BEHAVIOR THERAPY 14, 144–157 (1983)

Coping Imagery and Relaxation Instructions in a Covert Modeling Treatment for Test Anxiety

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The present study compared the efficacy of instructing test-anxious subjects to use personalized coping imagery based on nonacademic experiences of competence with coping imagery based on academic experiences of competence. The effect of relaxation was also examined and the relationship of imagery elaborateness and content to treatment effectiveness was assessed. Sixty-three subjects were randomly assigned to one of four treatments or a waiting list control group. Test anxiety as measured by self-report instruments significantly decreased in all treatment groups. Improvement in grade point average occurred for all treatment groups except for academic coping imagery without relaxation which was also the least efficient treatment. The waiting list control group significantly deteriorated in academic performance. Relaxation training did not appear to enhance treatment effectiveness or influence the elaborateness or content of the imagery used. Test anxiety scenes elicited highly response-oriented images by all subjects. However, the stimulus/response content of the subjects' images was not influenced by treatment outcome. In contrast, successful treatment was primarily associated with reduction in negative coping imagery descriptions, although an increase in positive coping statements occurred as well.

The controlled assessment of the imagery process presents substantial methodological difficulties. Images are private events; the experimenter can never assume complete control over the client's image production. Yet, the highly anxious person's attentional processes may be an important target for change. Wine (1971) has suggested that highly test-anxious individuals tend to emit negative self-statements that interfere with the task at hand.

This report is based upon a dissertation submitted by the first author in partial fulfillment of requirements for the PhD degree. The efforts of Sue Johnston, Leslie Dubin, Elizabeth Haughney, Andrew Kerr, Mark Miller, Linda Nissenoff, Dan Rosenthal, Kevin Stempel, Michael DeGennaro, and Randy Carter are gratefully acknowledged. Requests for reprints should be sent to the second author, Box J-234, Department of Psychiatry, J. Hillis Miller Health Center, Gainesville, FL 32610.

0005-7894/83/0144–0157$1.00/0

A number of investigators have suggested that training subjects in the use of imagery through different instructions may be one successful method to manipulate the subjects' imagery experimentally (Bower, 1971; Bugelski, Kidd, & Segman, 1968). For example, Lang has demonstrated that different imagery instructions to the client can exert differential control over the client's somatovisceral responses during the imagery process (1977, 1979). Clinical studies by Meichenbaum (1972), Kazdin (1973, 1974), and Sarason (1975) suggest that instructions to imagine a fearful model who successfully copes with fear is a more effective treatment approach than instructions to imagine a nonfearful model or a fearful model who demonstrates no coping behavior. These studies suggest that manipulating the content of imagery through instructions may substantially augment the power of the imagery technique.

Instructions that encourage clients to develop personalized coping images may also enhance treatment effectiveness. In two studies by Kazdin (1979, 1980), subjects were instructed to develop personal, elaborate images in which a model coped successfully with a difficult task. A similar approach was taken by Harris and Johnson (1980) who instructed test-anxious subjects to use images of competence and success drawn from their own repertoire of success experiences achieved in situations other than test taking. In all three studies, instructions to use highly personalized coping images appeared to enhance behavioral and attitudinal change.

The present investigation further assessed the effectiveness of different imagery instructions in a covert modeling treatment for test anxiety. All subjects were encouraged to imagine a coping model that was highly personal and based on their own success experiences. However, half of the subjects were instructed to imagine a coping model based on previous nonacademic experiences of success while the other half of the subjects were instructed to image a coping model based on some academic success experienced in the past. This comparison was based on the assumption that personal, academic images of competence might produce treatment outcomes that would generalize better as the imagery used is more relevant to the test-taking situation.

The effect of relaxation training on both treatment outcome and the elaborateness of the imagery used by the client was also assessed. Singer (1973, 1974) and Van Egeren, Feather, and Hein (1971) have suggested that relaxation instruction may increase imagery vividness and improve treatment outcome of imagery-based techniques. However, their conclusions emerge mainly from case reports and have not been subjected to controlled assessment.

The present study also assessed the images the clients used before and after treatment, relating the type of imagery used to the treatment the client received and to the treatment's outcome. The images produced were analyzed using both the stimulus/response categorization of Lang (1977, 1979) and the positive/negative coping categorization of Wine (1971).

METHOD

Subjects

Sixty-three subjects were selected from a group of individuals meeting the following criteria: (a) volunteered in response to announcements of a study for the treatment of test anxiety; (b) scored above 30 on the debilitating anxiety scale of the Achievement Anxiety Test (Alpert & Haber, 1960);[1] (c) had a cumulative grade point average (GPA) under 3.5; (d) were willing to participate in all of the eight treatment sessions and two assessment sessions; (e) granted permission for the investigator to obtain grade records from the Registrar's office. Students who had the highest degree of subjectively measured anxiety and the lowest cumulative grade point average were selected for treatment.

Measures

Treatment outcome. The Suinn Test Anxiety Behavior Scale (STABS) (Suinn, 1969), the Achievement Anxiety Test (AAT) (Alpert & Haber, 1960), and the Test Anxiety Scale (TAS) (Sarason, 1972) were administered before and after treatment. In addition to these self-report measures, grade point averages were collected for the quarters prior to, during, and following treatment.

Expectations for improvement. In the posttreatment session, subjects in all five groups were asked to estimate what their expected grade point average for that treatment quarter would be.

Treatment efficiency. The number of trials it took each subject to complete the test anxiety hierarchy during treatment was tabulated.

Imagery measures. Subjects in all five groups also completed an imagery assessment before and after treatment. Scenes for this imagery assessment were selected by dividing the 27-item desensitization hierarchy employed by Harris and Johnson (1980) into low, medium, and high anxiety-evoking scenes. One scene was randomly chosen from the least anxiety-evoking section of the hierarchy (items 1–9), a second scene was randomly chosen from middle hierarchy items (10–18), and a third scene was chosen from the most anxiety-evoking third of the hierarchy (items 19–27).

The subject was first presented with a practice scene (i.e., you are taking a walk on a sunny spring day). The client was asked to raise a finger of the right hand when the scene was clearly in the subject's mind. At that point the client was asked to describe what was imagined in detail. After the subject described the practice scene, (s)he was told that a few situations related to test taking would be presented. The same procedure was followed for the imagined test-related scenes as was followed for the practice scene. All subject descriptions were tape-recorded. The order of scene presentation was randomized across subjects.

[1] Prior administration of the Achievement Anxiety Test to university students has shown that a score of 30 employed as a cutoff includes the upper 15% of the distribution of scores on this measure (Snyder & Deffenbacher, 1977).

This same imagery assessment procedure was employed at posttreatment. Although different test anxiety scenes were used, each subject was asked to imagine one scene randomly selected from the low, medium, and high anxiety levels of the hierarchy.

From these pre- and posttreatment scene descriptions, three imagery measures were taken: (1) Elaborateness: The number of words employed by the subject to describe each of the target scenes was tabulated. (2) Stimulus/Response Content: Each sentence of each description was classified as reflecting primarily stimulus or response attributes. When physical details of the object or situation were emphasized, the sentence was classified as reflecting stimulus content. When the sentence emphasized somatovisceral or emotional responses of the subject, it was classified as response-oriented. (3) Coping Content: Each sentence of each description was also classified as reflecting predominantly positive (successful) or negative (unsuccessful) coping. Statements which reflected neither positive nor negative coping were coded as neutral.

Seven raters, naive as to the study's hypotheses, coded the imagery descriptions. Rater reliability was regularly assessed. Raters were always unaware of when reliability checks were made.[2]

Treatment: General Procedures

After measures of general and test anxiety were administered and imagery assessments conducted, subjects were randomly assigned to one of the four treatment groups in a 2 (academic vs. nonacademic coping imagery) × 2 (relaxation vs. no relaxation) factorial design or they were assigned to a waiting list control group. There were 12 subjects in each of the treatment conditions and 15 subjects in the control group. The number of male and female participants was equated across all groups. The first author and one female advanced graduate student in clinical psychology served as therapists, each conducting two of the four types of treatment. All treatments were conducted in groups for 8 weekly, 60-min sessions and were given the same rationale, test anxiety hierarchy, study skills training, and homework assignments.

Each item on the test anxiety hierarchy was presented a minimum of two times. The length of item presentation was either 60 sec or the amount of time for all individuals in the group to imagine the item for a 20-sec anxiety-free period. If a subject signaled anxiety after the second exposure, the item was repeated until no subject signaled anxiety when imagining this item.

All treatment subjects also received study skills training using a modified version of a program developed by Allen (Note 1). It incorporated a number of self-management techniques, as well as instruction on note taking and methods for a systematic attack on both objective and essay exams. Approximately 20 min of each treatment session were devoted to study skills training.

[2] Procedures for sentence classification may be obtained by contacting the second author.

Treatment Manipulations

Each treatment group differed in the type of imagery and relaxation instructions employed.[3]

Covert modeling based upon nonacademic images of competence. For two treatment groups, highly personalized images of competence and proficiency achieved by the subjects in stressful environments other than test taking were paired with visualization of anxiety-eliciting scenes that comprised the test anxiety hierarchy. Prior to the presentation of each item, subjects were instructed (1) to imagine themselves performing well in their personalized coping image, and (2) then to imagine the same confident and competent self-image in the anxiety-provoking situation presented in the hierarchy.

Covert modeling based upon academic images of competence. Subjects in the two other treatment groups were instructed to employ individualized coping imagery based upon academic images of competence (e.g., making presentations, performing difficult problems in class, successful test-taking experiences in the past). It was assumed that test-anxious college students would have some history of academic achievement and success (albeit an intermittent one) in order to have gained college admission. Treatment followed the same format experienced by subjects in the other treatment groups utilizing nonacademic images of competence.

Progressive relaxation. Subjects in two of the treatment groups received training in progressive relaxation and were instructed to use this training while imagining scenes from the anxiety hierarchy. The other two treatment groups received no specific relaxation instructions. Although only two of the treatment groups received relaxation training, all treatment groups received the same total amount of therapist time (i.e., eight 60-min sessions).

RESULTS

Reliability of Stimulus/Response and Coping Content

Reliability between each rater and a "standard" rater (the first author) was calculated for each test scene by dividing the number of agreements by the number of agreements plus disagreements. Reliability ranged from 80% to 100% agreement and averaged 85% for the stimulus/response classifications and 86% for the coping classifications.

Intercorrelations Between Anxiety Measures

Intercorrelations between the anxiety measures are provided in Table 1. As expected, the measures were low to moderately related.

Analysis of Treatment Effects

Twelve subjects dropped out of the treatment groups, leaving 9 subjects in each of the relaxation groups, 8 subjects in the group receiving non-

[3] A detailed session-by-session description of each treatment condition can be obtained from the second author.

TABLE 1
INTERCORRELATIONS BETWEEN ANXIETY TEST SCORES AT PRETREATMENT

Measures	AAT-DA	AAT-FA	STABS	TAS
AAT-DA	1.00	−.64*	.49*	.45*
AAT-FA		1.00	−.29*	−.19
STABS			1.00	.39*
TAS				1.00

Note. AAT-DA = Debilitating Anxiety subscale of the Alpert-Haber Achievement Anxiety Test; AAT-FA = Facilitating Anxiety subscale of this same instrument; STABS = Suinn Test Anxiety Behavior Scale; TAS = Test Anxiety Scale.
* $p < .05$.

academic coping imagery without relaxation, and 7 subjects receiving academic coping imagery treatment without relaxation. Of the control subjects, 13 out of 15 completed the postassessment measures. A MANOVA was conducted on the pretreatment assessment measures completed by the dropouts to determine if they differed significantly from nondropouts. Since this analysis was not significant, data from dropouts were discarded from all subsequent analyses.

To assess the relative efficacy of the four treatment and one control conditions, a MANOVA was conducted using all repeated measures (Service, 1979). Since the groups were significantly different at the multivariate level, $F(24,90) = 2.25$, $p < .003$, further analyses were performed. A MANOVA of the pretreatment scores for the self-report anxiety measures and GPA was nonsignificant, $F(24,102) > 1$, indicating initial equivalence of the four treatment and control groups. Separate repeated measures ANOVAs were conducted for each of the dependent measures. When appropriate, Duncan's Multiple Range Test for pairwise comparisons was used to assess posttreatment differences between groups. Pairwise t tests were employed for assessing pre- to posttreatment changes.[4]

The pre- and postassessment mean scores for all measures of test anxiety and for grade point average are presented in Table 2.

Self-report measures of test anxiety. A repeated measures ANOVA performed on the pre- and posttreatment Debilitating Anxiety scores of the AAT revealed a significant Group × Time interaction $F(4,40) = 4.71$, $p < .005$ (see Table 2). At posttreatment, all four treatment groups scored significantly lower than the waiting list control group, $p < .05$, but were not significantly different from each other. All four treatment groups also showed significant change from pre- to posttreatment, $p < .04$. No substantive change occurred for the waiting list control group.

[4] A 2(Relax) × 2(Image) MANOVA was also conducted to assess the possible main effects of relaxation and imagery used on the treatment outcome measures. No main effects or interactions were found. Additional analyses indicated that there was no main effect for sex of the participant nor did sex interact with any of the treatments employed.

TABLE 2

PRE- AND POSTTREATMENT MEAN SCORES ON MEASURES OF TEST ANXIETY AND GRADE POINT AVERAGE BY EXPERIMENTAL GROUP

Treatment	AAT-DA		AAT-FA		STABS		TAS		GPA	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Nonacademic coping imagery with relaxation (n = 9)	37.2	26.3	21.2	24.6	140	107	23.8	14.7	2.00	2.62
Academic coping imagery with relaxation (n = 9)	34.9	28.6	23.7	25.0	133	100	23.9	14.3	2.32	2.96
Nonacademic coping imagery without relaxation (n = 8)	35.6	24.5	21.0	23.0	161	118	26.3	14.5	2.38	3.00
Academic coping imagery without relaxation (n = 7)	33.7	27.7	22.3	24.1	135	100	24.0	16.7	2.32	2.54
Waiting list control (n = 13)	36.4	36.6	19.2	20.6	144	169	22.5	23.2	2.66	2.08

Note. AAT-DA = Debilitating Anxiety subscale of the Alpert-Haber Achievement Anxiety Test; AAT-FA = Facilitating Anxiety subscale of this same instrument; STABS = Suinn Test Anxiety Behavior Scale; TAS = Test Anxiety Scale; and GPA = grade point average.

The statistical analysis of the Facilitating Anxiety scores at the AAT did not yield a significant Group × Time interaction. The main effects for group, $F(4,40) = 12.88, p < .0001$, and time, $F(1,40) = 9.49, p < .005$, were significant. Each treatment group reported more facilitating anxiety than the control group, $p < .05$. There was an overall increase in pre- to posttreatment scores, $p < .05$ (see Table 2).

When scores on the STABS were analyzed, a significant Group × Time interaction, $F(4,40) = 6.63$, $p < .0006$, resulted. At posttest, all four treatment groups were significantly lower on this measure than was the waiting list control group, $p < .05$. All other group comparisons were nonsignificant. In addition, all four treatment groups scored significantly lower on this measure at posttest than at pretest, while the waiting list control group showed a significant increase, $p < .04$ (see Table 2).

Results of the TAS score analysis also yielded a significant Group × Time interaction, $F(4,40) = 3.47$, $p < .02$. At posttest all four treatment groups scored significantly lower than the waiting list control group, $p < .05$, but were not significantly different from each other. Pre- to posttreatment changes were significant for the nonacademic coping imagery group combined with relaxation, the academic coping imagery group combined with relaxation, and the nonacademic coping imagery treatment without relaxation, $p < .0005$. Pre- to posttreatment changes approached significance for the group receiving academic coping imagery without relaxation, $p < .07$. The waiting list control group showed a slight nonsignificant increase on this measure (see Table 2).

Academic performance. There were no differences between GPAs obtained prior to treatment and those obtained during the quarter in which treatment took place. Consequently, only the GPAs for the pretreatment and posttreatment quarters were analyzed, yielding a significant Group × Time interaction, $F(4,40) = 3.57$, $p < .02$. At posttest none of the four treatment groups were significantly different from each other. Only the academic coping imagery group combined with relaxation and the nonacademic coping imagery group without relaxation were significantly different from the control group, $p < .05$. From pre- to posttreatment, both the nonacademic coping imagery treatment with relaxation and the nonacademic coping imagery group without relaxation showed a significant increase in GPA, $p < .05$. Pre- to posttreatment changes in GPA for the academic coping imagery group combined with relaxation approached significance, $p < .09$. Academic coping imagery without relaxation made a small, nonsignificant increase in academic performance. The waiting list control group significantly decreased on this measure, $p < .04$ (see Table 2).

Expectations for Improved Academic Performance

In the postassessment session, subjects in all four treatment groups were asked to estimate what their grade point average for that quarter would be. No significant differences in group expectations emerged.

Treatment Efficiency

An ANOVA performed on the number of trials participants needed to complete the hierarchy was significant, $F(3,76) = 4.80$, $p < .004$. Both the nonacademic coping imagery combined with relaxation and the nonacademic coping imagery without relaxation were significantly more efficient treatments than the academic coping imagery with no relaxation condition.

Imagery Analyses

For each of the imagery measures (i.e., elaborateness, stimulus/response content, and coping content), separate ANOVAs were conducted on the pretreatment scores to assess whether the dropouts differed significantly from nondropouts; no significant differences emerged.

Scene elaborateness. A 5(Groups) × 2(Time) × 4(Scene) ANOVA was conducted, yielding main effects for Time, $F(1,37) = 4.43$, $p < .04$, and Scene, $F(3,123) = 12.21$, $p < .0001$. At posttreatment, subjects used more words to describe the target scenes than at pretest, $p < .05$. All subjects used more words to describe the three anxiety-evoking scenes than the practice scene, $p < .05$. A 2(Relax) × 2(Image) × 2(Time) × 4(Scene) ANOVA was performed in order to assess whether the addition of relaxation or the type of imagery instruction used differentially contributed to scene elaborateness. There were no significant interactions or main effects for relaxation or imagery instructions on this measure.

Stimulus/response content. In order to control for differing scene length and to normalize the data, all stimulus and response data were subjected to an arcsin transformation. Analysis of either stimulus or response statements through a 5(Groups) × 2(Time) × 4(Scene) repeated measures ANOVA on the transformed scores was essentially equivalent, yielding a significant Scene × Time interaction, $F(93,102) = 3.4$, $p < .006$. Table 3 shows the percentages of stimulus and response statements making up the practice and anxiety scene descriptions. Also shown are the mean transformed scores for both the stimulus and response data from all four scenes. Before treatment, subjects used significantly more stimulus statements in the practice scene and more response statements in the three anxiety scenes, $p < .05$. While both stimulus and response statements were used frequently in the practice scene, response elements clearly predominated in the anxiety scenes, $p < .001$. The high anxiety scene, in particular, showed an almost exclusive use of response statements, significantly more so than the medium anxiety scene, $p < .05$.

At posttreatment a similar pattern of results occurred. More stimulus elements were used in the practice scene, while response statements predominated in the anxiety-scene descriptions, $p < .05$. Both the medium and high anxiety scenes elicited greater response elements than the low anxiety scene, $p < .05$. Note that there was little change from pre- to posttreatment in the relative contribution of stimulus and response statements to subjects' scene descriptions. Additional statistical analyses in-

TABLE 3

PRE- AND POSTTREATMENT CONTENT OF SUBJECTS' IMAGERY DESCRIPTIONS OF THE PRACTICE AND ANXIETY SCENES

	Stimulus				Response				Positive coping				Negative coping			
	Pre		Post		Pre		Post		Pre		Post		Pre		Post	
Scene	%	$\bar{x}$ts	%	$\bar{x}$ts	%	$\bar{x}$ts	%	$\bar{x}$ts	%	$\bar{x}$ts	%	$\bar{x}$ts	%	$\bar{x}$ts	%	$\bar{x}$ts
Practice	57	.872	62	.946	43	.698	38	.624	6	.105	8	.147	1	.020	0	0
Low anxiety	10	.191	30	.498	90	1.38	70	1.07	51	.797	50	.774	23	.386	12	.216
Medium anxiety	18	.311	13	.220	82	1.25	87	1.35	24	.392	61	.938	41	.641	13	.224
High anxiety	5	.097	4	.070	95	1.47	96	1.50	41	.652	50	.758	46	.716	26	.431

Note. $\bar{x}$ts = mean arcsin transformation score. The percentage of stimulus and response descriptions for each scene = 1.00 as each statement was coded as stimulus or response oriented. The percentage of positive coping and negative coping for each scene $\neq$ 1.00 as each statement was coded as positive, negative, or neutral. Neutral data are not provided in this table.

dicated that the type of imagery or relaxation instruction employed did not affect the stimulus/response content of scene descriptions.

Table 3 provides the percentage of positive and negative coping statements used by subjects for each scene as well as mean transformed scores. A 5(Groups) × 2(Time) × 4(Scene) × 2(Positive vs. Negative Coping) repeated measures ANOVA was performed to determine if different treatments made subjects more likely to describe themselves coping successfully or unsuccessfully with the situations presented to them. This analysis yielded a significant Scene × Type of Coping × Time interaction, $F(3,136) = 5.53$, $p < .002$. At pre- and posttreatment very few coping statements of any kind were used to describe the practice scene. In contrast, both positive and negative coping statements were frequently used when describing the anxiety scenes, particularly at pretest. At posttreatment, positive coping statements clearly predominated. From pre- to posttreatment, there was a significant increase in positive coping statements for the medium anxiety scene, $p < .0001$. This was true for all treatment groups, but not for the control group.

A much stronger pattern of results was found when pre-post changes in frequency of negative coping statements were analyzed. A significant decrease in the use of such statements occurred for both the medium and high anxiety scenes, $p < .01$. The pre-post change for the low anxiety scene approached significance, $p < .07$. All treatment groups showed significant decreases in negative coping statements for one or more of the anxiety scenes except for the academic coping imagery group without relaxation. The control group also showed no diminution in the number of negative coping statements used to describe any of the anxiety-provoking scenes.

DISCUSSION

All variations of coping imagery treatment brought about significant decreases in test anxiety as measured by self-report anxiety questionnaires. Three of the treatment groups also evidenced some improvement in academic performance. Treatments involving nonacademic coping imagery without relaxation or academic coping imagery with relaxation were associated with significantly better GPAs than the control condition. Nonacademic coping imagery treatment without relaxation and nonacademic coping imagery with relaxation brought about significant changes from pre- to posttreatment. Academic coping imagery alone was not associated with any significant change in GPA, while the waiting list control group deteriorated on this measure.

It appears that academic coping imagery treatment without relaxation was neither sufficiently powerful to increase GPA nor was it as efficient as the other exposures used in the other three treatment groups. An explanation for this finding may lie in the nature of the coping imagery instruction itself. Academic experiences of competence and success are part of a class of situations (academic or test taking) that for these subjects have a potential to evoke fear and avoidance. Thus, subjects may have more

difficulty producing and maintaining academic images of competence as part of the desensitization procedure because such images are too closely associated with the experience of test taking and its concomitant anxiety. Test-anxious clients often indicate that their negative thoughts are more vivid and perseverant than their images of competence and proficiency. These negative cognitions seem to be overlearned and may be more effectively countered by personalized images of competence and proficiency in a nonacademic activity or situation. By their lack of association with the stressor, nonacademic experiences of competence and success may more successfully evoke feelings of competence and success rather than fear and avoidance. The fact that the addition of relaxation training to the academic coping imagery treatment augmented both its treatment efficacy in terms of GPA and its treatment efficiency, offers some support for this explanation. Relaxation training may have reduced any fear associated with academic images and enabled the student to more clearly focus on images of competence or success in test-taking situations.

Relaxation training did not substantially enhance the effectiveness of the nonacademic coping imagery treatment. Instructions to use personalized covert models who cope effectively seem to be one reliable method of behavior and attitude change (Harris & Johnson, 1980; Kazdin, 1979, 1980). Both personalized coping imagery and study skills training were used in this treatment outcome study. Although study skills training alone is not a highly effective treatment for test anxiety (Harris & Johnson), the combined approach of covert modeling with study skills training may be necessary for change in both test anxiety and GPA. The utility of personalized coping imagery instructions in the absence of study skills training remains to be seen.

The absence of differential expectations of improved GPAs across treatments suggests that the treatments did not differ in credibility. However, the valid assessment of therapeutic expectations is a complicated task that was only superficially addressed in this study. The role of therapeutic expectations, treatment credibility, etc. as part of a personalized covert modeling treatment remains a subject for future scrutiny.

In this study and others (Harris & Johnson, 1980; Holroyd, 1976; Paul & Shannon, 1966), waiting list control subjects deteriorated in GPA. Test-anxious students seem to perform more poorly if their anxieties are left untreated. In contrast, treated subjects actually improved their GPA from pre- to posttreatment (this improvement was statistically significant for two of the four treatment groups), suggesting that treatment did more than simply maintain the status quo.

The use of relaxation as part of treatment was not associated with the production of highly elaborate images. The stimulus/response or positive/negative coping content of the image was also unaffected by the relaxation instructions. Contrary to the findings of Singer (1973, 1974) and Van Egeren et al. (1971), little support was found for relaxation's role in increasing vividness as well as treatment effectiveness. However, the target scenes themselves seemed to have powerful effects on the elaborateness

and content of the imagined descriptions the subjects produced; subjects used more words and more response elements in describing anxiety-evoking scenes.

While Lang (1977, 1979) has proposed that increasing the number of response descriptors of the individual's imagery may be critical to imagery-based treatments, the treatments used in this study did not differentially affect the number of stimulus or response elements subjects used in their scene descriptions. Test-anxious subjects produced response oriented images to test-taking scenes prior to treatment.

However, changing the content of the emotional image may be an important factor in bringing about a successful treatment outcome. Successful treatment was associated with an increase in positive coping statements and a decrease in negative coping for one or more of the anxiety scenes. However, the reduction in negative coping statements was more dramatic than the increase in positive coping statements. These findings are consistent with Wine's (1971, 1980) theoretical position which emphasizes negative cognitions and self-statements as primary ingredients in the test-anxious person's performance problems. Kendall & Hollon (1981) have also highlighted the importance of nonnegative thinking as central to successfully coping with stress.

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RECEIVED: August 13, 1981
FINAL ACCEPTANCE: June 25, 1982