
The Differential Effects of Progressive Relaxation and Imagery on Anxiety

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Abstract

The aim of this research was to compare the effects of progressive relaxation and imagery on stress levels. High and low anxiety subjects were selected on the basis of scores on the State-Trait Anxiety Inventory, and were randomly assigned to Progressive Relaxation or Cognitive Imagery treatment conditions. Results indicated that there were no significant differences between treatment conditions: both treatment groups significantly reduced cognitive anxiety scores ($p < .007$) from pre- to posttreatment. The analysis of anxiety scores indicated that high anxious subjects significantly decreased their trait anxiety scores ($p < .0003$) and somatic anxiety scores ($p < .02$) while low anxious subjects increased their trait anxiety scores ($p < .006$). The results of this study are discussed in order to help professionals in consultation to become aware of the importance of anxiety induction as a factor in the course of a relaxation treatment.

Résumé

Le but de ce projet de recherche était de comparer les effets de la Relaxation Progressive et l'Imagerie sur différents niveaux de stress. Les candidats ont été sélectionnés selon leurs résultats (élevés ou bas) sur le test d'anxiété "State-Trait Anxiety Inventory". Ils ont par la suite été assignés au hasard, à l'une ou l'autre des deux conditions: la Relaxation Progressive ou l'Imagerie. Les résultats ont indiqué qu'il n'y avait pas de différences significatives entre les deux conditions et que les deux groupes ont réduit significativement leur résultat ($p < .007$) entre ceux avant et ceux après la manipulation. L'analyse des résultats d'anxiété a indiqué que les candidats obtenant un résultat élevé ont réduit significativement leurs résultats de trait d'anxiété ($p < .0003$) et celui d'anxiété somatique ($p < .02$) tandis que ceux qui ont obtenus des résultats pa élevés ont augmenté leur résultat du trait d'anxiété ($p < .006$). Les résultats de cette étude ont été discutés de façon à aider les professionnels en consultation à prendre conscience qu'au cours d'un traitement de Relaxation, l'induction d'anxiété est un facteur important.

Since the introduction of relaxation training by Jacobsen (1938), the clinical use of relaxation procedures as a primary or adjunctive treatment strategy has increased dramatically. Relaxation procedures have been labeled the "behavioural aspirin" (Russo, Bird, & Masek, 1980), and are used to treat a wide range of problems, (i.e., anxiety, sleep disturbances, headaches, hypertension, speech anxiety, test anxiety, anger control). As the clinical utilization of relaxation techniques expands, researchers (Barrios & Shigetomi, 1979; Borkovec & Sides,

1979) have become increasingly interested in evaluating the efficacy of relaxation procedures. Studies generally demonstrate that relaxation training is effective, although the actual mechanism responsible is not well understood. Two models have been developed to explain the mechanisms through which relaxation techniques produce their effects. Benson, Beary & Carol (1974) propose a unitary model of arousal relaxation and hypothesize that all relaxation techniques produce a common integrated relaxation response. The multiprocess model (Davidson and Schwartz, 1976) proposes that different relaxation procedures produce differential effects. This model suggests that relaxation training effects depend on the particular skills that are taught and the parts of the nervous system that are most directly involved in learning. In other words, relaxation procedures that employ a physiological or somatic focus (e.g., progressive relaxation) would produce different patterns of relaxation than relaxation procedures that employ a cognitive focus (e.g., meditation or imagery). Several studies (Lehrer, Woolfolk, Rooney, McCann Carrington, 1983; Borgeat, Stravynski & Chalault, 1983; Reinking & Kohl, 1975) support the multiprocess model and report differences in the effects of various types of relaxation procedures. Others (Borkovec & Hennings, 1978) report no differences between relaxation procedures and support the unitary model.

Anxiety is a common problem among students. Students often seek professional help for test anxiety, performance anxiety or social anxiety. For example, 20% of school children (Eysenck & Rachman, 1965) and 25% of university and college students (Suinn, 1969) report experiencing test anxiety. Various measures have been developed to measure different types of anxiety. A commonly used instrument, the State-Trait Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1970) measures two distinct aspects of anxiety: state anxiety (A-State) and trait anxiety (A-Trait). Since several authors (Barrett, 1972, Davidson & Schwartz, 1976; Schalling, Cronhalm & Asberg, 1975) have asserted that individuals differ in terms of the predominant mode in which they experience anxiety, measures to assess differences in cognitive and somatic anxiety have been developed. One of these measures, the Trimodal Anxiety Questionnaire (Lehrer & Woolfolk, 1982) assesses somatic, cognitive and behavioural modalities of anxiety.

The present investigation was undertaken to compare progressive relaxation, a somatic method, with imagery training (Woolfolk & McNulty, 1983), a cognitive method of relaxation training, on anxiety levels with particular interest in measures of cognitive and somatic anxiety. On the basis of previous findings (Lehrer, 1978; Lehrer et al., 1983) it was predicted that the effects of relaxation would be more easily observed in participants who were high in anxiety than those who were lower in anxiety.

METHOD

Subjects

One hundred volunteers enrolled in first year psychology courses completed the State-Trait Anxiety Inventory (STAI) producing a mean trait (A-Trait) score of 40.6 ($SD = 8.9$). Participants whose A-Trait scores were one SD or more above the mean comprised the High Anxious (HA) group ($M = 55.2, SD = 6.3$); participants whose A-Trait scores were one SD below the mean were the low anxious (LA) group ($M = 29.0, SD = 2.8$). The resulting mean trait anxiety score for the HA group was higher than the mean of 46.7 reported for student clients with emotional problems (Spielberger, Gorsuch & Lushene, 1970).

Sixteen males and 39 females who ranged in age from 17 to 40 ($M = 19.7, SD = 3.7$) participated in the study. All subjects who had previous training in any form of relaxation were excluded. Subjects in the two anxiety groups were randomly assigned to progressive relaxation (PR) or cognitive imagery (CI) relaxation treatment conditions. Thirty-two subjects were assigned to each treatment condition, 29 completed the progressive relaxation condition and 26 completed the cognitive-imagery condition. The final sample included 13 subjects in the High Anxiety-Cognitive Imagery condition (HA-CI), 14 subjects in the High Anxiety-Progressive Relaxation condition (HA-PR), 13 subjects in the Low Anxiety-Cognitive Imagery condition (LA-CI) and 15 subjects in the Low Anxiety-Progressive Relaxation condition (LA-PR).

Measures

This study was part of a larger investigation of dream activity in which subjects recorded their dreams daily on awakening. Each week they handed in written dream summaries and a record of tape usage. If the subjects failed to hand in a weekly report, they were contacted by the experimenter's assistant who discussed with them any problems or concerns they were experiencing.

Two scales, the State-Trait (STAI) and the Trimodal Anxiety Scale, were administered in group sessions prior to treatment and at the end of the twelve weeks of relaxation training. The STAI is a self-report scale which measures two distinct anxiety concepts, state anxiety (A-State) and trait anxiety (A-Trait). The A-State scale of 20 statements assesses how an individual feels at a particular moment in time. A-State may vary in intensity and fluctuate over time. The A-Trait scale of 20 statements asks people to describe how they generally feel and measures individual differences in anxiety proneness.

The Trimodal Anxiety Questionnaire (Lehrer & Woolfolk, 1982) which has been shown to have reliability in measuring three types of

anxiety: somatic, cognitive and behavioural (Lehrer et al, 1983; Woolfolk & McNulty, 1983) is a 36-item self-report instrument. The somatic scale measures symptoms such as chest pains, dizziness, rapid breathing and stomachaches. The cognitive scale assesses worrying and includes items such as "I can't get some thought out of my mind." "I picture some future misfortune." "I am concerned others may not think well of me." The behavioural scale measures social avoidance and includes such items as "I try to avoid social gatherings." "I avoid new and unfamiliar situations." and "I try to avoid starting conversations."

Procedures

Subjects met in groups of eight to receive training in the appropriate relaxation procedure. All training sessions were delivered by a female clinical psychologist experienced in self-regulation techniques. During the first session the treatment rationale was explained, the procedures were demonstrated, and the participants practiced the procedures. Each subject received a 15 minute tape of relaxation instructions which they were instructed to begin using the next day and to use each night during the following week. During the second session, subjects reviewed the techniques and discussed any problems in learning the technique. Subjects were instructed to continue to use the tape each night until they had learned to apply the procedure independent of the tape.

Group I: Progressive Relaxation training: Subjects in this group were taught a standardized form of muscle relaxation (Bernstein & Borkovec, 1973). Subjects systematically tensed (for 5-7 seconds) and relaxed 16 muscle groups and were instructed to focus their attention on the feelings of tension and relaxation in these muscle groups. The tape included these same standardized instructions.

Group II: Cognitive-Imagery training: Subjects in this condition received relaxation instructions specifically designed to preclude focusing on somatic sensations and emphasized guided imagery and visualization of common objects (Woolfolk & McNulty, 1983). Participants initially were presented with pictorial images of 5 common objects (i.e., candle, flowers, trees, kite, box) as prompts and told to concentrate on the specific details and features of each image for approximately 3 minutes. These prompts were faded when participants reported they could visualize each object with their eyes closed. The trainer used a standard set of guided imagery instructions to assist the participants in visualization. The tape included these same standardized guided imagery instructions. The following is an example of the guided imagery instructions: "Picture a candle...look first at the general outline of the candle... clearly focus on the shape and height of the candle... move your focus downward to the candle holder... notice how round the holder is... just to the side of the candle is the handle of the holder..."

notice the shape of the handle . . . now let your focus move up to the top of the candle . . . see how uneven the candle is . . . look at the wax forming on the sides . . . slightly above the top is the wick and the flame . . . observe the colours and shape of the flame.”

RESULTS

In order to assess compliance to the relaxation procedures, participants' recording of tape usage was assessed at the beginning of training (Week 2), mid-training (Week 6) and at the end of training (Week 12). All the participants ($N = 55$) reported using the tape daily during the second week of training. During the sixth week of training 88.3% of the participants reported daily usage and at the twelfth week 69.8% of the participants reported daily tape usage.

The level of interest and involvement in this study was further demonstrated by the participants' willingness and desire to talk with the experimenter's assistant about their dreams when they handed in their weekly reports. They also offered a variety of personal observations, both written and oral, about their sleeping, waking and dreaming patterns throughout the duration of the study.

The two anxiety questionnaires were administered to each participant before and after relaxation training. The data were analyzed using a $2 \times 2 \times 2$ (Groups \times Treatment \times Pre-post Scores) analysis of variance with repeated measures on the last factor. Each of the subscale scores of the Trimodal Anxiety Inventory was analyzed separately. ANOVAS on the pretreatment and posttreatment STAI difference scores were also conducted.

TABLE 1
*Univariate Analyses of Variance of
Pre and Post Trimodal Anxiety Scores*

<i>Sources of Variation</i>	<i>Dependent Variables</i>		
	<i>Somatic</i>	<i>Cognitive</i>	<i>Behavioural</i>
Group (HA or LA)	24.2***	76.74***	28.7***
Treatment (PR or CI)	1.56	1.2	<1
Group \times Treatment	<1	1.2	<1
Repeated Measure (M)	1.95	7.78**	<1
Repeated Measure \times Group	5.02*	2.84	<1
Repeated Measure \times Treatment	2.26	2.85	1.05
M \times Group \times Treatment	<1	<1	<1

* $p < .05$

** $p < .01$

*** $p < .001$

The data for the univariate analyses of variance of the Trimodal Anxiety scores is presented in Table 1. As would be expected because of the initial procedures used to form groups, pretreatment scores on the cognitive ($F(1,51) = 76.7, p < .001$), somatic ($F(1,51) = 24.2, p < .001$), and behavioural ($F(1,51) = 28.7, p < .001$) subscales of the Trimodal Anxiety Questionnaire were significantly larger in high anxious subjects. Table 2 presents the pretreatment and posttreatment means and standard deviations of the Trimodal Anxiety scores. There were no significant differences between the treatment groups on initial Trimodal scores.

TABLE 2
*Pre and Post Treatment Means and
Standard Deviations of Trimodal Anxiety Scores*

Treatment Conditions		Somatic		Cognitive		Behavioural	
		Pre	Post	Pre	Post	Pre	Post
HA-PR	<i>M</i>	49.9	45.3	55.4	50.1	32.9	32.9
	<i>SD</i>	22.3	24.0	12.7	15.8	16.0	17.0
HA-CI	<i>M</i>	49.2	39.3	58.5	47.1	29.7	28.5
	<i>SD</i>	18.8	25.9	8.4	17.0	12.3	15.5
LA-PR	<i>M</i>	25.0	30.0	29.5	30.7	11.7	17.1
	<i>SD</i>	10.1	13.8	13.7	14.1	6.7	16.1
LA-CI	<i>M</i>	20.3	18.6	26.2	21.0	15.7	14.4
	<i>SD</i>	9.3	16.6	8.3	9.7	7.8	9.4

The analyses showed that both treatment groups significantly decreased levels of cognitive anxiety from pretreatment to posttreatment ($F(1,51) = 7.78, p < .007$). Although there were no significant between-group differences on the cognitive anxiety measure, there was evidence of a near significant trend in treatment effects ($F(1,51) = 2.85, p < .09$); the imagery training produced greater decreases in cognitive anxiety levels of the high anxious subjects than did the progressive relaxation.

There was no significant main effect for somatic anxiety. There was, however, a significant interaction of pre-post scores by group ($F(1,51) = 5.02, p < .02$). Further analysis indicated that high anxious participants significantly decreased their levels of somatic anxiety across treatments ($t = 2.44, p < .02$) but low anxious participants did not ($t = .71, p < .49$).

The analysis of pretreatment to posttreatment changes between high anxious and low anxious participants on measures of behavioural anxiety was nonsignificant.

In order to determine whether relaxation treatments differentially affected anxiety levels as measured by the STAI, 2×2 analyses of

variance (Groups \times Treatments) were conducted on the difference scores from pre- to posttreatment. There were no significant main or interaction effects in state anxiety. The analysis of trait anxiety (A-Trait) difference scores found a significant group main effect ($F(1,51) = 26.62, p < .001$). There was a nonsignificant treatment effect ($p < .12$). Further analysis of trait scores indicated that high anxious participants significantly decreased ($t = 4.20, p < .0003$) their trait anxiety scores and low anxious participants significantly increased ($t = 3.02, p < .006$) their trait anxiety scores.

DISCUSSION

The results of this study lend some support to Benson's et. al. (1974) unitary model of relaxation which proposes that all relaxation techniques produce the same general relaxation response. The findings of no difference between progressive relaxation training (somatic method) and imagery training (cognitive method) on self-report measures of anxiety corroborate previous research in this area (Lehrer et al., 1983) and support the hypothesis that relaxation procedures are equally effective in reducing anxiety levels. Since both procedures produce similar effects, counsellors can provide their clients with a choice in relaxation procedures. Clients can choose a relaxation procedure based on their preferences and abilities which may facilitate greater commitment.

A significant finding of this study is that relaxation treatments differentially effect high anxious and low anxious participants. The high anxious participants achieved significant decreases in cognitive and somatic anxiety scores. The low anxious participants demonstrated no decrease in somatic anxiety. The analysis of pre- and postdifference scores on trait anxiety is particularly interesting. High anxious participants significantly decreased their trait anxiety scores and low anxious participants significantly increased their trait anxiety scores. This finding may be due to relaxation induced anxiety (RIA). RIA (Budzynski, Stova and Peffer, 1980; Carrington, 1977; Heide and Borkovec, 1983, 1984) is a phenomenon wherein relaxation procedures produce the paradoxical effect of actually increasing cognitive, somatic and behavioural components of anxiety. Alternatively, the pre to post changes in anxiety scores may reflect regression to the mean effects.

The findings of this study discussing the effects of relaxation training on high anxious participants are particularly relevant to counsellors. High anxious individuals are usually the ones who seek treatment since their higher anxiety levels are causing them discomfort. According to the results of this study counsellors can feel confident that both types of relaxation training can effectively reduce worry and physical symptoms associated with anxiety. The finding of no significant changes in behavioural anxiety is a reminder to counsellors that relaxation training is

not an effective treatment for reducing social avoidance. Counsellors need to use other therapeutic approaches (i.e., assertiveness training) to help clients cope with social or behavioural anxiety.

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