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SYSTEMATIC DESENSITIZATION AS A COUNTER-CONDITIONING PROCESS [1]

GERALD C. DAVISON

State University of New York at Stony Brook

Systematic desensitization, demonstrated in both clinical and experimental studies to reduce avoidance behavior, entails the contiguous pairing of aversive imaginal stimuli with anxiety-competing relaxation. If, as is widely assumed, the efficacy of the procedure derives from a genuine counterconditioning process, a disruption of the pairing between graded aversive stimuli and relaxation should render the technique ineffective in modifying avoidance behavior. This hypothesis was strongly confirmed: significant reduction in avoidance behavior was observed only in densensitization Ss, with none occurring either in yoked Ss for whom relaxation was paired with irrelevant stimuli or in yoked Ss who were gradually exposed to the imaginal aversive stimuli without relaxation. Other theoretical issues were raised, especially the problem of transfer from imaginal to actual stimulus situations.

Recent years have witnessed increasing application of the systematic desensitization procedure, as developed by Wolpe (1958), to the modification of a wide range of neurotic disorders. In this therapeutic method the client is deeply relaxed and then instructed to imagine scenes from a hierarchy of anxiety-provoking stimuli. Initially he is asked to imagine the weakest item in the list and, if relaxation is unimpaired, is gradually presented incremental degrees of aversive stimuli until eventually he is completely desensitized to the most upsetting scene in the anxiety hierarchy.

In numerous publications, both Wolpe (e.g., 1952, 1958) and other clinical workers (e.g., Geer, 1964; Lang, 1965; Lazarus, 1963; Lazarus & Rachman, 1957; Rachman, 1959) have claimed a high degree of success in eliminating diverse forms of anxiety disorders by means of this therapeutic technique.

These clinical claims of efficacy find some support in recent laboratory investigations conducted under more controlled conditions and with more objective assessment of therapeutic outcomes (e.g., Lang and Lazovik, 1963; Lang, Lazovik, & Reynolds, 1965; Lazarus, 1961; Paul, 1966; Paul & Shannon, 1966). Although results from these experiments have confirmed the effectiveness of systematic desensitization, they do not provide direct information on the relative contributions to the observed outcomes of the different variables in the treatment procedure (e.g., relaxation, graded exposure to aversive stimuli, temporal contiguity of stimulus events). Moreover, the learning process governing the behavioral changes has not been adequately elucidated. There is some suggestive evidence from Lang et al. (1965) that extensive contact with an *E*, along with relaxation training, does not effect behavior change. However, one can raise questions about the suitability of their control for relaxation, inasmuch as *S*s in this condition began imagining snake-aversive items, but were then led away from this theme by means of subtle manipulation of content by *E*. It is possible that this imaginal snake avoidance may have counteracted the nonspecific effects built into the control.

Wolpe's (1958) theoretical formulation of the desensitization process as "reciprocal inhibition" is based on Hull's (1943) drive-reduction theory of classical conditioning, a fatigue theory of extinction ("conditioned inhibition"), and Sherrington's (1906) concept of reciprocal inhibition, whereby the evoca-

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tion of one reflex suppresses the evocation of other reflexes. The conditions which Wolpe (1958) specified for the occurrence of reciprocal inhibition were succinctly stated in his basic principle:

> 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, the bond between these stimuli and the anxiety responses will be weakened [p. 71].

This statement appears indistinguishable from Guthrie's (1952) view of counterconditioning, according to which notion the elimination of a response can be achieved by eliciting a strong incompatible response in the presence of cues that ordinarily elicit the undesirable behavior: "Here . . . the stimulus is present, but other responses are present shutting out the former response, and the stimulus becomes a conditioner of these and an inhibitor of its former response [p. 62]." Wolpe, in fact, used the terms "reciprocal inhibition" and "counterconditioning" interchangeably, but clearly indicated a preference for the former in view of his inferences about the neurological process accounting for the observed changes in behavior. However, aside from the fact that he has as yet provided no independent evidence for the existence of reciprocal inhibition at the complex behavioral level that he is dealing with, one must be wary of basing a neurological hypothesis, albeit an ingenious one, upon a behavioral system which, itself, has been shown to have serious shortcomings (Gleitman, Nachmias, & Neisser, 1954; Kimble, 1961; Lawrence & Festinger, 1962; Mowrer, 1960; Solomon & Brush, 1956).

At the present time, it appears both unnecessary and premature to "explain" behavioral phenomena in terms of an underlying neural process whose existence is inferrable solely from the very psychological data which it is invoked to explain. It appears to this writer more fruitful to stay closer to the empirical data and to conceptualize the process of systematic desensitization in terms of counterconditioning, according to which the neutralization of aversive stimuli results from the evocation of incompatible responses which are strong enough to supersede anxiety reactions to these stimuli (cf. Bandura, in press).

PROBLEM

In view of the fact that the behavioral outcomes associated with systematic desensitization are assumed to result from counterconditioning, evidence that such a process does in fact occur is particularly essential (cf. Breger & McGaugh, 1965). To the extent that desensitization involves counterconditioning, the contiguous association of graded anxiety-provoking stimuli and incompatible relaxation responses would constitute a necessary condition for fear reduction. It is possible, however, that the favorable outcomes produced by this method are primarily attributable to relaxation alone, to the gradual exposure to aversive stimuli, or to nonspecific relationship factors. The present experiment was therefore designed to test directly the hypothesis that systematic desensitization involves a genuine counterconditioning process.

The *S*s were individually matched in terms of strength of their snake-avoidance behavior and assigned to one of four conditions. For one group of *S*s (desensitization), a graded series of aversive stimuli was contiguously paired in imagination with deep muscle relaxation, as in the standard clinical technique. The *S*s in a second group participated in a "pseudodesensitization" treatment that was identical to the first procedure except that the content of the imaginal stimuli paired with relaxation was essentially neutral and completely irrelevant to snakes. This group provided a control for the effects of relationship factors, expectations of beneficial outcomes, and relaxation per se. A third group (exposure) was presented the same series of graded aversive items, but in the absence of deep relaxation. This condition served as a control for the effects of mere repeated exposure to the aversive stimuli. A fourth group (no treatment) participated only in the pre- and posttreatment assessments of snake avoidance.

In order to ensure comparability of stimulus events, *S*s in the pseudodesensitization and exposure groups were *yoked* to their matched partners in the desensitization group, whose progress determined the number of

treatment sessions, the duration of each session, the number of stimulus exposures per session, and the duration of each exposure.

Within 3 days following the completion of treatment, all *Ss* were tested for snake avoidance as well as for the amount of anxiety accompanying each approach response.

On the assumption that the temporal conjunction of relaxation and anxiety-provoking stimuli is essential for change, it was predicted that only *Ss* in the desensitization condition would display significant decrements in avoidance behavior, and would also be superior in this respect to *Ss* in the three control groups.

METHOD

Subjects

The *Ss* were 28 female volunteers drawn from introductory psychology courses at a junior college. Students who reported themselves very much afraid of nonpoisonous snakes were asked to assist in a study investigating procedures for eliminating common fears. In order to minimize suggestive effects, the project was presented as an experiment, rather than as a clinical study, and no claims were made for the efficacy of the procedure to be employed. To reduce further the development of strong expectation of beneficial outcomes, which might in itself produce some positive change, *E* was introduced as a graduate student rather than as an experienced psychotherapist. To some extent, the results from all the experiments cited above might have been confounded by these variables.

Pre- and Posttreatment Assessments of Avoidance Behavior

These assessments were conducted by an *E* (E_1) who did not participate in the treatment phases of the study and had no knowledge of the conditions to which *Ss* were assigned. The avoidance test was similar to that employed by Lang and Lazovik (1963) except for several important changes that were introduced in order to provide a more stringent and sensitive test of the efficacy of the various treatment procedures. First, whereas Lang and Lazovik used essentially a 3-item test, the present behavioral test consisted of 13 items requiring progressively more intimate interaction with the snake (e.g., placing a gloved hand against the glass near the snake, reaching into the cage and touching the snake once, culminating with holding the snake barehanded for 30 sec.). Second, rather than obtaining a single overall estimate of felt anxiety following the entire approach test, the examiner in the present study asked *S* to rate herself on a 10-point scale following the successful performance of each task. Third, the examiner stood at all times not closer than 2 ft. from the cage, whereas the tester in Lang and Lazovik's study touched and held the snake before requesting an *S* to do so. Evidence that avoidance behavior can be reduced through observation of modeled approach responses (Bandura, Grusec, & Menlove, 1967) suggests that the behavioral changes obtained by Lang and Lazovik may reflect the effects of both vicarious extinction and counterconditioning via systematic desensitization.

Any *S* who, on the pretreatment assessments, succeeded in touching the snake barehanded was excluded from the study. Eligible *Ss* were matched individually on the basis of their approach behavior and then assigned randomly to the different treatment conditions so as to constitute "clusters" of equally avoidant *Ss* across groups. Initially it had been planned to include an equal number of matched *Ss* in the no treatment control group. However, since preliminary findings, as well as data reported by Lang and Lazovik (1963), revealed virtually no changes in nontreated controls, it was decided to enlarge the size of the three treatment conditions. Therefore, eight *Ss* were assigned to each of the three treatment groups, while the nontreated control group contained four cases. The experimental design is summarized in Table 1.

Treatment Procedures

The treatment sessions were conducted in a room other than the one in which the avoidance behavior was measured. The *Ss* in conditions employing relaxation training reclined in a lounger, whereas for *Ss* in the exposure group the chair was set in an upright position to minimize the development of relaxed states.

Relaxation paired with graded aversive stimuli (systematic desensitization). During the first session, these *Ss* received training in deep muscular relaxation by means of a 30-min. tape recording consisting of instructions to tense and to relax alternately the various muscle groups of the body, interspersed with suggestions of heaviness, calm, and relaxation. This procedure, used earlier by the author (Davison, 1965b), is based on Lazarus' (1963) accelerated training in Jacobsonian relaxation and is very similar to the technique used by Paul (1966).

In the second session *Ss* ranked 26 cards each describing snake scenes in order of increasing aversiveness, for example, "Picking up and handling a toy snake," "Standing in front of the cage, looking down at the snake through the wire cover, and it is moving around a little," "Barehanded, picking the snake up, and it is moving around." The desensitization procedure, modeled after Lazarus (1963), Paul (1966), and Wolpe (1961), was administered in a standardized fashion, with a criterion of 15 sec. without signaling anxiety on each item. (For specifics of the procedure, see Davison, 1965a.) A maximum of nine sessions, each lasting about 45 min., was allowed for completing the anxiety hierarchy.

Relaxation paired with snake-irrelevant stimuli (pseudodesensitization). The *Ss* assigned to this group received the same type and amount of

TABLE 1

SUMMARY OF EXPERIMENTAL DESIGN

Group	Pretreatment assessment (E_1)	Treatment procedure (E_2)	Posttreatment assessment (E_1)
Desensitization[a]	Avoidance test with anxiety self-reports	Relaxation paired with graded aversive stimuli	Avoidance test with anxiety self-reports
Pseudodesensitization[a]	Same	Relaxation paired with snake-irrelevant stimuli	Same
Exposure[a]	Same	Exposure to graded aversive stimuli without relaxation	Same
No treatment[b]	Same	No treatment	Same

[a] $N = 8$.
[b] $N = 4$.

relaxation training as *Ss* in the above-mentioned group. Similarly, in the second session they also ranked 26 stimulus items, except that the depicted scenes were entirely unrelated to snakes. Because of the widespread belief that exploration of childhood experiences may be important in alleviating objectively unrealistic fears, it was decided to employ descriptions of common childhood events, which *Ss* were asked to rank chronologically. Some of the items were essentially neutral in content ("You are about age six, and your family is discussing where to go for a ride on Sunday afternoon, at the dinner table."), while the others had mild affective properties ("You are about five years old, and you are sitting on the floor looking sadly at a toy that you have just broken."). The use of generic content thus made it possible to use snake-irrelevant stimuli without reducing the credibility of the treatment procedure.

As in the desensitization condition, *Ss* were deeply relaxed and asked to imagine vividly each scene presented by the *E* until told to discontinue the visualization. Each *S* in this condition, it will be recalled, was yoked to her matched partner in the desensitization group, whose progress defined the number of treatment sessions, the length of each session, as well as the number and duration of each imaginal exposure. Thus, *Ss* undergoing pseudodesensitization received the same number and duration of pairings during each session as their desensitization mates, with the important exception that snake-irrelevant stimuli were contiguously associated with relaxation.

Exposure to graded aversive stimuli without relaxation (exposure). The *Ss* in this group were administered the same series of snake-aversive stimuli in the same order and for the same durations as determined by their respective partners in the desensitization group to whom they were yoked. However, exposure *Ss* received no relaxation training (hence, had one session less with *E*), nor did they engage in anxiety-competing relaxation while visualizing the aversive situations. Because of the yoking requirements, on those occasions when *Ss* signaled anxiety, they were instructed to maintain the images until *E* asked them to discontinue. Cooperation in this obviously unpleasant task was obtained through friendly but cogent reminders that such visualization was important for the experimental design.

No treatment group. The *Ss* assigned to this group merely participated in the assessments of avoidance behavior at the same time as their matched partners in the desensitization condition.

TABLE 2

CHANGES IN SNAKE-APPROACH BEHAVIOR DISPLAYED BY SUBJECTS IN EACH OF THE TREATMENT CONDITIONS

Matched cluster	Condition			
	Desensitization	Pseudodesensitization	Exposure	No treatment
1	3	2	2	0
2	3	−1	0	—
3	6	0	−1	−1
4	5	1	−5	0
5	0	1	2	—
6	6	8	1	0
7	12	0	0	—
8	7	1	1	—
M	5.25	1.50	0.0	−0.25

RESULTS

Table 2 presents the change scores in approach behavior for each *S* in each of the eight matched clusters.

Between-Group Differences

Because of the unequal number of *Ss* in the no treatment group, these data were not included in the overall statistical analysis. Two-way analysis of variance of the change scores obtained by the three matched treatment groups yielded a highly significant treatment effect ($F = 6.84$; $p < .01$).

Further, one-tailed comparisons of pairs of treatment conditions by t tests for correlated means revealed that *Ss* who had undergone

systematic desensitization subsequently displayed significantly more snake-approach behavior than *Ss* in either the pseudodesensitization group ($t = 2.57$; $p < .01$), the exposure group ($t = 3.60$; $p < .005$), or the no treatment control group ($t = 3.04$; $p < .01$). The pseudodesensitization and exposure groups did not differ significantly in approach behavior from the no treatment controls (t's = .92, .21, respectively), nor did they differ from each other.

Within-Group Differences

Within-group changes in avoidance behavior were evaluated by t tests for correlated means. Results of this analysis likewise disclosed that only *Ss* in the desensitization condition achieved a significant reduction in avoidance behavior ($t = 4.20$; $p < .005$).

Performance of the Criterion Behavior in Posttreatment Assessment

If the desensitization treatment does, in fact, involve a genuine counterconditioning process, then one would expect to find relationships between factors that are known to affect the conditioning process (e.g., number of aversive stimuli that have been neutralized) and degree of behavioral change. In this connection, of the eight *Ss* in the desensitization group, five completed their anxiety hierarchies within the allotted nine sessions. It is of interest to note that four of these five *Ss* performed the terminal behavior at the posttreatment assessment, whereas not a single *S* whose desensitization had to be terminated before all anxiety items had been successfully neutralized was able to hold the snake barehanded. Moreover, no *S* in the exposure or no treatment groups performed the terminal behavior, and only one out of the eight pseudodesensitization *Ss* attained the criterion performance.

Anxiety-Inhibiting Function of Relaxation

The *Ss* in both the desensitization and exposure conditions had been instructed to signal to *E* by raising their index finger whenever a particular imagined scene aroused anxiety. Since *Ss* in these two groups were matched for the order, number, and duration of stimulus exposures, any differences in the frequency of anxiety signaling provide suggestive evidence for the efficacy of relaxation in counteracting the development of emotional arousal during systematic desensitization (but see methodological problem raised in Discussion below).

The *Ss* in the desensitization group signaled anxiety on 27% of the stimulus presentations, whereas the corresponding figure for the exposure group was 61%. This highly significant difference ($t = 3.30$; $p < .01$, two-tailed test) not only furnishes an independent check on the relaxation training, but also attests to the anxiety-inhibiting capabilities of relaxation procedures.

Relationship between Anxiety Decrements and Approach Behavior

All *Ss* except those in the first cluster rated the degree of emotional disturbance that they experienced during the successful performance of each task in the pre- and posttreatment assessments. Since all but one *S* in the desensitization treatment surpassed their initial approach performance, it is possible to obtain a measure of anxiety decrement at the point at which *Ss* were unable to proceed any further during the pretreatment assessment. Thus, for example, an *S* who, on the first test, went so far as to look down at the snake with the wire cover drawn back and reported an anxiety rating of 9, but subsequently performed this same task with an anxiety rating of 2, would receive a decrement score of 7 points. These self-report data were analyzed in order to determine whether desensitization, in addition to increasing approach behavior, also reduces the degree of emotional disturbance accompanying the overt responses.

Except for one *S* who exhibited no behavioral change and reported a 1-point increase in anxiety, the remaining six cases all showed decreases, the mean decrement being 3.28. The t value for the correlated differences is 3.31, significant beyond the .04 level, two-tailed test.

It will be recalled that some *Ss* in the pseudodesensitization group showed small but nonsignificant increases in approach behavior (Table 2). These *Ss* also displayed some decrease in anxiety ($M = 2.67$), but not of a statistically significant magnitude ($t = 1.76$).

A within-group correlational analysis for *Ss* in the desensitization condition further revealed that the magnitude of anxiety decrement is highly predictive of the degree of increase exhibited by *Ss* in approach behavior. The product-moment correlation obtained between these two measures is $r = .81$, significant beyond the .05 level. This strong relationship indicates that *Ss* who experienced the greatest amount of anxiety reduction also showed the most behavioral improvement.

Anxiety Accompanying Strong Approach Responses

Although *Ss* who had undergone systematic desensitization exhibited highly significant improvement in overt approach to the snake, it is evident from the data that the bold approach responses performed in the posttest were accompanied by considerable anxiety, ranging from 4 to 10 on the 10-point self-report scale, with a mean of 7.75. These findings, which are consistent with results obtained by Lang and Lazovik (1963) and Lang et al. (1965), will be discussed later.

DISCUSSION

The results of the present study provide strong support for the hypothesis that behavioral changes produced by systematic desensitization reflect a counterconditioning process. This is shown in the finding that only *Ss* for whom aversive stimuli were contiguously associated in imagination with the anxiety-competing response of relaxation (i.e., *Ss* in the desensitization group) displayed significant reduction in avoidance behavior; this reduction was also significantly greater than the nonsignificant changes observed in the pseudodesensitization, exposure, and no treatment control groups. The fact that *Ss* who were merely exposed to the aversive stimuli, and those for whom relaxation was paired with snake-irrelevant stimuli, showed no significant changes in snake avoidance indicates that neither graded exposure alone nor relaxation and expectations of beneficial effects were determinants of the outcomes yielded by the desensitization treatment. Moreover, the desensitization–no treatment comparison replicates Lang and Lazovik (1963), while the desensitization–pseudodesensitization comparison provides some manner of confirmation of Lang et al. (1965).

In evaluating the treatment involving mere exposure to the graded aversive stimuli, it should be noted that, in order to control for duration of visualization, *Ss* were often required to continue imagining a scene after they had signaled anxiety. It is possible that, had *Ss* been allowed to control their own exposures to the aversive items, they might have produced some extinction of fear. In a pilot study by the author (Davison, 1965b), considerable extinction was observed when *Ss* controlled their own exposures to aversive stimuli. In comparison, it should be pointed out that Davison's experiment, as well as the earlier observations of Grossberg (1965), Herzberg (1941), and Jones (1924), used actual rather than symbolic stimuli. Nonetheless, it would be of considerable interest and importance to determine whether self-controlled exposure to aversive stimuli in imaginal form also effects significant reduction in avoidance.

In addition, this issue of forced versus self-controlled exposure necessitates caution in interpreting the finding that desensitization *Ss* signaled anxiety significantly less often than their matched and yoked exposure mates. This difference may be due not only to the anxiety-competing properties of deep muscular relaxation, but also to the aversive nature of being unable to perform a response that will remove one from a fearful situation (cf. Mowrer & Viek, 1948).

Suggestive evidence was obtained indicating that the increased approach behavior of the desensitization group was due to a decrease in anxiety; that is, the actual avoidance gradient seems to have been lowered to allow for more approach. While performing on the posttreatment assessment the most difficult behavior encountered at the pretreatment assessment, desensitization *Ss* rated themselves as significantly less anxious; furthermore, a high positive and significant correlation was found in this group between decrements in self-reported anxiety and amount of overt behavioral improvement. These findings are consistent with the anxiety-avoidance paradigm of Mowrer (1940, 1947) and Miller (1948), as well as with theories of psychopathology based on animal learning

experiments (Dollard & Miller, 1950; Mowrer, 1950)—all of which at least implicitly form the basis of Wolpian behavior therapy. According to this general view, avoidance responses are mediated by a secondary drive of fear; to the extent that a treatment method successfully reduces this fear, formerly inhibited approach responses will become manifest with the reduction of fear.

However, this anxiety-reduction analysis of the data is subject to several qualifications. First, questions can be raised as to the validity of self-report data on a numerical scale as a measure of anxiety (cf. Martin, 1961). Asking a naive *S* to rate herself on a scale from 1 to 10 may be making undue demands for rather fine discriminations among degrees of emotional arousal. A second problem is that *Ss* rated their anxiety *after* they performed a given behavior. In order to infer the role of fear in inhibiting a given behavior, a logical requirement is that such measures be taken before or during the behavior. Although *Ss* had been asked to rate the anxiety they were experiencing while performing the behavior, it is impossible to estimate the effect of actually performing the behavior on their self-reported ratings. A third consideration is of a theoretical nature. The experiments of Solomon and Wynne (1954) and Wynne and Solomon (1955) raise doubts about a straightforward interpretation of avoidance behavior as mediated by covert fear responses. Indeed, the data reported in the present study are amenable to at least one alternative explanation, namely, that anxiety and avoidance responses are *both* conditioned to the aversive stimuli, therefore being correlated classes of responses but not necessarily causally related. Systematic desensitization, then, may be reducing both components of avoidance behavior. Indeed, some suggestive evidence for the partial independence of anxiety and avoidance is the fact that *Ss* characteristically experienced high emotional arousal while successfully executing the terminal approach response, even after having completed their anxiety hierarchies. Unfortunately, these data, it will be seen below, may also be considered in support of the anxiety-avoidance hypothesis.

Limitations of Systematic Desensitization

Having confirmed that systematic desensitization significantly reduces avoidance behavior, and having provided evidence that an actual process of counterconditioning underlies these effects, it would seem valuable at this point to examine both the practical and theoretical limitations of the technique.

The practical limitations concern levels of relaxation achieved, the clarity of aversive images, and the signaling of anxiety. In the present study, as in clinical uses of the procedure, extensive reliance was placed on *Ss*' self-reports. It is clear that the outcome of any desensitization study will greatly depend on how satisfactorily these problems are dealt with.

Perhaps more intriguing are the theoretical limitations. It will be recalled that desensitization *Ss* experienced considerable anxiety while performing the terminal behavior or approach responses high in the graduated series of tasks during the posttreatment assessment. Inasmuch as five of eight *Ss* in this group had been successfully desensitized in imagination, their anxiety reactions in the posttreatment assessment situation raise an interesting theoretical question regarding transfer effects.

One would expect, on the basis of the principle of stimulus generalization (Kimble, 1961), that the degree of transfer of counterconditioning effects from one stimulus situation to another is determined by the number of common elements. According to Guthrie's (1952) notion, for example, a complex stimulus (like a snake) consists of a finite number of stimulus elements, each of which can be attached to only one molecular fear response at any given time. The desensitization procedure, as the present author has heuristically viewed it, operates in two ways to render a given molar stimulus incapable of arousing the molar response of fear. First, by beginning with the weakest items of an anxiety hierarchy one is presumably taking a very small sample of the "snake-object population of stimulus elements." Since this limited "amount of snake" elicits a limited "amount of fear," an incompatible response can be made dominant over the minimal fear response. This is why, second, deep muscular re-

laxation responses are induced prior to the introduction of the small dose of aversive stimuli. It is in this fashion that one "alienates" the small sample of fear stimuli from the limited number of molecular fear responses.

When a given anxiety item has been neutralized (defined as visualizing it for 15 sec. without signaling anxiety), another sample from the population of fear stimuli is presented, the incompatible relaxation response being set against that part of the total fear response which would ordinarily be elicited by the sample of fear stimuli. This process continues up the anxiety hierarchy until all items have been successfully desensitized.

When viewed in this fashion, the process of systematic desensitization would not be expected to effect complete transfer from the imaginal to the real-life situation. For, even though an *S* succeeds in imagining the various anxiety items without becoming anxious, the facts remain that: (*a*) The visualization is unlikely to involve all the stimulus elements for the respective level of the hierarchy; and (*b*) the hierarchy itself cannot possibly provide an exhaustive sampling of the population of fear elements.

In the studies of Lang and Lazovik (1963), Lang et al. (1965), and Paul (1966), there was also a failure to find complete fearlessness on the part of successfully desensitized *S*s. On the other hand, the clinical literature would lead one to expect perfect transfer, namely, "It has consistently been found that at every stage a stimulus that evokes no anxiety when imagined in a state of relaxation evokes no anxiety when encountered in reality [Wolpe, 1961, p. 191]." This discrepancy may in some measure be due to the unreliability of clinical reports. However, assuming that the clinical data are, in fact, valid, the greater generalization of counterconditioning effects in actual clinical practice may be a function of several factors which were intentionally excluded from the present experimental design. Among these would be in vivo desensitization based on differential relaxation (Davison, 1965b; Wolpe & Lazarus, 1966), the positive reinforcement of approach responses in interaction with presumed counterconditioning (Bower & Grusec, 1964; Davison, 1964; Lazarus, Davison, & Polefka, 1965), the vicarious extinction of avoidance responses by means of modeling procedures (Bandura et al., 1967; Jones, 1924), "placebo effect" (Frank, 1961; Paul, 1966), and the so-called "nonspecifics" of a therapeutic relationship (cf. Lazarus, 1963).

Etiology versus Treatment

Having furnished evidence in favor of a conditioning interpretation of a particular technique of behavior modification, it would seem appropriate to comment briefly on the implications which these findings have for the development of neurotic anxiety. An error in logic is committed if one adduces data such as these as evidence in support of a conditioning model of the *acquisition* of inappropriate anxiety: from evidence regarding efficacy in changing behavior, one cannot claim to have demonstrated that the problem evolved in an analogous fashion (cf. Rimland, 1964). Whether in the present instance neurotic disorders, modifiable via counterconditioning techniques, originate in situations conceptualized in classical conditioning terms is a very important research and preventive therapy question; it is, however, separate from the corrective therapy issue. In fact, the author has sought vainly in the experimental literature for paradigms which illustrate the acquisition of *stable* fear responses in human beings under conditions bearing even a remote resemblance to what would likely hold in real life.[2]

[2] The author is indebted to Gordon L. Paul and Bernard Rimland for first pointing out these issues.

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