The Role Of Individual Difference Factors In The Efficacy Of Covert Modeling And Self-instructional Training For Fear Reduction

Terrance Michael Vallis

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LA THÈSE A ÉTÉ MICROFILMÉE TELLE QUE NOUS L’AVONS RECEUE
THE ROLE OF INDIVIDUAL DIFFERENCE FACTORS IN THE
EFFICACY OF COVERT MODELING AND SELF-INSTRUCTIONAL
TRAINING FOR FEAR REDUCTION

by

Terrance Michael Vallis

Department of Psychology

Submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

Faculty of Graduate Studies
The University of Western Ontario
London, Ontario
November, 1982
ABSTRACT

This series of studies examined the role of selected individual difference factors in the efficacy of visual imagery (Covert Modeling) and verbal (Self-Instructional Training) coping skills procedures. Specifically, individual differences in imagery-verbal processes were examined. A variety of individual difference measures were employed in an attempt to understand whether previous inconsistent data were due to assessment issues. Also, these studies employed an 'Aptitude-Traitment Interaction' (ATI) design to evaluate the role of the individual difference variables. This design is more powerful than the typical median split procedure.

Study 1 focused on whether ATI effects could be found between Covert Modeling and Self-Instructional Training for rat phobics. Strong ATI effects were generated for behavioral approach as well as subjective fear measures. However, the nature of the assessment of individual differences was crucial. Only the scale which assessed reliance on visual imagery and verbal strategies to cope with fear (i.e., the Fear-Coping scale) was strongly predictive of training gains. Covert Modeling was more effective than Self-Instructional Training for those who relied on imagery to cope with fear, whereas Self-Instructional Training was more effective than Covert...
Modeling for those who strongly relied on verbal fear coping strategies.

Study 2 replicated the predictive validity of this measure in an independent sample of rat phobics. More specifically, there was greater predictive validity for Self-Instructional Training than for Covert Modeling. In addition, ATI effects were generated by measures of intellectual level. Here CM was more effective than SIT for those scoring high. The reverse was found for those scoring low. Also, predictive relationships were found for pretraining fear level measures in Study 2.

Study 3 examined the generalization of these ATI effects to snake phobics. While ATI effects were again found for the Fear-Coping scale, the direction of these effects were reversed. Most of the other scales also demonstrated this pattern of reversal. Possible explanations for this reversal, as well as implications of these data, are discussed.
Dedication
In memory of my Grandmother.
Acknowledgements

The completion of this research represents more than simply an academic achievement. A moment's reflection highlights many personal changes which have accompanied my work as a graduate student. To acknowledge those individuals who have supported me through this discourse is to acknowledge more than an academic contribution. First, I would like to acknowledge Janice Howe's. Her role as confidant, critic, sympathetic ear, and facilitator has contributed to my work in innumerable ways. I especially appreciate her willingness to take time from her own work to assist me. I am most fortunate to have someone as capable and intelligent as Janice as my wife. Second, I would like to acknowledge my advisor, Dr. Brad Bucher. Brad's willingness to allow me to pursue my own ideas, all the while demonstrating interest, input, and encouragement, is particularly appreciated. As well, his willingness to read drafts of this thesis, and provide useful feedback, in what must be record time, was particularly facilitative in completing this work. Third, I would like to acknowledge the contribution of my committee members: Dr. J. Neufeld, Dr. A. Katz, Dr. M. Pressley, and Dr. D. Wolfe. My thesis has been improved as a result of their input. Finally, I would like to thank my parents. Their unconditional positive regard made it much easier for me to endure this trek.
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Introduction

The present series of studies is concerned with identifying individual difference factors that predict differentially the efficacy of a visual imagery-based or a verbal-based coping skill for fear reduction. In this section the efficacy of visual imagery and self-instructional techniques is briefly reviewed. The need for isolating individual, situational, and procedural variables which mediate their efficacy is highlighted. Studies, not necessarily dealing with fear, which identify interactions between specific individual difference factors and imagery/verbal strategies are also discussed. Finally, a methodological framework for understanding such effects is presented. Theoretical models which are implicit in many of these studies will be briefly addressed.

For some time now clinical psychologists have been attempting to isolate factors that would identify specific types of individuals who would benefit from different therapy techniques (Garfield, 1978; Keisler, 1966). Comparatively little has been done in this area with respect to recent cognitive-behavioral training strategies (notable exceptions include Hammen, Jacobs, Mayol, & Cochran, 1980; Ost, Jerremalm, & Johnson, 1981; Safran, Alden, & Davidsón, 1980; Rosenbaum, 1980; Tucker, Shearer, & Murray, 1977).
The present series of studies examines two of these cognitive coping skills; visual imagery (Covert Modeling) and self-instructions (Self-Instructional Training). Covert Modeling (CM), Flooding, Systematic Desensitization (SD), Covert Sensitization, and Covert Reinforcement all depend heavily on visual imagery to mediate treatment effects. On the other hand, Self-Instructional Training (SIT), Cognitive Restructuring, and Rational-Emotive Therapy all rely heavily on verbal self-instructions. Thus, imagery and verbal coping skills form important components of a variety of clinical treatment procedures. It is important, therefore, to establish their efficacy independent of other skills. Many clinical treatments confound several specific coping skills.

Efficacy of Imagery and Self-Instructional Techniques

It is common for researchers and therapists to employ visual imagery and/or self-instructions as part of therapeutic manipulations. These skills have been applied to a wide variety of problems. Their use is partly justified by data which indicate that both visual images and self-instructions are capable of eliciting physiological as well as subjective responses in anxious, phobic, and depressed individuals (Baker & Jessup, 1981; Coleman, 1975; Foa & Chambless, 1978; Marzillier, Carroll, & Newland, 1979; May, 1977; May & Johnson, 1973; McGlynn, Puhr, Gaynor, & Perry, 1973; Rimm & Litvak, 1969; Rogers &
Covert Modeling (CM) and imaginal Flooding represent relatively pure clinical applications of imagery techniques. Typical applications of these procedures generally do not include nonimagery coping skills (such as relaxation). Covert Modeling and Imaginal Flooding differ primarily in the content of the imagery instructions. In Flooding subjects imagine the feared situation in the most fear-provoking form possible. The purpose is to maintain this maximal level of fear for the duration of the scene. In CM subjects imagine the fear arousing scene and then imagine performing successfully in it. They do not try to maximize the amount of fear experienced. It is the coping imagery which is considered critical.

Emmelkamp and Wessels (1975) compared in vivo Flooding with imaginal Flooding in treating agoraphobics. They reported in vivo Flooding superior. Imaginal Flooding improved ratings on several anxiety scales, but failed to improve behavioral tolerance. Interestingly, they reported that some subjects found imaginal Flooding counterproductive. Foa, Steketee, Turner, and Fischer (1980), on the other hand, reported that while imaginal Flooding (1.5 hrs, followed by 0.5 hr of in vivo exposure) was as effective as in vivo Flooding (2 hrs of exposure), at follow-up (mean= 11 months) the imaginal group maintained their gains whereas the in vivo group did not.
Boulougouris, Marks, and Marset (1971) compared imaginal Flooding to Systematic Desensitization (SD) in agoraphobics and situation specific phobics. The nature of these specific phobias was not reported. Systematic Desensitization involves pairing relaxation with visual images of the phobic situation in an hierarchical manner. Boulougouris et al. reported flooding superior to SD for agoraphobics. The two techniques were not differentially effective for specific phobics. However, their protocol involved some in vivo exposure during the final two training sessions and no behavioral index was employed. Rudestam and Bedrosian (1977) found imaginal Flooding superior to SD on physiological measures, with SD being superior to Flooding on participant and therapist ratings. Marshall, Gauthier, and Currie (1977) also compared imaginal Flooding to SD and reported Flooding superior in treating snake phobics. Flooding in this study did not involve imagining adverse consequences. The presence of adverse consequences in the imaginal scenes was manipulated in a follow-up study. Data indicated that when adverse consequences were present the flooding procedure was less effective than a placebo group. When adverse consequences were omitted flooding was superior to the placebo. Similarly, Mathews and Rezin (1977) reported low arousal flooding (scenes involved less than maximum fear) superior to high arousal flooding in treating dental fears.
Although the status of imaginal Flooding relative to other procedures (e.g., SD) has yet to be resolved, the above data warrant the conclusion that, at least under some conditions, imaginal Flooding can be effective. Important variables to be examined would include the presence of adverse consequences in the image and the type of problems addressed.

Covert Modeling (CM) has also received support for its efficacy. Cautela, Flannery, and Hanley (1974) compared CM to Overt Modeling with rat phobics. These treatments were equally effective, and both were superior to an attention control group, on behavioral measures. Overt Modeling was superior to CM on three subjective measures. Harris and Johnson (1980) compared CM, Self-Control Desensitization, Study Skills training, and wait-list control groups in the alleviation of test anxiety. Both CM and Self-Control Desensitization groups received Study Skills training as well. CM was found to be as effective as Self-Control Desensitization on self-report measures and both were superior to the control. Only CM was effective in raising Grade Point Averages (GPA), however. Harris and Johnson (1980) replicated these results on a small number of subjects in a follow-up study.

Other applications of Covert Modeling techniques include Esse and Wilkins (1978), who demonstrated a reduction in snake avoidance by imagining-hierarchical Behavioral Avoidance Task (BAT) items. Thase and Moss
(1976) evaluated CM relative to Guided Participant Modeling with snake phobics. While CM was more effective than a no treatment control, Guided Participant Modeling was superior to CM on behavioral and subjective measures. Thus, as with imaginal Flooding, CM's efficacy relative to other treatments is not unequivocally established, especially when compared to overt behavioral treatments such as Guided Participant Modeling or Overt modeling (see Flannery, 1972; Kazdin, 1978). CM is clearly more effective than control conditions, however. This justifies continued examination of the procedure.

A good deal of work on the efficacy of Covert Modeling has focused on the problem of lack of assertion. Both Rosenthal and Reese (1976) and Hersen, Bellack, and Turner (1979) found CM essentially equivalent to overt modeling procedures. The former study employed college women, the latter, psychiatric inpatients. Kazdin (1974 a,b; 1976; 1979 a,b) has done extensive work, primarily with lack of assertion, on identifying variables which maximize CM's efficacy. Factors such as the following have been found to facilitate CM's efficacy: imagining a model similar to the client (Kazdin, 1974a); having this model appear anxious and overcome the anxiety (coping model) as opposed to showing no anxiety in his/her performance (Kazdin, 1974b; 1976); employing multiple models; and incorporating reinforcement into the model's performance (Kazdin, 1974a). As well, Kazdin (1979a) demonstrated that the addition of
verbal summary codes can facilitate the efficacy of CM, as can allowing the participants to elaborate spontaneously on their image (Kazdin, 1979).

In addition to being effectively applied to anxiety and unassertiveness, visual imagery coping skills have also been applied to pain (Chaves & Barber, 1974; Beers & Karoly, 1979), depression (Gold, Jarvinen, & Teague, 1982; Propst, 1980), and recently, extended to the area of athletic performance (Mahoney, 1979).

Self-Instructional Training (SIT) has also been applied to a wide range of problems. With this technique subjects are taught to employ their self-verbalizations to shift their attention off dysfunctional thoughts and to direct their performance (see Meichenbaum, 1977). SIT has been most frequently used with attention control problems in children (Cellucci & Cellucci, Note 1; Meichenbaum & Goodman, 1971; Kendall, 1977; Kendall & Finch, 1978; 1979a,b; Schlessar, Meyers, & Rodik, Note 2). However, SIT has also been used to deal with anxiety.

Meichenbaum (1972) conducted one of the first investigations of the efficacy of self-instructions in reducing test anxiety. In this study Self-Instructional Training was compared to Systematic Desensitization and waiting list control groups. Results demonstrated that self-instructions were highly effective relative to the control procedure. As well, Self-Instructional Training—
produced nonsignificant trends which suggested greater improvement than that evidenced by Systematic Desensitization.

In working with clinical anxiety Emmelkamp and his associates have evaluated self-instructional treatments. Emmelkamp, Kuipers, and Eggeraat (1978) compared SIT to prolonged in vivo exposure using agoraphobics. Treatment was brief and employed a cross-over design. Although SIT was effective in improving performance on several of the behavioral measures it was much less effective than in vivo exposure. Similarly, Emmelkamp, van der Helm, van Zanten and Plochg (1978) compared SIT plus exposure to exposure alone with obsessive-compulsive patients. Both groups had already been trained in relaxation techniques. Self-Instructions did not facilitate the efficacy of exposure, and on one measure exposure alone was superior to the combined procedure. Emmelkamp (Note 3) replicated the Emmelkamp, Kuipers, and Eggeraat (1978) study using a between group design. At posttreatment behavioral rehearsal was superior to SIT. At one-month follow-up, however, the two treatments were equally effective. SIT's efficacy increased with time, whereas rehearsal subjects relapsed somewhat.

Woodward and Jones (1980) compared SIT with a modified SD treatment, the combination of the two, and a no treatment control in a group of nonspecific anxiety patients. They reported the combination to be superior to each component.
On one measure SIT proved less effective than SD. Woodward and Jones concluded that SIT can facilitate the efficacy of SD, but that it is ineffective by itself. Girodo and Roehl (1978) compared SIT to a preparatory information group, the combination, and a pseudo-treatment control in treating flight phobics. During regular flight conditions the treatments were not differentially effective. However, only SIT subjects coped better than controls during an unexpected event (missed landing).

Mixed results have also occurred when self-instructional skills have been applied to other problems. Meichenbaum and Goodman (1971), as well as Kendall and his associates (e.g., Kendall, 1977; Kendall & Finch, 1978 a,b) report findings which suggest that self-instructional training can improve at least analogue measures of impulsivity in children. Others have been unable to replicate these effects, however (Friedling & O'Leary, 1979; Gold, 1978). As well, some of these studies (e.g., Kendall, 1977) have confounded self-instructional procedures with behavioral procedures (e.g., response cost contingencies). When used to improve pain tolerance self-instructional skills have also received mixed support. While some (Reeves, 1975; Worthington, 1978) have reported positive results, others have been unable to replicate these effects (Hackett & Horan, 1980; Worthington & Shumate, 1981). One possible variable underlying these findings might be the frequent presence of other coping skills
available to the subjects (e.g., relaxation or visual imagery). In contrast to pain reduction relatively positive results have been reported when self-instructions have been applied to the areas of unassertiveness (Craighead, 1979; Derry & Stone, 1979) and anger control (LeCroy, Note 4; Novaco, 1976).

The above review illustrates the variability in outcome of imagery training and self-instructional training studies. Differences in procedure, population and the presence of other coping skills all cloud the issue of efficacy. However, enough positive results have been reported to justify continued examination of these techniques. Studies which attempt to isolate specific conditions under which these skills can be effective are needed. Both individual and situational variables should be examined.

One procedural caveat common to SIT procedures should be noted. Specifically, it is common to use visual imagery in training subjects in the use of self-instructions (e.g., Baker & Jessup, 1980; Emmelkamp, Note 3; Emmelkamp et al., 1978; Emmelkamp et al., 1980; Girodo & Roehl, 1978; LeCroy, Note 4; Tucker, Shearer, & Murray, 1977; Woodward & Jones, 1980). That is, subjects are instructed to imagine visually a situation and then to imagine themselves employing their self-instructions in this situation. The contribution of such visual imagery procedures are not evaluated in these studies and therefore serve as confounds.
Few studies have compared visual imagery and self-instructional skills directly. Bistline, Jaremko, and Sobolemen (1980) compared CM, SIT, the combined procedure, and a wait list control in speech anxious students. Subjects in the SIT group practised self-instructions using visual imagery. All three treatment groups improved significantly and to the same extent on the Suinn Test Behavior Scale and the State-Trait Anxiety Inventory. On the Test Anxiety scale only CM and the combined treatment groups improved significantly. Control subjects failed to improve on any measure. Similarly, Tucker et al. (1977), as well as Akins, Hollandsorth, and O'Connell (1982) have failed to find clear differences in the efficacy of visual imagery and self-instructional training procedures. The former study dealt with social fear, the latter dental fear.

Working with the problem of lack of assertion Twentyman, Pharr, and Connor (1980) were unable to differentiate CM from SIT procedures. Zitomer and Quevillon (1980) attempted to compare CM and SIT with impulsive children. However, they were unable to demonstrate superiority of the training groups over the control procedure. Worthington and Shumate (1981) found visual imagery skills superior to SIT on a pain tolerance task.

These few studies suggest that, at least in fear situations, visual imagery and self-instructional procedures cannot be differentiated from each other in effectiveness. However, due to the paucity of the literature, this
conclusion must be tentative.

While the two treatments both appear to be effective and there is little evidence to suggest that one is superior to the other (except perhaps when applied to pain reduction) both techniques are likely not as effective for some problems or some subject types as they are for others. This is perhaps most clearly illustrated in the review of the efficacy of SIT. While there have been isolated attempts to identify conditions under which treatments are differentially effective (Hammen et al., 1980; Safran et al., 1980 Tondo & Cautela, 1974; Tucker et al., 1979) much is left to be done. The present research focuses on variables that assess the use of and/or ability in visual imagery and verbal skills as predictors of the efficacy of visual imagery and self-instructional coping skills.

**Aptitude-Treatment Interactions**

Generally very little has been done to examine the interaction between individual differences in visual imagery/verbal processes (aptitude variables) and the efficacy of visual imagery and verbal coping skills (treatment variables). The occasional study has been reported in the clinical and other (e.g., cognition, education) literatures. These studies are reviewed below. Due to the obvious relevance to the present research nonclinical studies are also reported. It will be argued that the identification of aptitude-treatment interactions
depends in part on methodological issues (e.g., the design of the study and the nature of the assessment measure).

Tucker, Shearer, and Murry (1977) evaluated self-instructional and visual imagery skills for social fears as they interact with hemispheric preference. That is, the individual difference dimension involved assessing, via contralateral eye movements, preference for employing the right or left hemisphere in information processing. They asserted that hemispheric preference was indicative of cognitive style. Right hemisphere preference was thought to reflect a primarily visual style. Left hemisphere preference was thought to reflect a verbal style. The validity of this model will not be commented upon here. It will be discussed more fully at a later point. At present the issue of outcome will be addressed. Twenty-four subjects were assigned to either imaginal or verbal treatment strategies. The verbal-visual (or eye-movement) grouping was done via median-split procedures. Thus, only 6 subjects per cell were employed. Both treatments involved training in relaxation and emphasizing the use of coping skills at signs of fear. Tucker et al. reported that both subjective and behavioral measures produced a nonsignificant trend such that left movers (therefore imagers) benefited more from verbal training and that right movers (verbalizers) benefited more from imagery training. Unfortunately, the lack of reliable differences prevents clear interpretation of these data. Also clouding the
interpretation are the facts that imagery was employed during rehearsal in the self-instructional group and relaxation was presented to both groups. Finally, there are likely some serious problems with the assessment of cognitive style based on lateral eye movements. This will be discussed later.

Using the Tucker et al. study as a base Akins, Hollandsworth, and O'Connell (1982) investigated whether verbal/visual style interacted with the efficacy of visual imagery and self-instructional training. They classified subjects not by eye movements but on the basis of a 15-item questionnaire, the Verbalizer-Visualizer Questionnaire (V-VQ). The questionnaire was developed by A. Richardson (1977b) who extracted the items from Paivio's Individual Difference Questionnaire (IDQ, Paivio, 1971). The Individual Difference Questionnaire was designed to assess preference for verbal or visual processing of general information (e.g., use of imagery/verbal skills in learning, aesthetic preferences in one direction or another, etc). Akins et al. chose this task because Richardson reported significant correlations between it and the eye movement measure. Other differences from the Tucker et al. study involved the use of extreme groups (quartiles). Also, this study involved the use of subjects who reported fear of dental procedures, not social fear. Subjects were not necessarily phobic, however. They were selected only on the basis of scoring above the mean on the Dental Anxiety Scale.
(DAS; Corah, 1969). No behavioral fear measures were obtained. As with Tucker et al., this study involved only 6 subjects per group.

The data failed to reveal interactions between the Verbalizer-Visualizer Questionnaire and the efficacy of the visual imagery or self-instructional skills. However, on most measures there was no differentiation between training and control groups. No pretraining measures were obtained, which makes training effects difficult to address. Further, the dependent measures employed can be best thought of as only pseudomeasures. That is, subjects were not assessed in an actual dental situation or analogue situation. After they heard a 30 min audiotape (the training procedure) they watched a videotape of someone receiving dental treatment. Fear (subjective and physiological) measures in reaction to this videotape were the dependent variables. In the absence of strong training effects, lack of aptitude-treatment interactions might be due to the low power expected with such a design.

Over the past decade there has been some attempt to relate the efficacy of Systematic Desensitization and other visual imagery techniques to measures of visual imagery constructs. This work has generally produced inconsistent results. Davis, McLemore, and London (1970) recontacted subjects of a desensitization study on snake phobia. They measured imagery by having subjects rank order the sensory modalities elicited by various stimulus situations. The sum
of the ranks for the visual modality was used as the index of imagery. The partial correlation between this measure and behavioral change, controlling for pretreatment performance, was nonsignificant. The imagery measure was related to the initial severity of the phobia, however. Those with higher imagery scores were more phobic. McLemore (1972) replicated this study, employing the Questionnaire on Mental Imagery (QMI, Sheehan, 1969) and the Visual Imagery Control Scale (VIC, Gordon, 1949). Again no relationship was revealed between imagery scores and outcome. McLemore failed to report whether imagery scores were related to severity of the phobia in this study.

Within the context of the Covert Reinforcement paradigm, Tondo and Cautela (1974) were able to demonstrate the predictive validity of a measure of visual imagery. They classified subjects into high and low imagers using the Imagery Survey Schedule (a self-report measure; Cautela & Tondo, Note 5). Subjects estimated the size of circle stimuli (diameter judgements). One-half of the subjects were cued to imagine a pleasant scene following overestimation of the circle diameter, the remaining subjects did not employ imagery. Significant overestimation occurred only for experimental subjects high on the imagery measure. These subjects also reported greater clarity and pleasantness of their images and had shorter latencies to elicit images. In a training study Wisocki (1973) compared a covert reinforcement procedure to a no treatment control
with test anxious subjects. Covert reinforcement involved imagining anxiety eliciting behaviors (as in CM) and then reinforcing this image with a pleasant image. This procedure significantly reduced anxiety and improved self-reports of exam performance. More importantly, Wisocki reported that the amount of improvement was significantly related to the vividness ratings of the imagined scenes employed in training.

Dyckman and Cowen (1978) compared imagery vividness ratings from the Questionnaire on Mental Imagery (QMI) to within therapy vividness ratings in predicting the efficacy of SD for snake phobics. While both measures were predictive, in-therapy ratings showed greater predictive validity. Gold, Jarvinen, and Teague (1982) report significant correlations between in-training clarity ratings of imagery scenes and reduction in Beck Depression Inventory (BDI) scores in an imagery training study for depression. Leboeuf and Wilson (1978) reported data which also highlight the value of obtaining in-training measures. They were examining whether imagery variables could be related to the outcome efficacy of a feedback (EMG frontalis feedback) assisted relaxation treatment. Imagery scores from the Questionnaire on Mental Imagery were unrelated to outcome EMG levels. However, LeBoeuf and Wilson also classified subjects into imagers and nonimagers on the basis of their self-report on how they achieved relaxation. In this case, imagers maintained lower EMG levels than
nonimagers over extinction trials. These data underscore the importance of assessing the strategies subjects employ on a particular task (cf. Berger & Gaunttiz, 1979; Paivio & Foth, 1971). Other data such as Carroll, Baker, and Preston (1979) who related imagery variables to the voluntary control of heart rate, and White, Ashton, and Lewis (1977) working with the effects of mental rehearsal on swimming starts support the hypothesis that imagery variables are related to performance.

An important issue which might underly the inconsistencies in the above data is the nature of imagery assessment. Self-report of imagery vividness is the most common method used. As is clearly illustrated by Danaher and Thoresen (1972), Rehm (1973), and Rimm and Bottrell (1969) assessment using such self-report measures leaves much to be desired. Further, recent commentary on the role of visual imagery in therapy questions the role of vividness per se. Constructs such as affective intensity (Lang, 1977), spontaneous elaboration (Strosahl & Aschough, 1981), or active versus passive imagery (Tower & Singer, 1981) have been put forth as possible mediating factors. Nonetheless, the above data indicate that relationships between visual imagery variables and outcome measures have been found, at least under some circumstances. The issue of the specific nature of the assessment technique, and assumptions implicit in the various types of measures will be addressed more fully at a later point.
Interactions between individual differences in imagery/verbal processes and imagery/verbal strategies have also been reported in areas other than clinical psychology. Specific studies in the areas of cognition and education have been reported. Hollenburg (1970) employed spatial ability tasks to divide children into high-low (extreme) groups. These groups were compared on label learning and concept formation tasks. Hollenburg reasoned that imagery would facilitate label learning but interfere with concept formation. The latter would occur because the readily generated image (a specific instance) would interfere with identification of similar category instances, important in concept attainment. Her data indicated a strong aptitude-treatment interaction. Those in the high imagery group were significantly better than the low imagery group in label learning. This same group was significantly worse than the low imagery group in concept formation, however.

Stewart (1965) compared high and low imagers (extreme groups formed on the basis of the Flagg’s and Space Relations tasks) on ability to learn verbal (word) and nonverbal (imagery) associations. He also found significant aptitude-treatment interaction effects. High imagers were superior to low imagers in learning nonverbal associations. The reverse occurred with verbal associations. Delaney (1978) assessed subjects using verbal as well as spatial tasks. He compared extreme groups on memory tasks where verbal or imagery elaboration instructions were manipulated.
Strong aptitude-treatment interactions resulted for the verbal scale; trends were generated by the imagery scale. High verbalizers did better than the low group with verbal elaboration instructions. With imagery elaboration instructions high verbalizers did worse. DiVesta and Sunshine (1974) also identified ATI. They divided subjects into high and low imagery groups using spatial tasks (e.g., Space Thinking; Space Relations tasks). Subjects were required to employ either a verbal or imagery strategy in learning paired-associates. The high imagery group performed better than the low imagery group under the imagery strategy. Although not significant there was a trend for the low imagery group to be superior under verbal mediation instructions.

In a study attempting to reduce hyperactivity in male school children Bugental, Whalen, and Henkin (1977) uncovered aptitude-treatment interactions between attributions of personal control and self-instructional training versus a contingent social reinforcement procedure. Self-instructional training was found to be particularly poor for those scoring low on attributions of personal control. The training groups did not differ for those with high attributions of personal control.

To summarize, aptitude-treatment interaction effects between imagery/verbal processes and/or visual imagery and verbal strategies have been identified, at least in the cognitive paradigm. Clinical studies have produced mixed
results. It is difficult, however, to find consistently strong effects. This may possibly be due in part to methodological factors. Specifically, these factors might include the design of the ATI studies as well as the nature of the assessment measures used. Each of these issues will now be addressed.

Methodological Considerations

Design issues. The most typical procedure for assessing the influence of individual differences in imaginal/verbal processes has been the median split of subjects into high and low groups. Given that the individual difference measures are, in all likelihood, more continuous than dichotomous in nature this creates problems. That is, there will be more variance within each group than is desirable. Clearly, this can influence the power of such analyses. Even extreme groups, which reduces this problem, still pose difficulties. These difficulties include having to (a priori) make some decision as to how extreme the groups should be. The degree of separation of groups would depend on the strength of the relationship between the predictor and the performance measure. But this is often not known when extreme groups are decided upon. Also, extreme groups would not be sensitive to important but nonlinear relationships between predictor and performance variables. Alternatively, regression procedures would be more sensitive to relationships between interval/ratio level predictors and
performance measures.

Cronbach and Snow (1977) have explicated a methodology which combines experimental and regression techniques to assess the presence of interactions between different treatment procedures and interval level predictor variables. They refer to this as an Aptitude-Treatment Interaction design (called ATI). Procedurally, subjects are randomly assigned to two (or more) treatment conditions. The analysis involves calculating regression equations for each treatment group separately, using the individual difference (aptitude) measures to predict outcome. Differences between the regression slopes for the different treatments indicates an ATI. For instance, assume that when some aptitude measure (VarX) is regressed on the outcome of a treatment A the regression slope is +2.5. Further assume that the regression slope for VarX regressed on some treatment B is -1.4. In this case the regression slopes cross over and indicate that the efficacy of treatment A is enhanced the greater the score on VarX. The opposite is true for treatment B, however. Thus, for those who score high on VarX treatment A is better than treatment B. For those who score low on VarX treatment B is better than treatment A. Regression slopes need not crossover to indicate an ATI. Nonparallel slopes are all that is required (see Cronbach & Snow, 1977).

The actual test for ATI effects involves creating a dummy variable to represent the treatment condition.
Separate regression equations are then calculated. The most important equations involve: (a) the regression of the dummy variable and the predictor on outcome for all subjects, and (b) the regression of the dummy variable, the predictor, and the interaction between the dummy variable and predictor on the outcome for all subjects. The interaction term is created by multiplying the dummy variable by the predictor. This variable takes into account differential relationships between the treatments. An F-ratio is then formed by dividing the difference between the amount of variance accounted for by (a) and (b) by the variance accounted for by (b), each divided by their appropriate degrees of freedom. This F-ratio identifies differential relationships between the two treatment groups.

Once a significant ATI has been identified there are statistical procedures which allow one to identify specific regions within the distribution where the two (or more) treatment groups differ significantly. This procedure is called the Johnson-Neyman technique (Johnson & Neyman, 1936, cited in Potthoff, 1964). It has been extended by Potthoff (1964) and by Serlin and Levin (1980) to produce regions within which the treatment conditions differ significantly. Rogosa (1980) has reviewed statistical techniques which test for nonparallel regression lines and considers this technique as a conservative one. The advantages of the Johnson-Neyman technique over treating the predictor as a
nominal variable should be clear. The technique takes into account the strength of the predictive relationship and identifies specific differentiated regions. One is then able to obtain an understanding as to how important such effects might be. For example, it would allow one to calculate how many standard deviations above the mean predictor score group differences can be detected. Also, the proportion of subjects for whom the treatments can be significantly differentiated can be readily identified.

This methodology is particularly well suited when one expects different relationships between some individual difference measure and 2 or more treatments, as is the case in the present research. It has been most frequently applied in the Education area (e.g., Corno, Mitman, & Hedges, 1981; Janicki & Peterson, 1981; Peterson, Janicki, & Swing, 1980). Peterson, Janicki, and Swing (1980) found, among other effects, ATIs involving the type of classroom instruction (lecture; inquiry; public issues discussion) and ability as well as anxiety factors. Similarly, Janicki and Peterson (1981) employed the methodology to uncover ATI effects between attitude and locus of control variables and type of instruction (direct instruction versus a small group variation). Due to its obvious value the ATI methodology will be used in the present research.

Type of assessment employed. Another factor which might influence the finding of ATI effects is the specific device
employed to assess individual differences. Many types of measures have been employed; including eye movements, vividness ratings, spatial ability tasks, cognitive style measures, etc. All of these cannot be assumed to measure the same construct. Indeed, studies which assess relationships between different measures of imagery/verbal processes consistently demonstrate a lack of relationship between the different measures (Danaher & Thoresen, 1972; Rehm, 1973; Rimm & Bottrell, 1969). The range of measures likely taps different processes. They also differ in terms of the implicit assumptions (i.e., theoretical models) which underly them. In this section the different types of measures, and the assumptions underlying them, will be explicated. The most frequently employed measures will be considered.

The specific measures that will be presented include measures which have developed from an information processing model, as well as a neuropsychological model of ATI effects. In an attempt to consider alternative explanations a conditioning (learning theory) model for ATI effects will also be presented. Although the present research is not primarily concerned with identifying the most appropriate theoretical model the author believes it is important to identify theoretical assumptions underlying the range of individual difference measures available.

Information processing model. Most of the measures can be tied, at least loosely, to an information processing
model. These measures are designed to assess specific characteristics of the individual (e.g., ability to generate vivid images; ability to perform mental rotation tasks; self-reported preferences for verbal or visual imagery processing). Such characteristics are then related to how effectively the individual can acquire and/or execute imagery/verbal strategies (e.g., perform a paired-associate learning task with verbal or visual elaboration strategies). Generally, the information processing model has given rise to three types of measures: self-report vividness of imagery measures, spatial/verbal ability (performance measures, and self-report cognitive style measures. All three of these types of measures assume that they are assessing static abilities or traits (Tower & Singer, 1981). That is, they assume that a person classified as high on imagery ability would employ imagery in virtually every task and circumstance. Katz (in press) questions the validity of this 'trait' assumption, however. The implications of this assumption will be discussed as the different measures are presented.

First, consider subjective vividness ratings. Self-report vividness measures most frequently involve having subjects rate the vividness of elicited visual images (e.g., the Questionnaire Upon Mental Imagery, QMI, Sheehan, 1967; and the Vividness of Visual Imagery Questionnaire, VVIQ, Marks, 1973), or the ease of manipulating images (the Visual Imagery Control Scale, VIC, Gordon, 1949). This type
of measure was employed by Davis et al. (1970), McLeomore (1972), Dyckman and Cowen (1978), Gold et al. (1982) LeBoeuf and Wilson (1978), as well as Wisocki (1973) (see above review).

Ernest (1977) has reviewed the cognition literature which is concerned with individual differences in imagery variables and how such individual differences influence cognitive constructs (e.g., recognition, recall). She concluded that visual imagery vividness ratings were predictive of incidental recall of verbal and nonverbal material, and possibly of the rapid generation of visual images and of divergent thinking. These measures were unrelated to tasks requiring implementation of recall strategies. As well, the different vividness rating scales were found to vary in their ability to predict performance. The Vividness of Visual Imagery and Visual Imagery Control scales appeared to be more predictive of the above variables than the Questionnaire on Mental Imagery. White et al. (1977) have also reviewed self-report visual imagery vividness tests. While they report reasonable test-retest reliabilities for most measures they also note that these measures tend to be associated with measures of social desirability. This finding has been replicated by A. Richardson (1977b) and also by Divesta, Sunshine, and Ingersoll (1971), but not by Hiscock (1978).

The inconsistency in results when vividness ratings are employed, along with the possibility that such measures may
reflect social desirability, might make them less than optimal for future research. In addition, a major difficulty arises with the types of judgments that subjects are asked to make in these scales. To rate the vividness of one's visual image on a scale assumes that individuals are using the same standard. However, it might be that different subjects employ different standards (i.e., one person's '5' might not be the same as another's '5'). Cross-subject comparison with these types of scales might therefore be suspect. Such comparisons could be improved by the use of specific behavioral descriptors of the various scale values. In this way the specific ratings would mean similar things to different subjects. Another difficulty with vividness rating scales from a clinical perspective is that the visual images upon which respondents are asked to make judgements differ from the emotional images employed in therapy (see Anderson & Borkovec, 1980; Lang, 1977; Strosahl & Aschoff, 1981). Those images from which vividness ratings are made tend to be static, neutral or pleasant visual images which contain few response propositions; i.e., descriptions of affective responses (see Lang, 1977; Lang, Melamed & Hart, 1970; Anderson & Borkovec, 1980). In therapy, however, the visual images participants are asked to elicit are active, frequently unpleasant, and full of response propositions; i.e., they are much more rich than images involved in subjective rating scales (Anderson & Borkovec, 1980). Further, in therapy images are not restricted to the visual modality. For these
reasons vividness ratings might be unreliable indicators of the processes which are involved in behavior change. Perhaps it would be more profitable to focus on imagery measures taken during therapy (Dyckman & Cowan, 1978) and possibly involving physiological indices (Anderson & Borkovec, 1980) or descriptions of the image detail (see Lang, 1977), rather than vividness ratings. Only in cases where vividness ratings covary with the habitual use of imagery skills or the degree of arousal elicited by the image would one expect to find a relationship between imagery vividness ratings and outcome. Despite this, a measure of self-report vividness (the Vividness of Visual Imagery Questionnaire) is included in the present studies so that its predictive power can be compared to other scales. Results can also be compared to past literature.

Second, consider spatial ability measures. These measures generally involve presenting stimuli which need to be mentally rotated in a variety of directions (e.g., the Flagg's Test, Thurstone & Jeffrey, 1956), or involve two-dimensional stimuli which must be mentally folded into three dimensions (e.g., the Space Relations test, Bennett, Seashore, & Wessman, 1947). Typically, several response alternatives are provided and respondents must choose the correct alternative(s).

Spatial ability tests were reported by Ernest (1977) to be predictive of most performance measures which she reviewed (i.e., verbal learning, incidental learning,
verbal-nonverbal memory, perceptual processes, mental manipulative operations, concept identification, creativity, and problem solving). Data suggested that high spatial ability scorers tended to use visual imagery if encouraged and were able to use visual imagery effectively when conditions were not conducive to imagery use. As well, Ernest reported a trend such that high spatial ability scorers performed poorly when verbal stimuli were employed or verbal strategies were encouraged. These conclusions are consistent with those of Hollenberg (1970), Stewart (1965), Delaney (1978), Divesta and Sunshine (1974) as well as Bugental et al. (1977) (see above review). All of these studies employed spatial ability tasks.

The predictive ability of spatial ability measures has not, to the author's knowledge, been evaluated in more clinical situations. While they need be examined in this context one must note that the abilities tapped by these measures might not correspond to the abilities required in such clinical situations. Specifically, these tests measure the ability of individuals to perform a variety of mental manipulations and comparison judgements based on these manipulations. Success at this task might be related to the ability to form detailed and clear images, but one must note the lack of correlation between performance and subjective vividness rating measures. Also, this type of imagery activity is much different from that employed in therapy. Success at this task may not be related to success at
effectively learning and employing imagery in therapy. Finally, individuals might not necessarily rely on imagery to perform these tasks. This is an empirical question, however. In the present studies the Space Relations task is used to assess spatial ability.

Third, the information processing model has given rise to preference/habitual style measures. These measures are intended to assess a general style (habit) of processing information in either a verbal or imaginal manner. Unlike the above types of measures, ability is less of an issue for these scales. It is generally acknowledged that individuals have the ability to use either verbal or visual imagery styles (e.g., J. Richardson, 1978). For instance, one could encode and/or store a list of words by employing either visual imagery (e.g., evoking an image of each of the stimulus words) or verbal strategies (e.g., making a meaningful sentence out of a word). Given this, different individuals are likely to show different preferences for these types of strategies. The issue is not one of which strategy they better able to employ but one of which strategy they habitually employ. One can then relate these preferences to skill at acquiring and implementing imagery/verbal strategies.

Akin et al. (1982) as well as Gold et al. (1978) (reviewed above) have unsuccessfully employed the Verbalizer-Visualizer Questionnaire (V-VQ) to predict outcome of analogue studies of dental fear and depression,
respectively. More successful use of this type of measure has been reported in the cognition literature. Ernest (1977), in her review, concluded that using Paivio's Individual Difference Questionnaire (IDQ) to classify subjects as verbalizers or visualizers was predictive of verbal recall performance (as well as image generation data). Hiscock (1978) found a significant correlation between the visual scale of the Individual Difference Questionnaire and a test assessing interests and values. Subjective and performance measures failed to show such a relationship. Similarly, A. Richardson (1977a) reports data to suggest that the Verbalizer-Visualizer Questionnaire is related to independent measures of verbal and nonverbal functioning. Verbalizers did better than visualizers on the Mill Hill Vocabulary test. Visualizers did better than verbalizers on visual tasks. Interestingly, both the Individual Difference Questionnaire and the Verbalizer-Visualizer Questionnaire have been found to be generally free from social desirability (Hiscock, 1978; A. Richardson, 1977a;b). Collectively, these data suggest that a reported preference or style for the use of visual imagery or verbal strategies can be related to skill in the use of that strategy. This justifies the use of these types of measures in clinically relevant situations. In the present studies, the Individual Difference Questionnaire (visual and verbal scales), and its derivative, the Verbalizer-Visualizer Questionnaire, is employed.
As mentioned earlier, all of the above measures assume that the constructs assessed are static traits. It might be the case, however, that a person's efficacy at using imagery and/or verbal skills is in part dependent on situational, motivational, or other factors. Indeed, the Dyckman and Cowan (1978) and LeBoeuf and Wilson (1978) studies cited above suggested that situation specific measures of imagery were more predictive than general imagery measures. Data by J. Richardson (1978) is also consistent with this perspective. He assessed subject's tendency to code stimuli as either pictures or words. In his series of studies he found that vividness ratings (the Questionnaire on Mental Imagery) as well as a spatial ability task (the Flagg test) were unable to predict recall performance. The coding style measure, which was relatively independent from the subjective or performance measures, was, however, highly predictive of recall performance. Katz (in press), working within the cognition area, reviewed the issue of what it means to score high on tests of visual imagery. He considers skill (how to use the strategy), monitoring sensitivity (when to use the strategy), preference, and self-presentation style as possible mediators of imagery 'ability'.

Given that imagery/verbal skill use might be situationally dependent, a task which attempts to assess situational dependence will be constructed for use in the present studies. The characteristic use of visual imagery
and verbal strategies in fear, anger, and pain related situations will be assessed. In addition, the use of these strategies for coping as well as catastrophizing is addressed.

Neuropsychological model. The majority of individual difference measures are derived from an information processing model. However, the contralateral eye movement task implicitly endorses a neuropsychological view of information processing preference. While this task has not been frequently employed, at least one group (Tucker et al., 1977; Tucker & Newman, 1981; Shearer & Tucker, 1981) do relate this issue to training effects in clinical contexts.

In the contralateral eye movement task subjects are asked a series of reflective questions. Their eye movements are monitored as they answer. The direction in which they first glance once the question has been asked is thought to indicate preference for processing with one hemisphere or the other. If an individual consistently glances to the right they are thought to prefer the left hemisphere and therefore rely on verbal processing. If they consistently glance to the left they are thought to prefer the right hemisphere and rely on imagery processes. Those who rely on verbal processes are believed to benefit more from verbal strategies than imagery strategies. Vice versa for those relying on imagery processes. Again, this model implicitly assumes that such a preference applies in virtually all situations.
The theoretical value of this model will not be addressed here. Instead, concern is with the nature of assessing imagery/verbal preferences; i.e., contralateral eye movements. Although the relationship between eye movements and processing style has been repeatedly asserted (Bakan, 1969; Day, 1964; Kosel, Galin, Ornstein, & Merrin, 1972; Kinsbourne, 1972) there is little data to suggest that left movers are more facile at learning and employing imaginal skills relative to verbal skills and vice versa for right movers. Available data suggest differences between left and right movers on hypnotic susceptibility tasks, preference for social science majors, and ratings of image vividness (Bakan, 1969). This is not the same as determining a characteristic style of processing information, however. Further, the classification of direction of eye movements is far from reliable. Direction is influenced by such factors as the type of questions asked (Bakan, 1969; Gur, 1975; see also A. Richardson, 1978, who found results opposite to Bakan); whether the experimenter is positioned in front of or behind the subjects when the questions are asked (Gur, 1975); the characteristics of the experimenter, especially for female experimenters (Richardson, 1978); and the anxiety level of the subject (Day, 1969). As a final comment it is the author's opinion that assessing type of processing by characteristic eye movements involves a longer chain of inference than is necessary. From eye movements processing style is inferred and this inferred variable is then related to performance.
It would be more profitable to focus on the assessment of processing style more directly. Thus, while Tucker et al.'s interest in relating training techniques to processing style is valuable their classification is poor. For these reasons this type of measure is not employed in the present studies. The model is presented to illustrate the assumptions underlying the contralateral eye movement measure. Recall that this measure has been employed in two of the few clinical ATI studies (Akins et al., 1982; Tucker et al., 1977).

Conditioning model. To the author's knowledge there is no clear explication of a conditioning model for ATI effects. However, learning theory does make relevant testable predictions. The model is presented because the author believes it is important to consider alternative theoretical models for ATI effects.

A learning theory perspective might consider verbal and visual stimulus representations as conditioned stimuli. That is, self-verbalizations and visual images about the phobic situation could be paired with actual phobic encounters. Conditioning history could account for one or the other of these forms of stimulus representation (visual images or self-verbalizations) eliciting greater fear. If for instance, more fearful situations were associated with visual imagery relative to self-verbalizations about the feared situation greater fear would be expected to be elicited by the visual images. It would follow then, that a
training strategy which employed the form of stimulus representation most feared (visual or verbal) would elicit greater fear than if the training strategy involved the form of stimulus representation less feared. Exposure to a more fear arousing stimulus might produce greater fear reduction via extinction. That is, extinction of fear might be greater when the stimulus presented elicits greater fear. If this is the case, greater training effects would be expected when the form of stimulus representation matches the mode of treatment.

Again, it should be noted that this model is not clearly stated in any relevant literature. However, it should be kept in mind as an alternative perspective when trying to understand ATI effects. To this end, an attempt is made in the present studies to assess which form of stimulus representation (visual or verbal) subjects find most frightening.

The present series of studies does not attempt to identify which model best fits the data. This would be premature. First, it has to be established that individual difference factors can in fact reliably predict training effects. Thus, the purpose of these studies is to employ a variety of measures available to predict training effects. This will allow one to address whether ATI effects are dependent on the nature of the assessment task. If ATI effects are consistently shown for some types of measures and not others, this would have meaningful implications,
both methodological as well as theoretical. These implications will be considered if the data indicate that reliable ATI effects exist.

The present research involves three studies examining ATI effects between Covert Modeling and Self-Instructional training procedures for animal phobias. Study 1 examines whether ATI effects can be identified. Study 2 focuses on the replicability of such effects. Study 3 is concerned with the generalizability of ATI effects across phobic stimuli.
STUDY 1

Study 1 examined whether aptitude-treatment interaction effects could be identified between Covert Modeling (imagery) and Self-Instructional Training (verbal) procedures for fear reduction in rat phobics. Specifically, this study investigated whether the nature of the assessment device was an important variable in identifying such ATI effects. Consistent with the discussion above, a variety of measures were used to assess subjects' use of imagery/verbal strategies. These measures included: (a) use of imagery/verbal strategies in specific, clinically relevant situations, (b) general preference for processing information in a visual imagery or verbal manner, (c) spatial/verbal ability tasks, (d) subjective vividness of visual imagery ratings, and (e) a measure of whether verbal or visual stimulus representations of the phobic object produced greater fear. As training was relatively brief (i.e., involved a single session) the efficacy of CM and SIT is specifically addressed. Also, relationships between individual difference measures and pretraining performance is examined. Recall that Davis, McLemore, and London (1970) reported a positive correlation between their visual imagery measure and severity of the phobic response.
Method

Participants

Screening Criteria

Subjects were screened for this study in two steps. Initially they were screened from a subject pool through the use of an 11-point self-report rating scale. Potential subjects rated their fear of rats (one subject participated due to fear of cats) on this scale. To facilitate comparison across subjects this scale had behavioral descriptors at the 0, 5, and 10 scale values (i.e., 0 = No fear; could easily handle a live rat; 5 = Fear; could not touch a live rat; and 10 = Extreme Fear; could not enter a room with a rat). Subjects who rated their fear 6 or above (could not touch a rat due to fear) were then screened on a 15-step Behavioral Avoidance Task (BAT). This was the second step in the screening process. Subjects who were unable to make contact with the caged animal were labelled phobic and received training.

Sample Description

Seventy-one introductory psychology students (45 females and 26 males) met the initial screening criteria. Of these 71, 45 were eliminated from the training phase due to failure to meet the second screening criteria. Of the 26 phobics trained, 21 were female and 5 were male. These
subjects were randomly assigned to Covert Modeling (n = 14) or Self-Instructional Training (n = 12). Two males received CM, three received SIT. All 71 subjects completed the individual difference measures and the pretraining Behavioral Avoidance Task (BAT). Subjects received course credit for their participation.

Materials

Phobic Stimulus

The phobic stimulus was a large (600 gr) male hooded laboratory rat. The animal was housed in a 40 cm X 30 cm X 30 cm plexiglass cage. The cage opened by lifting the hinged top and was placed on a table 90 cm high. A heavyweight leather glove was placed beside the cage. It was employed in the BAT.

Assessment Measures

The following measures were included to assess individual differences in imaginal/verbal processing. A brief definition of these measures and the direction in which they are keyed appears in Table 1.

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INSERT TABLE 1

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Table 1

Descriptions of the Individual Difference Measures used in Study 1

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<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Style Questionnaire</td>
<td>Subjects rated how characteristic visual imagery and verbal strategies were of them for coping with or catastrophizing about fear, anger, or pain situations. There are six scales: Fear-Coping, Fear-Catastrophizing, Pain-Coping, Pain-Catastrophizing, Anger-Coping, Anger-Catastrophizing. High scores indicate a strong reliance on imagery strategies.</td>
</tr>
<tr>
<td>Individual Difference Questionnaire</td>
<td>Subjects responded to 86 True-False questions. Questions were designed to assess a preference for visual or verbal information processing styles. Three scales are derived from this measure: Visual Scale; high scores indicate a preference for imagery processing. Verbal Scale; high scores indicate a preference for verbal processing. Verbalizer-Visualizer Questionnaire, high scores indicate a preference for imagery processing.</td>
</tr>
<tr>
<td>Space Relations</td>
<td>A spatial ability task. Subjects were presented with two-dimensional figures. They had to choose from 5 three-dimensional stimuli those which the 2-dimensional stimulus could represent if folded into three dimensions. High scores indicate greater spatial ability.</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>Subjects generated as many 4-letter words beginning with 'c' and then as many 5-letter words beginning with 's' that they could. They were given 60 sec for each task. High scores reflect greater verbal fluency.</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>Subjects rated the clarity of their visual images of 15 specific situations. High scores indicate less vivid images.</td>
</tr>
</tbody>
</table>
1. Cognitive Style Questionnaire. This questionnaire was developed for use in the present series of studies (see Appendix A). It was designed to assess how typical imagery and verbal strategies were in specific stressful situations. Separate judgements were made for coping with as well as catastrophizing about these situations. These judgements were obtained by presenting specific scenarios. The scenarios were presented in detail and dealt with fear-arousing, painful, or anger-arousing events. Following the detailed description of the situation, subjects were presented with specific reactions to the situation. For example, in a fear-arousing situation the reaction might be, 'you try to calm yourself', or 'you begin to panic'. These reactions involved either attempts at coping with the stress or catastrophizing about the stress. Each situation contained at least one coping and one catastrophizing reaction.

To each of the coping or catastrophizing reactions to the particular situation, subjects had to decide how characteristic each of two alternative styles of responding were of them. That is, they had to decide how frequently they would employ each of the two styles in that situation. The two alternatives involved an imagery-related style (e.g., you would deal with the anxiety by imagining walking up to the counter and returning the defective material) or a verbal-related style (you would deal with your anxiety by telling yourself, 'just walk up to the counter and tell the
clerk you are not satisfied'). Subjects indicated how characteristic each of these styles was by dividing 100% between the two. That is, if they would employ one strategy 100% of the time and the other 0% they would respond 100-0. If they would employ both strategies equally often they would respond 50-50, and so on. The ratings were to total 100 between the two alternatives. Thus, subjects had to choose between the two strategies.

Responses were keyed in the direction of imagery use. That is, the higher the score the greater the reliance on imagery in that particular situation. Separate scores were calculated for the coping and catastrophizing reactions for each of the fear, pain, and anger scales (6 scales).

2. Individual Difference Questionnaire (IDQ, Paivio, 1971). This is an 85 item True-False questionnaire designed to assess whether subjects rely on a primarily verbal or imaginal style of processing information (see Appendix B). Two scale scores are derived from this test. One is designed to assess verbal processing (47 items). The other is designed to assess imagery processing (39 items). A. Richardson (1977a,b) has developed the Verbalizer-Visualizer Questionnaire (V-VQ) by extracting 15 items from both scales of the Individual Difference Questionnaire. In this study scores for the Individual Difference Questionnaire-verbal and visual scales, as well as the Verbalizer-Visualizer Questionnaire were employed.
3. Space Relations Test (Bennett, Seashore, & Wesman, 1947). This test involved presenting diagrams of 2-dimensional figures as stimuli. Subjects selected from among five 3-dimensional response figures those that the 2-dimensional figure could represent if it were folded into three dimensions and rotated. For each stimulus there was up to five correct responses. Subjects were to select all correct stimuli. A 10 min time limit was set on this task.

4. Verbal Fluency Test (see Lezak, 1976). In this task subjects were instructed to generate as many four letter words that began with 'c' and then as many five letter words that began with 's' that they could think of. They were given 60 sec to complete each of these tasks. The Verbal Fluency score was the total number of words written on both tasks.

5. Vividness of Visual Imagery Questionnaire (VVIQ, Marks, 1973). This self-rating questionnaire (Appendix C) consisted of having subjects rate the vividness of their visual images of four specific scenes. For each scene the subject was to imagine some aspect (e.g., the scene was a quiet lake, the aspect was the sun reflecting off the water). Subjects rated the vividness of the image on a 5-point scale (1- very vivid, 5- not vivid at all). Fifteen images were rated and the total score was employed in subsequent analyses. With this scale the lower the score the more vivid the image.
6. **Verbal-Visual Arousal Scale.** An attempt was made to assess which form of stimulus representation (visual or verbal) subjects found most frightening (see discussion of conditioning model above). Subjects responded to a forced-choice question where they were to indicate whether self-verbalizations about the phobic object or visually imagining the phobic object was more frightening.

**Outcome Measures**

Both behavioral and subjective outcome measures were included.

1. **Behavioral Avoidance Task (BAT), Approach Scores.** The BAT involved 15 hierarchical steps. For the first step subjects stood 10 ft away from the caged animal. In subsequent steps subjects approached the cage (steps 2-4), touched the closed cage with and without a glove (steps 5-6), placed a gloved and bare hand into the cage (steps 8-9), touched the animal with and without a glove (steps 10-11), held the animal with and without a glove (steps 12-13), picked up the animal from the cage without a glove (step 14) and finally held the animal with both bare hands away from the cage for 30 sec (step 15).

Subjects were instructed to complete as much of the task as they could. They were told that if they felt too frightened to continue they could ask the experimenter to stop the task. The experimenter stood behind the subjects.
during the task, verbally described each step following completion of the previous step, and recorded steps completed and fear ratings at each step (see below). None of the approach behaviors were modeled by the experimenter and questions went unanswered (other than to restate, if asked, that the animal was harmless). The number of steps subjects were able to complete was used as the behavioral approach measure.

2. Behavioral Avoidance Task (BAT), Fear Ratings. Subjects rated their subjective fear level following each step of the BAT, using an 11-point rating scale. They were given a copy of this scale, which had behavioral descriptors at the 0 (no fear), 5 (moderate fear) and 10 (extreme fear) points. To facilitate comparison across subjects all subjects were familiarized with the scale and what each of the points would mean in behavioral referents. Following each BAT step the subject would call out their rating and the experimenter would record it. Mean fear ratings, over the number of steps completed, were used as a major dependent measure. Posttraining mean fear ratings were calculated only on the number of steps completed at the pretraining assessment. In this way pre- and posttraining scores are directly comparable.

3. Additional Self-Report Measures. First, prior to the BAT assessment subjects rated their fear of rats, mice, snakes, and spiders on 7-point Fear Survey Schedule type scales. Second, following the pre- and posttraining BATs
subjects responded in writing to an open-ended question which asked them to describe what was going through their minds as they were performing the BAT. Third, during training subjects rated the difficulty they experienced in employing the skill on practice trials. Clarity of image ratings were also made at these points by subjects in the CM group. Fourth, following the posttraining BAT subjects rated the difficulty they experienced in using the skill at this exposure, the percentage of time they employed the skill, and how useful they believed the skill was. In an attempt to identify whether the ease at acquiring and/or executing the particular skill might mediate ATI effects correlations between scales which produce ATIs and difficulty ratings will be made. Thus, difficulty ratings are employed both as outcome and process variables in the present and subsequent studies.

**Procedure**

**Subject Selection**

Upon arrival at the lab, subjects completed a consent form. No subject refused to participate in the study. This was followed by the administration of the individual difference measures and fear ratings, and then the BAT. Nonphobic subjects, those able to make contact with the animal, were debriefed and dismissed following the BAT. Phobic subjects were randomly assigned to one of two training conditions, either Covert Modeling or
Self-Instructional Training.

**Training Protocols**

Training protocols were designed to be as similar as possible, except for the focus on imagery or self-instructions. Both training protocols consisted of three phases: rationale, training, and rehearsal. Each training condition took approximately one hour.

**Rationale Phase.** The rationale was identical for the two treatments. Subjects were presented with a model of fear that highlighted the role of cognitive events. They were told that by gaining control over these events they could reduce fear. Subjects in the Covert Modeling group were told they could reduce fear by developing imagery skills, those in the Self-Instructional Training group were told that they could reduce fear by learning self-instructions. This rationale was presented twice and the experimenter then had subjects repeat it back in their own words.

**Training Phase.** Covert Modeling (CM): To facilitate vivid imagery a detailed, neutral scene was narrated. Subjects were instructed to imagine the scene as vividly as possible. Once completed subjects reported on the clarity of the image and any difficulties they might have had forming and holding the image. Feedback was given where appropriate and subjects were encouraged to arouse the most
vivid image possible. Following this, subjects were told that to use imagery effectively they should: (a) obtain a clear image of the fear arousing scene, (b) imagine performing the behavior, (c) imagine becoming fearful, (d) imagine continuing despite the fear, and (e) completing the behavior successfully. This specific procedure follows the coping image format of Covert Modeling employed by Kazdin (1974b; 1977). These instructions were presented twice using specific examples as illustrations. Subjects restated the instructions in their own words.

Second, Self-Instructional Training (SIT): Once the role that self-statements play in fear was discussed these subjects were presented with a list of self-instructions. They were told these statements would help them cope with fear by controlling their attention and directing their performance. The experimenter went through the list providing examples of the use of the statements. Subjects were instructed to study the list (for approximately 5 min) and select 3-5 statements which they felt would be particularly effective for themselves. They were told that they could rephrase any statement in their own words if they wished.

Subjects were then told that to use the self-instructions effectively they should (a) use them to guide their performance in the situation, (b) use them whenever they began to feel their fear rise, and, (c) remember to use self-instructions to reinforce themselves.
for successful performance. As with CM this material was presented twice and subjects repeated it to the experimenter.

Rehearsal Phase. The final phase of training involved rehearsal of the skills. Five practice situations were presented to the two groups. Identical situations were employed for each group. Each situation was presented twice and involved: a general description of the context, a description of the individual approaching the feared situation, becoming fearful, continuing despite fear, and finally, performing successfully. The first situation was unrelated to the subjects' phobia. It involved social-performance anxiety. The remaining situations dealt with increasingly fear provoking encounters with the phobic object. Situations low in fear involved encountering a caged, tame animal. Situations high in fear involved actual physical contact with a wild animal.

Subjects in CM were instructed to sit comfortably in their chair, close their eyes, and to generate as vivid an image as possible while the experimenter narrated the scene to them. They were told to include each of the five components of coping imagery (detailed above) in the image. Each scene took approximately 45-60 sec to narrate. Narrations included numerous response propositions (see Lang, 1977). Subjects were instructed to review the scene covertly for 30 sec immediately after. The experimenter then quizzed subjects on their image and gave feedback where
appropriate.

Subjects in the SIT group rehearsed their skill differently. The general background of each situation was presented in written form on an overhead projector, and was read aloud by the experimenter. Then, specific features of the situation were presented (e.g., you approach the animal) in written as well as spoken form. The subjects' task was to respond to these features, as they were presented, with self-instructions. They had a copy of the self-instructions to refer to and responded aloud. The experimenter prompted subjects when they were unable to use self-instructions and gave feedback where appropriate. Each scene took approximately 75–90 sec to complete.

Following each presentation of a situation all subjects rated (on a 7-point scale) the difficulty they had in using the skill on that trial. Also, CM subjects rated the clarity of their image on that trial, also using a 7-point scale.

After training the BAT and self-report scales were readministered. Subjects were then debriefed and their questions answered.

Results

The issues to be addressed in this section include: (a) comparisons between the training groups (and between the phobic and nonphobic groups) on individual difference and fear measures, (b) training effects, (c) relationships
between pretraining performance measures and individual difference measures, and most importantly, (d) ATI effects between CM and SIT on behavioral approach and subjective fear measures.

Descriptive Data

Table 2 presents descriptive data on each of the individual difference measures for the two training conditions. T-tests were employed to compare training groups in most cases. The exception was for the Cognitive Style Questionnaire scales. Here a Group (CM/SIT) by Function (coping/catastrophizing) by Situation (fear/pain/anger) repeated measures analysis of variance was employed. This assessed whether the reliance on visual imagery or verbal strategies was dependent on situational and functional factors.

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INSERT TABLE 2

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The two training groups did not differ on any of the individual difference measures (all t's < 1, except for Vividness of Visual Imagery Questionnaire, t = 1.25, p > 0.05). Similarly, analysis of the Cognitive Style Questionnaire scales failed to produce Group differences (F = 0.53, p > .05). The Group factor in this analysis was not involved in any interaction. There was a significant main effect for Situation (F = 9.73, p < 0.001) and a
### Table 2

Means and Standard Deviations For Phobic and Nonphobic Groups on Individual Difference Measures

<table>
<thead>
<tr>
<th></th>
<th>Phobic</th>
<th>Nonphobic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>G</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CM&lt;sup&gt;a&lt;/sup&gt;</strong></td>
<td><strong>Mean</strong></td>
<td><strong>SD</strong></td>
</tr>
<tr>
<td>CSQ&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>35.00</td>
<td>21.48</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>62.86</td>
<td>22.34</td>
</tr>
<tr>
<td>Pain-Coping</td>
<td>34.28</td>
<td>28.21</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>35.00</td>
<td>30.32</td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>50.72</td>
<td>20.64</td>
</tr>
<tr>
<td>Anger-Catastrophizing</td>
<td>46.07</td>
<td>19.23</td>
</tr>
<tr>
<td><strong>IDQ&lt;sup&gt;d&lt;/sup&gt;</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>25.00</td>
<td>7.99</td>
</tr>
<tr>
<td>Visual</td>
<td>32.30</td>
<td>2.84</td>
</tr>
<tr>
<td>V-VQ&lt;sup&gt;e&lt;/sup&gt;</td>
<td>9.62</td>
<td>1.74</td>
</tr>
<tr>
<td>Space Relations</td>
<td>20.60</td>
<td>16.64</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>11.60</td>
<td>4.22</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>37.90</td>
<td>7.13</td>
</tr>
</tbody>
</table>

<sup>a</sup>CM: Covert Modeling  
<sup>b</sup>SIT: Self-Instructional Training  
<sup>c</sup>CSQ: Cognitive Style Questionnaire  
<sup>d</sup>IDQ: Individual Difference Questionnaire  
<sup>e</sup>V-VQ: Verbalizer-Visualizer Questionnaire
significant Function by Situation interaction ($F = 11.65, p < 0.0001$). These effects were analyzed by Newman-Keuls procedures. The Situation main effect indicated that overall, visual imagery was significantly more characteristic of fear and anger situations than of pain situations. Ratings for the fear and anger situations did not differ. The interpretation of this effect is qualified by the significant interaction; however. This revealed that imagery was significantly more characteristic of catastrophizing than coping in fear situations. A similar trend was noted for anger situations. The reverse trend occurred in pain situations where imagery was more characteristic of coping than catastrophizing.

The two training groups were also compared on fear measures at pretraining (see Table 3). T-tests failed to reveal differences for either BAT approach scores ($t = -0.10, p > 0.05$) or mean fear ratings ($t = -0.47, p > 0.05$). Fear ratings at each step of the BAT were compared using repeated measures analysis of variance. It is noteworthy that a single analysis was not possible as sample size decreased as subjects progressed through the BAT. None of these comparisons showed significant differences between the two groups (all $F$'s n.s.). A Group (CM/SIT) by Item (animal) repeated measures analysis of variance compared training groups on Fear Survey Schedule ratings. There was no Group difference ($F = 3.22, p > 0.05$), nor a Group by Item interaction ($F = 0.74, p > 0.05$). The Item main effect was
highly significant, however ($F = 6.97, p < 0.001$). Newman–Keuls analysis indicated that rats and snakes were more feared than spiders and mice. Rats and snakes were equally feared.

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**INSERT TABLE 3**

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When subjects were asked whether they found visual or verbal stimulus representation (i.e., imagining the phobic object or talking about it) more fear provoking virtually all (over 80%) considered imagery more fear provoking. Due to the very limited number of subjects who reported that verbalizing about the phobic object was more fear arousing these data could not be meaningfully analyzed. Perhaps an interval scale rating, with verbalizing and imagining forming endpoints would have allowed a more sensitive analysis of this issue. Subsequent studies (Studies 2 and 3) include such an interval level scale.

Next, the phobic sample was compared to the nonphobic sample on individual difference and fear measures. Means for the nonphobics on individual difference measures appear in Table 2. It should be noted that the selection criteria resulted in many more nonphobics than phobics. Therefore, these comparisons involve a degree of nonorthogonality. To reduce this nonorthogonality the two phobic groups were combined. Also, the proportion of males to females in the two groups is quite different. Very few males met the
Table 3
Pre- and Posttraining Means and Standard Deviations For Covert Modeling and Self-Instructional Training on Performance Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pretraining</th>
<th></th>
<th>Posttraining</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CM</td>
<td>SIT</td>
<td>CM</td>
<td>SIT</td>
</tr>
<tr>
<td>BAT&lt;sup&gt;c&lt;/sup&gt;; Approach</td>
<td>6.14 2.79</td>
<td>6.25 2.73</td>
<td>9.71 3.10</td>
<td>9.67 3.52</td>
</tr>
<tr>
<td>BAT; Mean Fear</td>
<td>3.43 2.16</td>
<td>3.80 1.76</td>
<td>2.23 1.52</td>
<td>2.37 1.34</td>
</tr>
<tr>
<td>FSS&lt;sup&gt;d&lt;/sup&gt;; Mean</td>
<td>5.45 0.88</td>
<td>4.92 0.86</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>FSS; Phobic Item</td>
<td>5.92 0.62</td>
<td>5.38 0.67</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Difficulty Using Skill</td>
<td>--</td>
<td>--</td>
<td>3.50 1.09</td>
<td>3.29 1.76</td>
</tr>
<tr>
<td>Percent Time Skill Used</td>
<td>--</td>
<td>--</td>
<td>60.71 21.65</td>
<td>55.42 26.06</td>
</tr>
<tr>
<td>Usefulness of Skill</td>
<td>--</td>
<td>--</td>
<td>5.36 1.01</td>
<td>5.21 1.90</td>
</tr>
</tbody>
</table>

<sup>a</sup>CM: Covert Modeling

<sup>b</sup>SIT: Self-Instructional Training

<sup>c</sup>BAT: Behavioral Avoidance Task

<sup>d</sup>FSS: Fear Survey Schedule
phobic criteria. As sex differences in imagery related variables have been reported in the literature (e.g., Ernest, 1977; White, Ashton, & Brown, 1977) sex was employed as a covariate when comparing phobics to nonphobics. Table 2 indicates that the means for these groups were quite close. No differences between the phobic and nonphobic groups were found on any of the individual difference measures (all F's n.s.).

Comparing phobic and nonphobic groups on pretraining BAT approach scores produced a highly significant difference, such that nonphobics (mean = 13.70) progressed much further ($t = 12.72, p < 0.001$). This difference is to be expected as BAT approach was used to define phobic and nonphobic groups. Mean fear ratings during the BAT failed to differentiate the two groups, however (mean = 3.71 for nonphobics, $t = 0.29, p > 0.05$). Figure 1 presents fear ratings at each step of the BAT for these groups. As this figure suggests there are no substantial differences in fear ratings at any of the steps of the BAT (all F's < 1.0). While the two lines appear to diverge after step 6 so few of the phobics progress beyond this point that comparisons are not meaningful. In addition, the dropping off of fear level at later steps for the phobic group reflects the increasing influence of one subject who reported very little fear but nonetheless avoided contact with the animal. These data indicate that nonphobics did not report significantly less fear than phobics.
Phobic and nonphobic subjects were also compared on their Fear Survey Schedule (FSS) ratings. A Group (phobic/nonphobic) by Item (animal) repeated measures analysis of variance compared these ratings. As would be expected phobics, overall, rated their fear greater than nonphobics (mean = 5.20 for phobics, 4.62 for nonphobics; $F = 5.35, p < 0.05$). There was also a main effect for Item, which indicated that mice were rated as less fearful than rats, snakes, or spiders ($F = 16.15, p < 0.0001$). While the interaction failed to reach conventional significance ($F = 2.09, p = 0.10$) a Newman-Keuls post hoc analysis indicated that phobics rated their fear significantly higher than nonphobics only for rats and mice. The two groups were equally fearful of snakes and spiders.

While sex differences cannot be addressed for the phobic group due to limited sample of males, they are relevant for nonphobics. T-tests failed to reveal differences between males and females on any of the variables except the Individual Difference Questionnaire-visual scale. Here females scored significantly higher than males ($t = -2.53, p < 0.02$). Females also demonstrated marginally higher scores than males on the Verbalizer-Visualizer Questionnaire ($t = -1.93, p = 0.061$). On performance variables there were no sex
Figure 1

Fear Ratings at Each BAT Step for Phobics and Nonphobics
difference for approach ($t = 0.12, p > 0.05$) or mean fear level ($t = 1.35, p > 0.05$). Males did report significantly lower fear on the Fear Survey Schedule, however ($t = -2.90, p < 0.007$ for the phobic object; $t = -2.27, p < 0.03$ for mean scores).

**Training Effects**

It is important to demonstrate that the training protocols were effective, especially in light of their brevity. Group (CM/SIT) by Time (pre/post) repeated measures analyses of variance evaluated training effects (see Table 3). For approach scores there was no difference between groups ($F = 0.00, p > 0.05$). There was a highly significant increase in approach scores as a result of training ($F = 63.99, p < 0.0001$). This training effect did not differ between groups ($F = 0.03, p > 0.05$). Similarly, mean fear ratings were significantly reduced following training ($F = 47.18, p < 0.0001$). There was no Group difference ($F = 0.13, p > 0.050$) nor differential change as a function of the training condition ($F = 0.36, p > 0.05$). Fear ratings at each step of the BAT were compared by Group (CM/SIT) by Time (pre/post) repeated measures analyses of variance. Again, due to changing sample sizes across the BAT a single analysis was not possible. Analyses indicated that there were no differences between training groups at any step; nor any differential fear reductions as a function of training condition. There were clear reductions in fear.
ratings as a function of training, however. Figure 2 shows this effect. Reliable reductions ($p < 0.05$) were obtained at most steps of the BAT. The exceptions occurred at step 3 where only marginal differences were found ($p = 0.07$). Also, at step 10 there were too few subjects to allow meaningful comparison ($n = 4$).

Table 3 presents posttraining scores for behavioral as well as self-report measures. As indicated above there were no group differences in outcome on approach and Fear scores. $T$-tests were used to compare groups on the other posttraining variables. No significant differences between the two groups were found (all $t$'s n.s.).

Difficulty ratings were obtained on the use of the skills during each of the two training trials for the 5 practice situations. A Group (CM/SIT) by Trial (1st/2nd) by Situation (5) repeated measures analysis of variance was performed on these ratings. There was no difference between the two training conditions ($F = 1.19, p > 0.05$); nor any difference in ratings across the 5 situations ($F = 1.43, p > 0.05$). The second practice trial was rated as significantly easier than the first, however ($F = 48.95, p < 0.0001$). Mean difficulty ratings for the first trial was 3.02 (7-pt scale). This decreased to 2.40 on the second trial. There were no significant interactions in this
Figure 2
Pre-Posttraining Fear Ratings at Each BAT Step for the Phobic Group
analysis.

A similar Trial (1st/2nd) by Situation (5) analysis of variance was conducted on image clarity ratings obtained at each training trial for the CM group only. The main effect for situations failed to reach significance ($F = 1.46$, $p > 0.05$). The trial main effect was highly significant ($F = 19.12$, $p < 0.0009$). Images were rated as significantly more clear on their second exposure (means were 1.78 and 1.57, respectively).

The above data indicate that the training protocols were indeed effective. The absence of a no-training comparison group should be noted however. This was dictated by the small numbers of phobics available. Although one cannot assume that there would be no improvement in the absence of treatment (see Trudel, 1979) there are numerous studies using similar techniques on small animal phobics which report no change, or very little change, for no treatment control groups (see Gauthier & Marshall, 1977; Linder & McGlynn, 1971; McGlynn, 1971; McGlynn & Mapp, 1970; Wilson & Thomas, 1973).

Pretraining relationships

Table 4 presents correlations between the individual difference measures and pretraining approach scores as well as mean fear ratings for phobic and nonphobic subjects. For phobics scores on the Vividness of Visual Imagery
Questionnaire and the Individual Difference Questionnaire-verbal scale were significantly positively related to pretraining approach scores. Both the pain-coping and pain-catastrophizing scales of the Cognitive Style Questionnaire were significantly negatively related to pretraining approach scores. The Individual Difference Questionnaire-verbal scale was significantly negatively and the Cognitive Style Questionnaire fear-catastrophizing scale was significantly positively related to pretraining mean fear ratings. Thus, greater avoidance appears to be associated with increasing reliance on visual imagery in pain situations; with decreasing reliance on a verbal information processing style and with ratings of high image clarity. Greater subjective fear during the avoidance task was associated with decreasing reliance on a verbal information processing style; and with increasing reliance on visual imagery when catastrophizing in fear situations. In contrast to the phobic subjects the nonphobic group demonstrated few significant relationships with pretraining performance. There was, however, a positive association between the Individual Difference Questionnaire-verbal scores and approach. Thus, it appears that the degree of fear elicited in the BAT was associated with selected individual difference characteristics.

INSERT TABLE 4
Table 4
Correlations Between Individual Difference Measures and Pretraining Performance Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Phobics</th>
<th>NonPhobics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Approach</td>
<td>Mean Fear</td>
</tr>
<tr>
<td>CSQ^a:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>-.02</td>
<td>.03</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>-.06</td>
<td>.42**</td>
</tr>
<tr>
<td>Pain-Coping</td>
<td>-.44**</td>
<td>.29</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>-.62***</td>
<td>.16</td>
</tr>
<tr>
<td>Anger-Coping</td>
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<td>.10</td>
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<td>Anger-Catastrophizing</td>
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<td>.13</td>
</tr>
<tr>
<td>IDQ^b:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual</td>
<td>-.15</td>
<td>.14</td>
</tr>
<tr>
<td>Verbal</td>
<td>.34*</td>
<td>-.51**</td>
</tr>
<tr>
<td>V-VQ^c</td>
<td>-.19</td>
<td>.23</td>
</tr>
<tr>
<td>Space Relations</td>
<td>.21</td>
<td>.18</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>.14</td>
<td>-.02</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>.40*</td>
<td>-.11</td>
</tr>
</tbody>
</table>

^a CSQ: Cognitive Style Questionnaire
^b IDQ: Individual Difference Questionnaire
^c V-VQ: Verbalizer-Visualizer Questionnaire
* p < .05
** p < .02
*** p < .01
The presence of meaningful relationships between individual difference variables and pretraining performance measures could confound the identification of posttraining relationships. That is, since pretraining and posttraining scores would be expected to be highly correlated, relationships between individual difference factors and outcome might not reflect training gains if pretraining relationships existed. To avoid this adjusted posttraining scores were employed for any individual difference measure which showed significant correlations with pretraining performance. Posttraining scores were statistically adjusted to remove the effect of initial level. This is the same adjustment that is made in an analysis of covariance (Winer, 1971). The adjusted posttraining scores are independent of the pretraining scores. In this way relationships between individual difference measures and outcome reflect training gain.

Aptitude-Treatment Interaction Effects

Although CM and SIT were equally effective overall, training gain was not uniform across all subjects. To examine whether this variability in gain was related to the individual difference measures, regression equations were calculated using these measures to predict outcome. Separate equations were calculated for CM and SIT for posttraining approach scores and posttraining mean fear ratings.
BAT Approach Scores. Table 5 contains the regression equations and beta weights predicting posttraining approach scores for each training condition. Transformed approach scores were employed for several predictors as described above. Beta weights are included to facilitate comparison across the different measures. Cronbach and Snow (1977) caution against overreliance on interpreting beta weights, since estimates of standard error are omitted from this statistic.

Insert Table 5

Examination of these regression weights indicates that several of the scales keyed in the direction of visual imagery (see Table 1 for details on how each scale is keyed) showed positive relationships with outcome of CM, and negative relationships with outcome of SIT. The major exceptions occurred for the Vividness of Visual Imagery Questionnaire which showed low nonsignificant negative relationships with outcome of both groups. In addition, the anger-coping, anger-catastrophizing, and fear-catastrophizing scales of the Cognitive Style Questionnaire showed low positive relationships with outcome of both groups. Generally, scales keyed in the verbal direction failed to show differential regressions across the two groups. The Individual Difference Questionnaire-verbal scale was negatively, associated with adjusted outcome of
### Table 5
Regression Equations and Beta Weights for Individual Difference Measures Predicting Posttraining Approach for Covert Modeling and Self-Instructional Training

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
<th>Self-Instructional Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope</td>
<td>Intercept</td>
</tr>
<tr>
<td>CSQ^a:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>.108</td>
<td>5.95</td>
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<tr>
<td>Fear-Catastrophizing</td>
<td>.003</td>
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</tr>
<tr>
<td>Pain-Coping</td>
<td>.021</td>
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<tr>
<td>Pain-Catastrophizing</td>
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<td>8.61</td>
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<tr>
<td>Anger-Coping</td>
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<tr>
<td>Anger-Catastrophizing</td>
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<td>8.57</td>
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<tr>
<td>IDQ^c:</td>
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<tr>
<td>Verbal</td>
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<tr>
<td>Visual</td>
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<td>-2.95</td>
</tr>
<tr>
<td>V-VQ</td>
<td>.397</td>
<td>5.89</td>
</tr>
<tr>
<td>Space Relations</td>
<td>.056</td>
<td>8.53</td>
</tr>
<tr>
<td>Verbal Fluency</td>
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<td>.9755</td>
</tr>
<tr>
<td>Vividness of Visual Imagery^d</td>
<td>.053</td>
<td>11.78</td>
</tr>
</tbody>
</table>

^a CSQ: Cognitive Style Questionnaire
^b Adjusted Posttraining Approach Scores were used here
^c IDQ: Individual Difference Questionnaire
^d V-VQ: Verbalizer-Visualizer Questionnaire
^e F-ratios, testing ATL

* p < .07
** p < .05
*** p < .01
both groups, and the Verbal Fluency measure was positively associated with outcome of both groups.

While most scales demonstrated differential relationships across the two training groups few scales showed relationships of any magnitude. Notable exceptions occurred for the fear-coping and pain-catastrophizing scales of the Cognitive Style Questionnaire. The fear-coping scale was positively and significantly ($F = 4.99, p < 0.002$) related to outcome of CM. It was negatively associated with outcome of SIT, a relationship which demonstrated a strong trend ($F = 4.26, p = 0.066$). The pain-catastrophizing scale accounted for over 20% of the variance in outcome of CM ($F = 3.14, p = 0.102$) in a positive direction and for 30% of the variance in outcome of SIT ($F = 4.32, p = 0.064$) in the negative direction. However, neither of these relationships reached conventional significance.

While these associations are interesting the crucial test is whether the regression weights differ significantly between the two training groups. The test of this difference was calculated by first creating a dummy variable to represent the training conditions. Regressions were calculated for (a) the individual difference measure and the dummy variable predicting outcome for all subjects, and (b) the individual difference measure, the dummy variable, and the interaction between the individual difference measure and the dummy variable predicting outcome for all subjects. The difference in the amount of variance accounted for by
(a) and (b) was used as the estimate of the ATI effects. This was divided by 1.00 minus the amount of variance accounted for by (b), with each of these terms divided by their appropriate degrees of freedom (see Crenbach and Snow, 1977; Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). These F-ratios appear in Table 5.

These results indicate that the fear-coping ($F = 16.04$, $p < 0.01$) and pain-catastrophizing ($F = 7.38$, $p < 0.05$) scales produced significant aptitude-treatment interactions (ATI). That is, those who scored high on these scales performed significantly better when given CM than SIT. The opposite occurred for those who scored low on these scales (see Figures 3 and 4). The Individual Difference Questionnaire-visual scale produced a nonsignificant trend toward an aptitude-treatment interaction. None of the other measures appear to differentiate outcome across the two groups.

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Given the presence of reliable ATIs for the fear-coping and pain-catastrophizing scales the Johnson-Neyman technique (extended and refined by Potthoff, 1964, and also by Serlin & Levin, 1980) was employed to determine regions within which the two groups significantly differed. These regions are represented by the shaded areas in Figures 3 and 4. For the fear-coping scale those who scored above 51.51 improved
Figure 3

ATI for the Fear-Coping-Scale Predicting Posttraining Approach Scores
significantly more when given CM. Those falling above this point who received CM scored 13.00 on the posttraining BAT. Those who received SIT scored 7.60. Further, those who scored below 22.13 on this scale benefited more from SIT than CM. Five subjects fell within this range. Those who received CM scored 6.25; those who received SIT scored 12.00. These cut-offs successfully classified 46.15% of subjects into regions where training conditions differed.

Similar analysis for the pain-catastrophizing scale (Figure 4) revealed that CM was superior to SIT above 71.32. The lower bound of the region of significance occurred below zero, outside the range of possible scores. Thus, there appears to be a clear differentiation between the efficacy of CM and SIT only for those who strongly endorsed imagery as characteristic of catastrophizing in pain situations. Examination of the data indicates that only a few subjects (15.40%) scored above 70.00 on this scale. Means were as expected, however (11.20 for CM; 7.17 for SIT).

BAT Mean Fear Ratings. Table 6 presents regressions of individual difference measures on posttraining mean-fear ratings for CM and SIT. Examination of these data indicates a less consistent pattern of associations than was found with approach scores. Differential regressions across training conditions occurred only for the Cognitive Style
Figure 4

ATI for the Pain-Catastrophizing Scale Predicting Posttraining Approach Scores
Questionnaire, fear-coping and Individual Difference Questionnaire-visual scales. There was a negative association with outcome of CM and a positive association with outcome of SIT for these measures. For the fear-coping scale these relationships were very strong. They were highly significant, but in opposite directions, for both CM and SIT (F = 6.59, p < 0.03; F = 33.75, p < 0.001, respectively). For the Individual Difference Questionnaire-visual scale only the relationship with SIT was moderate, but was nonsignificant (accounting for 20.6% of the variance, however).

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INSERT TABLE 6
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The only other scale which showed differential relationships across the two training conditions was the Verbal Fluency scale. Here a small positive relationship with CM and a moderate negative relationship with SIT was observed.

The other scales failed to demonstrate differential relationships across the two groups. The Cognitive Style Questionnaire, pain-coping and Space Relations measures demonstrated positive associations with both CM and SIT. These relationships were particularly strong for the pain-coping scale, where they approached significance for CM (F = 4.01, p = 0.068) and reached significance for SIT (F = 6.74, p = 0.027). Moderate, but nonsignificant
Table 6

Regression Equations and Beta Weights For Individual Difference Measures Predicting Posttraining Mean Fear Ratings for CM and SIT

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
<th>Self-Instructional Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope</td>
<td>Intercept</td>
</tr>
<tr>
<td>CSQ&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>-.042</td>
<td>3.54</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>.016</td>
<td>1.14</td>
</tr>
<tr>
<td>Pain-Coping</td>
<td>.027</td>
<td>1.14</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>.007</td>
<td>1.81</td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>.009</td>
<td>1.59</td>
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<tr>
<td>Anger-Catastrophizing</td>
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<td>1.37</td>
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<tr>
<td>IDQ&lt;sup&gt;c&lt;/sup&gt;</td>
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<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>-.002</td>
<td>2.22</td>
</tr>
<tr>
<td>Visual</td>
<td>-.013</td>
<td>2.48</td>
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<tr>
<td>V-VQ&lt;sup&gt;d&lt;/sup&gt;</td>
<td>.132</td>
<td>0.80</td>
</tr>
<tr>
<td>Space Relations</td>
<td>.028</td>
<td>1.50</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>.045</td>
<td>1.54</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>-.034</td>
<td>3.38</td>
</tr>
</tbody>
</table>

<sup>a</sup>CSEQ: Cognitive Style Questionnaire
<sup>b</sup>Adjusted Posttraining Scores were used here
<sup>c</sup>IDQ: Individual Difference Questionnaire
<sup>d</sup>V-VQ: Verbalizer-Visualizer Questionnaire
<sup>e</sup>F-ratios testing ATI
* p < .07
** p < .05
*** p < .01
relationships occurred for Space Relations. The remaining scales were weakly associated with posttraining mean fear ratings. The Verbalizer-Visualizer Questionnaire demonstrated a marginal positive relationship with SIT only ($p = 0.091$) and the fear-catastrophizing scale showed a marginal relationship with CM only ($p = 0.102$).

F-ratios testing the difference between slopes were nonsignificant for all scales, except fear-coping scale (Figure 5) which yielded a highly significant aptitude-treatment interaction ($F = 23.27$, $p < 0.001$).

Application of the Johnson-Neyman technique indicated that CM was superior to SIT above 49.66. Below 29.67 SIT was superior to CM. Posttraining mean fear ratings for those who scored above 49.66 was 1.22 for CM and 3.38 for SIT. For those who scored below 29.67 mean anxiety was 3.54 for CM and 0.68 for SIT. These cut-off points classified 56.69% of subjects into regions where CM and SIT were differentiated.

As there was no differential relationship across training conditions for the pain-coping scale, and substantial positive associations with fear ratings, the data were collapsed across training conditions. The result was a highly significant positive relationship with mean fear ratings ($F = 10.76$, $p = 0.003$). Subjects were then
Figure 5

ATI for the Fear-Coping Scale Predicting Posttraining Mean Fear Ratings
divided into extreme groups (upper and lower thirds) and compared on posttraining mean fear ratings. Low scorers reported significantly less fear at posttraining assessment (mean = 1.42) than high scorers (mean = 3.14; t = -2.80; p = 0.013).

To gain some insight into possible mediators of the ATI effects in this study scores on the fear-coping and pain-catastrophizing scales were correlated with difficulty ratings obtained during training, and following the posttraining assessment. It may be that those who benefit more from a particular skill find that skill easier to use. Table 7 presents these correlations separately for CM and SIT. Since both skills were rated significantly easier on the second practice trial separate r's are given for the two trials. None of these correlations reached significance. There were some interesting trends, however. Both the fear-coping and pain-catastrophizing scales produced trends suggesting that increasing reliance on visual imagery was associated with lower difficulty ratings for CM. For the pain-catastrophizing scale only the opposite trend occurred for SIT.

INSERT TABLE 7
Table 7
Correlations Between Fear-Coping and Pain-Catastrophizing Scales and Difficulty Ratings For Using Skills During and Following Training

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
<th>Self-Instructional Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>During Training</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trial 1</td>
<td>Trial 2</td>
</tr>
<tr>
<td>Fear-Coping</td>
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<td>-.24</td>
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<td>Pain-Catastrophizing</td>
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<td>-.12</td>
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<tr>
<td>Posttraining</td>
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<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
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<td>Pain-Catastrophizing</td>
<td>-.36</td>
<td></td>
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</tbody>
</table>
DISCUSSION

The screening procedures used in this study appear to have identified a highly fearful sample. On average these subjects were unable to open the lid of a cage that contained a harmless laboratory rat. In addition, this group rated their fear of rats and mice significantly higher than a group of nonphobics. Interestingly, phobics did not report greater fear during the BAT relative to nonphobics.

While the subjects in the present study were phobic they are not intended to represent 'clinical' phobics (cf., Hayes, 1976). The procedures employed in this study were intended to evaluate the efficacy of brief coping skills training in reducing a specific fear response. These procedures were not considered analogues of 'therapy'. It was felt that the hypotheses examined in this research were best evaluated initially in a relatively controlled paradigm, where a sizeable number of subjects could be obtained. This allows the issues of replicability and generalizability to be systematically evaluated.

Given the brief training protocols involved it is important to establish their efficacy. Pre-post comparisons validate that both CM and SIT reliably increased approach to the animal and reduced fear ratings. As well, posttraining comparisons between groups were nonsignificant for all behavioral and self-report measures. Difficulty ratings obtained during training also suggested that both skills
were equally easy to acquire. It is noteworthy that the difficulty rating scale did not involve behavioral descriptors at various scale values. This might make cross-subject comparisons less sensitive than if such descriptors were employed.

The absence of a no training control group prevents one from ruling out the hypothesis that pre-post gains occurred independently of the specific training protocols. While this is a weakness in the present design it should be noted that the critical hypotheses involve differentially predicting the amount of training gain across the two groups. As all subjects were equated on such variables as attention, assessment, passage of time, and so on, differential gains cannot be explained by such factors. Nonetheless, in the replication study (Study 2) a control group is included.

Although both training conditions were equally effective overall, all subjects did not improve to the same degree. In fact, specific individual difference measures were highly predictive of the outcome of both CM and SIT. Group differences occurred, but these differences interacted with specific individual difference measures. Specifically, the fear-coping scale of the Cognitive Style Questionnaire demonstrated significant interactions between CM and SIT for both posttraining approach scores and posttraining mean fear ratings. With CM greater reliance on visual imagery as a means of coping with fear was associated with greater
approach (accounting for 55.50% of the variance) and with lower mean fear ratings (accounting for 35.40% of the variance) at the posttraining BAT. With SIT, greater reliance on visual imagery to cope with fear was associated with less approach (accounting for 29.90% of variance) and greater fear (accounting for 77.10% of variance) at the posttraining BAT. The efficacy of CM and SIT clearly interacted with this individual difference measure.

Application of the Johnson-Neyman technique to identify regions of significance for both fear-coping ATIs produced similar bounds across posttraining approach and mean fear measures. The upper bound was 51.50 for approach scores and 49.70 for fear ratings. Lower bounds were 22.10 and 29.70, respectively. These bounds are somewhat lop-sided, which is likely due to the overall reliance on verbal strategies in coping with fear. That is, CM was superior to SIT for those who indicated a reliance on visual imagery over verbalizing as a coping strategy, regardless of the strength of this preference. However, SIT was superior to CM only for those who strongly relied on verbalizing (relative to imaging) as a coping strategy. Approximately 50% of the sample fell within these regions that differentiated the two groups. This indicates that these ATI effects are not only statistically reliable but that they would apply to enough subjects to make them practically meaningful as well.

Self-report of reliance on visual imagery and/or verbal coping strategies in fear situations might possibly be used
to decide a priori the specific coping skill (imagery or verbal) different individuals should receive. Taking into account such individual differences in 'style' should improve the efficacy of these cognitive coping skills. Given that in vivo exposure procedures appear to be superior to cognitive skills (e.g., Kazdin, 1977), it would be interesting to compare in vivo exposure with CM and SIT for subjects who rely heavily on either verbal or visual imagery skills to cope with fear. Perhaps when such individual difference variables are taken into consideration these cognitive skills would compare much better to the in vivo exposure procedures.

The pain-catastrophizing scale of the Cognitive Style Questionnaire also produced a significant ATI for adjusted posttraining approach scores. However, the two training groups differed significantly only for those who scored above 71.30. Within this region CM was superior to SIT. Only about 15% of the sample fell within this region. This scale might therefore be of less practical value than the fear-coping scale.

The pain-coping scale failed to predict posttraining approach scores. However, this scale did predict posttraining mean fear ratings. Reliance on imagery to cope with pain was associated with higher posttraining fear ratings for both training groups. Those who strongly relied on imagery gave significantly higher fear ratings following training, regardless of the specific content of the training.
(imagery or verbal coping skills). One should note that the fear-coping and pain-coping scales produced significant correlations in opposite directions for posttraining mean fear ratings for the CM group. This might reflect differences in the type of imagery employed in these situations. Further work is needed to investigate whether imagery strategies differ in different situations. It might be that imagery is effective for pain when it is used to distract away from the pain. Imagery could be effective in fear situations when it is used to reinterpret the situation.

The above findings strongly argue for the importance of individual difference factors in the efficacy of CM and SIT coping skills procedures. However, these differential relationships between CM and SIT reliably occurred only for the fear-coping and pain-catastrophizing scales of the Cognitive Style Questionnaire. The only other scale which produced a trend toward a significant ATI effect was the Individual Difference Questionnaire-visual scale. Thus, these data do not argue for the simple conclusion that individual differences in imagery-verbal measures interact with training efficacy. They argue that these interactions are much more specific. One needs to be concerned with the way in which the imagery and verbal processes are assessed. Reliance on visual imagery and/or verbal coping strategies in fear situations differentiated the efficacy of CM and SIT in opposite directions for those who fell on the extremes of
these data have implications for the nature of the assessment device employed to assess imagery/verbal processes. Those measures which attempted to assess imagery 'ability' (e.g., Vividness of Visual Imagery Questionnaire, Individual Difference Questionnaire) failed to identify significant ATI effects between CM and SIT. The type of measure which proved most useful focused on the use of imagery/verbal strategies in specific situations, similar to the situation in which the coping skills were evaluated. Classifying individuals as verbalizers or visualizers on the basis of tasks which differ greatly from those on which one is evaluating imagery or verbal strategies may be less profitable than matching the assessment to the task being evaluated. Even for the Cognitive Style Questionnaire scales, the best predictor of performance was the fear-coping scale. The other scales which assessed imagery/verbal strategy use in situations different from the target situation (e.g., anger provoking situations) were less valuable than the fear-coping scale.

The data from the Cognitive Style Questionnaire scales themselves also suggest that reliance on visual imagery/verbal strategies is highly situation specific. Subjects' ratings of their use of visual imagery or verbal strategies was systematically influenced by situational and functional (coping-catastrophizing) factors. Specifically, for fear provoking events visual imagery was rated as being
used more frequently when catastrophizing than when coping. Self-statements appeared to predominate coping attempts. In situations involving physical pain imagery was most characteristic of coping. Self-statements were most characteristic of catastrophizing.

These systematic differences reinforce the hypothesis that the use of imagery/verbal strategies is highly specific to certain situations. The data question whether one can make global 'ability' type statements as to a person's reliance on these strategies. While one strategy might be relied upon in a certain situation altering the nature of the situation can produce change in the typical strategy employed. Tests which result in statements such as 'person X relies heavily on visual imagery' might therefore be expected to be of limited value. Whether such tests are predictive of performance might be dependent on the specific situation. This clearly appears to be the case in the present study, where predictive validity was obtained only for scales which assessed situation-specific reliance on visual imagery/verbal strategies.

Tucker and associates (Shearer & Tucker, 1981; Tucker & Newman, 1981) have also examined the role of visual imagery and verbal processes in coping and catastrophizing and report data consistent with the above. Shearer and Tucker (1981) provide evidence suggesting that when subjects are asked to inhibit their emotional reaction to aversive (fearful) material they rely on self-verbalizations. When
subjects were asked to facilitate their emotional reaction they reported relying on visual imagery. In a follow-up Tucker and Newman (1981) manipulated strategy use in a task where subjects were to inhibit arousal to sexual and aversive slides. Physiological and subjective data supported the hypothesis that imagery strategies were less effective than verbal strategies in inhibiting arousal. These data are quite consistent with the results of the present study for fear situations. The results of the present study go further to suggest that the role of visual imagery and verbal strategies is not uniform across different situations (e.g., pain, anger). It would be interesting to replicate the Tucker and Newman study, adding anger and pain situations.

The data from the present study strongly suggest that reliance on visual imagery/verbal strategies in fear and pain situations predicts training effects. While the practical application of such effects, if they are replicable, is obvious, one might also wonder how such differential effects could occur. Possibly those subjects who receive the form of training (imagery/verbal) which matches the way they characteristically deal with fear and pain situations find that skill easier to acquire and/or use. Alternatively, the ease of acquiring the skill might not be critical; rather knowledge of when to employ the skill, or perseverance in the use of the skill might be important (see Katz, in press). Interestingly, there were
weak (nonsignificant) correlations with difficulty ratings that suggested that greater reliance on imagery to cope with pain and fear was associated with lower difficulty ratings when learning the imagery skill. The opposite trend was noted for the pain-catastrophizing scale and SIT. However, these relationships failed to reach significance. Nonetheless, such hypotheses are worth considering. Future research might focus specifically on the factors which mediate ATI effects (cf., Katz, in press).

While this study is not intended to evaluate the theoretical models presented in the introduction, it does have certain implications for these models. First, from an information processing model the data favour a specific person by situation model over ability type models. Reliance on imagery/verbal strategies appear to differ not only across individuals but across situations for the same individual. When such additional factors are taken into account, prediction of performance in specific situations is more likely (e.g., as was found with the fear-coping scale of the Cognitive Style Questionnaire). Those scales which attempted to assess image vividness, verbal/spatial ability (i.e., trait measures) failed to predict performance of either training group.

Consider also the conditioning model and its implications. As mentioned earlier this model would likely suggest that the mode (visual-verbal) of stimulus representation most fear arousing would predict the most
effective training strategy. For instance, if visual imagery was more fear arousing than verbal processing, visual imagery training would lead to greater exposure to the fear arousing stimuli and therefore greater extinction of fear. The opposite would hold for those who found verbal representations most arousing. The present data suggest that, overall, visual imagery was more fear arousing than verbal representation. This would lead to the prediction that imagery training should be more effective than verbal skills training, overall. Clearly this was not the case. However, one caution should be noted. Very few subjects indicated that verbalizing about the phobic object was more frightening than imagining the phobic object. Perhaps a larger sample of individuals who found verbalizing most fear provoking would provide a fairer test of the conditioning model.

The present study also identified relationships between individual difference measures and pretraining performance measures (i.e., BAT approach scores and mean fear ratings). These relationships suggested that stronger avoidance of the phobic object was associated with lower Individual Difference Questionnaire-verbal scores, higher ratings of the use of imagery in pain situations (pain-coping and pain-catastrophizing scales), and ratings of greater image clarity. Increasing fear ratings were also associated with lower Individual Difference Questionnaire-verbal scores and greater reliance on imagery when catastrophizing in fear.
situations. The relationship between approach scores and the Individual Difference Questionnaire-verbal scale was replicated in the nonphobic group. These relationships were all in the direction suggesting that stronger phobic responses were associated with greater scores on visual imagery measures. Although only selected measures demonstrated a relationship this data suggests the hypothesis that severity of the phobic response might be related to selected imagery processes. The Individual Difference Questionnaire-verbal scale appears particularly encouraging in this light, as it was the only scale to show relationships with both behavioral and subjective fear measures, and to replicate across phobic and nonphobic groups. Davis, McLeomere, and London (1971) have reported a similar association between severity of the phobic response and imagery variables. It may be that those who rely on imagery processes find themselves preoccupied with aversive imagery during the BAT. While preoccupation with aversive imagery might mediate relationships between imagery scales and severity of the phobic response alternate explanations should be considered. Specifically, social desirability factors might be considered. DiVesta et al. (1971) found, in a factor analysis, that self-report measures of imagery and a social desirability measure loaded on the same factor. Katz (in press) also discusses the importance of investigating the possible role of self-presentational style in imagery related performance. Future studies should therefore include social desirability measures. While these
pretreatment relationships are interesting and generated testable hypotheses they were unexpected. It is important therefore to replicate these effects.

In summary, the data from the present study indicate that strong ATI's exist, but that assessment of the use of imagery-verbal skills is a critical issue. The data seem to argue for a highly specific situation-person interaction model. Reliance on visual imagery and/or verbal strategies to cope with fear was highly predictive of performance (on both behavioral and subjective outcome measures). The strength of these associations suggests that this cognitive style measure could be of practical value. For instance, it might be used to decide upon the most appropriate coping skill (imagery or verbal) to present to subjects/clients.

While these data are quite encouraging one must be concerned with the robustness of these findings. One of the major difficulties with the examination of individuals difference factors is the replication of effects (noted by Cronbach & Snow, 1977, as well as Peterson, Janicki, & Swing, 1980). Now that ATI have been identified a systematic examination of replicability (Study 2) and generalizability (Study 3) will be conducted. If the findings of the present study can be replicated in a similar population and their generalizability examined the value of the data would increase dramatically, especially with respect to their practical application. Other issues could be addressed (such as identifying possible mediating
variables, or the most important characteristics of the coping skills) but they will not be. Only if the effects found in this study are replicable do these more penetrating questions become relevant.
STUDY 2

The major issue for the second study is the replicability of the ATI effects between CM and SIT. The major aptitude variables of interest are those that assess reliance on visual imagery and/or verbal strategies in coping and catastrophizing in fear and other stressful situations (i.e., the Cognitive Style Questionnaire). The remaining scales that were used in Study 1 were also included so that a complete replication of Study 1 was possible. ATI's were not expected to occur for these scales. Several procedural changes were made to Study 2. First, a delayed-treatment control group was included. This allowed the question of whether pre- to posttraining changes were due to the content of the training protocols or to less specific factors (e.g., demand) to be examined. Second, a larger sample of rat phobics were employed to increase the power of the analyses. Third, a measure of social desirability and also of intellectual level was included. Fourth, training was expanded to two sessions, separated by one week. This made the training protocols more similar to actual applications of these procedures. It also allowed examination of the stability of the fear over the period of one week for controls. Fifth, relationships between pretraining fear measures and training gains were also examined for the two training groups. This analysis was performed in a post hoc manner. Elder, Edelstein, and Fremouw (1981) report data which suggested that
self-instructional skills were effective only for socially anxious subjects high on fear.

Given that the Cognitive Style Questionnaire scales proved most valuable in the previous study this questionnaire was expanded to include more fear and pain situations. Internal consistency data were also collected. Finally, test-retest reliability data were collected on a small group of rat fearful subjects.

Method

Participants

Screening Criteria. Subjects were screened in two steps, as in Study 1. First, only subjects who reported that they could not touch a live harmless rat because of fear were screened further. Subjects reported their fear via an 11-point rating scale. To facilitate comparison across subjects this scale included behavioral descriptors at several of the scale values (see Study 1). A score of 6 or greater was required to meet initial screening criteria. Second, subjects who met this criterion were screened on a 17-step Behavioral Avoidance Task (BAT). Those unable to make contact with the animal (while wearing a glove) were labeled phobic and were included in the training phase. Remaining subjects were dismissed.

Sample Description. All subjects in this study were introductory psychology students, who received course credit for participation. A total of 80 subjects met the initial
screening criteria. Of these, 47 (41 females, 6 males) met the phobic criteria. Two of these phobics refused to continue with the experiment immediately following screening. The remaining subjects were randomly assigned to Covert Modeling (n=17), Self-Instructional Training (n=18), or delayed-treatment control (n=10) conditions. There were three men in the SIT group, one man in the CM group, and two men in the delayed-treatment control group.

Of the nonphobic subjects 10 were selected to comprise a test-retest reliability sample for the Cognitive Style Questionnaire (CSQ). These subjects were selected contingent upon willingness and time availability. They completed the Cognitive Style Questionnaire on two occasions, separated by one week.

The selection criteria were such that only highly fearful subjects were involved. Since it would be valuable to obtain data on a more random sample for comparative purposes, abbreviated Fear Survey Schedules (animal items only) were completed by several introductory psychology classes (n=109). These subjects were part of the same population from which phobics were obtained. It should be noted that while classes were randomly selected all introductory students were not equally likely to be assessed.
**Materials**

**Phobic Stimulus.** A large, 650 gr, male hooded laboratory rat was used as the fear stimulus. The animal was housed in a 40 cm X 30 cm X 30 cm plexiglass cage. The cage opened by lifting the hinged top. Heavy weight gloves, as well as a wooden pointer, were also used as part of the BAT.

**Assessment Measures.** The majority of these measures (e.g., Individual Difference Questionnaire (IDQ)- verbal and visual scales, Vividness of Visual Imagery Questionnaire, Space Relations Test) have been described in Study 1 and will not be presented again. Unique, and modified, tests are described below. All measures are summarized in Table 8.

**INSERT TABLE 8**

1. **Intellectual Level.** To obtain an index of intellectual level two subtests of the Weschler Adult Intelligence Scale were administered. A test from the Verbal as well as the Performance subscale was used. First, a recognition (multiple choice) version of the Vocabulary Subtest, called the WAIS-Clarke, was administered. This version has been shown to correlate 0.92 with the standard version (Paitich & Crawford, Note 6). Paitich and Crawford (Note 6) provide a formula to convert WAIS-Clarke scores to
# Table 8

## Descriptions of the Individual Difference Measures used in Studies 2 and 3

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Style Questionnaire</td>
<td>Subjects rated how characteristic visual imagery and verbal strategies were of them for coping with or catastrophizing about fear, anger, or pain situations. There are six scales: Fear-Coping, Fear-Catastrophizing, Pain-Coping, Pain-Catastrophizing, Anger-Coping, Anger-Catastrophizing. High scores indicate a strong reliance on imagery strategies.</td>
</tr>
<tr>
<td>Individual Difference Questionnaire</td>
<td>Subjects responded to 86 True-False questions. Questions were designed to assess a preference for visual or verbal information processing styles. Three scales are derived from this measure: Visual Scale: high scores indicate a preference for imagery process; Verbal Scale: high scores indicate a preference for verbal process; Verbalizer-Visualizer Questionnaire; high scores indicate a preference for imagery processing.</td>
</tr>
<tr>
<td>Space Relations</td>
<td>A spatial ability task. Subjects were presented with two-dimensional Figures. They had to choose from 5 three-dimensional stimuli those which the 2 dimensional stimulus could represent if folded into three dimensions. High scores indicate greater spatial ability.</td>
</tr>
<tr>
<td>Intellectual Level</td>
<td>Subjects completed a multiple-choice version of the WAIS Vocabulary subtest and the WAIS Block Design subtest. Age-corrected scale scores were averaged to yield Intellectual Level. High scores reflect greater intellectual level.</td>
</tr>
<tr>
<td>Measure</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Verbal-Visual Arousal Scale</td>
<td>Subjects rated on an 11-pt scale the degree to which they found visual imagery or self-verbalizations about the phobic object more frightening. High scores indicate visual imagery is more frightening.</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>Subjects generated as many 4-letter words beginning with 'C' and then as many 5-letter words beginning with 'S' that they could. They were given 90 sec for each task. High scores reflect greater verbal fluency.</td>
</tr>
<tr>
<td>Quick Test</td>
<td>A vocabulary test. Subjects were shown 4 pictures. They were then presented with a list of 50 words. They choose the picture which best described the word. Higher scores reflect greater word knowledge.</td>
</tr>
<tr>
<td>Social Desirability</td>
<td>The items from the Social Desirability scale from the Personality Research Form (PRF) were embedded among the items of the Individual Difference Questionnaire. High scores reflect greater social desirability.</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>Subjects rated the clarity of their visual images of 15 specific situations. High scores indicate less vivid images.</td>
</tr>
</tbody>
</table>
Vocabulary scores. Second, the Block Design subtest was administered in standard format. Age corrected scaled scores were obtained for each subtest and these were averaged to yield a measure of intellectual level. This score is not intended to represent an Intelligence Quotient. It is intended only to provide an approximate indicator of relative intellectual level. The Vocabulary and Block Design subtests were selected as they appear to be most representative of their respective Verbal and Performance scales, as well as of the total scale (Lezak, 1976; Silverstein, 1982).

2. Quick Test. This is a 50-item vocabulary test. It was administered to provide another index of verbal ability, in addition to verbal fluency. This test involves a display of 4 pictures. Subjects were to consider each picture as a list of 50 words was presented. The task was to choose the picture which best described any particular word. Form 1 of this test was used in this study.

3. Social Desirability. The Social Desirability scale of the Personality Research Form (PRF; Jackson, 1974) was administered to provide an index of social desirability. This scale was chosen over the Crowne and Marlow (1964) scale because of the excellent psychometric properties demonstrated by the PRF. These items were randomly embedded in the Individual Difference Questionnaire.
In addition to these new measures modifications were made to several others. First, the Cognitive Style Questionnaire was expanded. Four situations (3 dealing with fear; one with pain) were added to this measure. One of the fear situations described an actual encounter with the phobic object. Second, the self-report measure used in Study 1 which attempted to assess the form of stimulus representation (verbal or visual) most frightening was modified. Specifically, it was changed to an 11-point rating scale. Ratings ranged from: \(-5\) (self-verbalizations concerning rats most frightening), through 0 (both equally frightening), to \(+5\) (images of rats most frightening). This scale is subsequently referred to as the Verbal-Visual Arousal scale. Third, the administration of the Verbal Fluency task was altered. Specifically, the time allowed in which to generate words was increased from 60 to 90 sec. This was done to avoid any possible floor effects from a shorter time period.

Outcome Measures

1. Behavioral Avoidance Task; Approach Scores. This task was very similar to that of Study 1. The major differences involved the following. First, two additional steps were included. These steps involved the use of a wooden pointer. Following the opening of the cage (step 7) the next step was to place the pointer on the floor of the cage, and hold it there for 10 sec. Also, once subjects had
held their bare hand on the floor of the cage for 10 sec (step 10), they used the pointer to touch the animal for the first time. Second, subjects used two hands whenever they lifted the animal. In Study 1 two steps (numbers 13 and 14) involved lifting the animal with one hand. This proved difficult for some subjects, who preferred to use two hands. This latter change was also made to ensure that the BAT was comparable between Study 2 and Study 3. In Study 3 a large boa constrictor snake was employed. The size of the reptile necessitated the use of two hands in picking it up.

The conduct of the BAT was identical to that of Study 1. That is, the experimenter stood behind the subject, did not model behaviors, and presented each step following completion of the previous. Questions went unanswered, other than to restate that the animal was harmless. The number of steps successfully completed was used as the behavioral approach score.

The BAT procedure was found to be quite stressful for most subjects. It was decided that all nonphobic subjects would not be required to complete the BAT. Screening criteria were such that once these subjects made contact with the animal they were eliminated from the study. Since these subjects would not receive training it was felt ethically unnecessary to require them to continue with the task. A subset (n = 15) was randomly selected to complete as much of the BAT as possible. These subjects served as a comparison group for the phobics.
2. Behavioral Avoidance Task; Fear Ratings. Subjects rated their fear level at each step of the BAT, using an 11-point scale. To facilitate cross-subject comparison behavioral descriptors were included for many of the scale values. Subjects were familiarized with what the scale values would mean in behavioral terms. They carried a copy of this scale for reference throughout the BAT. The mean fear rating, based on the number of steps completed, was employed as a major dependent measure. Posttraining mean fear ratings were based on the number of steps successfully completed at the pretraining assessment. This ensured that pre- and posttraining ratings were directly comparable. Fear ratings at each step were also employed in some analyses.

3. Additional Self-Report Measures. First, prior to screening, subjects completed an abbreviated Fear Survey Schedule. Only animal items were included. Second, following each BAT subjects responded to an open-ended questionnaire which asked them to list their thoughts during the BAT. Third, during training subjects rated the degree of difficulty they experienced using the particular skill (imagery/verbal) following each practice trial. Fourth, following the posttraining BAT, subjects rated the difficulty they experienced using the coping skill while going through the BAT, the usefulness of the skill, and the percent of BAT steps on which they employed the skill. As in Study 1 correlations were calculated between any scale
which identified significant ATI effects and difficulty ratings. This might shed light on the possibility that ATI effects are mediated by the ease in acquiring or executing the particular skill.

**Procedure**

The major procedural changes from Study 1 involved expanding the protocol to cover two sessions. The initial session (approximately 45 min) involved screening and administration of assessment measures. The second session, approximately one week later (mean = 7.1 days), involved administration of training (or control) protocols. Assessment measures not completed at session 1 were completed at session 2, prior to training. The second session lasted approximately two hours.

The training protocols were virtually identical to those of Study 1. As more time was available, the protocols were expanded to include more examples and allow more time for feedback and practice. Since details were provided in Study 1 only a brief synopsis will be described here. Each training condition involved: rationale, training, and rehearsal phases. The rationale stressed the role of cognitive events (either imaginal or verbal) in fear arousal and fear reduction. Several concrete examples were discussed and subjects were required to restate the rationale in their own words.
The training phase differed for the two groups. Under CM subjects received instruction and practise in evoking vivid coping images. Specifically, they were instructed to, (a) obtain a clear image of the task relevant scene, (b) imagine performing the particular task, (c) imagine becoming frightened, (d) imagine continuing despite the fear, and (e) imagine completing the task successfully. Under SIT subjects learned a list of self-statements which were intended to control their attention and direct their performance. They were instructed to, (a) use their self-statements to guide their performance, (b) employ the statements when they felt their fear rise, and (c), reinforce themselves with self-statements for any accomplishments they were able to make. In both groups subjects explained these principles to the experimenter in their own words to ensure they understood the task.

The final phase, rehearsal involved presenting 5 practice situations. Each situation was presented twice. Identical situations were presented to the two groups. For CM the situations were narrated and subjects imagined the content. Numerous response propositions were included in these narrations. That is, there were frequent references to physiological and subjective fear reactions (see Lang, 1977). Following each presentation subjects covertly rehearsed the scene for approximately 60 sec. For SIT each scene was presented in written form via an overhead projector and read aloud by the experimenter. The events
comprising that scene were also presented in this manner. In response to specific occurrences in the situations (e.g., 'you approach the animal and your fear becomes intolerable') subjects generated (aloud) coping self-statements which they had studied. Following each practice scene subjects in both groups rated the difficulty in using the skill on that trial (on a 7-point scale). As well, the experimenter questioned subjects on the use of the skill and provided feedback when they had specific difficulty with the task (e.g., generated negative rather than coping self-statements).

Following training the BAT was readministered. Finally, the self-report measures noted above were completed and subjects were debriefed.

Subjects in the delayed-treatment control condition returned for the second session and completed any remaining questionnaires. Following this the BAT was readministered. They were instructed to progress as far as possible in this task. These subjects were then scheduled for a third session the following week. At this time these subjects were randomly assigned to CM or STT.

Results

The major issues to be addressed in this study include; (a) equality of training groups on individual difference and fear measures, (b) comparison of the Cognitive Style Questionnaire scales assessing reliance on visual and verbal
strategies for coping and catastrophizing, (c) overall training effects, (d) pretraining relationships between individual difference and fear measures, and (e) examination of ATI effects for posttraining approach scores and mean fear ratings. In addition, a post hoc analysis of the role of pretraining fear measures in predicting posttraining approach and mean fear ratings is presented.

Descriptive Data

Table 9 presents the mean scores on the individual difference variables for the CM, SIT, and delayed-treatment control groups. These means, with the exception of the Cognitive Style Questionnaire scales, were compared via one-way analyses of variance. No significant group differences on any variable were found (all F's n.s.). The Cognitive Style Questionnaire scales were compared using a Group (CM/SIT/Control) by Function (coping/catastrophizing) by Situation (fear/pain/anger) repeated measures analysis of variance. This analysis produced a significant main effect for Situation (F = 18.18, p < 0.0001), for Function (F = 9.90, p < 0.003), and a significant Function by Situation interaction (F = 35.45, p < 0.0001). Newman-Keuls post hoc analyses were subsequently performed. The main effect of Situation indicated that visual imagery was significantly more characteristic for fear and anger situations than pain situations. The Function main effect was due to higher imagery ratings in catastrophizing situations compared to
coping situations. The interpretation of these effects is qualified by the significant interaction, however. Newman Keuls analysis revealed that imagery was more characteristic of catastrophizing than coping in fear and anger situations. In pain situations, however, the reverse was true. Here imagery was rated more characteristic of coping than catastrophizing. This analysis also produced a significant Group by Function by Situation interaction ($F = 2.59, p = 0.042$). This was due to elevated scores on the anger-catastrophizing scale for the control group. As all subjects had been treated identically to this point, this difference can be attributed to random assignment. Nonetheless, caution should be exercised in interpreting any effects involving the anger-catastrophizing scale.

\[ \text{INSERT TABLE 9} \]

\[ \text{Table 10 presents pre- and posttraining means for each of the three groups. These groups failed to differ on either pretraining approach ($F = 0.10, p > 0.05$) or mean fear ratings ($F = 0.19, p > 0.05$). Fear ratings at each step of the BAT were compared using repeated measures analyses of variance where possible. Due to changing sample size across the BAT steps one-way analyses of variance were employed in many cases. Fear ratings increased markedly as the BAT progressed (e.g., 1.94 at step 1; 5.40 at step 9), but in no case were there any differences between the three phobic} \]
Table 9
Means and Standard Deviations For the Covert Modeling, Self-Instructional Training and Control Groups on Individual Difference Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CMa</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>CSQc</td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>42.88</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>61.96</td>
</tr>
<tr>
<td>Pain-Coping</td>
<td>42.94</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>35.88</td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>41.76</td>
</tr>
<tr>
<td>Anger-Catastrophizing</td>
<td>45.59</td>
</tr>
<tr>
<td>IDQd</td>
<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>27.24</td>
</tr>
<tr>
<td>Visual</td>
<td>31.18</td>
</tr>
<tr>
<td>V-VQe</td>
<td>9.76</td>
</tr>
<tr>
<td>Space Relations</td>
<td>26.29</td>
</tr>
<tr>
<td>Intellectual Level</td>
<td>12.50</td>
</tr>
<tr>
<td>Verbal-Visual Arousal</td>
<td>1.47</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>17.82</td>
</tr>
<tr>
<td>Quick Test</td>
<td>43.12</td>
</tr>
<tr>
<td>Social Desirability</td>
<td>12.35</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>37.25</td>
</tr>
</tbody>
</table>

aCM: Covert Modeling
bSIT: Self-Instructional Training
cCSQ: Cognitive Style Questionnaire
dIDQ: Individual Difference Questionnaire
eV-VQ: Verbalizer-Visualizer Questionnaire.
groups (all F's < 1.00).

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INSERT TABLE 10

---

Fear Survey Schedule ratings across the three groups were compared using a Group (CM/SIT/Control) by Item (11) repeated measures analysis of variance. These groups did not differ in their overall fear ratings (F = 1.82, p > 0.05). The Group factor did not interact with the items (F = 0.40, p > 0.05). However, there was a significant main effect for Item (F = 75.08, p < 0.0001). The animals rated fell into three groups: rats, snakes, and bats were all highly and equally feared. This was followed by; insects and dead animals; worms; and finally, cats, dogs, and birds which elicited virtually no fear. In summary, the three phobic groups were comparable on virtually all variables.

Next, phobics were compared to nonphobics. As in Study 1, sex was employed as a covariate in these analyses. On BAT approach scores nonphobics (mean = 15.03) progressed significantly further than phobics (F = 64.80, p < 0.0001). This was to be expected given the selection criteria. Mean fear ratings did not differ between these groups (F = 0.28, p > 0.05). This comparison was confounded by the greater number of steps completed by the nonphobics, however. Fear ratings across each step of the BAT are compared in Figure 6. Phobics rated their fear significantly higher (p < 0.05)
Table 10
Pre- and Posttraining Means and Standard Deviations For CM, SIT, and Control Groups on Performance Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pretraining</th>
<th></th>
<th></th>
<th>Posttraining</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CM&lt;sup&gt;a&lt;/sup&gt;</td>
<td>SIT&lt;sup&gt;b&lt;/sup&gt;</td>
<td>CON&lt;sup&gt;c&lt;/sup&gt;</td>
<td>CM</td>
<td>SIT</td>
</tr>
<tr>
<td>BAT&lt;sup&gt;d&lt;/sup&gt;; Approach-Mean</td>
<td>7.19</td>
<td>7.28</td>
<td>6.90</td>
<td>13.55</td>
<td>12.83</td>
</tr>
<tr>
<td>SD</td>
<td>1.92</td>
<td>1.87</td>
<td>2.08</td>
<td>3.77</td>
<td>3.59</td>
</tr>
<tr>
<td>BAT; Mean Fear-Mean</td>
<td>3.95</td>
<td>4.28</td>
<td>4.45</td>
<td>2.80</td>
<td>3.04</td>
</tr>
<tr>
<td>SD</td>
<td>1.81</td>
<td>1.66</td>
<td>2.43</td>
<td>1.67</td>
<td>1.58</td>
</tr>
<tr>
<td>FSS&lt;sup&gt;e&lt;/sup&gt;; Mean</td>
<td>3.61</td>
<td>3.47</td>
<td>3.16</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>SD</td>
<td>0.63</td>
<td>0.54</td>
<td>0.62</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>FSS; Phobic Item-Mean</td>
<td>5.71</td>
<td>5.53</td>
<td>5.80</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>SD</td>
<td>1.05</td>
<td>1.07</td>
<td>0.92</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Difficulty Using Skill</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>4.00</td>
<td>2.44</td>
</tr>
<tr>
<td>Mean</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1.66</td>
<td>1.29</td>
</tr>
<tr>
<td>SD</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Percent Time Skill Used</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>60.00</td>
<td>68.33</td>
</tr>
<tr>
<td>Mean</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>22.64</td>
<td>22.03</td>
</tr>
<tr>
<td>SD</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Usefulness of Skill</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>5.18</td>
<td>6.22</td>
</tr>
<tr>
<td>Mean</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1.55</td>
<td>0.73</td>
</tr>
<tr>
<td>SD</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

<sup>a</sup>CM: Covert Modeling
<sup>b</sup>SIT: Self-Instructional Training
<sup>c</sup>CON: Control
<sup>d</sup>BAT: Behavioral Avoidance Task
<sup>e</sup>FSS: Fear Survey Schedule
than nonphobics on all steps up to step 7. Beyond this point the number of phobics decreased drastically (e.g., 14 at step 9, 2 at step 10), making statistical comparison difficult. Thus, phobics rated their fear during the BAT higher than nonphobics.

--- INSERT FIGURE 6 ---

Phobics were also compared to nonphobics, and to the unselected sample of introductory psychology students on Fear Survey Schedule ratings. Interestingly, sex differences were observed here for both the nonphobic (F = 4.99, p < 0.04) and unselected (F = 25.16, p < 0.0001) samples. Males reported significantly less fear than females in both cases. The Group (phobic/nonphobic/unselected) by Item (11) repeated measures analysis of covariance (sex was the covariate) produced a main effect for Group (F = 13.31, p < 0.0001), Item (F = 160.12, p < 0.0001), and a significant Group by Item interaction (F = 4.97, p < 0.0001). Newman-Keuls analyses were used to interpret these significant effects. The main effect of Group failed to yield significant differences between the three conditions. The main effect of Item produced virtually identical results as for the analysis of phobics alone (see above). The interaction indicated the following: phobics reported significantly greater fear of rats, mice, snakes, spiders, and bats than the unselected
Figure 6
Fear Ratings at Each BAT Step for the Phobic and Nonphobic Groups
sample. Similarly, nonphobics were more fearful of rats, snakes, and spiders relative to the unselected sample. The phobics differed from the nonphobics only in their greater fear of bats.

**Training Effects**

Approach scores (Table 10) were examined using a Group (CM/SIT/Control) by Time (pre/post) repeated analysis of variance. There was a significant main effect of Group \( F = 6.84, p < 0.002 \), Time \( F = 72.53, p < 0.0001 \), and a significant Group by Time interaction \( F = 12.35, p < 0.001 \). The main effect of Group was due to the lower overall approach scores by the control condition. The Time effect reflected an improvement in overall approach scores. Importantly, the Group by Time interaction reflected significant and equal improvement in approach scores by the CM and SIT groups relative to the control (see Figure 7). Indeed, approach scores did not change for the control group. A similar analysis of mean fear scores produced only a significant main effect for Time \( F = 11.41, p < 0.002 \). Overall, mean fear ratings were reduced from pre- to postassessment. Although the control subjects rated their fear higher than the training subjects on the second assessment (see Figure 8), these ratings failed to differ from the training subjects.
Fear ratings at each of the BAT steps were also examined for training effects. In no case were posttraining fear ratings by CM and SIT subjects significantly lower than controls (all F's 1.00). As well, the degree of improvement did not differ between the groups. Overall, however, fear ratings were significantly reduced between pre- and postassessments, especially through the middle steps of the BAT (steps 4-8, see Figure 9).

Difficulty ratings obtained during training were evaluated using a Group (CM/SIT) by Trial (1st/2nd) by Situation (5) repeated measures analysis of variance. While there was no Group main effect (F = 3.18, p = 0.08), there was a significant Trial main effect (F = 55.36, p < 0.0001) and a significant Group by Trial interaction (F = 5.58, p < 0.03). None of the other effects were significant. The Trial main effect reflected greater difficulty ratings on the first, relative to the second, trial. This was qualified by the interaction, however. Newman Keuls analysis indicated that SIT skills were rated significantly more difficult than CM skills only on the first trial. Further, only SIT skills became easier at trial 2.
Figure 7

Pre-Posttraining Mean Approach Scores for CM and SIT
Posttraining, self-report measures (see Table 10) were also compared between the two training groups. CM and SIT did not differ on ratings of the percent of time subjects employed the skill during the final assessment \( (t = -1.10, p > 0.05) \). Subjects in SIT rated their skill as significantly easier to use, however \( (t = 3.10, p < 0.005) \). Similarly, SIT was rated as a more useful treatment for fear than CM \( (t = -2.58, p < 0.02) \).

Nine of the 10 delayed-treatment control subjects returned following the second session to receive training. These subjects were randomly assigned to training conditions (4 received CM, 5 SIT) and were treated in a manner identical to the other subjects. This group demonstrated significant improvement in both approach \( (t = -6.94, p < 0.001) \) and mean fear ratings \( (t = 3.89, p < 0.005) \) from the second to the third session. These subjects differed from the others only in that they were administered an additional BAT prior to training. To evaluate whether this additional BAT influenced training effects outcome scores were compared between the delayed-treatment subjects and the CM and SIT subjects combined. Analysis of covariance (pretraining score as the covariate) was employed to compare posttraining approach and mean fear scores. Pretraining scores for the delayed-treatment control subjects were those
Figure 8

Pre-Posttraining Mean Fear Ratings for CM and SIT
BAT FEAR RATINGS

TIME OF ASSESSMENT
taken at the second session. T-tests were employed for posttraining self-report measures. All comparisons were nonsignificant ($F = 0.11, p > 0.05$ for approach scores; $F = 1.91, p > 0.05$ for fear ratings; $t = -0.50, p > 0.05$ for ratings of percent time skill used during BAT; $t = -0.33, p > 0.05$ for posttraining usefulness ratings; and $t = -0.34, p > 0.05$ for posttraining difficulty ratings). Similarly, analysis of the difficulty ratings during training did not produce overall group differences ($F = 1.75, p > 0.05$).

Thus, although the delayed-treatment control procedure was such that it reduced fear ratings to the point where they were not differentiated from the training groups the additional reduction due to subsequent training was not greater than for the other groups. It appears that the additional assessment involved for the delayed-treatment control subjects did not influence subsequent training effects for the major dependent measures (approach scores and mean fear ratings).

Since there were no differences in training effects between delayed-treatment subjects and the other subjects on the major dependent measures the data from the former group were included in the evaluation of the critical ATI hypotheses. This increased the sample size to 21 for CM and 23 for SIT. Increased sample size adds to the power of the ATI comparisons. To ensure that only training effects were reflected in the control subjects' data, scores that were obtained at the second assessment (prior to training) were
Figure 9
Pre-Posttraining Fear Ratings at Each BAT Step for the Phobic Group
used as pretraining scores. Thus, any change reflected by these subjects was not due to repeated testing. Also, to ensure that outcome scores reflected training effects, posttraining approach scores and mean fear ratings were statistically adjusted to remove the effects of the pretraining level. This is the same statistical adjustment that is made in an analysis of covariance (Winer, 1971).

Pretraining Relationships

Table 11 presents correlation coefficients between individual difference measures and pretraining approach scores, as well as mean fear ratings. The only relationship to reach significance was between the Individual Difference Questionnaire-verbal scale and pretraining approach scores. This was a minor association, however (accounting for less than 8% of the variance), and was in a direction opposite to that found in Study 1. Those who increasingly relied on verbal information processing progressed further on the BAT.

INSERT TABLE 11

Aptitude-Treatment Interaction Effects

BAT Approach Scores. The critical hypotheses of this study involve whether the individual difference factors (particularly the Cognitive Style Questionnaire scales) differentially predict outcome of CM and SIT. The relevant
Table 11. Correlations Between Pretraining Performance Measures and Individual Difference Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Approach</th>
<th>Mean Fear</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSQ&lt;sup&gt;a&lt;/sup&gt;:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>-.16</td>
<td>.07</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>-.16</td>
<td>-.15</td>
</tr>
<tr>
<td>Pain-Coping</td>
<td>-.09</td>
<td>-.03</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
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<td>-.04</td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>-.04</td>
<td>-.11</td>
</tr>
<tr>
<td>Anger-Catastrophizing</td>
<td>-.16</td>
<td>-.05</td>
</tr>
<tr>
<td>IDQ&lt;sup&gt;b&lt;/sup&gt;:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>-.28&lt;sup&gt;*&lt;/sup&gt;</td>
<td>.11</td>
</tr>
<tr>
<td>Visual</td>
<td>-.02</td>
<td>-.02</td>
</tr>
<tr>
<td>V-VQ&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.08</td>
<td>-.11</td>
</tr>
<tr>
<td>Space Relations</td>
<td>-.22</td>
<td>.02</td>
</tr>
<tr>
<td>Intellectual Level</td>
<td>-.11</td>
<td>.07</td>
</tr>
<tr>
<td>Verbal-Visual Arousal</td>
<td>.06</td>
<td>-.17</td>
</tr>
<tr>
<td>Verbal-Fluency</td>
<td>-.15</td>
<td>-.04</td>
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<td>Quick Test</td>
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<td>-.17</td>
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<tr>
<td>Social Desirability</td>
<td>.09</td>
<td>.04</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>-.06</td>
<td>-.04</td>
</tr>
</tbody>
</table>

<sup>a</sup>CSQ: Cognitive Style Questionnaire
<sup>b</sup>IDQ: Individual Difference Questionnaire
<sup>c</sup>V-VQ: Verbalizer-Visualizer Questionnaire
<sup>*</sup>p < .05
regression equations and beta weights for adjusted posttraining BAT approach scores appear in Table 12.

As in Study 1 many of the individual difference scales failed to predict outcome for either training group. The notable exceptions included; the Cognitive Style Questionnaire fear-coping scale, the Intellectual Level measure, the Space Relations task, and the Verbal-Visual Arousal scale. All four of these scales showed positive relationships with the outcome of CM and negative relationships with the outcome of SIT. For CM, the Verbal-Visual Arousal scale ($F = 5.29, p < 0.04$) and the Intellectual Level measure ($F = 9.63, p < 0.008$) both showed highly significant relationships, each accounting for over 20% of the variance in outcome. Space Relations ($F = 3.45, p < 0.08$) accounted for over 15% of the variance in CM, but this was only a marginal relationship. The fear-coping scale showed a small nonsignificant relation with CM. On the other hand, the negative relationship with the outcome of SIT was highly significant for the fear-coping scale ($F = 9.63, p < 0.001$), the Intellectual Level measure ($F = 4.13, p < 0.055$), and the Space Relations task ($F = 17.88, p < 0.0001$). There was no substantial relationship between the outcome of SIT and the Verbal-Visual Arousal scale ($F = 0.02, p > 0.05$).
Table 12
Regression Equations and Beta Weights For
Individual Difference Measures Predicting
Adjusted Posttraining Approach for CM and SIT

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
<th>Self-Instructional Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope</td>
<td>Intercept</td>
</tr>
<tr>
<td><strong>CSQ</strong></td>
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<td></td>
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<tr>
<td>Fear-Coping</td>
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<td>11.78</td>
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<tr>
<td>Fear-Catastrophizing</td>
<td>-.032</td>
<td>15.69</td>
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<tr>
<td>Pain-Coping</td>
<td>-.036</td>
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<tr>
<td>Pain-Catastrophizing</td>
<td>-.044</td>
<td>14.97</td>
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<tr>
<td>Anger-Coping</td>
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<td>12.87</td>
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<tr>
<td>Anger-Catastrophizing</td>
<td>.011</td>
<td>13.05</td>
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<tr>
<td><strong>IDQ</strong></td>
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<td></td>
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<tr>
<td>Verbal</td>
<td>.036</td>
<td>12.68</td>
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<tr>
<td>Visual</td>
<td>.015</td>
<td>13.18</td>
</tr>
<tr>
<td>V-VQ (^C)</td>
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<td>15.44</td>
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<tr>
<td>Space Relations</td>
<td>.114</td>
<td>10.68</td>
</tr>
<tr>
<td>Intellectual Level</td>
<td>1.230</td>
<td>-1.68</td>
</tr>
<tr>
<td>Verbal-Visual Arousal</td>
<td>.628</td>
<td>12.83</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>-.114</td>
<td>15.66</td>
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<tr>
<td>Quick Test</td>
<td>.253</td>
<td>2.72</td>
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<tr>
<td>Social Desirability</td>
<td>-.231</td>
<td>10.82</td>
</tr>
<tr>
<td>Vividness of Imagery</td>
<td>.096</td>
<td>10.05</td>
</tr>
</tbody>
</table>

\(^a\) CSQ: Cognitive Style Questionnaire
\(^b\) IDQ: Individual Difference Questionnaire
\(^c\) V-VQ: Verbalizer Visualizer Questionnaire
\(^e\) \( F \): ratios testing AT1

* \( p < .08 \)
** \( p < .05 \)
*** \( p < .01 \)
The remaining scales failed to demonstrate predictive validity for either training condition. The Vividness of Visual Imagery Questionnaire was positively associated with outcome for CM, and the Individual Difference Questionnaire-visual, fear-catastrophizing, and anger-coping scales were negatively associated with outcome for SIT. All of these relationships were small and statistically unreliable. Thus, there appears to be a good deal of consistency between Study 1 and 2 in terms of the scales which predicted posttraining approach scores as well as those which do not.

The F-ratios testing for the presence of ATI effects are included in Table 12. Significant ATI effects occurred for; the fear-coping scale (F = 4.45, p < 0.05), the Space Relations task (F = 15.47, p < 0.01), and the Intellectual Level measure (F = 12.73, p < 0.01). The Verbal-Visual Arousal scale produced only a trend toward an ATI effect (F = 2.10, p > 0.05). Figures 10 through 12 present the significant ATI effects. The Johnson-Neyman technique was employed to identify regions of significance within these relationships. These regions are indicated by the shaded areas in Figures 10 to 12.

--- INSERT FIGURE 10 ---

Analysis of the fear-coping scale (Figure 10) produced a closed region of significance. That is, CM and SIT
Figure 10

ATI for the Fear-Coping Scale Predicting Adjusted Posttraining Approach Scores
Fear-coping scale

BAT Adjusted Approach Scores
differed significantly between the two cutoff points, not outside the region defined by these cutoffs. Serlin and Levin (1980) note that as one gets further away from the mean score on the individual difference measure the standard error increases. If this increase in error outstrips the group differences this can produce a closed region of significance. That this occurred for the fear-coping scale is understandable when one examines Figure 10. Very few subjects scored above the upper bound. None of the subjects in the CM group scored in this range and only two of the SIT group did so. Thus, CM was superior to SIT for those who scored above 45.22 and below 73.28. Approximately 30% of the sample fell within this range. Those who received CM scored 15.06, while those who received SIT scored 11.19.

INSERT FIGURE 11

For the Space Relations task (Figure 11) CM was superior to SIT for those who scored above 29.90. The mean for those subjects who actually fell within this range and received CM was 15.13. Those who received SIT scored 12.27. SIT was found to be superior to CM below 5.86. Only three subjects actually scored below this cutoff, however. Together, 50% of the subjects fell within the differentiated regions.
Figure 11
ATI for the Space Relations Task Predicting Adjusted Posttraining Approach Scores
Analysis of the Intellectual Level measure (Figure 12) indicated that CM was superior to SIT above 12.98, with the reverse being true below 10.25. As might be expected with a university population, and consistent with the analysis of Space Relations, few subjects scored below 10.25 (n = 2). Thirteen subjects fell above the upper bound, however. Here those that received CM scored 16.18, while those receiving SIT scored 11.27. All in all, 34% of subjects could be successfully categorized into differentiated regions.

Although the Verbal-Visual Arousal scale failed to produce a significant ATI this scale was quite predictive of the outcome for CM only. To evaluate the predictive ability for this scale more fully extreme groups were compared. As in Study 1 few subjects reported that self-verbalizations were more fear arousing than visual images. Thus, the extreme groups involved, (a) those who reported both self-verbalizing and imagining equally fear arousing as well as the few who found verbalizing most fear arousing, and (b) those who strongly endorsed imagery as most fear arousing. Those who strongly endorsed imagery (n = 9) progressed significantly further on the posttraining BAT (14.88) than those who endorsed verbalizing or both imagery and verbalizing (n = 9; mean score = 11.85, t = 2.10, p < 0.05). This effect occurred only for the CM group, however.
Figure 12

ATI for the Intellectual Level Measure Predicting Adjusted Posttraining Approach Scores
Given that ATI effects were found for multiple predictors, an attempt was made to maximize the predictive ability of these scales. The fear-coping, Space Relations, Intellectual Level, and Verbal-Visual Arousal measures were combined via multiple regression to predict the outcome of CM and SIT. To simplify this procedure a single scale was formed. This scale was formed by the weighted combination of the four predictors. The weights were the regression coefficients from the multiple regression. These scores were then standardized to facilitate comparison between CM and SIT. The resulting scales are presented in Figure 13. This combined scale accounted for 57.2% of the variance, in the positive direction, for the adjusted posttraining approach scores of CM (F = 25.39, p < 0.0001). For SIT, the scale accounted for 51% of the variance in the negative direction (F = 21.85, p < 0.0001). The test for ATI with this scale was highly significant (F = 44.50, p < 0.0001).

________________________

INSERT FIGURE 13

________________________

The Johnson-Neyman analysis applied to this ATI indicated that CM was superior to SIT above +0.19. Eighteen subjects fell above above this point. Ten received SIT (mean = 10.47), eight received CM (mean = 16.22). On the other hand, SIT was superior to CM below -0.57. Thirteen subjects fell in this range. Seven received SIT (mean = 15.27), six received CM (mean = 9.79). Together, over 70% of
Figure 13
ATI for Multiple Predictors (Fear-Coping, Space Relations, Intellectual Level, and Verbal-Visual Arousal Measures) Predicting Adjusted Posttraining Approach Scores
the sample fell into these differentiated regions. Clearly, strong ATI effects were uncovered with this combined scale.

**BAT Mean Fear Ratings.** Differential regression equations for adjusted posttraining mean fear ratings are presented in Table 13. Examination of these relationships revealed that few scales adequately predicted the degree of fear reduction produced by CM. The exception was the pain-catastrophizing scale, where increasing reliance on imagery was associated with increasing fear ratings during the BAT \( (F = 5.17, p < 0.05) \). The fear-catastrophizing scale produced a marginal (nonsignificant) negative relationship with fear and the Quick Test a marginal (nonsignificant) positive association. None of the other scales accounted for much variance in the outcome of CM.

---

**INSERT TABLE 13**

---

For SIT the situation was quite different. Here many of the predictors were associated with adjusted posttraining mean fear ratings. As with the behavioral approach measure the fear-coping \( (F = 4.66, p < 0.05) \), Space Relations \( (F = 4.18, p = 0.054) \), Intellectual level \( (F = 5.14, p < 0.05) \), and Verbal-Visual Arousal scales \( (F = 5.73, p < 0.05) \) significantly predicted posttraining mean fear ratings. These relationships were positive for all measures except the Verbal-Visual Arousal scale. In addition to these scales, the fear-catastrophizing \( (F = 5.12, p < 0.05) \) and
### Table 13
Regression Equations and Beta Weights for Individual Difference Scales Predicting Adjusted Posttraining Mean Fear Ratings for CM and SIT

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
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<th></th>
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<tr>
<td></td>
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<td>Intercept</td>
<td>Beta</td>
<td>Slope</td>
<td>Intercept</td>
<td>Beta</td>
<td>F^d</td>
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<td>------------------------------</td>
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<td></td>
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<td>Fear-Coping</td>
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<td>.426**</td>
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<td>-.322</td>
<td>.042</td>
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<td>.443**</td>
<td>6.08**</td>
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<td>.013</td>
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<td>.234</td>
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<td>.438**</td>
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<td>.353*</td>
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<td>Visual</td>
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<td>.081</td>
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<td>.319</td>
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<td>V-VQ^c</td>
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<td>.081</td>
<td>.197</td>
<td>0.97</td>
<td>.314</td>
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<tr>
<td>Space Relations</td>
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<td>.120</td>
<td>.040</td>
<td>2.10</td>
<td>.407**</td>
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<td>Intellectual Level</td>
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<td>.443**</td>
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<td>-.451**</td>
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<td>.030</td>
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<td>.116</td>
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<td>Quick Test</td>
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<td>.020</td>
<td>2.14</td>
<td>.030</td>
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<tr>
<td>Social Desirability</td>
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<td>-.031</td>
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<tr>
<td>Vividness of Visual Imagery</td>
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<td>-.072</td>
<td>.034</td>
<td>1.75</td>
<td>.276</td>
<td>1.22</td>
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^aCSQ: Cognitive Style Questionnaire
^bIDQ: Individual Difference Questionnaire
^cV-VQ: Verbalizer-Visualizer
^dF-ratios testing AT1

* p < .10
** p < .05
anger-coping ($F = 4.98, p < 0.05$) scales produced significant positive associations with mean fear ratings. The anger-catastrophizing, Verbalizer-Visualizer Questionnaire, and Individual Difference Questionnaire-visual scales showed nonsignificant trends toward positive associations with fear ratings as well. Thus, while few scales accounted for significant variance in the adjusted posttraining mean fear ratings for CM, many scales did so for SIT. For SIT there was a high degree of consistency between the approach scores and subjective fear ratings in this regard.

Table 13 includes the F-ratios testing for the ATI effects. Only the fear-catastrophizing scale ($F = 6.08, p < 0.05$, Figure 14) produced a significant ATI. While trends toward ATI were generated by the Verbal-Visual Arousal scale and the Intellectual Level measure these were nonsignificant. The ATI for fear-catastrophizing scale was examined using the Johnson-Neyman technique. This produced a closed region of significance between 46.45 and -16.45. Since scores below zero are impossible, this indicates that adjusted posttraining mean fear ratings were significantly lower for those who scored below 46.45 and receive SIT, relative to CM. Indeed, those who fell within this range and received SIT scored 0.78, while those who received CM scored 2.88. Only 9.1% of the sample actually fell within this range, however.
Although none of the other scales demonstrated differential prediction of outcome for CM and SIT on adjusted posttraining mean fear ratings it is important to note that several scales significantly predicted the outcome of SIT alone. To further examine these relationships mean fear ratings for the upper and lower centiles (i.e., upper and lower 20% of the distribution of these individual difference scales' values) were compared. Centiles were chosen for several reasons. First, they represent meaningful separation of the groups. Second, they allow a reasonable proportion of subjects to be considered (i.e., 40%). These means appear in Table 14. Comparing these groups revealed significantly greater mean fear ratings for those who scored high on the fear-coping, anger-coping, Space Relations, and Intellectual Level measures. For the Verbal-Visual Arousal scale, high scorers displayed significantly lower mean fear ratings than low scorers.

Recall that the pain-catastrophizing scale significantly predicted mean fear ratings for CM only. Therefore, upper and lower centiles were compared for this measure, as above. Those who scored high...
Figure 14
ATI for the Fear-Catastrophizing Scale Predicting Adjusted Posttraining Mean Fear Ratings
BAT ADJUSTED MEAN FEAR RATINGS

FEAR—CATASTROPHIZING SCALE
<table>
<thead>
<tr>
<th>Measure</th>
<th>Lower Centile</th>
<th>Upper Centile</th>
<th>t</th>
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<tbody>
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<td>4.18</td>
<td>2.15*</td>
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<td>4.01</td>
<td>2.19*</td>
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<tr>
<td>Space Relations</td>
<td>2.30</td>
<td>3.97</td>
<td>2.31*</td>
</tr>
<tr>
<td>Intellectual Level</td>
<td>1.79</td>
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<td>2.61*</td>
</tr>
<tr>
<td>Verbal-Visual Arousal</td>
<td>3.43</td>
<td>2.01</td>
<td>2.13*</td>
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</table>

*p < .05, one tail
significantly greater mean fear ratings than those who scored low (means were 4.00 and 1.63, respectively; \( t = 2.39, p < 0.05 \)).

Table 15 presents correlations between those scales which predicted outcome (for approach scores or fear ratings) of CM and/or SIT and difficulty ratings in using the coping skills during training and at the posttraining exposure. Any relationships could provide insight into possible mediators through which ATI effects might occur. There were no significant correlations between difficulty ratings and individual difference variables for SIT. However, significant correlations occurred between the fear-coping, pain-catastrophizing, Space Relations, and Intellectual Level measures and difficulty ratings during training for CM subjects. The pain-catastrophizing scale was also significantly correlated with difficulty ratings obtained after the posttraining BAT. Thus, there are some relationships which suggest that those who score high on these scales find the imagery skill easier to learn and apply. No such relationship occurred for the verbal skill.

---

INSERT TABLE 15

---

Post hoc analysis of fear level. A post hoc analysis of the role of pretraining fear measures in predicting training effects was also performed. Specifically, the
Table 15

Correlations Between Difficulty Ratings During and Following Training and Selected Individual Difference Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
<th>Self-Instructional Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Training Trials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSQ:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>-.40**</td>
<td>-.41**</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>.02</td>
<td>-.01</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>-.39**</td>
<td>-.27</td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>-.23</td>
<td>-.26</td>
</tr>
<tr>
<td>Space Relations</td>
<td>-.28</td>
<td>-.38**</td>
</tr>
<tr>
<td>Intellectual Level</td>
<td>-.21</td>
<td>-.34*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSQ:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>-.01</td>
<td></td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>-.15</td>
<td></td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>-.40**</td>
<td></td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>-.05</td>
<td></td>
</tr>
<tr>
<td>Space Relations</td>
<td>-.21</td>
<td></td>
</tr>
<tr>
<td>Intellectual Level</td>
<td>-.15</td>
<td></td>
</tr>
</tbody>
</table>

*p < .06
**p < .05
following were employed to predict outcome for each coping skill: Fear Survey Schedule mean rating, Fear Survey Schedule phobic object rating, and mean fear rating obtained at the pretraining BAT (Table 16). Each of these three variables significantly predicted adjusted posttraining approach scores for CM: \( R = 0.47, F = 5.29, p < 0.05 \) for Fear Survey Schedule mean rating; \( R = 0.44, F = 4.71, p < 0.05 \) for Fear Survey Schedule phobic object; \( R = 0.53, F = 7.54, p < 0.02 \) for mean fear ratings during the BAT. All of these relationships were positive, indicating that CM was more effective for those who were more fearful. For SIT, only Fear Survey Schedule mean ratings significantly predicted outcome \( (R = 0.41, F = 4.32, p < 0.05) \). Again, this relationship reflected the fact that SIT was more effective for those high in fear.

---

**INSERT TABLE 16**

Tests for ATI's among these predictors failed to reach significance for either mean Fear Survey Schedule \( (F = 0.10, p > 0.05) \) or Fear Survey Schedule phobic object \( (F = 1.90, p > 0.05) \). There was a significant ATI for mean fear level during the BAT, however \( (F = 4.75, p < 0.05) \). Figure 15 displays this effect. The Johnson-Neyman analysis identified a closed region of significance between 6.21 and 7.96. Within this narrow range CM was superior to SIT. As would be expected with such a narrow range, few individuals
Table 16

Differential Regression Equations for CM and SIT Using Pretraining Fear Measures to Predict Adjusted Posttraining Approach Scores and Mean Fear Ratings

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
<th>Self-Instructional Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope</td>
<td>Intercept</td>
</tr>
<tr>
<td>Adjusted Posttraining Approach Scores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSS&lt;sup&gt;a&lt;/sup&gt;; phobic item</td>
<td>1.57</td>
<td>4.62</td>
</tr>
<tr>
<td>FSS; mean</td>
<td>2.68</td>
<td>4.05</td>
</tr>
<tr>
<td>Mean BAT Fear&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.14</td>
<td>9.10</td>
</tr>
<tr>
<td>Adjusted Posttraining Mean Fear Ratings,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSS; phobic item</td>
<td>-.040</td>
<td>5.18</td>
</tr>
<tr>
<td>FSS; mean</td>
<td>-.020</td>
<td>2.99</td>
</tr>
<tr>
<td>Mean BAT Fear</td>
<td>-.20</td>
<td>3.68</td>
</tr>
</tbody>
</table>

<sup>a</sup>FSS: Fear Survey Schedule; animal items only

<sup>b</sup>Ratings obtained at Pretraining

*p < .05
actually fell within it (11%).

INSERT FIGURE 15

Figure 16 displays the regression equations for Fear Survey Schedule mean ratings. Clearly, there was no hint of an ATI effect here. Since the prediction equations were significant for both CM and SIT the grouping factor was ignored, and upper and lower centiles were compared. The highly fearful group progressed significantly further than the low fear group (means were 14.69 and 11.62, respectively; $t = 1.80, p < 0.05$, one-tail).

INSERT FIGURE 16

Table 16 indicates that none of the fear variables predicted adjusted posttraining mean fear ratings. Interestingly, the pretraining mean fear level produced a trend toward an ATI. This failed to reach conventional significance, however.

Test-Retest Reliability of the Cognitive Style Questionnaire. One concern with the present study was with the psychometric properties of the Cognitive Style
Figure 15

ATI for Mean Fear Level at Pretraining BAT Predicting Adjusted Posttraining Approach Scores
Mean Fear at Pre-bat
Figure 16

Regression Lines for CM and SIT With Fear Survey Schedule Mean Ratings Predicting Adjusted Posttraining Approach Scores
Fear Survey Schedule - mean rating

BAT
ADJUSTED
APPROACH
SCORES

CM
SIT
Questionnaire. To provide some preliminary indication of the reliability of these scales estimates of split-half and test-retest reliability were calculated. These estimates were calculated separately for each of the Cognitive Style Questionnaire scales. Split-half reliabilities were obtained from the entire sample of phobics employed in this study (n = 45). A small group of rat fearful subjects (n = 10) was recruited to provide an index of test-retest reliability. Unavailability of sufficient phobics prevented test-retest reliability from being calculated on this sample.

Table 17 presents these reliabilities. These values indicate a moderate level of internal consistency for both fear scales, and also for both pain scales. Very low estimates of internal consistency were found for the anger scales, however. Test-retest reliability estimates were very high for all scales, particularly the fear scales (r's > 0.90). Thus, the Cognitive Style Questionnaire scales appear extremely stable over time and, at least for the fear and pain scales, appear to display a moderate level of internal consistency.
Table 17

Test-Retest and Split-half Reliabilities for the Cognitive Style Questionnaire Scales

<table>
<thead>
<tr>
<th>Measure</th>
<th>Split-half (n=45)</th>
<th>Test-Retest (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear-Coping</td>
<td>.70</td>
<td>.95</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>.63</td>
<td>.92</td>
</tr>
<tr>
<td>Pain-Coping</td>
<td>.50</td>
<td>.88</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>.56</td>
<td>.79</td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>.23</td>
<td>.86</td>
</tr>
<tr>
<td>Anger-Catastrophizing</td>
<td>.27</td>
<td>.79</td>
</tr>
</tbody>
</table>
Discussion

Phobic subjects in this study were differentiated from both the nonphobic and unselected subjects. Fear Survey Schedule ratings clearly indicated greater fear for the phobic and nonphobic groups compared to the unselected group. As well, phobics reported significantly more fear, and progressed less far during the BAT than nonphobics. Therefore, the screening criteria of the present study identified a highly fearful group.

Data also replicate the efficacy of CM and SIT for phobic avoidance. Both training conditions significantly improved approach and markedly reduced fear ratings. Inclusion of a control condition allows one to conclude that the effects of the training protocols on behavioral approach scores were independent of at least some nonspecific contextual factors. While avoidance behavior was unaffected by factors such as attention, repeated testing, passage of time, completing the questionnaires, and so on, mean fear ratings were less resistant to such factors. Although there was less reduction in fear ratings for the control subjects (e.g., pre-post t-tests were nonsignificant only for control subjects) fear ratings were reduced to the point where they could not be meaningfully differentiated from those of the CM or SIT subjects. This data suggests that self-report fear measures might be more easily influenced by nonspecific factors than behavioral measures.
Even though fear ratings were reduced somewhat by the control procedure, when these subjects were subsequently trained in coping skills they did not show greater improvement than the other subjects. Differential training gains as a function of the additional assessment for control subjects was not found on the major dependent measures.

Both CM and SIT also produced equivalent improvement in BAT approach scores as well as mean fear ratings. Posttraining self-report measures suggested some group differences, however. First, SIT was rated more difficult to use during the initial (but not the second) training trial. Second, even though SIT was more difficult initially it was reported to be significantly easier to employ during the posttraining assessment. SIT was also rated significantly more useful as a treatment for fear than CM. While at a subjective level verbal coping skills were considered easier to employ following training and more useful, this difference was not reflected in actual performance differences. Also, similar differences were not found in Study 1. Further work is therefore needed to explore this effect. If it proves to be reliable it might suggest that under certain conditions (e.g., highly demanding tasks) these subjective differences might influence performance.

The major issue for the present study deals with the replicability of ATI effects across CM and SIT procedures. In this regard the data are quite encouraging, particularly
on the behavioral approach measure. The fear-coping scale, which demonstrated significant ATI in Study 1, for posttraining approach scores produced ATI effects for adjusted posttraining approach scores in Study 2 as well. Increasing reliance on imagery to cope with fear was associated with greater approach scores when subjects were trained in CM, but with smaller approach scores when subjects were trained in SIT. Further analysis identified CM superior to SIT for those who scored above 45.22 on this scale. This is quite similar to the cutoff of 51.51 which was identified in Study 1. Thus, not only was the ATI effect for this scale replicated but the region where CM was superior to SIT was also closely replicated. The superiority of SIT over CM for those who strongly relied on verbal fear coping strategies was identified in Study 1. It was not replicated in the present study, however. This appeared to be due to the lower predictive power of the fear-coping scale for CM in this study, relative to Study 1. The predictive power of the fear-coping scale for the SIT group was virtually identical between Studies 1 and 2, however (\( r = -0.55, p < 0.05 \) in Study 1; \( r = -0.57, p < 0.01 \) in Study 2).

The greater predictive validity for SIT over CM occurred also on adjusted posttraining mean fear ratings. Only in Study 1 was the fear-coping scale significantly predictive of fear ratings for CM (\( r = -0.60 \) in Study 1; \( r = -0.08 \) in Study 2). Significant predictions of
posttraining mean fear ratings for SIT occurred in both studies; however, \( R = +0.88, p < 0.01 \) in Study 1; \( R = +0.43, p < 0.05 \) in Study 2. This greater predictive validity for SIT over CM likely accounts for the fact that the significant ATI effect found in Study 1 for posttraining mean fear ratings was not replicated in Study 2.

Thus, the data from Study 2 replicate the ATI effects for the fear-coping scale with posttraining behavioral approach scores. However, the data suggest that this individual difference factor plays a much greater role in predicting the efficacy of SIT than CM. As with Study 1 the fear-coping scale was highly predictive of posttraining approach scores as well as mean fear ratings for the SIT group. Those who relied on visual imagery to cope with fear benefitted more from imagery coping skills than verbal coping skills. Similarly, those who relied on visual imagery performed significantly poorer than those who relied on verbal coping skills when trained in verbal skills. The replication of ATI effects for this cognitive style measure (i.e., the fear-coping scale) is quite encouraging. It suggests that reliance on visual imagery and verbal strategies could have practical applications.

The other scales of the Cognitive Style Questionnaire reflected similar results. Generally, the predictive power of these scales was greater for SIT than CM. This was particularly true for adjusted posttraining mean fear ratings where several of the Cognitive Style Questionnaire...
scales accounted for substantial outcome variance. While only the fear-catastrophizing scale produced a significant ATI for adjusted posttraining mean fear ratings (such that SIT produced lower fear ratings than CM for subjects scoring low on this scale) an extreme groups analysis indicated significant differences in mean fear ratings for the fear-coping and anger-coping scales. Thus, while these latter scales did not reveal CM-SIT differences they did indicate that SIT was more successful for some subjects than for others. This, in itself, could have meaningful implications. That is, the possibility that individual style variables play a greater role in the efficacy of SIT might account for the conflicting data on the efficacy of this skill.

The pain-catastrophizing scale, which produced a significant ATI for approach scores in Study 1, failed to generate differential regressions between CM and SIT in the present study. This might reflect the addition of items to the pain scale which occurred following Study 1. Alternatively, it could reflect the fact that this scale does not reliably assess constructs which are related to training effects in this paradigm.

As with Study 1 the different Cognitive Style Questionnaire scales produced differential relationships with adjusted posttraining mean fear ratings for the CM group. Specifically, the fear scales demonstrated small negative associations with posttraining mean fear ratings for CM
while the pain scales showed positive relationships (significant for pain-catastrophizing). In Study 1 fear-coping was significantly positively, and pain-coping was significantly negatively, related to posttraining fear ratings for CM. These differential associations across Cognitive Style Questionnaire scales may reflect the specificity of the imagery construct. That is, ratings of visual imagery/verbal strategy use in one particular situation (e.g., fear) may predict performance in one direction in a similar situation (fear). Ratings of imagery/verbal strategy use in a different situation (e.g., pain) may be related to performance in the opposite direction for that situation (fear). Thus, the data from Study 2 also replicate the highly specific relationships that can occur between the application of visual imagery/verbal skills in a particular situation and assessment of imagery/verbal strategy use in a variety of situations.

Despite the fact that mean fear ratings were influenced by nonspecific factors (e.g., repeated testing) the Cognitive Style Questionnaire scales were able to predict the amount of training gain, particularly for SIT. If one takes the data from the control procedure to indicate that self-reported fear does not really reflect training effects, but 'placebo' effects, one is still left with the fact that individual difference factors are important in the amount of fear reduction reported.
The descriptive data comparing the Cognitive Style Questionnaire scales to each other again suggest that the use of imagery and verbal strategies is highly situation specific. While imagery was significantly more characteristic of catastrophizing than coping in fear and anger situations, the reverse was true in pain situations. These effects strongly replicate those of Study 1. They highlight the fact that reliance on imagery or verbal strategies is highly dependent on the particular situation as well as the function of the strategy within that situation. Reliability data gathered on the Cognitive Style Questionnaire were also quite encouraging. All scales demonstrated excellent stability over time. As well, the fear and pain scales demonstrated an adequate degree of internal consistency. Clearly, the data on the Cognitive Style Questionnaire generated by this and the previous study suggest that it is an interesting device, worthy of continued attention. Reliance on visual imagery and/or verbal strategies in specific stressful situations has the potential of becoming a useful cognitive style measure.

In addition to the fear-coping and fear-catastrophizing scales, highly significant ATI effects were produced by the Space Relations and Intellectual Level measures for adjusted posttraining approach scores. For Space Relations CM was superior to SIT for those who scored above 29.90. On the other hand, SIT was superior to CM for those who scored below 5.86. Although this scale discriminated the two
conditions at both ends of the scale it is important to note that few subjects actually scored below 5.86. Less than 7% fell within this range, while over 43% fell above 29.90. Thus, this scale most clearly differentiated SIT from CM for those who did well on this task. The Space Relations task failed to generate a significant ATI effect for adjusted posttraining mean fear ratings, however. Nonetheless, the Space Relations task significantly predicted posttraining fear ratings for the SIT group alone. Those who scored in the upper centile on this measure rated their fear significantly greater than those in the lower centile. Again, we see the pattern for this scale to be most predictive of performance for the SIT group.

While the Space Relations task produced highly reliable ATI effects in this study it should be noted that it failed to produce ATI effects in Study 1. One interesting finding in Study 1, however, was the depressed mean score for the SIT group. Specifically, in Study 1 the SIT subjects averaged 13.80 on this scale. In Study 2 SIT subjects averaged 22.10. Such a depressed mean might account for the lack of a predictive relationship with the SIT group. Consistent with this, similar beta weights occurred for CM in the two studies (B = +0.31 in Study 1; B = +0.40 in Study 2). As well, in Study 1 those who fell above 29.9 (the cutoff generated in Study 2) scored 11.00 on the approach scale when trained in CM. This group scored 8.60 when trained in SIT. Clearly, these differences are consistent
with the results of the present study. Notably, this is a post hoc interpretation. Future research should focus on replicating ATI effects with the Space Relations task.

A strong ATI effect was also generated by the Intellectual Level measure for adjusted posttraining approach scores. This scale significantly predicted outcome for both CM and SIT. The direction of these relationships was positive for CM, negative for SIT. CM was superior to SIT for those scoring above 13.00. SIT was superior to CM for those scoring below 10.20. As with Space Relations, few subjects (5%) actually fell below 10.20. Also consistent with Space Relations, as well as with the fear-coping scale, Intellectual Level significantly predicted adjusted posttraining mean fear ratings only for SIT. The test for ATI effects with this measure was nonsignificant. However, SIT subjects in the upper centile on this measure reported their fear significantly greater than SIT subjects in the lower centile.

None of the other individual difference measures produced significant ATI. The Verbal-Visual Arousal scale significantly predicted posttraining approach for CM (positive association) and posttraining mean fear ratings for SIT (negative association). Those who found visual imagery more frightening than self-verbalizations about the phobic object produced greater approach scores when given CM. These subjects reported less fear when given SIT. Therefore, there does not appear to be a differential
association across the two training conditions. That is, both verbal and imagery based coping skills showed greater training effects (albeit on different dependent measures) for those who found visual imagery more frightening. The lack of differential predictive validity for this scale is not consistent with a conditioning model of ATI effects. This model would predict that greater training gains would occur when the form of training matched the form of stimulus representation that was most fear arousing.

The strength of the ATI effects uncovered in this study was highlighted when the fear-coping, Space Relations, Intellectual Level, and Verbal-Visual Arousal measures were combined to predict posttraining approach scores. The resulting scale accounted for over 50% of the variance in behavioral outcome for both training conditions, but in opposite directions. In fact, over 70% of the sample fell into regions where the two training conditions differed significantly.

The data from Study 2 is consistent with that of Study 1 with respect to the Cognitive Style Questionnaire scales. There were highly specific relationships between ratings of the characteristic use of visual imagery and verbal skills and the ability to apply these skills in a fear provoking situation. The predictive validity of the fear-coping scale in Study 2 should be highlighted. Reliance on visual imagery and/or verbal coping strategies in fear situations was highly predictive of training gains for SIT. This
measure was able to differentiate the efficacy of CM and SIT for a subgroup of subjects. The practical value of such a cognitive style measure is likely to be great; especially given the fact that this measure's predictive validity was replicated in an independent sample.

The data from Study 2 argue for more than just this highly specific ATI factor, however. A more general factor was found to produce ATI as well. Significant ATI effects were generated by the Intellectual Level and the Space Relations measures. CM was more effective than SIT for those who scored high on these scales. The reverse was true for those who scored low. The Intellectual Level measure suggests that this general factor likely involves intellectual ability. It is a bit more difficult to interpret what the Space Relations task might be assessing, however. This task has frequently been employed as a measure of visual imagery. Despite this, the task does not necessarily ensure that subjects use imagery in solving the tasks. Self-verbalizations are also a possible strategy. It may be that this task is assessing a more general ability factor, similar to the Intellectual Level measure. This suggestion is supported by several facts. First, Space Relations showed a pattern of results nearly identical to that showed by Intellectual Level measure. Second, in a factor analysis of the individual difference measures these two tests loaded together on a single factor (no other scales loaded on this factor). The two scales were highly
correlated as well ($r = 0.53, p < 0.001$). Thus, in addition to a specific imagery/verbal strategy use factor, the present data suggest that a more general factor, possibly involving intellectual ability, differentially predicts the efficacy of CM and SIT.

Intellectual Level has not, to the authors knowledge, been examined as a mediating variable in the efficacy of CM and SIT coping skills training for adults. The psychotherapy literature has been concerned with the role of intelligence might play in outcome. Garfield (1978) has reviewed this literature and concludes that the evidence is quite mixed as to whether intelligence is positively associated with continuance in, as well as outcome of, psychotherapy. The review did not make mention of the possible negative association between intelligence and outcome (this was seen for SIT in the present study).

Intellectual Level has been examined as a mediating variable in the efficacy of training procedures with children, however. In this area, ATI effects between intellectual level and outcome have been reported. Generally, these ATI effects suggest that highly intelligent children benefit more than less intelligent children under condition that are unstructured and allow considerable choice. On the other hand, the data suggest that less intelligent children benefit more from highly structured instruction than highly intelligent children (see Cronbach & Snow, 1977, for a review of this literature).
Perhaps CM and SIT can be conceptualized as varying in terms of the amount of structure they provide. SIT, it might be argued, is more structured. Specific self-instructions are presented to subjects, who practise these self-instructions aloud. On the other hand, CM involves a more covert process, where individuals could exercise more of their own will. If this dichotomy were valid the ATI for intellectual level would parallel that suggested in the education literature. The post hoc nature of this hypothesis should be noted. The ATI for Intellectual Level was unexpected in this study. Future research should focus on whether CM and SIT do differ in terms of the amount of structure. As well, it should be noted that the subjects in the present study were university students. This makes them atypical in that they are a highly intelligent group (mean scale score above 12.00). It would be important to replicate this effect on a more representative sample. Nonetheless, the present data found strong support for the ATI with this factor. The practical implications of this effect are worthy of future concern.

The present data also suggest that self-reported fear level may be an important predictor of the efficacy of CM and SIT. Again, however, these relationships were highly specific and were dependent on the measure employed. The degree of fear reported during the pretraining BAT differentially predicted the efficacy of CM and SIT on adjusted posttraining approach scores. Group differences
occurred only for subjects who were very highly fearful, however. For these subjects CM was superior to SIT. In contrast to this, a more general fear index, the Fear Survey Schedule mean rating (obtained prior to the BAT) predicted the behavioral outcome of CM as well as SIT. Statistically reliable positive associations occurred for both groups. Greater training gains were evidenced by more highly fearful subjects. These predictive relationships occurred despite the restricted range that would be expected when a highly fearful group is examined. These findings are consistent with those of Elder, Edelstein, and Fremouw (1981). They reported that self-instructional training (they called it Cognitive Restructuring) was more effective for subjects high in social anxiety. As in the present study these authors formed high and low groups on the basis of a pretraining self-report measure (the Social Avoidance and Distress Scale, Watson & Friend, 1969).

In an attempt to understand whether ATI effects might be related to the ease in using a particular coping skill correlations between difficulty ratings (during and following training) and individual difference factors identifying ATI were calculated. Data indicated that, for CM only, increasing scores on the fear-coping, pain-catastrophizing, Space Relations, and Intellectual Level measures were associated with lower difficulty ratings. This data suggests that high scorers on these scales found the imagery skill easier to employ. Ease of use might be
related to the efficacy of applying the skill at least for CM. This data is consistent with that from Study 1, where trends between individual difference measures and difficulty ratings were found for CM. In addition to ease of skill application other possible mediating factors should be examined. Factors such as knowledge of when to employ the skill, perseverance in the use of the skill, etc. should be considered (cf., Katz, in press). The fact that individual difference factors were most predictive of the outcome of SIT and difficulty ratings were unrelated to predictors for this group indicates that difficulty is not likely an important mediating factor for SIT.

Prior to introducing Study 3 mention should be made of the relationship (or lack thereof) between individual difference measures and pretraining performance measures. Unlike Study 1 virtually no such relationships were observed in Study 2. In Study 1 the Individual Difference Questionnaire-verbal scale was associated with pretraining approach scores as well as mean fear ratings. In addition, the pain-coping and pain-catastrophizing scales were related to pretraining approach scores and the fear-catastrophizing scale to pretraining mean fear ratings. All of these relationships suggested that greater reliance on an imagery style was associated with greater fear. Study 2 failed to replicate these findings. The Individual Difference Questionnaire-verbal scale was the only scale to predict pretraining approach scores. However, the direction of this
association was opposite to that found in Study 1. Clearly, there is little evidence from which to conclude that severity of the phobic response is consistently related to individual style. Interestingly, the social desirability scale also failed to predict initial fear level. It had been thought that the effects generated in Study 1 might be mediated by social desirability factors.

In summary, the data from this study replicate the ATI effects for the fear-coping scale. Judgements as to the characteristic use of imagery and verbal strategies to cope with fear differentially predicted the efficacy of CM and SIT procedures. Those who relied on visual imagery to cope with fear improved significantly more when trained in CM compared to SIT. As well, the data argued for the differential predictive validity of a more general intellectual factor. Those who scored high on these measures found CM increasingly effective. At the same time, those who scored high found SIT decreasingly effective. Further work is required to identify possible constructs assessed by these measures. Thus, it might be useful to obtain more complete intelligence measures. It may be that CM is a less structured technique, which highly intelligent individuals find more effective than SIT. On the other hand, SIT, which might be relatively more structured, could be more effective for less intelligent individuals. Study 2 data also suggest that fear level interacts with the efficacy of CM and SIT. Those who reported greater fear
during the BAT demonstrated a strong trend to benefit more from CM than SIT. A more global fear measure, based on fear ratings of a variety of animals, suggested that both CM and SIT were more effective for highly fearful subjects.

Therefore, it appears that ATI effects are important in the efficacy of CM and SIT coping skills. Overall, the data suggest that individual difference factors play a greater role in the efficacy of SIT than CM, especially for subjective fear measures. The data also indicate highly specific relationships between outcome and the various imagery/verbal scales. For example, the direction of relationships between two of the Cognitive Style Questionnaire scales (e.g., fear-coping and pain-coping scales) and adjusted posttraining mean fear ratings for CM were reversed in both Studies 1 and 2. Future work should concentrate on factors that might predict such specificity. Perhaps the specific nature (i.e., affective intensity, content, etc) of imagery tapped by these scales differs.

Now that ATI effects have been replicated in Study 2, let us turn our attention to the issue of generalizability. Specifically, will ATI effects occur in a situation involving a different fear. The issue of generalization is an empirical one. It can greatly effect the practical utility of ATI effects. To this end, a third study was conducted. This study was methodologically identical to Study 2. It involved a different fear stimulus, however. Study 3 examines the presence of ATI effects in the
reduction of avoidance displayed by snake phobics.
Study 3

The generalizability of ATI effects to a sample of snake phobics is examined in Study 3. The methodology of this study was identical to Study 2 with the exception of the target stimulus. By maintaining such consistency differences between the present and previous studies can, with greater certainty, be attributed to the phobic stimulus.

Method

Participants

Screening Criteria

Only subjects who reported being unable to touch a live snake because of fear were screened on the BAT. This was assessed by having subjects report their fear on an 11-point rating scale. Behavioral descriptors defined the various scale values. Subjects who met this criteria were then tested on the 17-step BAT. Those who could not make contact with the harmless reptile were labelled phobic and received training. Remaining subjects were debriefed and dismissed.

Sample Description

Sixty-eight introductory psychology students met the initial screening criteria. Thirty-two of these subjects were subsequently labelled phobic (3 males and 29 females).
The remaining 36 were dismissed. Due to the aversiveness of the BAT not all of the nonphobics were required to complete the task once they reached the point where they were defined nonphobic. For comparative purposes a subgroup was randomly selected (n = 14) to progress as far as possible on the BAT. In addition, Fear Survey Schedule data obtained from the 109 unselected introductory psychology students (see Study 2) was compared with phobic and nonphobic groups.

Four of the phobic subjects (all females) refused to continue with the experiment immediately following screening. In fact, two of these withdrew upon seeing the snake. The remaining twenty-eight (25 women, 3 men) were randomly assigned to either Covert Modeling (n = 13) or Self-Instructional Training (n = 12). There were 2 males in CM and 1 in SIT. Originally, larger sample sizes were planned. A delayed-treatment control group was also planned as part of the design. However, approximately 11 weeks after the experiment began the snake bit a subject. For ethical reasons the study had to be terminated at this point. Unfortunately, only three subjects had received the control procedure (identical to that of Study 2) when this occurred. Only one subject had returned for a third, training session. Due to the extremely limited sample size this group had to be dropped from the analyses. Brief mention will be made of the trends displayed by these subjects, however.
Materials

Phobic Stimulus

A large, 6 ft boa constrictor (*Constrictor Constrictor*) was employed as the fear stimulus in this study. The snake was housed in a 100 cm x 60 cm x 40 cm cage. The cage was plexiglass along two walls (the front and right side) and had a hinged plexiglass top. The cage opened from the top. Heavy gloves, as well as a wooden pointer were used as part of the BAT.

Assessment Measures

All of the measures employed in Study 2 were administered in this study. Specifically, participants completed the following measures: the Cognitive Style Questionnaire, the Verbal-Visual Arousal scale, the Individual Difference Questionnaire, the Space Relations task, the Intellectual Level measure, the Social Desirability scale from the Personality Research Form; the Verbal Fluency measure, the Quick Test, and the Vividness of Visual Imagery Questionnaire. These questionnaires are described in detail in Studies 1 and 2 and will not be repeated here. These measures are summarized in Table 8 (see also Appendices A through C).
Outcome Measures

1. Behavioral Avoidance Task, Approach Scores. This 17-step task was identical to that employed in Study 2 except for the use of a snake rather than a rat. To make the outcome data comparable to Study 2 posttraining measures were adjusted for initial scores. In this way relationships between predictors and posttraining measures are independent of pretraining relationships.

2. Behavioral Avoidance Task, Fear Ratings. Subjects rated their fear (11-pt scale) after each step of the BAT (see Studies 1 and 2). As with approach scores posttraining scores were adjusted to remove the effect of pretraining level. Mean fear ratings, based on the number of steps completed, were used as a major dependent measure. Posttraining mean fear ratings involved only the number of steps that were completed at pretraining. This makes pre- and posttraining ratings directly comparable.

3. Additional Self-report Measures. These were identical to the previous studies and included: (a) Fear Survey Schedule ratings (animal items only); (b) self-report of cognitions during the BATs; (c) difficulty ratings for practice trials during training, and (d) posttraining ratings of the difficulty using the skill, the percentage of time the skill was employed, and the overall usefulness of the skill to deal with fear. As in the previous two studies correlations between difficulty ratings
and individual difference measures which identify significant ATI effects were calculated.

Procedure

As in Study 2 subjects were seen for two sessions, approximately one week apart. The training and control protocols were identical to those of Study 2 in every regard except the reference to snakes rather than rats. The reader is referred to the procedure section of Study 2 for details.

Results

Consistent with the previous studies the major issues to be addressed in this study include; (1) equality of groups on fear and individual difference measures; (2) responses to the Cognitive Style Questionnaire scales; (3) training effects; (4) pretraining relationships between fear measures and individual difference measures, and (5) ATI effects for adjusted posttraining approach scores and mean fear ratings.

Descriptive Data

Table 18 presents mean scores for the CM and SIT groups on all individual difference measures. T-tests were employed to compare the groups on all variables, except the Cognitive Style Questionnaire scales. As Table 18 suggests there were no significant differences between the training groups on any of the individual difference measures (all t's
Although significant group differences were not found scores for the Space Relations and Verbal-Visual Arousal scales were lower for the CM group.

The Cognitive Style Questionnaire scales were examined by a Group (CM/SIT) by Function (coping/catastrophizing) by Situation (5) repeated measures analysis of variance. Results paralleled closely those of the previous two studies. There were no Group differences \( (F = 0.51, p > 0.05) \) and no interactions involving Group. There was a significant Situation main effect \( (F = 14.92, p < 0.0001) \) and a significant Function by Situation interaction \( (F = 17.52, p < 0.0001) \). Newman Keuls analysis of the situation main effect indicated that imagery was significantly more characteristic of fear and anger situations than of pain situations. This was qualified, however, by the interaction which indicated that imagery was significantly more characteristic of catastrophizing than coping in fear situations. In pain situations, imagery was significantly more characteristic of coping than catastrophizing. No difference in the ratings of coping and catastrophizing occurred for anger situations.

An item analysis of the Cognitive Style Questionnaire produced an interesting finding for the fear-coping scale. The one item which dealt specifically with an encounter with
Table 18
Means and Standard Deviations for CM and SIT on Individual
Difference Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
<th>Self-Instructional Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean SD</td>
<td>Mean SD</td>
</tr>
<tr>
<td>CSQ&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>45.26 17.25</td>
<td>44.85 13.26</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>65.64 13.51</td>
<td>64.54 11.72</td>
</tr>
<tr>
<td>Pain-Coping</td>
<td>49.62 19.09</td>
<td>43.64 13.80</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>30.38 19.31</td>
<td>34.09 25.48</td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>52.82 18.65</td>
<td>53.33 18.80</td>
</tr>
<tr>
<td>Anger-Catastrophizing</td>
<td>58.08 12.84</td>
<td>40.45 25.93</td>
</tr>
<tr>
<td>IDQ&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>24.08 7.82</td>
<td>24.33 8.36</td>
</tr>
<tr>
<td>Visual</td>
<td>31.15 4.30</td>
<td>31.75 3.00</td>
</tr>
<tr>
<td>V-V&lt;sup&gt;c&lt;/sup&gt;</td>
<td>10.08 2.46</td>
<td>9.75 2.49</td>
</tr>
<tr>
<td>Space Relations</td>
<td>17.23 23.21</td>
<td>26.58 14.17</td>
</tr>
<tr>
<td>Intellectual Level</td>
<td>12.04 1.99</td>
<td>12.29 1.62</td>
</tr>
<tr>
<td>Verbal-Visual Arousal&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1.69 1.55</td>
<td>3.00 1.66</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>17.62 7.64</td>
<td>15.50 4.83</td>
</tr>
<tr>
<td>Quick Test</td>
<td>41.23 3.19</td>
<td>42.50 2.02</td>
</tr>
<tr>
<td>Social Desirability</td>
<td>10.69 3.15</td>
<td>11.17 2.89</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>35.08 8.03</td>
<td>33.75 6.14</td>
</tr>
</tbody>
</table>

<sup>a</sup> CSQ: Cognitive Style Questionnaire

<sup>b</sup> IDQ: Individual Difference Questionnaire

<sup>c</sup> V-VQ: Verbalizer-Visualizer Questionnaire
a snake was statistically independent of the other fear-coping items. This item was uncorrelated with the total scale score ($r = 0.26, p > 0.05$; all other $r$'s ranged from $0.46, p < 0.02$ to $0.82, p < 0.001$). As well, in a factor analysis of the Cognitive Style Questionnaire items all fear items except this one loaded on a single factor. Thus, it appears that for this sample of phobics judgements of coping with the phobic object were independent of judgements of coping with more general fear situations. For this reason the phobic item was dropped from the fear-coping scale. The item will be examined separately. Similar analyses in Study 2 did not find this effect. The item dealing with a phobic encounter was highly correlated with the overall fear-coping scale and loaded on the same factor as the other fear-coping items in a factor analysis.

The two training groups were also compared on fear related measures (Table 19). As illustrated there were no differences between groups on initial approach ($t = 0.13, p > 0.05$) or mean fear ratings ($t = -0.07, p > 0.05$) scores. Similarly, when fear ratings at each step of the BAT were compared no group differences resulted (all $F$'s n.s.). Fear Survey Schedule ratings also failed to differ between the two groups ($F = 0.11, p > 0.05$). However, this analysis did produce a highly significant item effect ($F = 33.87, p < 0.0001$). Newman-Keuls post hoc analysis indicated that fear of snakes was significantly higher than all other animals. Fear levels were next highest for bats, rats, and
spiders; followed by mice, insects, worms, and dogs and finally, cats and birds.

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INSERT TABLE 19

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Phobics were next compared to nonphobics on fear measures. As in the previous two studies CM and SIT subjects were combined to reduce the nonorthogonality of these comparisons. Nonphobics progressed significantly further (mean approach = 13.5) than phobics (t = -9.95, p < 0.001). Although phobics reported higher mean fear ratings than nonphobics (5.04 vs 3.96) this difference did not reach significance (t = 1.79, p > 0.05). The comparison was confounded with the number of steps completed, however. Figure 17 shows mean fear ratings of phobic and nonphobic groups at each step of the BAT. Significantly higher fear ratings were made by the phobics at all steps (p < 0.05) except step 1.

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INSERT FIGURE 17

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The phobic subjects were also compared to the nonphobics, as well as to the unselected subjects (see Study 2 for details) on Fear Survey Schedule ratings. A Group (phobic/nonphobic/unselected) by Item (animal) repeated measures analysis of variance produced a significant main effect of Group (F = 7.97, p < 0.0005), Item (F = 109.21,
### Table 19

Means and Standard Deviations For CM and SIT on Pretraining and Posttraining Performance Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pretraining</th>
<th></th>
<th>Posttraining</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CM</td>
<td>SIT</td>
<td>CM</td>
<td>SIT</td>
</tr>
<tr>
<td></td>
<td>Mean SD</td>
<td>Mean SD</td>
<td>Mean SD</td>
<td>Mean SD</td>
</tr>
<tr>
<td>BAT&lt;sup&gt;a&lt;/sup&gt;; Approach Score</td>
<td>6.62 2.43</td>
<td>6.50 2.11</td>
<td>10.73 4.51</td>
<td>11.71 4.96</td>
</tr>
<tr>
<td>BAT; Mean Fear</td>
<td>5.07 2.40</td>
<td>5.01 2.07</td>
<td>4.08 2.17</td>
<td>4.82 2.02</td>
</tr>
<tr>
<td>FSS&lt;sup&gt;b&lt;/sup&gt;; Phobic Item</td>
<td>5.77 1.09</td>
<td>5.75 0.62</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>FSS; Mean</td>
<td>3.48 0.99</td>
<td>3.36 0.76</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Difficulty Using Skill</td>
<td>--</td>
<td>--</td>
<td>4.00 1.92</td>
<td>3.70 1.49</td>
</tr>
<tr>
<td>After Training</td>
<td>--</td>
<td>--</td>
<td>54.68 23.67</td>
<td>67.00 21.11</td>
</tr>
<tr>
<td>Percent Time Skill Used</td>
<td>--</td>
<td>--</td>
<td>5.54 1.66</td>
<td>6.00 0.94</td>
</tr>
<tr>
<td>Usefulness of Skill</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>BAT: Behavioral Avoidance Task  
<sup>b</sup>FSS: Fear Survey Schedule
and a significant Group by Item interaction ($F = 2.25, p < 0.002$). Newman-Keuls analysis of the Group main effect did not yield significant differences between the groups, although the phobics scored higher than the other groups. The Item main effect was essentially the same as that reported above for the phobic group. The Group by Item interaction indicated that phobics rated their fear of snakes significantly higher than the other two groups, which did not differ. Although a similar pattern existed for most other animals, differences did not reach significance.

Training Effects

The efficacy of CM and SIT were examined using Group (CM/SIT) by Time (pre/post) repeated measures analyses of variance. The analysis of approach scores produced a highly significant main effect for Time ($F = 50.65, p < 0.0001$). Approach scores increased greatly from pre- to posttraining. There was no Group effect ($F = 0.13, p > 0.05$), nor a Group by Time interaction ($F = 0.70, p > 0.05$). A similar analysis on mean fear ratings also resulted in a nonsignificant Group effect ($F = 0.23, p > 0.05$) and a nonsignificant Group by Time interaction ($F = 1.04, p > 0.05$). While there was a strong trend toward reduced mean fear ratings as a function of training this effect failed to reach significance ($F = 3.91, p = 0.06$). Comparisons of pre- and posttraining fear ratings at each step of the BAT appear in Figure 18. In this figure, ratings are combined across the CM and SIT groups.
Figure 17
Fear Ratings at Each BAT Step for Phobic and Nonphobic Groups
step 1 to step 6 there were no reductions in fear ratings from pre to posttraining. However, fear ratings were significantly reduced for steps 7 and 8, however \( p < 0.05 \). Too few subjects \( n = 2 \) were involved in the comparison at step 9 to allow for reliable testing. Notably, this analysis produced a significant Group by Time interaction at step 3 only \( (F = 5.73, p < 0.05) \). Newman-Keuls analysis indicated that at step 3 fear ratings were significantly reduced from pre- to postassessment for the CM group only. No other group differences occurred for this set of analyses.

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**INSERT FIGURE 18**

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Although too few subjects \( n = 3 \) had completed the control condition before this study was terminated some trends can be observed from these subjects' scores. Neither approach scores \( (5.9 \text{ at first assessment}, 6.5 \text{ at second assessment}) \) nor mean fear ratings \( (3.83 \text{ at first assessment}, 3.99 \text{ at second assessment}) \) showed appreciable decreases as a function of repeated testing. The limited sample size prevents one from concluding that pre-post reductions were not due to repeated testing or other nonspecific factors. These trends are consistent with this interpretation, however.

A Group (CM/SIT) by Trial (1st/2nd) by Situation (5) repeated measures analysis of variance compared difficulty
Figure 18
Pre-Posttraining Fear Ratings at Each BAT Step for the Phobic Group
ratings during training between the two groups. This analysis produced significant main effects for Group ($F = 15.06, \ p < 0.0001$), Trial ($F = 30.49, \ p < 0.0001$), and Situation ($F = 7.39, \ p < 0.001$). Significant Group by Trial ($F = 5.20, \ p < 0.04$) and Group by Situation ($F = 4.97, \ p < 0.002$) interactions were also found. The main effects indicated the following; SIT was rated more difficult overall than CM; difficulty ratings were greater on Trial 1 compared to Trial 2; and difficulty ratings increased as the situations became more threatening. The Group by Trial interaction indicated that difficulty ratings were highest for SIT on Trial 1. Also, only SIT demonstrated significant reductions in difficulty ratings from trial 1 to trial 2. Finally, the Group by Situation interaction is illustrated in Figure 19. Here it can be seen that difficulty ratings increased across practice situations only for SIT. SIT was rated significantly more difficult than CM for the final three practice situations. Overall, this analysis indicated that SIT was particularly difficult for subjects in this study. In Study 2 SIT was rated more difficult than CM on the first practice trial only and difficulty ratings did not increase as the practice situations became more frightening.

-----------

INSERT FIGURE 19

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Posttraining self-report measures for the two training groups were compared via t-tests (see Table 19). None of
Figure 19

Difficulty Ratings for Each Practise Situation During Training for CM and SIT
these comparisons reached significance ($t = 0.42, p > 0.05$ for difficulty ratings; $t = -1.32, p > 0.05$ for ratings of percent time skill was used; $t = -0.84, p > 0.05$ for usefulness ratings).

**Pretraining Relationships**

Table 20 presents the correlations between individual difference measures and pretraining fear measures. For approach scores none of the correlations reached significance. However, the Verbalizer-Visualizer Questionnaire demonstrated a marginal negative relationship with approach. This suggested that those who endorsed an imagery style were more phobic. For mean fear ratings several scales demonstrated significant relationships. Specifically, negative correlations resulted between this measure and the fear-coping scale, the anger-catastrophizing scale, the Social Desirability task, as well as the Quick Test measure. Marginal correlations were produced for the pain-coping scale ($p < 0.07$), Space Relations task ($p < 0.08$) and Verbalizer-Visualizer Questionnaire ($p < 0.10$). Generally, the relationships with the Cognitive Style Questionnaire scales suggested that increasing reliance on imagery was associated with lower fear ratings. The Quick Test, a vocabulary test, indicated that higher vocabulary scores were associated with lower fear ratings. In addition, high scores on the Space Relations task and Verbalizer-Visualizer Questionnaire were associated with
greater fear ratings. Clearly, there is a lack of consistency in the direction of these relationships.

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**INSERT TABLE 20**

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To investigate whether social desirability accounted for the above relationships, partial correlations, controlling for social desirability, were calculated for mean fear ratings. Few changes resulted. Significant correlations remained for the fear-coping (r = -0.39, p < 0.05) and Quick Test (r = -0.40, p < 0.05) measures. The relationship with the anger-catastrophizing scale was reduced to a trend. Interestingly, when social desirability was controlled for the trend between fear and the Space Relations task became significant (r = 0.42, p < 0.05). Social desirability appeared to be acting as a suppressor variable in this relationship. Thus, while no strong trends were revealed between individual style and pretraining approach scores, several relationships were observed for mean fear ratings.

**Aptitude-Treatment Interaction Effects**

**BAT Approach Scores.** In Table 21 the regression equations and beta weights for CM and SIT on adjusted posttraining approach scores are presented. Examination of these regression equations indicates that few scales were predictive of CM outcome. The only scale which
Table 20
Correlations Between Individual Difference Measures and Pretraining Performance Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Approach Scores</th>
<th>Mean Fear Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSQ&lt;sup&gt;a&lt;/sup&gt;:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>.03</td>
<td>-.40**</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>-.14</td>
<td>-.15</td>
</tr>
<tr>
<td>Pain-Coping</td>
<td>.12</td>
<td>-.31</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>.24</td>
<td>-.05</td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>-.08</td>
<td>-.19</td>
</tr>
<tr>
<td>Anger-Catastrophizing</td>
<td>.11</td>
<td>-.36**</td>
</tr>
<tr>
<td>IDQ&lt;sup&gt;b&lt;/sup&gt;:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>.24</td>
<td>-.10</td>
</tr>
<tr>
<td>Visual</td>
<td>-.28</td>
<td>.24</td>
</tr>
<tr>
<td>V-VQ&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-.32*</td>
<td>.27</td>
</tr>
<tr>
<td>Space Relations</td>
<td>-.00</td>
<td>.30</td>
</tr>
<tr>
<td>Intellectual Level</td>
<td>.23</td>
<td>-.06</td>
</tr>
<tr>
<td>Verbal-Visual Arousal</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>Quick Test</td>
<td>.00</td>
<td>-.38**</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>-.13</td>
<td>-.03</td>
</tr>
<tr>
<td>Social Desirability</td>
<td>.13</td>
<td>-.33**</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>.11</td>
<td>-.03</td>
</tr>
</tbody>
</table>

<sup>a</sup>CSQ: Cognitive Style Questionnaire

<sup>b</sup>IDQ: Individual Difference Questionnaire

<sup>c</sup>V-VQ: Verbalizer-Visualizer Questionnaire

* p < .06
** p < .05
significantly predicted approach scores for CM was the Verbal Fluency measure \((F = 8.38, \ p < 0.02)\). This relationship accounted for over 43% of the variance, and indicated that CM was more effective for those with higher Verbal Fluency scores. None of the other predictors accounted for significant outcome variance for CM. The Individual Difference Questionnaire-verbal scale was marginally related to the outcome of CM, a relationship that accounted for approximately 15% of the variance \((F = 1.92, \ p = 0.19)\). It is interesting to note that the Cognitive Style Questionnaire scales tended to show nonsignificant negative associations with the outcome of CM. This is in direct opposition to the findings of the previous two studies.

\[ \text{INSERT TABLE 21} \]

In contrast to the above, several of the individual difference scales predicted posttraining approach scores for SIT in the third study. This was particularly true for the Cognitive Style Questionnaire scales. Strong positive regressions were generated for the following scales; fear-coping \((F = 5.88, \ p < 0.05)\), fear-catastrophizing \((F = 3.62, \ p < 0.09)\), pain-coping \((F = 7.79, \ p < 0.03)\), pain-catastrophizing \((F = 4.38, \ p < 0.07)\), and Intellectual Level \((F = 3.89, \ p < 0.09)\). All of these relationships accounted for over 25% of the variance in outcome and
### Table 21

Regression Equations and Beta Weights For CM and SIT Using Individual Difference Measures to Predict Adjusted Posttraining Approach Scores

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
<th>Self-Instructional Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope</td>
<td>Intercept</td>
</tr>
<tr>
<td><strong>CSQ^a:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>-.059</td>
<td>13.37</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>.001</td>
<td>10.62</td>
</tr>
<tr>
<td>Pain-Coping</td>
<td>-.040</td>
<td>12.62</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>-.013</td>
<td>10.72</td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>-.007</td>
<td>11.06</td>
</tr>
<tr>
<td>Anger-Catastrophizing</td>
<td>-.064</td>
<td>6.94</td>
</tr>
<tr>
<td><strong>IDQ^b:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal *</td>
<td>.151</td>
<td>7.03</td>
</tr>
<tr>
<td>Visual</td>
<td>.086</td>
<td>11.97</td>
</tr>
<tr>
<td>V-VQ^c</td>
<td>.012</td>
<td>10.54</td>
</tr>
<tr>
<td>Space Relations</td>
<td>.013^p</td>
<td>10.44</td>
</tr>
<tr>
<td>Verbal-Visual Arousal</td>
<td>.116^p</td>
<td>10.46</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>.263</td>
<td>6.03</td>
</tr>
<tr>
<td>Quick Test</td>
<td>-.024</td>
<td>11.67</td>
</tr>
<tr>
<td>Social Desirability</td>
<td>.248</td>
<td>8.01</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>-.049</td>
<td>12.37</td>
</tr>
</tbody>
</table>

| ^a CSQ: Cognitive Style Questionnaire | | | | | | | |
| ^b IDQ: Individual Difference Questionnaire | | | | | | | |
| ^c V-VQ: Verbalizer-Visualizer Questionnaire | | | | | | | |
| ^d F-ratios testing AT1 | | | | | | | |

* P < .09
** P < .05
indicated that increasing reliance on imagery strategies was associated with greater efficacy of SIT. In addition to these scales marginal trends were demonstrated by the anger-catastrophizing scale ($F = 2.86, p > 0.05$; accounting for 24% of variance) and the Space Relations task ($F = 2.04, p > 0.05$; accounting for 18% of variance).

The overall pattern of results suggests the following. First, there appeared to be little or no association between individual difference measures and the outcome of CM. The only relationships which were uncovered suggested that CM was more effective for those scoring high on verbal tasks. Second, the Cognitive Style Questionnaire scales were highly predictive of the outcome of SIT. Here the relationships were such that SIT was more effective for those who relied on imagery strategies. There were also trends which suggested that SIT was more effective for subjects who scored higher on intellectual ability tasks (the Intellectual Level measure and perhaps the Space Relations task). In Studies 1 and 2 the opposite relationships occurred. That is, there were positive associations with the behavioral outcome of CM for the Cognitive Style Questionnaire scales, the Intellectual level, and Space Relations measures. The direction of association for these variables with the behavioral outcome of SIT was negative in Study 2.

As stated earlier the Cognitive Style Questionnaire fear item that dealt with an encounter with a snake was
dropped from the fear-coping scale because it was independent of the other items in the scale. When this item was examined alone it produced associations with CM and SIT in opposite direction to the fear-coping scale. That is, scores on this scale demonstrated a positive trend with the outcome of CM ($R = 0.342$) and a negative trend with the outcome of SIT ($R = -0.327$). Again, it appears that this item taps something different from the rest of the fear-coping scale. In Study 2 the comparable item (which addressed dealing with an encounter with a rat) showed results consistent with the rest of the fear-coping scale. That is, both the overall scale and the individual item demonstrated positive associations with posttraining approach scores for CM and negative associations with posttraining approach scores of SIT. Interestingly, the magnitude of association between this specific item and CM and SIT in Studies 2 and 3 was quite similar.

Table 21 includes F-ratios testing for ATI effects. Significant ATI effects were generated for the fear-coping ($F = 6.72, p < 0.05$), as well as the pain-coping ($F = 6.94, p < 0.05$) scales of the Cognitive Style Questionnaire. None of the other scales produced significant ATI effects, although the Intellectual Level measure produced a trend toward an ATI. In addition, the Cognitive Style Questionnaire item dealing with the phobic stimulus produced a trend toward an ATI in a direction opposite to the fear-coping scale ($F = 2.73, p > 0.05$).
The significant ATI effects were further examined using the Johnson-Neyman technique. Analysis of the fear-coping scale (Figure 20) identified a region above 55.10 where the two training conditions differed significantly. The lower bound occurred below zero, which is impossible on this scale. As indicated in Figure 20 SIT was superior to CM above the upper bound. Twenty percent of the sample fell within this range. Those who received CM scored 9.35; those who received SIT scored 16.21. Clearly, the ATI effects identified by this scale appear quite meaningful.

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INSERT FIGURE 20
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Analysis of the pain-coping scale (Figure 21) produced similar bounds to those observed for the fear-coping scale. SIT was superior to CM for those who scored above 43.20. The lower bound occurred below zero. For this scale 64% of the sample fell within the differentiated region. Those who received CM scored 8.10; those who received SIT scored 10.24. Thus, both the fear-coping and pain-coping scales indicated that SIT was superior to CM for those who relied on visual imagery to cope with these types of situations.

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INSERT FIGURE 21
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The test for ATI effects on the Verbal Fluency scale was clearly nonsignificant. There was a moderate positive
Figure 20

ATI for the Fear-Coping Scale Predicting Adjusted Posttraining Approach Scores
association between this measure and outcome for SIT as well as the strong positive association with CM. When the training condition was ignored there was, overall, a highly reliable positive association with outcome \( R = 0.468, F = 7.26, \ p < 0.02 \). Thus, regardless of the training condition those with high Verbal Fluency scores demonstrated greater outcome. To further investigate this extreme groups were formed. Those with high Verbal Fluency scores (25 or above) improved significantly more than those with low Verbal Fluency (1 or below) scores (means were 14.70 vs 9.87, respectively; \( t = 2.23, \ p < 0.05 \).

**BAT Mean Fear Ratings.** Differential regression equations and beta weights for adjusted posttraining mean fear ratings appear in Table 22. Generally, the individual difference variables were unsuccessful in predicting adjusted posttraining mean fear ratings. The only exceptions were for the following scales. The Verbal-Visual Arousal scale significantly predicted outcome of CM \( F = 13.31, \ p < 0.05 \). It was also positively, but nonsignificantly correlated with adjusted posttraining mean fear ratings for SIT \( F = 2.46, \ p = 0.16 \). As well, the anger-catastrophizing scale significantly predicted mean fear ratings for SIT only \( F = 6.36, \ p < 0.05 \). All of these relationships were in the opposite directions to those generated in Study 2. Nonsignificant trends were also generated between adjusted posttraining mean fear ratings for SIT and the fear-coping, pain-catastrophizing, and
Figure 21

ATI for the Pain-Coping Scale Predicting Adjusted Posttraining Approach Scores
PAIN—COPING SCALE

BART
ADJUSTED
APPROACH
SCORES

SIT
CM
Social Desirability scales. These relationships were all in the positive direction. The only other trend occurred between the Quick Test and the outcome of CM.

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INSERT TABLE 22

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Tests for the presence of ATI effects on adjusted posttraining mean fear ratings failed to reach significance for any of the individual difference measures. Although no ATI was generated by the Verbal-Visual Arousal scale when the training condition was ignored this scale was highly predictive of outcome ($R = 0.65$, $F = 15.61$, $p < 0.001$). Thus, regardless of the training condition greater fear was reported by those who found imagery more frightening than verbalizing about the phobic object. To evaluate this effect further subjects were split into extreme groups and compared. Those who scored low (zero or 1; no one scored below zero) reported significantly less fear than those who scored high (4 or 5; means = 3.39 versus 6.66; $t = 3.26$, $p < 0.05$).

Similarly, extreme groups on the anger-catastrophizing scale were compared on adjusted posttraining mean fear ratings. This was done for subjects in the SIT group only. This was because the regression for CM was nonsignificant and because when training groups were combined the regression was nonsignificant. Despite the restricted sample size when extreme groups were formed, those who
Table 22

Regression Equations and Beta Weights For CM and SIT Using Individual Difference Measures to Predict Adjusted Posttraining Mean Fear Ratings

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
<th>Self-Instructional Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope</td>
<td>Intercept</td>
</tr>
<tr>
<td>CSQ^a:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear-Coping</td>
<td>.007</td>
<td>3.72</td>
</tr>
<tr>
<td>Fear-Catastrophizing</td>
<td>.037</td>
<td>1.65</td>
</tr>
<tr>
<td>Pain-Coping</td>
<td>.002</td>
<td>3.94</td>
</tr>
<tr>
<td>Pain-Catastrophizing</td>
<td>.004</td>
<td>3.94</td>
</tr>
<tr>
<td>Anger-Coping</td>
<td>.024</td>
<td>2.77</td>
</tr>
<tr>
<td>Anger-Catastrophizing</td>
<td>.017</td>
<td>3.07</td>
</tr>
<tr>
<td>IDQ^b:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>-.003</td>
<td>4.12</td>
</tr>
<tr>
<td>Visual</td>
<td>.074</td>
<td>1.76</td>
</tr>
<tr>
<td>V-VQ^c</td>
<td>.220</td>
<td>1.84</td>
</tr>
<tr>
<td>Space Relations</td>
<td>-.017</td>
<td>4.35</td>
</tr>
<tr>
<td>Intellectual Level</td>
<td>.004</td>
<td>4.01</td>
</tr>
<tr>
<td>Verbal-Visual Arousal</td>
<td>.704</td>
<td>2.86</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>.014</td>
<td>3.81</td>
</tr>
<tr>
<td>Quick Test</td>
<td>-.220</td>
<td>13.14</td>
</tr>
<tr>
<td>Social Desirability</td>
<td>.022</td>
<td>3.82</td>
</tr>
<tr>
<td>Vividness of Visual Imagery</td>
<td>-.015</td>
<td>4.58</td>
</tr>
</tbody>
</table>

^a CSQ: Cognitive Style Questionnaire  
^b IDQ: Individual Difference Questionnaire  
^c V-VQ: Verbalizer-Visualizer  
^d F- ratios testing AT1  
* p < .05  
** p < .01
relied heavily on imagery when catastrophizing in anger situations reported significantly less fear (mean = 3.42) than those who relied on verbal strategies (mean = 5.79) when trained in SIT skills (t = 3.08, p < 0.05, one-tail).

As in Study 2 the predictive ability of pretraining fear measures was examined. This was a post hoc analysis. Table 23 indicates that, unlike Study 2, none of the pretraining fear measures significantly predicted the outcome of either CM or SIT. This lack of predictive validity was observed for both adjusted posttraining approach scores and adjusted posttraining mean fear ratings. Similarly, all tests for ATI effects using these scales failed to reach significance.

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INSERT TABLE 23
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To summarize, the data from the present study indicate that the only scales which identified ATI effects between CM and SIT were the fear-coping and pain-coping scales. As well, these effects applied only for the behavioral approach measures. Regardless of training condition the Verbal Fluency measures predicted approach scores and the Verbal-Visual Arousal scale predicted fear ratings. To investigate whether these effects could be related to the ease of acquiring and/or executing the skill correlations were calculated between these scales and difficulty ratings made during and following training. These correlations
Table 23

Regression Equations and Beta Weights
For CM and SIT For Pretraining
Fear Measures Predicting Adjusted
Posttraining Approach and Mean Fear

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling</th>
<th>Self-Instructional Training</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope Intercept</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>Adjusted Posttraining</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach Scores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSS&lt;sup&gt;a&lt;/sup&gt;; phobic item</td>
<td>.183 9.61 9.65</td>
<td>-2.02 23.40 -.370</td>
<td>1.56</td>
</tr>
<tr>
<td>FSS; mean</td>
<td>.479 8.99</td>
<td>.154 11.23 .037</td>
<td>0.02</td>
</tr>
<tr>
<td>Mean BAT Fear&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.137 9.96 1.08</td>
<td>-.182 12.69 -.111</td>
<td>0.28</td>
</tr>
<tr>
<td>Adjusted Posttraining</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Fear Ratings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSS; phobic item</td>
<td>.492 1.22</td>
<td>.364 .243 6.14 -.111</td>
<td>0.95</td>
</tr>
<tr>
<td>FSS; mean</td>
<td>-.174 4.66</td>
<td>-.116 -.480 6.41 -.246</td>
<td>0.17</td>
</tr>
<tr>
<td>Mean BAT Fear</td>
<td>-.100 4.11</td>
<td>-.016 .010 4.70 .015</td>
<td>0.00</td>
</tr>
</tbody>
</table>

<sup>a</sup>FSS: Fear Survey Schedule
<sup>b</sup>obtained at pretraining exposure
<sup>c</sup>F-ratio testing AT1
appear in Table 24. Small positive correlations resulted between difficulty ratings during training and fear-coping, as well as pain-coping scales. These relationships occurred only for CM, however. They reached significance only for the pain-coping scale and difficulty ratings made at trial 2. The fear-coping scale was also positively associated with the posttraining difficulty rating made by subjects in SIT. There were no significant relationships between difficulty ratings and the Verbal-Visual Arousal scale as well as inconsistent relationships for Verbal Fluency. A significant positive relationship between Verbal Fluency and difficulty at trial 2 occurred for the SIT group only.

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**INSERT TABLE 24**

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**Post hoc Comparisons Between Phobic Groups**

Due to the surprising reversal in direction of results between Studies 1 and 2, and Study 3, it becomes important to investigate whether there were any systematic differences between these studies, other than the phobic object. Since identical methodologies were employed in Studies 2 and 3, direct comparison between these studies can be made.

The rat and snake phobic samples were compared on individual differences as well as fear related variables. Training condition was ignored for most analyses because neither study identified differences between CM and SIT on
Table 24
Correlations Between Selected Individual Difference Factors and Difficulty Ratings During and Following Training for CM and SIT

<table>
<thead>
<tr>
<th>Measure</th>
<th>Covert Modeling During Training</th>
<th>Self-Instructional Training During Training</th>
<th>Covert Modeling Following Training</th>
<th>Self-Instructional Training Following Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trial 1</td>
<td>Trial 2</td>
<td></td>
<td>Trial 1</td>
</tr>
<tr>
<td>CSQ&lt;sup&gt;a&lt;/sup&gt;; Fear-Coping</td>
<td>.21</td>
<td>.34</td>
<td>-.15</td>
<td>-.08</td>
</tr>
<tr>
<td>CSQ; Pain-Coping</td>
<td>.37</td>
<td>.45*</td>
<td>.19</td>
<td>.23</td>
</tr>
<tr>
<td>Verbal-Visual Arousal</td>
<td>-.07</td>
<td>.05</td>
<td>-.17</td>
<td>-.03</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>.16</td>
<td>-.30</td>
<td>.34</td>
<td>.59*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSQ; Fear-Coping</td>
<td>.23</td>
<td>.63*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSQ; Pain-Coping</td>
<td>-.09</td>
<td>.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal-Visual Arousal</td>
<td>.34</td>
<td>.23</td>
<td></td>
<td>.23</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>-.16</td>
<td>.23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>CSEQ: Cognitive Style Questionnaire

* p < .05
individual difference or performance measures. However, differences were found for the difficulty ratings made during training and for the posttraining difficulty and usefulness ratings. Thus, training condition was included as a factor in the analyses of difficulty and usefulness measures.

The two phobic groups failed to differ on any of the individual difference measures (all p's > 0.05). However, performance measures (BAT approach scores and fear ratings) produced interesting differences. First, a Group (snake/rat) by Time (pre/post) repeated measures analysis of variance on BAT approach scores produced a significant main effect for Group (F = 4.16, p < 0.05). Rat phobics progressed significantly further than snake phobics at both pretraining and posttraining assessments (interaction F = 2.52, p > 0.05). The analysis also produced a highly significant Time effect (F = 166.84, p < 0.0001), which indicated that approach scores increased markedly following training. Second, a similar analysis of mean fear ratings also produced significant Group (F = 6.92, p < 0.02), as well as Time effects (F = 13.88, p < 0.005). The interaction was not significant (F² = 0.22, p > 0.05). Thus, rat phobics reported significantly less fear during the BAT than did snake phobics.

Comparison of the fear ratings made by the two groups at each step of the BAT appear in Figure 22. Both pretraining and posttraining ratings are included. As with all previous analyses of this type decreasing sample sizes
across the task forced the use of several separate analyses. These results closely replicate those for mean fear ratings. At almost every step (both pretraining and posttraining) snake phobics rated their fear significantly higher than rat phobics.

________________________

INSERT FIGURE 22

________________________

Comparison of the two phobic groups on Fear Survey Schedule ratings did not produce a significant Group effect ($F=0.09$, $p>0.05$). A significant Group by Item interaction resulted, however ($F=3.07$, $p<0.001$). Post hoc analysis of this effect indicated that rat phobics rated their fear of rats and mice significantly higher than snake phobics. No other group differences were found. Interestingly, snake phobics did not report more fear of snakes than rat phobics. However, a ceiling effect may have been operating here in that fear ratings were, overall, quite high (an approximate mean of 5.75 on a 7-point scale).

Differences between the two phobic groups also emerged for difficulty ratings made during training. The training condition was included in this Group (snake/rat) by Condition (CM/SIT) by Trial (1st/2nd) by Situation (5) analysis. This analysis produced significant Group ($F=18.19$, $p<0.0001$) and Group by Situation effects ($F=2.66$, $p<0.04$). The group main effect was due to higher difficulty ratings for snake phobics over rat phobics. The
Figure 22
Pre-Posttraining Fear Ratings at Each BAT Step for
Rat and Snake Phobic Groups
interaction reflected the fact that difficulty ratings increased across the practice situations only for snake phobics. Difficulty ratings remained stable across the practice trials for the rat phobics.

Finally, comparisons were made between the phobic groups on posttraining self-report measures. There was no group effect for any of the comparisons ($F = 2.45, p > 0.05$ for difficulty ratings; $F = 0.12, p > 0.05$ for usefulness ratings; $t = -0.58, p > 0.05$ for ratings of percent time skill was used).

In summary, snake phobics were significantly more fearful than rat phobics. Although Fear Survey Schedule phobic item ratings did not differ when these subjects were exposed to the behavioral avoidance task the snake phobics progressed less far and reported greater subjective fear. As well, SIT was considered more difficult to employ during training for snake phobics compared to rat phobics. There were no differences between the phobic samples on any of the individual difference measures.

Discussion

In this section the results of Study 3 will be discussed and related to the findings from Studies 1 and 2.

As in the previous two studies the screening criteria of Study 3 identified a highly fearful sample. The phobic group was significantly more fearful than nonphobics on all
fear-related measures (i.e., Fear Survey Schedule ratings, BAT approach scores and fear ratings). As well, both CM and SIT procedures demonstrated significant and equivalent increases in behavioral approach to the phobic object. However, there was only a nonsignificant trend toward reduction in mean fear ratings as a function of training. A more detailed analysis indicated that fear ratings were reduced for only two steps of the BAT. These steps involved opening the cage and placing a pointer into the cage. This reduction applied to only a restricted sample, however. Almost 60% of the subjects had dropped out of the BAT by the time these steps were reached. The lack of a clear reduction in fear early in the BAT cannot be attributed to a floor effect. Early reductions were noted in both Studies 1 and 2. As well, the BAT in Study 3 produced greater fear ratings at virtually every step compared to Study 2. Therefore, floor effects are quite unlikely. Perhaps the fact that the BAT task was more fear provoking than in Study 2 is related to the lack of a clear reduction in subjective fear.

The lack of a clear reduction in mean fear ratings is quite interesting in comparison to Studies 1 and 2. It is surprising in light of data from Study 2 which suggested that repeated testing was sufficient to reduce mean fear ratings to the point where they could not be differentiated from reductions due to training. It is unfortunate that Study 3 had to be terminated before more control subjects
were acquired. However, the data from the few controls available provide no suggestion that fear was reduced solely by repeated testing.

Among possible explanations as to why clear reductions in mean fear ratings were not found in Study 3 is the possibility that snake phobics are simply more resistant to treatment than rat phobics. However, this is not supported by the behavioral approach data. Alternatively, it might be due to the more fear provoking nature of the approach task involving the snake. Although the snake phobics were able to go further on the BAT following training, they were no more comfortable about their performance than prior to training. This data suggests that performance in the BAT situation is highly dependent on the particular stimulus involved.

Work by Bernstein and his colleagues has been seminal in highlighting just how specific the BAT situation really is (Bernstein, 1973a, b; Bernstein & Neitzel, 1973; 1974; Bernstein & Paul, 1971; Smith, Dener, & Beaman, 1974). These authors have demonstrated that performance on BAT tasks can be influenced by a variety of situational and contextual factors. Indeed, Bernstein (1973a) reports a study with snake phobics in which the specific snake was replaced part way through the experiment. Subsequent analyses produced a significant phobic stimulus effect, as well as some interactions involving the phobic stimulus. Thus, it is important to view the BAT as a highly specific
situation.

Comparison of difficulty ratings obtained during training in Study 3 indicated that SIT was rated as more difficult to employ than CM. As well, ratings of the difficulty of SIT increased as the practice situations became more fearful. Therefore, Studies 2 and 3 suggest that SIT is a more difficult skill to employ than is CM. In addition, SIT became more difficult as the practice scenes became more fearful in Study 3. Although these subjective differences were not reflected in performance differences the data suggest the possibility that SIT may be less effective under highly fearful conditions. It would be important to evaluate SIT with more 'clinical' phobias, where the level of fear would be expected to be extreme. Extreme levels of fear might impair SIT's efficacy.

To summarize, data from the present three studies strongly suggest that CM and SIT procedures are quite effective in increasing behavioral approach to at least some phobic objects. Data from control subjects (especially Study 2) indicated that this improvement was independent of repeated testing, assessment, and other nonspecific contextual factors. The two training conditions also appeared effective in reducing subjective fear ratings; although improvement was less clear under highly fearful conditions (Study 3) and may be in part due to nonspecific factors, such as repeated testing (Study 2).
Examination of ATI effects between CM and SIT and style of coping with fear produced surprising results in the third study. ATI effects were found for this measure (the fear-coping scale) but were restricted to the behavioral approach scores. Similarly, the style of coping with pain (pain-coping scale) also generated a significant ATI. These differential effects reflected the superiority of SIT over CM for subjects who relied heavily on visual imagery to cope with fear and pain. It is interesting to note that most of the other Cognitive Style Questionnaire scales demonstrated strong trends such that the efficacy of SIT was greater for those relying on visual imagery strategies. Thus, as was found in Studies 1 and 2 the Cognitive Style Questionnaire scales (particularly the fear-coping scale) were successful in predicting the efficacy of SIT. The fear-coping as well as pain-coping scales were able to differentiate the efficacy for CM and SIT. In terms of the predictive validity of the Cognitive Style Questionnaire scales (particularly the fear-coping scale) the data from Study 3 replicated those of Studies 1 and 2. Surprisingly, the direction of ATI effects in Study 3 was reversed from Studies 1 and 2. This is discussed more fully below.

None of the other individual difference measures produced ATI effects in Study 3 on adjusted posttraining approach scores. There were strong trends which suggested that scores on the Intellectual Level measure, the fear-catastrophizing scale, the pain-catastrophizing scale,
and perhaps also the Space Relations task were positively associated with posttraining approach scores for SIT. Recall that these scales predicted posttraining approach scores for SIT in Study 2, but in a negative direction. Thus, as with the Cognitive Style Questionnaire, scales the direction of these relationships was reversed between Studies 2 and 3. The magnitude of the relationships for the Intellectual Level and Space Relations measures was similar between Studies 2 and 3 even though they failed to reach significance in Study 3. Perhaps the smaller sample size in Study 3 can account for these results not reaching significance. Nonetheless, Study 3 did not replicate ATI effects for these measures.

The Verbal Fluency scale significantly predicted posttraining approach scores for CM in Study 3. While a similar positive relationship occurred for SIT it did not reach significance. Nonetheless, the Verbal Fluency scale was highly predictive of outcome. Those with high Verbal Fluency scores showed greater training gains than those with low scores, regardless of the training condition. Neither of the previous two studies found this scale predictive of approach or fear measures. Caution must be exercised in the interpretation of this effect, therefore. It is interesting to note that this verbal measure was positively associated with outcome for the imagery skill. This is consistent with the reversal in pattern of associations between Studies 1 and 2 and Study 3.
For adjusted posttraining mean fear ratings the Verbal-Visual Arousal scale predicted (in positive direction) fear ratings for both CM and SIT in Study 3. There was no hint of an ATI effect. Regardless of the training condition, this scale accounted for a sizable amount of variance and indicated that greater adjusted posttraining mean fear ratings were made by those who reported imagining the snake increasingly fearful. In Study 2 this same pattern was found, but in the opposite direction. That is, in Study 2 there was a positive association between this scale and improvement (on approach scores for CM, fear ratings for SIT). In Study 3 this scale was negatively associated with improvement (on fear ratings for both CM and SIT). According to a conditioning model it was expected that CM would be more effective for subjects who found imagery more frightening than verbalizing about the phobic object. The reverse was expected to occur for those who found verbalizing about the phobic object more frightening than visually imaging the object. The Verbal-Visual Arousal scale predicted outcome but not differentially across the two training conditions. These data are therefore not consistent with a conditioning model of ATI effects between CM and SIT.

The only other scale to significantly predict posttraining mean fear ratings was the anger-catastrophizing scale. A style of relying on visual imagery when catastrophizing was associated with lower mean fear ratings.
when subjects were trained in verbal coping skills.

Interestingly nonsignificant trends were generated in opposite direction for the fear-coping and anger-catastrophizing scales and adjusted posttraining mean fear ratings for SIT. As with the previous two studies we see the highly specific nature of the associations between outcome measures and the Cognitive Style Questionnaire scales.

The fear-coping scale significantly predicted posttraining approach scores in the SIT group (positive direction). It demonstrated a trend toward a positive association with posttraining fear ratings. Thus, while subjects scoring high on this scale progressed further when given SIT than low scorers these subjects demonstrated a trend toward reporting greater fear levels. In studies 1 and 2 when approach scores were predicted by this scale greater approach was accompanied by lower fear levels. The highly threatening nature of the BAT situation in Study 3 is likely responsible for this effect.

Perhaps the most striking feature of the results of Study 3 was the reversal in direction of effects relative to Studies 1 and 2. In particular self-reported style of coping with fear produced a significant ATI effect on behavioral approach scores for all three studies. In Studies 1 and 2 this most clearly reflected the superiority of CM over SIT for those who relied on visual imagery to
cope with fear. In Study 3 SIT was superior to CM for those who relied on visual imagery to cope with fear. This reversal of direction was most clearly demonstrated by the fear-coping scale, but it was also shown by most other measures, including the Verbal-Visual Arousal scale, the Intellectual Level and Space Relations tasks (especially for the SIT group).

In an attempt to understand how such reversal of ATI effects might occur the phobic samples from Study 2 and 3 were compared. These groups differed, not only in the nature of the phobic object, but in the degree of fear elicited by the particular BAT. Snake phobics preformed significantly fewer BAT steps, and found virtually all steps significantly more frightening, than rat phobics. Post hoc analyses of self-reported cognitions during the BAT also reflect the differential degree of fear involved. Approximately 40% of the subjects exposed to the snake reported specifically thinking that the reptile might be dangerous. Thoughts such as the following were reported: 'Was it deadly?', 'They can kill', 'I pictured the snake wrapping around my arm', 'Was it poisonous?'. Only one subject exposed to the rat made reference to possible danger involved in the task (this person reported thinking simply, 'Rats are dangerous'). This difference is understandable when one considers the specific animals involved (i.e., a common laboratory rat versus a large, rare carnivorous reptile). Therefore, Studies 2 and 3 differ in two
important ways: (a) the type of phobic object employed, and (b) the degree of fear (threat) elicited by the object. These factors would appear to be likely mediating factors in the reversal of ATI effects between Studies 2 and 3. Unfortunately, these factors were confounded in Study 3. That is, when the type of fear stimulus was changed, the fear level was also changed.

If the mediating factor was simply the level of fear experienced in a quantitative sense, then one might expect highly fearful rat phobics to show data consistent with Study 3. To investigate this the most fearful 50% of the rat phobics were examined. These subjects were equivalent to the snake phobics on approach, as well as mean fear ratings. This sample did not demonstrate reversal of effects. For instance, there were strong positive correlations between adjusted posttraining approach scores and Intellectual Level and Space Relations measures for CM and strong negative correlations between adjusted posttraining approach scores and fear-coping, Intellectual Level, and Space Relations measures for SIT. Thus, the amount of fear experienced in the BAT in Study 2 did not influence the direction of ATI effects.

Perhaps the important variable is the specific nature of the BAT itself. That is, under highly threatening conditions the direction of the ATI effects might reverse. It might be the qualitative nature of the situation, therefore (e.g., the type or size of the stimulus).
greater fear reported in the snake versus rat approach task is consistent with this hypothesis. Perhaps when the task is moderately fear arousing (not seen as terribly dangerous) it is helpful to train subjects in the types of skills they characteristically employ in fear situations. That is, CM for those who rely on imagery. However, when the situation is highly fear arousing (seen as objectively dangerous) these characteristic skills might break down, and skills subjects typically do not employ might be more effective. That is, under highly fearful situations it might be more effective to train subjects who rely on visual imagery in SIT. In clinical phobias, where the fear level could be expected to be extremely high the findings of Study 3 might be more likely to apply. For those who strongly rely on visual imagery to cope with fear, fear level might influence the content of the image. That is, in highly fear arousing situations (such as when they feel in objective danger) these subjects might be preoccupied with aversive imagery. This was suggested by the self-reports of subjects' cognitions during the BAT in Study 3. Consistent with this Gauthier and Marshall (1977) and well as Mathews and Resin (1977) have found that CM is more effective when aversive, highly fear provoking consequences are omitted from the imagery instructions.

Another potential mediator of reversed ATI effects is the nature of the phobic object. That is, the present data cannot rule out the hypothesis that ATI effects in one
direction occur for rat phobics and that effects in the opposite direction occur for snake phobics, regardless of how fearful the stimuli are. However, there is some data which suggest this might be unlikely. In Study 2 there was a high degree of association between all items of the fear-coping scale. This suggested that the skills these subjects employed to deal with general fear situations (e.g., social anxiety, heights) were also characteristic of the way they coped with the phobic situation. In Study 3 however, judgements of reliance on imagery/verbal skill in more general fear situations appeared independent from judgements of reliance on imagery/verbal skills in the phobic situation. Further, when judgements of coping with the phobic situation were examined alone (Study 3) there was a positive association between reliance on visual imagery and behavioral outcome of CM and a negative association with SIT. That is, this one item replicated the direction of ATI effects from Study 2. The magnitude of the associations with this item were very similar between Studies 2 and 3 (approximately +0.3 for CM and -0.35 for SIT in both studies). Snake phobics, therefore, appear to differentiate between dealing with snakes and dealing with more general fear situations. Rat phobics do not appear to make this distinction. Further, it is only the more general fear scale (as well as general Intellectual Level and Space Relations tasks) which shows reversed ATI effects across Studies 2 and 3. The specific item dealing with a phobic encounter showed the same pattern of associations with
outcome CM and SIT across studies 2 and 3. This suggests that it is not the particular object per se which is responsible for reversal of ATI effects. The level of fear elicited by the object might be a more likely mediating factor. Again, if the specific object itself were responsible for the reversal of ATI effects it would stand to reason that the Cognitive Style Questionnaire item dealing with a phobic encounter would reflect this reversal. This was not the case, however.

What is needed is a way of investigating factors which mediate the direction of ATI effects. The following experiment might be helpful. This study could manipulate the phobic object (e.g., rat, snake), and the degree of fear elicited by the object. Fear could be manipulated by varying the size and type of stimulus. For instance, one could use the following stimuli; (a) a small white mouse/baby garter snake; (b) young laboratory rat/small garter snake, (c) large laboratory rat/medium size local snake, and (d) a large wild sewer rat/large boa or python. These stimuli could be rated by pilot subjects to ensure that the degree of fear was manipulated. Perceptions of the degree of objective danger might be a useful dependent measure for this purpose. Separate groups of rat and snake phobic subjects could be trained in imagery and verbal coping skills and tested under one of these conditions. If the object was critical, then regardless of the threat involved ATI effects would be reversed for rat and snake
phobics. If, on the other hand, the degree of threat was the important factor, ATI effects would reverse as the degree of threat increased, regardless of the specific object.

Although the Cognitive Style Questionnaire scales most clearly demonstrated reversal of ATI effects from Studies 1 and 2 to Study 3 comparisons between the scales themselves produced consistent findings in all three studies. Visual imagery was reported to predominate in catastrophizing responses in fear situations. It was significantly more characteristic of catastrophizing than of coping in these situations. In pain situations, however, visual imagery was more characteristic of coping than it was of catastrophizing. Verbal strategies by far predominated in catastrophizing responses. The consistency of these findings over all three studies is noteworthy. Together, these data strongly argue that the use of imagery and verbal strategies in clinically relevant situations is dependent on situational and functional factors. This is consistent with data generated by Tucker and Newman (1981; also Tucker & Shearer, 1981) as well as Baker and Jessup (1981). On the basis of this data the Cognitive Style Questionnaire scales will, in all likelihood, prove useful in future investigations into the role of imagery and verbal skills in a variety of situations.

In all three studies an attempt was made to identify whether ATI effects could be related to judgements of the difficulty in acquiring and implementing the particular
coping skill. While relationships were found they tended to be small in magnitude and not easily replicated. In Study 3 the fear-coping scale was positively associated with difficulty in using SIT at posttraining; the pain-coping scale was positively associated with difficulty in using CM during training; and Verbal Fluency was positively associated with using SIT during training. These relationships were not strong in magnitude. Nor did they reveal a consistent pattern across studies. Thus, while ratings of the difficulty of employing these coping skills might in some way be related to ATI effects, it does not appear that difficulty is a primary mediating variable. Further investigation into possible mediating variables is called for. Perhaps variables such as self-efficacy, knowledge of when to employ a skill, etc. (see Katz, in press) might be investigated.

Finally, let us briefly consider Study 3 data that address the issue of predictive relationships between individual difference measures and pretraining performance measures. Notably, any such effects did not influence posttraining relationships, as these latter scores were adjusted for initial level. Several relationships between initial fear level and individual style were uncovered in Study 3. Recall that in Study 1 correlations between selected individual difference scales and performance measures were in the direction suggesting that greater reliance on imagery was associated with greater fear. The
approach scores and fear ratings reflected similar relationships. These findings were not replicated in Study 2. In fact, the Individual Difference Questionnaire-verbal scale suggested stronger avoidance was associated with reliance on verbal processing style. In Study 3 correlations between individual difference scales and performance measures were again uncovered. However, significant correlations occurred only with mean fear ratings. These relationships were quite inconsistent. Some scales (Cognitive Style Questionnaire: fear-coping and anger-catastrophizing) showed relationships such that increasing reliance on imagery was associated with smaller fear ratings. Other scales (the Quick Test) suggested greater fear for those with greater verbal (vocabulary) scores. Interestingly, the Social Desirability scale was found to be negatively associated with fear ratings.

It is difficult to draw interpretable conclusions from these patterns. Data from rat phobics suggest that clear, replicable relationships are difficult to find. For snake phobics, imagery/verbal measures are related to fear level measures in a complex fashion. Further work is required to understand these associations. The data from the present series of studies do not allow strong conclusions about associations between individual style and strength of phobic response to be drawn. Future work might focus on the possible role of social desirability and other self-presentational style factors. As well, it may be the
case that relationships between individual style and fear are mediated by factors such as the degree of fear involved in the particular task.

Summary

Overall, the data from the present 3 studies indicate that ATI effects do occur between Covert Modeling (imagery) and Self-Instructional Training (verbal) coping skills procedures. These ATI effects are replicable within the same paradigm (stimulus type, i.e., Studies 1 and 2). Importantly, the nature of the assessment of individual differences appears crucial. Reliance on visual imagery/verbal strategies in coping with fear situations (the Cognitive Style Questionnaire fear-coping scale) clearly identified ATI effects in all three studies. Self-report vividness ratings, as well as more general cognitive style measures, repeatedly failed to generate ATI effects. In addition to ATI generated by the fear-coping scale, Study 2 also suggested that more general factors might also identify ATI effects between CM and SIT. These factors included intellectual level, which generated strong ATI effects, and pretraining fear level in the phobic situation. This latter scale generated a relatively weak ATI effect. As well, Fear Survey Schedule mean ratings were predictive of postraining approach scores in the same (positive) direction for both CM and SIT. These latter effects, while extremely interesting, and potentially important, are in need of replication.
Bandura, Jeffery, and Wright (1974) and Mathews, Johnstone, Snow, and Gelder (1974) were unable to predict outcome in a snake avoidance paradigm using pretraining fear measures.

While ATI effects were found to be replicable assessment of generalizability produced surprising results. ATI effects were still present for the fear-coping scale. The direction of these effects was reversed from Studies 1 and 2, however. This suggested that some, as yet unidentified, factor can mediate the direction of ATI effects in the paradigm employed in this research. The most likely mediating factor might be the degree of threat (fear) involved in the particular approach task. This has yet to be verified, however. Until such time as this variable is more clearly understood one must be very cautious in making generalizations about which type of skills would benefit which types of people. The data of the present studies clearly suggest that one should not generalize beyond the specific situation one has observed.

While this conclusion might question the value of analogue studies, where generalization is a desired goal, there is a positive side. Although the direction of ATI effects is not consistent the detection of such effects seems highly likely. The type of assessment device most likely to identify ATI effects is likely one that assesses strategy use in situations very similar to those in which the use of the strategy is evaluated. Visual imagery and verbal strategies appear to be highly situation specific.
Future research should examine the fear level as well as the degree to which subjects feel they are in objective danger. Clinical research into imagery and verbal processes may be more productive if concern with 'ability', trait type factors (e.g., image generation, spatial manipulation, etc) was replaced with a concern for issues such as reliance on specific skills in specific situations, affective quality of imagery, spontaneous elaboration of images, and so on.
1. Correlations were calculated between these individual difference measures. Few significant relationships were found. The Individual Difference Questionnaire-visual scale was positively related to the Verbalizer-Visualizer Questionnaire; the Individual Difference Questionnaire-verbal scale was negatively related to the Verbalizer-Visualizer Questionnaire. Remaining correlations did not reveal any consistent patterns.

2. Correlations between individual difference measures indicated the following. First, the Cognitive Style Questionnaire scales were significantly intercorrelated. Second, Intellectual Level was significantly positively related to Space Relations. Third, the Individual Difference Questionnaire-visual scale was positively related, and the Individual Difference Questionnaire-verbal scale negatively related, to the Verbalizer-Visualizer Questionnaire. Fourth, the Individual Difference Questionnaire-visual scale and the Verbalizer-Visualizer Questionnaire tended to show positive correlations to the Cognitive Style Questionnaire scales. Fifth, Social Desirability was positively related to the Individual Difference Questionnaire-verbal scale, as well as to the
Verbal-Visual Arousal scale.

3. Correlations between individual difference measures revealed the following. As with Study 2 the Cognitive Style Questionnaire scales were significantly intercorrelated. Intellectual Level was significantly positively related to Space Relations. The Individual Difference Questionnaire-visual scale was positively related, and the Individual Difference Questionnaire-verbal scale negatively related, to the Verbalizer-Visualizer Questionnaire. Social Desirability was positively related to the Individual Difference Questionnaire-verbal scale, as well as the the pain-coping and the anger-catastrophizing scales.
Reference Notes


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References


Boulougouris, J., Marks, I., and Marset, P. Superiority of flooding (implosion) to desensitization for reducing pathological fear. *Behavior Research and Therapy*, 1971, 9, 7-16.


Gordon, R. An investigation into some of the factors that favour the formation of stereotyped images. British Journal of Psychology, 1949, 39, 156-167.


Katz, A. What does it mean to be a high imager?


Kazdin, A. Covert modeling, model similarity, and reductions of avoidance behavior. Behavior Therapy, 1974, 5, a


Kazdin, A. Imagery elaboration and self-efficacy in the covert modeling treatment of unassertive behavior. Journal of Consulting and Clinical Psychology, 1979, 47, 725-733. a
Kazdin, A. Effects of covert modeling and coding of modeled stimuli on assertive behavior. 
*Behavior Research and Therapy*, 1979, 17, 53-61. b

Kanter, N., and Goldfried, M. Relative-effectiveness of rational restructuring and self-control desensitization in the reduction of interpersonal anxiety. 
*Behavior Therapy*, 1979, 10, 472-490.

Kendall, P. On the efficacious use of verbal self-instructional procedures with children. 

Kendall, P., and Finch, A. A cognitive-behavioral treatment for impulsivity. A groups-comparison study. 


May, J., and Johnson, H. Physiological activity to
internally elicited arousal and inhibitory thoughts.

McGlynn, D. Individualized vs standardized hierarchies in
the systematic desensitization of snake avoidance.
Behavior Research and Therapy, 1971, 9, 1-6.

McGlynn, D., and Mapp, R. Systematic desensitization of
snake-avoidance following three types of suggestion.

McGlynn, F., Puhr, J., Gaynor, R., and Ferry, J. Skin
conductance responses to real and imagined snakes among
avoidant and non-avoidant college students.

McElnemore, C. Imagery in desensitization. Behavior Research
and Therapy, 1972, 10, 51-57.

Meichenbaum, D. Cognitive modification of test anxious
college students. Journal of Consulting and Clinical

Meichenbaum, D. Cognitive-behavior modification:
An integrative approach. New York: Plenum Press,
1977.


Richardson, A. Subject, task, and tester variables associated with initial eye movement responses. *Journal of Mental Imagery*, 1978, 2, 85-100.


Trudel, G. The effects of instructions, level of fear, duration of exposure, and repeated measures on the behavioral avoidance test. Behavior Research and Therapy, 1979, 17, 113-118.


Wine, J. Test anxiety and the direction of attention. 
Psychological Bulletin, 1971, 76, 92-104.

Winer, B. Statistical principles in Experimental Design. 

Wiscocki, P. A covert reinforcement program for the treatment of test anxiety: A brief report. 
Behavior Therapy, 1973, 4, 264-266.

Woodward, R., and Jones, R. Cognitive Restructuring treatment: A controlled trial with anxious patients. 
Behavior Research and Therapy, 1980, 18, 401-407.


APPENDIX A

Cognitive Style Questionnaire
Instructions:

In this questionnaire you will find a variety of specific situations, which are presented in detail. For each of these situations, read the description very carefully. You are to respond to the questions based on the description as if YOU were experiencing what is described.

Now, each question involves two (2) alternative reactions. You are to decide how characteristic these reactions are of you. That is, how frequently you experience these reactions in the form described. Your task is to decide which of the two alternatives is most characteristic of YOU. To facilitate this comparison you are to divide 100% BETWEEN these two reactions. For instance, if you experience one of the two reactions almost always, and the other almost never you would indicate 100% for the former, 0% for the latter reaction. If you characteristically experience both reactions equally often you would rate both 50%, and so on. You must choose between the two reactions and rate them such that TOGETHER they equal 100%.

DO YOU HAVE ANY QUESTIONS?

BE SURE TO CONSIDER BOTH ALTERNATIVES BEFORE RESPONDING

NOTE: Situations that were added after Study 1 are indicated by using asterisks rather than numbers.
Situation A

You are sitting in class one morning. This class is part of an area which you have decided to major in, and so it is very important for you to do well. During the class you were asked some questions which you feel you handled very poorly. Near the end of class your Professor asks you to stay. You react by thinking that perhaps you have done something wrong. You become anxious about what the Professor might say.

Question 1. While you are waiting for the Professor to speak to you you become more anxious. Would your anxiety be related more to:

-alternative 1:

Images (actual pictures in your mind) of the professor telling you that you had done poorly and had better consider another major, or that you will have to work harder to pass the course.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic

-alternative 2:

A series of statements to yourself, such as: "I've really messed up"; "I'm in trouble now"; "I'll probably have to change my major".

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic

characteristic
Question 2: Now, as you are sitting waiting you become aware of your growing anxiety. In an attempt to reduce this anxiety you:

**alternative 1:**

Tell yourself, "Stop focusing on the negative. You don't know what the professor wants"; "It may be nothing or it may be something good"; "Focus on something else".

![Likert Scale](0 10 20 30 40 50 60 70 80 90 100)

- extremely uncharacteristic
- characteristic

**alternative 2:**

Distract yourself by imagining other things (like being outside, or a movie you saw) or imagining the professor telling you that you did well on an assignment, or simply that you forgot to put your name on your last test paper.

![Likert Scale](0 10 20 30 40 50 60 70 80 90 100)

- extremely uncharacteristic
- characteristic
Situation B

You have a tooth that has been bothering you for several weeks. You therefore make an appointment with the dentist. The appointment is set for 9:00 AM the next day. You awake the next morning at 7:30 with terrible pain in the tooth. You know that you have 1.5 hours to wait before you can get the tooth treated.

Question 1. How would you try to tolerate the pain for this period? Would you;

-alternative 1:

Keep telling yourself over and over things like; "It's almost time"; "I only have to hang on another few minutes"; or try to take your mind off the pain by telling yourself to think of other things (e.g., "Let me make a list of things I have to do today"; "What is the first thing I need to do").

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic

-alternative 2:

Take your mind off the pain by imagining things like; a movie you have recently scene, picturing what you were doing several days ago, or imagining yourself resting on a sunny beach.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic

Question 2. You find yourself unable to distract your attention from pain. Instead you focus on the pain. As you focus on the pain do you experience:
-alternative 1:

Saying to yourself over and over things like; "My tooth hurts"; "I wish the pain would stop"; "Why won't the pain go away, it hurts so much".

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

-alternative 2:

Seeing visions of the pain incapacitating you; of the tooth and jaw swelling and infecting the whole side of your face.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic
Situation * *

You go with a few friends to the CNE. In the midway your friends suggest that you all try a new ride. While you do not as a rule enjoy rides you decide to go along. The particular ride involves being in a small chair lift, which swings around high—in the air. Your legs dangle freely. The ride is OK at the beginning. However, after a few minutes it begins to make loud noises. You immediately become frightened. Just when your chair is near the highest point in the ride it abruptly stops, leaving you swinging high in the air. You are now beginning to panic.

Question 1. In this situation what would elicit your fear the most:

-alternative 1

Imagining yourself slipping from your chair and falling; or perhaps imagining the chair itself letting go and falling.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

-alternative 2

Telling yourself; "I'm going to slip out and fall"; "The whole chair is going to fall".

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

Question 2. Now, you try to calm yourself. Which do you find more calming:

-alternative 1

Telling yourself; "It will be OK, Help is on its way"; "Just hang on, it'll be OK; "Try to take your mind off the negative".

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic
alternative 2

Imagining the rescue crew climbing quickly to your rescue; or distracting yourself by imagining something pleasant.
Situation C

You have just received a notice from your bank that your account is overdrawn by $500. You know that you have written a lot of cheques lately, but are sure they did not exceed your deposits, let alone by $500. You immediately check your deposit slips and cancelled cheques and indeed find that you have not overdrawn your account. You become angry at this point and call your bank. The person you call tells you there is nothing that can be done until you settle the overdraft. You demand to speak to someone else and are passed on to the assistant manager. He tells you that he has checked the computer and that you do owe the money. You question him about the computer and he tells you that it is impossible for it to make a mistake and suggests in a sarcastic voice that you should keep a more responsible record of your spendings. He then bids you good-day. At this point you are livid. You decide to take your records and go down to the bank immediately to speak to the manager.

Question 1. On your way to the bank how would you prepare for your upcoming confrontation:

-alternative 1:

Would you imagine walking into his/her office and demanding that your account be straightened out.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic characteristic

-alternative 2:

Would you focus on what you are going to say, without actually imagining anything; just repeating over and over what you intend to say.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic characteristic

Question 2. In this situation where you are very angry would your anger be more aroused:
alternative 2

Find images flashing through your mind of your leg bleeding heavily, or of you rolling on the ground in pain, or perhaps of having the leg amputated.

0  10  20  30  40  50  60  70  80  90  100
extremely uncharacteristic characteristic
Situation **

You have decided to go with a friend for an afternoon hike through nearby woods. It is a pleasant, warm afternoon and you are enjoying your walk through narrow trails that wind up and down a hilly area. As you are nearing the end of your hike you stumble and fall. Although you are not hurt you look up and see that a rat/snake has crawled onto the path directly in front of you, only inches from your hand. You begin to panic.

Question 1. In this situation would your feelings of panic be represented by:

-alternative 1

Saying to yourself; "Oh my God, it will bite me"; "What am I going to do"; "This is horrible".

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

-alternative 2

Having an image of the rat/snake springing at you and sinking its teeth into your hand.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

Question 2. You realize that your panic is rising and you try to calm yourself. How would you do this:

-alternative 1

Call to mind the image of yourself calmly rising up and slowly and carefully passing by the rat/snake.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic
alternative 2

Say to yourself over and over, "I will be OK, just slowly get up and pass the rat/snake".

0 10 20 30 40 50 60 70 80 90 100 extremely uncharacteristic.

extremely characteristic.
Situation D

You are sitting in a restaurant with your boy/girlfriend. When your food is brought you notice that your meal is cold and undercooked. Your partner says her/his dish is cooked perfectly and is piping hot. You would like to complain but feel you might make a fool of yourself. The more you think about what to do the more of a conflict it becomes. In the end you do not say anything and do not enjoy your meal.

Question 1. In this situation would your failure to say something be related to:

-alternative 1:

Telling yourself things like, "You'll just make a fool of yourself and ruin your partner's meal", "My partner will be embarrassed and uncomfortable", "I'll make a fool of myself".

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic.

-alternative 2:

Having an image come to your mind of things like the waiter becoming angry and accusing you of waiting too long before eating your food; or your partner blushing and getting angry at you making a scene.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic.

Question 2. If in this you did say something would it help to:
**alternative 1:**

First imagine the scene and picture yourself telling
the waiter that you are dissatisfied and want another dish.

- extremely
- uncharacteristic
- extremely
- characteristic

**alternative 2:**

Telling yourself to; "Speak clearly and slowly", "Tell
him you are dissatisfied, it is your right".

- extremely
- uncharacteristic
- extremely
- characteristic
Situation **

You are returning to your hometown for Christmas, by plane. When you arrive at the airport and during boarding, the weather is quite nice. However, just before take-off, the sky begins to cloud over. The plane takes off. The first half-hour of the flight is OK, with just occasional turbulence. However, about one-half hour before the plane is due to touch down the plane hits very rough weather. The lane is jostling around and the 'FASTEN SEAT BELTS' sign is flashing. You notice that the stewardesses have gathered together near the front of the plane. You are becoming nervous, as are the other passengers. All of a sudden the plane drops drastically, throwing several of the stewardesses to the ground. Some of the overhead luggage falls. Again, there is a drastic fall and this time the oxygen masks drop from the overhead compartments. The crew instruct you to put the masks on and encourage people to calm down. You are terrified.

Question 1. Just as the oxygen masks fall you realize the situation is quite serious and become very frightened. You are afraid the plane might crash. Are your thoughts of the nature of:

-alternative 1

Saying things to yourself such as; "Oh no, we might crash;", "How much longer can the plane stand this", "I'm so frightened".

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

-alternative 2

Images that flash through your mind of things such as the plane crashing into the ground; of the engine of some other part of the plane falling off.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

Question 2. You realize as you are sitting in your chair that there is nothing you can do in this situation but
wait and hope. You try to calm yourself down. Do you:

-alternative 1

Distract yourself by imagining something other than the situation you are in, such as a pleasant scene; or what you were wearing several days ago; or perhaps imagine yourself sitting calmly.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

-alternative 2

Distract yourself by saying things like, "Take your mind off the situation", "Think of something pleasant, like a good movie, or something I was wearing a few days ago", "Just be calm".

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic
You are riding along the streets on your bicycle one morning. You are looking around and don't notice a pothole in front of you. Your bike hits the pothole and you take a nasty fall. Your ankle strikes the curb and your leg twists painfully behind you. As you are lying on the street you try to move your leg. The pain is unbearable. You look and see blood and swelling. It seems broken. A passerby stops and goes to call an ambulance. It takes 10 minutes for the ambulance to arrive. In the meantime the pain is very severe.

**Question 1.** You try to take your mind off the pain. Do you:

- **alternative 1**
  
  Tell yourself; "Think of something else", "try to take your mind off the pain", "it really doesn't hurt that much".

  0 10 20 30 40 50 60 70 80 90 100
  extremely uncharacteristic characteristic

- **alternative 2**

  Distract yourself from the pain by imagining other things, like your ankle being numb, or imagining something altogether different from the pain.

  0 10 20 30 40 50 60 70 80 90 100
  extremely uncharacteristic characteristic

**Question 2.** The pain becomes even more intense. You can't distract yourself from it. What do you experience:

- **alternative 1**

  Saying over and over to yourself; "Why won't the pain stop", "It hurts so much, "I can't stand this".

  0 10 20 30 40 50 60 70 80 90 100
  extremely uncharacteristic characteristic
alternative 2

Find images flashing through your mind of your leg bleeding heavily, or of you rolling on the ground in pain, or perhaps of having the leg amputated.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic
Situation E

You are on your way up to the 25th floor in an office building. The building is quite modern and the elevator is built on the outside of the building such that one side is glassed and you can see directly outside. You are alone in the elevator. At first it rises smoothly but just after you pass the 15th floor it begins to slow and move in a jerky fashion. You begin to become very frightened. Suddenly the elevator stops between the 19th and 20th floors. Just as you begin to calm the elevator drops 2 floors and stops suddenly, throwing you to the floor. Now you are terrified and begin to panic.

Question 1. In this situation which would you find yourself more likely to experience:

-alternative 1:
Repeating over to yourself, "I'm going to die", "Oh God, the elevator is falling".

- alternating 2:
Visioning the elevator falling the rest of the way and crashing to the ground.

Question 2. You try to calm yourself. Do you:
-alternative 1:

Repeat to yourself: "Calm down, don't panic", "Just sit tight and help will come", "Push the emergency button".

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

-alternative 2:

Imagine the scene where other people are preparing for your rescue; that fire engines and rescue squads are on their way.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

Question 3. You try to distract your attention away from the panic. Do you:

-alternative 1:

Tell yourself; "Try to keep your mind off falling", "Think of something else", "What do I have to do today".

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic

-alternative 2:

Imagine yourself walking in a park, or relaxing by a fire, or perhaps picturing a movie in your mind.

0 10 20 30 40 50 60 70 80 90 100
extremely uncharacteristic extremely characteristic
APPENDIX B

Individual Difference Questionnaire
Instructions

The statements on the following pages represent ways of thinking, studying, and problem solving, which are true for some people and not for others. Read each statement and decide whether or not it is true with respect to yourself. Then indicate your answer on the separate answer sheet.

If you agree with the statement or feel that it does describe you, answer TRUE. If you disagree with the statement or feel that it is not descriptive of you, answer FALSE. Answer the statements as carefully and honestly as you can. The statements are not designed to assess the goodness or badness of the way you think. They are attempts to discover the methods of thinking you consistently use in various situations. There are no right or wrong answers.

In making your answers on the answer sheet, be sure that the number that you are answering is the same as the number on the answer sheet.

Answer every statement either true (T), or false (F), even if you are not completely sure of your answer. If there are any questions please ask.

Note: Items from the Social Desirability Scale of the Personality Research Form were randomly embedded among the items of the Individual Difference Questionnaire in Studies 2 and 3 only. These items appear in this appendix preceded by two asterisks. They are placed in the position that they occurred in Studies 2 and 3. They were numbered...
appropriately at these times.
1. I have no difficulty in-expressing myself verbally.

2. Listening to someone recount his/her experiences does not usually arouse mental pictures of the incidents being described.

3. When reading fiction I usually for a mental picture of a scene or room that has been described.

4. I am quite able to make correct decisions on difficult questions.

5. Essay writing is difficult for me.

6. I enjoy being able to rephrase my thoughts in many ways for variety's sake when both writing and speaking.

7. I enjoy visual arts, such as paintings, more than reading.

8. I tell jokes and stories poorer than most people.

9. I enjoy doing work that requires the use of words.

10. My daily life includes many activities that I dislike.

11. My day dreams are sometimes so vivid I feel as though I actually experience the scene.

12. I often use mental pictures to solve problems.

13. I enjoy reading an interesting story even if it is not particularly well written.

14. I find it difficult to find enough synonyms or alternate forms of a word when writing.
14. I have difficulty expressing myself in writing.

15. My knowledge and use of grammar needs improvement.

16. I would rather work with ideas than words.

**. If someone gave me too much change I would tell him/her.

17. I memorize material largely by the use of verbal repetition.

**. I am one of the lucky people who could talk to my parents about my problems.

18. I enjoy learning new words and incorporating them into my vocabulary.

19. I do not have a vivid imagination.

20. I can easily picture moving objects in my mind.

21. Most of the time my thinking is verbal, as though talking to myself.

22. If given the choice, I would rather listen to a good speaker than visit an art gallery.

**. I am always prepared to do what is expected of me.

23. I find that I am more critical of writing style than content when reading literature.

24. I can form mental pictures to almost any word.

25. I have only vague visual impressions of scenes I have experienced.

26. My vocabulary is not as large as I would like.
27. When doing mental arithmetic, such as addition, I think in abstract terms rather than actually picturing the numbers.

28. I can easily think of synonyms for words.

**. I am never able to do things as well as I should.

29. I think that most people think in terms of mental pictures whether they are completely aware of it or not.

30. I am able to express my thoughts clearly.

31. I remember things I have done myself, much better than things I have read.

32. My powers of imagination are higher than average.

33. I consider myself a fast reader.

34. I have a large vocabulary.

35. I find it easy to visualize the faces of people I know.

**. I would be willing to do something a little unfair to get something that was important to me.

36. My marks have been hampered by inefficient reading.

37. It bothers me when I see a word used improperly.

38. I don't believe that anyone can think in terms of mental pictures.

39. I can easily form a mental picture of Prime Minister Trudeau.

40. I am fluent at writing essays and reports.
41. I would rather have a verbal description of an object or person, than a picture.

** I did many very bad things as a child.

42. I can close my eyes and easily picture a scene I have experienced.

43. I have a photographic memory.

44. I feel a picture is worth a thousand words.

45. I cannot generate a mental picture of a friend's face when I close my eyes.

46. When someone describes something that happens to him/her I sometimes find myself vividly imagining the events that happened.

47. I can add numbers by imagining them to be written on a blackboard.

** I find it difficult to concentrate.

48. I have found it easy in the past to learn a second language.

49. When I hear or read a word, a stream of other words often comes to mind.

50. I seldom dream.

** I get along with people at parties quite well.

51. I read rather slowly.

52. I am usually able to say what I mean in my first draft of an essay or letter.

53. I am good at thinking up puns.
54. I never use mental pictures or images when trying to solve problems.

55. While I have often seen pictures of him, I cannot remember exactly what ex-President Nixon looks like.

56. I often remember work I have studied by imagining the page on which it is written.

57. Studying the use and meanings of words has become a habit with me.

**. I am glad I grew up the way I did.

58. I speak or write what comes into my head without worrying greatly about my choice of words.

59. Not enough people pay attention to the manner in which they express themselves.

60. I enjoy solving crossword puzzles and other word games.

**. Many things make me feel uneasy.

61. I find it difficult to form a mental picture of anything.

62. Memorizing by verbal repetition is time consuming and inefficient.

63. My dreams are extremely vivid.

64. I have better than average fluency in using words.

65. I read a great deal.

66. I am continually aware of sentence structure.

**. My life is full of interesting activities.
67. My thinking often consists of mental pictures or images.

68. I do not form a mental picture of people or places when reading of them.

69. I often have difficulty in explaining things to others.

70. My day dreams are rather indistinct and hazy.

71. I find it easier to learn from a demonstration than from written instructions.

72. I often enjoy the use of mental pictures to reminisce.

73. I often use mental images or pictures to help me remember things.

74. When remembering a scene I use verbal descriptions rather than mental pictures.

**. I believe people tell lies any time it is to their advantage.

75. I take great pains to express myself with precision and accuracy in both verbal speech and written word.

76. I have never done well in learning languages.

77. The proper use of words is secondary to the ideas and content of speech or writing.

78. I have a better memory for things I have read, rather than things I have experienced.

79. I am disturbed by people who quibble about word usage.

80. I have difficulty producing associations for words.

**. I am careful to plan for my distant goals.
81. I often have ideas that I have trouble expressing in words.

82. I think that puns are the lowest form of humour.

83. Just before falling asleep I often find myself picturing events that have happened.

84. I prefer to read instructions about how to do something, rather than have someone show me.

85. I am a good story teller.

86. I spend very little time attempting to increase my vocabulary.

**. I often question whether life is worthwhile.
APPENDIX C

VIVIDNESS OF VISUAL IMAGERY QUESTIONNAIRE
In this questionnaire you will be asked to consider four scenes. These scenes will be described and you will be asked to consider the picture that comes before your mind's eye. You will be asked specific questions about this picture and will be asked to rate the characteristics specified in the question according to the following rating scale:

<table>
<thead>
<tr>
<th>RATING</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Perfectly clear and as vivid as normal vision</td>
</tr>
<tr>
<td>2</td>
<td>Clear and reasonably vivid</td>
</tr>
<tr>
<td>3</td>
<td>Moderately clear and vivid</td>
</tr>
<tr>
<td>4</td>
<td>Vague and dim</td>
</tr>
<tr>
<td>5</td>
<td>No image at all, you only know that you are thinking of the object</td>
</tr>
</tbody>
</table>

BE SURE TO CONSIDER EACH OF THE SCENES CAREFULLY BEFORE ANSWERING

Think of some relative or friend whom you frequently see (but who is not with you at present) and consider carefully the picture that comes before your mind's eye. Rate the following:

<table>
<thead>
<tr>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The exact contour of face, head, shoulders, and body</td>
</tr>
</tbody>
</table>
2. Characteristic poses of head, attitudes of body, etc. ( )

3. The precise carriage, length of step, etc in walking. ( )

4. The different colours worn in some familiar clothes. ( )

Visualize a rising sun. Consider carefully the picture that comes before your mind's eye. Rate the following:

5. The sun is rising above the horizon into a hazy sky. ( )

6. The sky clears and surrounds the sun with blueness. ( )

7. Clouds. A storm blows up, with flashes of lightning. ( )

8. A rainbow appears. ( )

Think of the front of a shop which you often go to. Consider the picture that comes before your mind's eye. Rate the following:

9. The overall appearance of the shop from the other side of the road. ( )

10. A window display including colours, shapes and
details of individual items on sale.

11. You are near the entrance. The colour, shape, and
detail of the door.

12. You enter the shop and go to the counter. The
counter assistant serves you. Money changes hands.

Finally, think of a country scene which involves trees,
mountains, and a lake. Consider the picture that comes
before your mind's eye. Rate the following:

13. The contours of the landscape.

14. The colour and shape of the trees.

15. The colour and shape of the lake.

16. A strong wind blows on the trees and on the lake
causing waves.