CUE-CONTROLLED RELAXATION:
SAVING TIME VERSUS EFFICACY

THESIS

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By

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Cue-controlled relaxation is looked at to determine whether a component is efficacious as the entire procedure. Subjects were 40 male and 40 female undergraduates. Subjects were randomly assigned to one of four conditions: cue-controlled relaxation, progressive muscle relaxation, breathing exercises with a paired cue word, on a presentation of the cue word without being paired. It was hypothesized that cue-controlled relaxation would be superior to a component of cue-controlled relaxation.

It was determined that cue-controlled relaxation is not more efficacious than a particular component. Data suggests the majority of anxiety reduction takes place when the treatment focuses on the same modality from which the subject receives the most information about their anxiety. Implications and suggestions for further research are presented.
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CUE-CONTROLLED RELAXATION:
SAVING TIME VERSUS EFFICACY

The last several years have seen an increase in the use of behavioral procedures in the alleviation of anxiety, fears, phobia, and the accompanying tension that results. One of the standard procedures implemented in working with these disorders is systematic desensitization or relaxation with an increased emphasis on cue-controlled relaxation (CCR). Systematic desensitization has a number of drawbacks including a client's inability to achieve or maintain imagery, and/or clients who have multiple phobias (Rimm & Masters, 1979). Relaxation is effective but the client may not be in a position that allows him/her to go through the procedures required for him/her to relax. CCR, or "conditioned relaxation" (Paul, 1966), does not appear to have these limitations. CCR enables the client to achieve relaxation in response to a self-induced, covert cue word such as "calm." Because the technique does not require the construction or working through of a hierarchy of imagery scenes and allows for covert and rapid relaxation, CCR has the potential for a greater range of application and greater generalizability than systematic desensitization or relaxation alone as a generalizable coping skill for anxiety.
Since Paul (1966) first described CCR as a way of controlling anxiety, evaluations of CCR have begun appearing. Being utilized by itself or in conjunction with other behavioral techniques, CCR has been used for the alleviation of fear of snakes (Russell & Matthews, 1975), test anxiety (Barrios, Ginter, Scalse & Miller, 1980; McGlynn, Kinjo & Doherty, 1978; Marchetti, McGlynn & Patterson, 1977; Russell, Wise & Stratoudakis, 1976; Russell & Sipich, 1974), public speaking (Gurman, 1973), dental anxiety (Beck, Kaul & Russell, 1978), epileptic seizures (Ince, 1976), migraine headaches (Daniels, 1977; Luther, 1971) and pervasive anxiety (Cautela, 1966). However, many of these studies have failed to show a therapeutic gain any greater than that produced by an inert procedure perceived as credible by the subjects. Furthermore, many of the previously mentioned studies relied solely on self-report measures of reductions in anxiety and failed to take physiological readings. Finally, if CCR is of therapeutic benefit, what is the effective component that makes it work?

The present study will be concerned with breaking CCR down into its various components and comparing these components to each other and to CCR to ascertain which procedure is the effective working component. If no one component is found to be the working component,
is the effectiveness of CCR an interaction between components? If relaxation can be induced in a more efficient manner by using only a component of CCR as it is practiced today, the cost effectiveness of relaxation procedures can be enhanced. As Grimm (Grimm, 1980) has pointed out, the literature from therapy outcome studies have not shown that CCR as it is currently practiced is more effective as a change procedure than a credible placebo. However, with the present studies to date it cannot be said that CCR is an ineffective procedure since there have been few applied studies which have established the preconditions for testing CCR.

The procedure used in establishing relaxation through CCR consists first of establishing relaxation with the use of progressive muscle relaxation (PMR). The person to be relaxed is then given a cue word to subvocalize as they exhale. The three components of CCR then are: PMR, the cue-controlled portion including the breathing cycle, and the subvocalization of a cue word. Since Wolpe first initiated relaxation induction (Wolpe, 1958), there have been many studies performed which have established the effectiveness of PMR (Rimm & Masters, 1979) as a procedure for the reduction of anxiety and muscle tension. The procedure involves successive
tensing and relaxing voluntary muscle groups in an orderly sequence throughout all the main muscle groups. However, by itself is PMR as effective as CCR? I propose that PMR is not, due to the problems of it not generalizing outside of therapy. It would be difficult or inappropriate or too time consuming to perform the relaxation exercises needed to lower the tension level in an anxiety-producing situation. Could PMR be left out of the CCR procedure and still achieve the same effects? Again, the answer would be no. The hypothesis behind CCR is that the person must be in a relaxed state so that the cue word can be conditioned to the relaxed state rather than conditioning the cue word to a tense state. There must be some procedure to induce this state of relaxation for the proper conditioning to take place and PMR is the most appropriate as it allows the person to experience the control over his/her bodily processes.

Breathing is the second component of CCR. Deep breathing by itself has been shown to induce a certain amount of relaxation (Rama, Ballentine & Hymes, 1979). The advantage of including the breathing exercises to CCR is that it allows for relaxation to be generalized to outside settings. If a person is in an anxiety-producing situation, it follows that a person can induce relaxation
by simply breathing. This is a more covert procedure to use in relaxing rather than the more blatant performance of someone attempting to relax through the use of PMR. Concentration in breathing also allows for a certain amount of cognitive control over a person relaxing; the first point being that this gives a client something to think about other than his/her anxiety and tension.

The final component of CCR is pairing the cue word during each exhalation. By itself, the cue word may have an insignificant therapeutic effect which may be due to any cognitive changes caused by self-talk having a reciprocal effect on his/her anxiety and tension. (Michenbaum, 1977). More likely during CCR the presentation of the cue word develops a conditioned response with the relaxation during the therapy sessions. As the cue word and breathing are covert, the person is more likely to use the procedure outside of therapy and thus have more generalization to outside events.

The following study was comprised of four groups: a CCR group, a PMR group, a breathing group with the cue word, and a group presented with the cue word by itself. Given these groups, it was hypothesized that there would be a significant difference between the CCR group and the working component groups, showing relaxation from CCR is an interaction requiring all the components
rather than relaxation originating from any one working component.

**Method**

**Experimenter**

The experimenters responsible for treatment were two graduate students enrolled in the Ph.D. program in Clinical Psychology, one male and one female. Both therapists had previous experience with behavior therapy at a reading level and in practical experience at the North Texas State University Psychology Clinic. Each experimenter treated one-half of the subjects from each condition and of each sex. Both therapists were supervised by a licensed clinical psychologist.

**Subjects**

The subjects were 40 male and 40 female students who were enrolled in introductory psychology courses. Their age ranged from 18-23 years, with a mean age of 19 years, 10 months. They fulfilled a course research-participation requirement and received extra credit for participating. Each was assigned to one of the four experimental groups utilizing a randomized block of anxiety scale scores that were obtained during the pretreatment evaluation of anxiety. Of the enrolled students, 1,238 were given the State-Trait Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1970)
and the top percentage (7%) were selected who reported the highest Trait anxiety. The subjects were told that several therapy techniques for the alleviation of anxiety and tension were to be studied and that they would be placed in one of these groups. Subjects were told that possible benefits to them would be: a) the possible alleviation of anxiety and tension and b) the fulfillment of the experimental credit requirement. Time required of them was five, 30-minute sessions over a two-week period, and a one month followup. The selected subjects were contacted by phone to set up times for them to come in.

Measurement Devices

Pre- and post-treatment physiological responses were taken utilizing a BFT 302 Feedback Thermometer (Bio-feedback Technology, Garden Grove, Calif.) for temperature measurement, and Medical Associates modular system using an infrared variable resistor to measure pulse rates integrated and amplified to give a digital readout and averaged out over one minute. Pulse and temperatures were measured from the distal portion of the second and third phalanx respectively, from the right hand.

Pretreatment Evaluation of Anxiety

The 80 subjects (preselected with the Trait portion of the State-Trait) were assessed individually using a standard package, consisting of the Symptom Checklist-90
(Derogatis, 1975), the STAI/TRAIT Anxiety Inventory, the Fear Survey Schedule-III (Wolpe & Lang, 1964) along with signing an informed consent. Prior to treatment and after having read the rationale (see Appendix A), all subjects were given a four-item questionnaire (see Appendix B) designed to check the credibility of the treatment that they received (Borkovec & Nau, 1972). These particular measures were selected due to their high validity and reliability. The Symptom Checklist-90 (SCL-90) is a 90-item questionnaire with each item being ranked on a zero to five scale according to how much distress the item causes. Three configural items were assessed: somatization, depression, and anxiety. These three factors are positively correlated; when one rises the other two also go up (Garfield & Bergin, 1979).

The STAI/TRAIT was selected as it is a quick test to administer and correlates highly with other anxiety measures and is an excellent measure of state and stable individual differences in anxiety proneness. The Fear Survey Schedule-III (FSS-III) was selected due to the relationship between Trait anxiety and the perception of events and stimuli being anxiety provoking (Grossberg & Wilson, 1965; Hodges & Felling, 1970; Spielberger, 1966; Kilpatrick & McLeod, 1973). The testing instructions were given orally. After the subjects
completed these scales they were told they would be contacted to set up the treatment times and then dismissed.

**Procedures**

The experiment consisted of six distinct stages: a) the preliminary administration of the STAI/TRAIT Anxiety Inventory, b) the pretreatment evaluation of anxiety, c) the assignment of the subjects to experimental conditions, d) the experimental treatment, e) the post-treatment evaluation of anxiety, and f) the followup evaluation of anxiety. Items a, b, and c have previously been discussed.

**Experimental Treatment**

All the experimental treatments were conducted in a quiet therapy room with no outside distractions. All treatment procedures were performed live with the exception of PMR which was recorded. The treatments were performed individually and subjects were visible to the experimenter at all times. Each subject was hooked up to the physiological measure and each attachment was explained to the subject prior to attaching it. A five-minute baseline was taken prior to the treatment. The last five minutes of each procedure was also recorded. At the end of each session all subjects were given
homework assignments to practice their particular treatment for 30 minutes each evening and were asked to utilize their treatment technique whenever they found themselves in an anxiety or tension provoking situation. With the exception of reading the rationale each time, all subjects in each condition continued with the same procedure for five sessions over a two-week period. The subjects continued their procedure for 30 minutes in order to equate for time.

The purpose behind CCR is to enable the client to control his/her anxiety and tension by conditioning the client's relaxation response to a nonverbal cue and to teach the client to present the cue to him/herself whenever anxiety is discriminated. CCR is divided into two steps with the first being progressive muscle relaxation, and the second the repeated pairings of the discrete cue word with the client's body in a relaxed state.

Upon arriving, the CCR subject was met by the experimenter, seated in a recliner and given a type-written rationale of the CCR treatment.

The reclining subject was then given a 25-minute taped progressive muscle relaxation exercise following Wenrich, et. al's procedure (Wenrich, Dawley & General,
The CCR procedure is basically the same as that used by Marchetti, McGlynn and Patterson (1977). Thirty seconds after the progressive muscle relaxation exercise, the cue association training commenced. The subject was told to focus his/her attention on his/her slow and regular breathing and to say to him/herself "calm" during each exhalation. The experimenter said the word aloud along with the subject for the first five exhalations. The subject was then on his/her own for an additional 15 pairings when "calm" was said covertly. The subject was then instructed to focus his/her attention on the feelings of relaxation for one minute after which he/she was instructed to continue for an additional 20 pairings. This continued for five minutes.

The subjects in the PMR condition received the same procedures from the reading of the rationale. The PMR subjects received the same relaxation exercises as the CCR condition but did not receive the cue portion. Instead, the subjects received only progressive muscle relaxation exercises which lasted for 25 minutes. They were then told to relax for five additional minutes to equate for time.

The third group received cue-controlled relaxation including the breathing exercises and the presentation.
of the cue word but did not receive PMR. This continued for 30 minutes.

The final group received the same general procedures but were only given the cue word as in the CCR condition without being paired to the breathing cycle or to being in a relaxed state. The procedure lasted for 30 minutes.

Post-Treatment Evaluation of Anxiety

The post-treatment evaluation for anxiety was conducted individually immediately following the completion of the final treatment session. The subject was conducted to another room and given the SCL-90, STAI/TRAIT Anxiety Inventory, and the FSS-III.

Followup Evaluation of Anxiety

Thirty subjects were contacted by telephone one month following treatment and were administered the battery of self-report measures utilized in the post-treatment evaluation. All subjects were debriefed and offered the opportunity to receive information once the study was completed.

Results

In general, the statistical analysis of data from this experiment entailed three stages. A two (pre-post assessment) X two (male, female) analysis of variance
with repeated measures on the second factor (Winer, 1962) was performed for experimenter's sex as well as for the subject's sex. A two (pre-post assessment) X four (groups) was performed to determine group differences. The followup analysis was performed using the same statistics with the exception of adding a followup assessment. Significant differences between groups were delineated by performing a Neuman-Keuls' to determine where the differences were.

With regards to the experimenter's sex, of the dependent variables, only the credibility rating was significant at the post-treatment \( (F = 12.38, \text{ df} = 1, 78, < .001) \). Both male and female subjects saw the female experimenter as being more credible. There was also only one dependent variable that was significant with regards to the subject's sex \( (F = 4.75, \text{ df} = 1, 78 < .03) \). Males achieved a significantly higher temperature than females and also achieved this temperature more quickly than the females increased their temperature.

With regards to group differences, all four groups had significant pre-post differences on all of the dependent measures (Table 1). Four of the measures somatization, depression, anxiety (taken from the SCL-90), and heart rate indicated significant group differences (Table 2). A Neuman-Keuls'
Table 1
Pre-Post Data

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>F*</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAI</td>
<td>56.01</td>
<td>.001</td>
</tr>
<tr>
<td>TRAIT</td>
<td>26.45</td>
<td>.001</td>
</tr>
<tr>
<td>Credibility</td>
<td>22.45</td>
<td>.001</td>
</tr>
<tr>
<td>Somatization</td>
<td>8.89</td>
<td>.003</td>
</tr>
<tr>
<td>SCL-90: Depression</td>
<td>14.55</td>
<td>.001</td>
</tr>
<tr>
<td>Anxiety</td>
<td>15.77</td>
<td>.001</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>5.31</td>
<td>.02</td>
</tr>
<tr>
<td>Temperature</td>
<td>16.70</td>
<td>.001</td>
</tr>
<tr>
<td>Fear Surveys Schedule</td>
<td>16.19</td>
<td>.001</td>
</tr>
</tbody>
</table>

*df = 3, 76

was run on the three measures from the SCL-90 (SOMA, Dep., Anx.). This showed that the breathing with the cue word group was significantly lower in somatization, depression and anxiety than the PMR or cue word alone group, with the CCR group showing no significant difference. However, the CCR group, according to the Neuman-Keuls' did have a significantly lower HR than the other three groups.

Table 2
Group Followup Data

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>F*</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOMA</td>
<td>5.56</td>
<td>.001</td>
</tr>
<tr>
<td>Depression</td>
<td>2.92</td>
<td>.03</td>
</tr>
<tr>
<td>Anxiety</td>
<td>4.08</td>
<td>.01</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>4.36</td>
<td>.006</td>
</tr>
</tbody>
</table>

*df = 3, 76

Group differences in the followup had three significant dependent variables (Table 3), STAI (F = 16.26, df =
3, 26, < .001), TRAIT (F = 7.85, df = 3, 26 < .001), and FSS (F = 3.46, df = 3, 26 < .04). A Neuman-Keuls' was performed indicating no difference between the follow-up and the post-test but both significantly differed from the pre-test for the three dependent variables. This indicates that the initial gain was held at least for a one month followup for the STAI/TRAIT anxiety measures and one physiological measure.

Table 3

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Pre-Followup Means</th>
<th>Pre-Followup SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAI</td>
<td>39.9 - 28.1</td>
<td>5.3 - 7.2</td>
</tr>
<tr>
<td>TRAIT</td>
<td>45.7 - 38.9</td>
<td>8.3 - 9.1</td>
</tr>
<tr>
<td>FSS</td>
<td>53.3 - 45.5</td>
<td>5.9 - 8.7</td>
</tr>
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The results of the analysis of variance for the pilot study of the rationales with a two (male, female) X four (groups) ANOVA (Winer, 1962) had no significant or even approximately significant main effects or interactions.

Discussion

The purpose of the present investigation was to use self-report and psychophysiological measures to determine if the components of cue-controlled relaxation (CCR)
produced the same amount of relaxation and concommittant lowered anxiety as the CCR package as a whole.

The hypothesis that CCR would be more effective than the component parts in producing relaxation was not supported. There were significant pre-post differences independent of the group. This would indicate that there is no difference in what component of CCR is used, relaxation will occur. Most will achieve some benefit as long as they practice some procedure.

Only four of the measures indicated that there were any group differences and three of those were from the SCL-90. This may be that the SCL-90 is just more sensitive to certain areas. The areas the SCL-90 used appear to measure more of the physical symptoms associated with somatization, depression, and anxiety than the STAI/TRAIT. These physical symptoms are continually impinging on the person's cognitive processes and thus interfering with them. By presenting a physical relaxation process such as the breathing with a cue word, the person is using the same modality to alleviate the problem as that from which the person's problem areas may stem. At this point the question arises as to why the PMR didn't work since this is also from a physical modality. Most likely,
as PMR was given by tape rather than being given live, there was less relaxation since it was not individualized to each person's idiosyncratic tension (Lehrer, 1982). The cue word alone does not approach the physical mode, whereas the CCR has the same shortcomings as the PMR, but with some relaxation coming from the five minutes of breathing practice.

It was believed that the subject's sex and the experimenter's sex would have no effect. This held up with the exception of one dependent variable for each.

The credibility ratings indicated a significant difference in that the subjects saw the female experimenter as more credible than the male. This appears to go against much of the literature (Garfield & Bergin, 1978). However, as there was only one experimenter of each sex, this result must be looked at with some caution. It is most likely the difference shown from this experiment is an artifact from the experimenters rather than any type of sex bias which would be received from any behavioral intervention. There may have been variations between the experimenters' presentations that varied due only to the inherent personality differences. Additional research in this area, utilizing a larger number of experimenters, could be of future benefit.
With the exception of temperature control, the subjects' sex caused no differences. As temperature is easier to control than heart rate as well as having a wider range from which to manipulate, it was expected that this psychophysiological measure would be controlled to a great degree, as it was. The males not only started out at a higher temperature but were also able to raise their mean temperatures faster than were the females. The reason may be due to a male's tendency to control his physiological processes more than a female.

The most likely explanation is males may be more oriented to pay attention to the physical modality since most of a male's orientation is physically oriented. Since women utilize feedback just as efficiently as men, had they received some type of feedback along with their relaxation, any differences would most likely disappear. The differences exhibited may be from a deficit of information and thus they were unable to raise their temperatures more than they did. This difference was lost by the one month followup, indicating the effect is transient. Over a period of time, subjects' sex had little to do with the amount of anxiety alleviated.
Perhaps a switch in how a person perceives tension and/or anxiety is more important. It was decided due to the subject pool dispersing every four months a followup of one month could feasibly be carried out. Thirty of the subjects were contacted.

The STAI/TRAIT tends to load more on the cognitive aspect of anxiety, whereas the FSS focuses on the cognitive/behavioral aspect. Though the subjects did not improve during the one month they were not receiving their particular exercises, they were able to hold on to their initial gains as shown by those particular variables. From this data it appears an anxious person may profit more from a process which utilizes a focus on alleviating the physical when first learning how to relax. Once relaxation is learned, the cognitive aspect becomes more important. The subject receives added information that he/she can be relaxed in a tension producing situation so he/she must be coping more than thought possible. If these problems are objects or situations in the environment, and if there is less anxiety when in the proximity of those objects or situations, it is more probable a person will approach them.

As the CCR in this study does not relieve tension and anxiety any better than any other component of CCR, it
appears the modality from which the anxiety originates is the modality toward which the treatment must be guided in order to affect the anxiety. It may not be whether CCR or PMR is more effective, but rather does the anxiety and/or tension come from a cognitive or physical modality. Therapy must be focused on the modality from which the client receives the most information.

The question which needs investigating is what particular technique would be most efficacious for the relief of anxiety and/or tension in accordance with the modality being targeted. It may be that a client only needs to be taught how to focus his/her attention to receive the maximum amount of information.
Appendix A

Relaxation can be achieved in various ways. In this experiment you will be taught a particular way to relax that will hopefully benefit you when you find yourself in an anxiety producing situation. This study will help to determine whether or not this procedure is effective in reducing your anxiety. Over the next several sessions your anxiety will be reduced. Anxiety is usually a conditioning process established when you are exposed to certain stimuli that become associated with certain responses. This follows the laws of conditioning that Pavlov found. We can eliminate your anxiety by using the same procedures. During the next five sessions you will be given exercises in how to relax your muscles. You will practice these exercises here and at home, and will eventually be able to relax by using your particular procedure. This will eliminate much of your anxiety in whatever stressful situation you may find yourself.
Appendix B

Read the statement, then circle the number that corresponds to your level of agreement. 1 being no agreement and 10 being complete agreement.

1) The treatment seemed logical to me.
   1  2  3  4  5  6  7  8  9  10

2) I would be confident in recommending the treatment to a friend who was anxious.
   1  2  3  4  5  6  7  8  9  10

3) I believe that this type of treatment would be successful in decreasing anxiety in many differing situations.
   1  2  3  4  5  6  7  8  9  10

4) If necessary, I would be willing to undergo this treatment again.
   1  2  3  4  5  6  7  8  9  10
References


Marchetti, A., McGlynn, F. D., and Patterson, A. S. Effects of cue-controlled relaxation, a placebo treatment, and no treatment on changes in self-reported and psychophysiological indices of test anxiety among college students. Behavior Modification, 1977, 34, 47-72.


Wenrich, W. W., Dawley, H. H., and General, D. A.  

