Total	$(kn-1) = 35$

A common problem which is encountered whenever using the Simple Repeated Measures design is the almost certain probability of violating an assumption of the mixed effects ANOVA (that is, compound symmetry of the variance and covariance matrix). The resulting effect of such a violation is an extremely liberal alpha level. In an effort to correct for this liberal alpha level, the Geisser-Greenhouse Conservative F Test will be employed in the analysis (Kirk, 1968).

With regard to the measure of the dependent variable involving the subject's ranking of levels of the treatment variable according to the extent of resulting autonomic involvement, a nonparametric analysis of variance method will be used. Namely, the Friedman two-way Analysis of Variance by ranks will be employed to analyze whether significant differences were obtained, between levels of the treatment variable, on the subjects' rank ordering (Kirk, 1968).

The statistical null hypothesis (that there are no differences between levels of the treatment variable) will be tested at the .05 significance level. If the null hypothesis is accepted on all measures of the dependent variable, then this will be interpreted to mean that variations in method of presentation does not differentially influence level of autonomic arousal. However, if the null hypothesis is rejected, at the .05 significance level on measures of the dependent variable, then it would indicate that variations in method of presentation of anxiety-eliciting stimuli does differentially influence level of autonomic arousal. In this case, appropriate post hoc comparisons of cell means, while controlling for the alpha level, will be computed to ascertain which levels of the treatment variable are significantly different.

Conclusions

If the statistical analysis of the data derived from this study indicates significant differences between levels of the treatment variable on measures of the dependent variable, then this will indicate that variations in method of presentation of anxiety-eliciting stimuli, within a laboratory analog of the systematic desensitization paradigm, results in differences in autonomic arousal. Further, if degree of autonomic arousal is greatest for the Ss taped voice level of the treatment variable, this would confirm the research hypothesis and indicate the effectiveness of "self as a model" within systematic desensitization. If the data

does, in fact, support this hypothesis, then a follow-up study aimed directly at experimentally establishing whether this increase in autonomic arousal potential will result in greater treatment effectiveness in comparison to the usual procedure would be warranted.

However, if the statistical analysis of the data indicates no significant differences between levels of the treatment variable on measures of the dependent variable, then this will indicate that variations in method of presentation of anxiety-eliciting stimuli, within the systematic desensitization paradigm, does not result in differences in autonomic arousal.

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APPENDIX B

Fear Inventory

The items in this questionnaire refer to things and experiences that may cause fear or other unpleasant feelings. Write the number of each item in the column that describes how much you are disturbed by it nowadays.

	Not at All	A Little	A Fair Amount	Much	Very Much
1. Noise of vacuum cleaners					
2. Open wounds					
3. Being alone					
4. Being in a strange place					
5. Loud voices					
6. Dead people					
7. Speaking in public					
8. Crossing streets					
9. People who seem insane					
10. Falling					
11. Automobiles					
12. Being teased					
13. Dentists					
14. Thunder					
15. Sirens					
16. Failure					

	Not At All	A Little	A Fair Amount	Much	Very Much
17. Entering a room where other people are already seated					
18. High places on land					
19. Looking down from high buildings					
20. Worms					
21. Imaginary creatures					
22. Strangers					
23. Receiving injections					
24. Bats					
25. Journeys by train					
26. Journeys by bus					
27. Journeys by car					
28. Feeling angry					
29. People in authority					
30. Flying insects					
31. Seeing other people injected					
32. Sudden noises					
33. Dull weather					
34. Crowds					
25. Large open spaces					
36. Cats					
37. One person bullying another					

	Not At All	A Little	A Fair Amount	Much	Very Much
38. Tough looking people					
39. Birds					
40. Sight of deep water					
41. Being watched working					
42. Dead animals					
43. Weapons					
44. Dirt					
45. Crawling insects					
46. Sight of fighting					
47. Ugly people					
48. Fire					
49. Sick people					
50. Dogs					
51. Being criticized					
52. Strange shapes					
53. Being in an elevator					
54. Witnessing surgical operations					
55. Angry people					
56. Mice					
57. Blood a--human b--animal					
58. Parting from friends					

	Not At All	A Little	A Fair Amount	Much	Very Much
59. Enclosed places					
60. Prospect of a surgical operation					
61. Feeling rejected by others					
62. Airplanes					
63. Medical odors					
64. Feeling disapproved of					
65. Harmless snakes					
66. Cemeteries					
67. Being ignored					
68. Darkness					
69. Premature heart beats (missing a beat)					
70. Nude men (a) Nude women (b)					
71. Lightning					
72. Doctors					
73. People with deformities					
74. Making mistakes					
75. Looking foolish					
76. Losing control					
77. Fainting					
78. Becoming nauseous					
79. Spiders					

	Not At All	A Little	A Fair Amount	Much	Very Much
80. Being in charge or responsible for decisions					
81. Sight of knives or sharp objects					
82. Becoming mentally ill					
83. Being with a member of the opposite sex					
84. Taking written tests					
85. Being touched by others					
86. Feeling different from others					
87. A lull in conversation					

APPENDIX C

Relaxation Instructions

O.K. just settle back in the chair and relax as best as possible. Take a few deep breaths and begin to feel yourself let go.... Now extending both arms straight out, clench your fists more and more tightly as I count up toward 5...1...2...3...good...4...relax. Just let your arms drop wherever they will and begin to appreciate the difference between the feelings of tension, which you felt a few seconds ago, and the feelings of relaxation in your hands and arms now.... Now let's concentrate on the muscles in your forearms, extending both arms straight out once again only this time push forward with your hand...1...2...3...4...hold it...now, relax. Just let your arms go up and concentrate on the warm, tingling feelings of relaxation spreading throughout your forearms...O.K., fine, let's concentrate now on the muscles in your upper arms. To do this, bend both arms at the elbow and flex your biceps, more and more as I count toward 5...1...2...3...4...relax. Attend to the heavy, warm feelings associated with relaxation as they spread downward throughout your arms right to the tips of your fingers.... Let's concentrate now on the muscles in your forehead. Wrinkle up your forehead (or frown) by raising your eyebrows...1...2...more and more...3...4..., now do the opposite of tension and relax.... Just let all the muscles in your forehead smooth out and become smoother and smoother...O.K. Let's work on the area surrounding your eyes and nose. Close your eyes more and more tightly as I

count up toward 5...1...2...3...feel the tension...4...relax....

While keeping your eyes closed, just enjoy the soothing calm feeling in your eyes, similar perhaps to that which you feel when closing your eyes after reading for a long period of time.... Now, let's work on the area surrounding your lips, cheeks and jaw...and draw the corners of your mouth back further and further, try and get that ear to ear grin...1...2...3...4...relax, just let your jaw hang loose...appreciate the feeling of relaxation.... Now, grit your teeth and feel the tenseness in your throat muscles get greater and greater as I count up toward 5...1...2...3...4...relax ...just let your neck hang loose, let it relax at whatever position it feels most comfortable...as you continue to relax further and further, notice how your breathing has become more and more regular.... Good...now, let's concentrate on your shoulder muscles, go ahead and shrug your shoulders and try and touch your ears...1...2...3...good...4...relax, let your shoulders slump and attend to the warm, tingling feelings as they spread throughout your shoulders and connect up with the relaxation in your arms... let the tingling feeling spread throughout your arms right to the tips of your fingers.... Now, go ahead and arch your back more and more as I count up toward 5...1..2...3...4...hold it...now, relax, let your whole body just slump back into the chair...let the chair support the weight of your body, just let your whole body relax further and further...O.K. let's concentrate now on your stomach muscles more and more as I count up to 5...1...2... 3...4...hold it...now relax, just let your stomach muscles go...

remember, each time you breathe out your stomach muscles relax... and each time you breathe in this relaxation begins to spread throughout your entire body...further and further...notice how you're breathing freely and deeply, freely and deeply.... Let's shift our attention now to the muscles in your thighs...straighten out both your legs and bend both your legs and bend your toes back toward your head, feeling the tension in your thighs...1...2...3 ...more and more...4...relax, let your legs drop and attend to the difference in this large muscle group between the feelings of tension and now the feelings of relaxation...a warm, tingling feeling spreading throughout your legs.... Once again, go ahead and straighten out both your legs only this time bend your toes away from your head, tensing your calf muscles...1...2...3...4...now, relax...no more tension at all now, nothing but relaxation... enjoy the calm, soothing feeling of relaxation as it spreads right to the tip of your toes.... In order to help you relax even further, I'm going to mention the various muscle groups you've been tensing and relaxing, only this time don't tense them, simply relax them further and further...try and get that extra bit of relaxation in each muscle group as I mention it...your forehead... the area around your eyes and nose...your lips, cheeks and jaw... just begin to feel a wave of relaxation spreading downward across your facial muscles...let this wave continue to spread downward through your neck muscles...across your shoulders...down through

your arms right to the tips of your fingers...across your chest
and down your back...into your stomach muscles...notice how your
breathing becomes more and more regular as the waves of relaxation
continue downward through your thighs...and calves...right to the
tips of your toes.

APPENDIX D

Brief Orientation

I will be asking you to imagine a specific scene or object that you have indicated by your response on the inventory causes you some degree of concern or anxiety. I will ask you to imagine this scene or object in three different ways and will measure the amount of anxiety which you generate. I will be measuring your electrical conductivity, pulse rate, and blood pressure. Prior to and in between each presentation of the anxiety scene, I will ask you to relax and imagine pleasant thoughts.

The procedure I have just described will be done tomorrow. Tonight, I will show you the equipment, give you instructions in relaxation, and generally get you ready for tomorrow evening's session. Do you have any questions?

APPENDIX E

Analysis of Variance Tables

Galvanic Skin Response

Source	df	SS	MS	F
Between Treatments	2	27.75	13.88	4.42*
Between Subjects	23	246.33	10.71	
Interaction	46	144.44	3.14	
Total	71	418.52		

*p $\leq$.05

Blood Pressure

Source	df	SS	MS	F
Between Treatments	2	17.40	8.70	.60
Between Subjects	23	7,315.30	318.06	
Interaction	46	662.60	14.40	
Total	71	7,995.30		

Heart Rate

Source	df	SS	MS	F
Between Treatments	2	4.69	2.34	.59
Between Subjects	23	2,029.44	88.24	
Interaction	46	181.04	3.94	
Total	71	2,215.17		

APPENDIX F

Raw Data

Subject	Galvanic Skin Response			Blood Pressure		
	EV	ET	ST	EV	ET	ST
1	1.4	.2	.4	142	142	144
2	3.4	.3	.0	152	148	152
3	4.0	.0	.2	130	126	128
4	1.0	.8	.9	130	128	128
5	3.4	1.4	1.6	148	144	138
6	1.8	1.6	.7	130	126	128
7	4.0	1.0	2.3	142	144	138
8	.3	1.8	1.1	148	144	138
9	5.8	9.5	5.7	138	142	140
10	1.0	.6	.8	134	130	132
11	9.5	1.2	5.0	120	112	122
12	3.0	.8	1.9	138	138	140
13	5.3	.3	.2	156	154	152
14	.8	1.0	1.0	142	144	142
15	1.5	4.9	1.9	138	136	132
16	7.4	1.6	1.2	118	124	120
17	1.1	2.2	1.1	128	130	134
18	1.0	2.5	.6	146	148	138
19	2.7	1.8	1.2	123	132	138
20	1.5	5.9	1.7	136	140	138
21	.3	.0	.9	128	122	126
22	9.1	10.0	2.5	135	138	142
23	.8	.0	1.0	156	158	150
24	.2	.4	.0	154	164	148

Raw Data

Subject	Heart Rate			Ranking		
	EV	ET	ST	EV	ET	ST
1	46	43	47	2	3	1
2	33	32	35	1	2	3
3	39	31	37	1	3	2
4	25	25	26	3	2	1
5	33	31	30	1	2	3
6	32	29	28	3	2	1
7	38	36	36	3	1	2
8	32	31	30	1	3	2
9	36	42	37	1	3	2
10	32	33	31	3	1	2
11	32	30	29	2	3	1
12	39	40	39	1	3	2
13	51	50	48	1	2	3
14	34	34	35	1	3	2
15	38	37	41	3	2	1
16	38	33	33	1	2	3
17	28	29	31	1	3	2
18	31	35	29	3	1	2
19	37	33	35	3	1	2
20	38	41	38	1	2	3
21	35	36	35	1	3	2
22	35	30	32	2	1	3
23	27	37	28	1	3	2
24	28	31	32	1	2	3