A Comparison of Two Cognitive Strategies Utilized Through Three Different Cognitive Modalities in the Experimental Reduction of Stress

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ABSTRACT

This study investigated the anxiety effects of receiving two different cognitive coping strategies utilized through three different cognitive modalities while viewing a stressful film. Three groups were given a defensive strategy in the form rationalization, denial and intellectualization self-statements (Film-Arousal); a second three groups were given self-statements designed to help them control their internal arousal (Subject Arousal). Each of the two conditions was divided into three modalities, those subjects who repeated the self-statements to themselves (Covert), those subjects who listened to a tape of reconceptualizations (Listen) and those subjects who repeated aloud the self-statements (Overt). Measures of self-report of anxiety, cognitive coping techniques, and heart rate were examined during the film period. While the Control, Overt Film-Arousal, and Listen Film-Arousal subjects reported higher levels of anxiety due to the film, the Overt and Listen Modalities were significantly more physiologi-

cally aroused while viewing the Film overall. Both Cognitive Coping Strategies were found to be equally effective in coping with the stressful film. The study provided partial support for the attention diversion hypotheses in accounting for anxiety states while exposed to a stressor. These findings and their implications were discussed.

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Curriculum Studiorum

Wayne L. Pellegrini was born on May 13, 1950 in Waterbury, Connecticut. He received the Bachelor of Arts degree from Saint Michael's College, Winooski, Vermont in 1972.

TABLE OF CONTENTS

Chapter Page

Appendix

Appendix Page

LIST OF FIGURES

LIST OF TABLES

Table Page

Table Page

CHAPTER I

INTRODUCTION AND REVIEW OF THE LITERATURE

Albert Ellis has recently emphasized what ancient Greek, Roman and Buddhist philosophers had taught concerning the importance of cognitions in emotional reactions. This philosophy is aptly expressed in the aphorism "As you think so shall you feel." Since the early 1960's a number of researchers have empirically demonstrated the importance of cognitive factors in moderating emotional reactions, particularly stress reactions. The cognitions attending psychological processes by which a person anticipates harmful events have become important variables in recent studies of psychological stress (Lazarus, 1966). In this connection, Lazarus has pointed out that stress involves anticipation of future harm. He has demonstrated that vulnerability to stress can be reduced by using adaptive methods of coping which incorporate appraisal and reappraisal of events (Lazarus, 1966; 1968; 1975; Lazarus, Averill and Opton, 1970). A second body of literature has also demonstrated that a client's self-statements can be altered in stress reactions (Meichenbaum, 1973).

Cognitive Variables in Stress Reactions: In one of their earliest studies Lazarus, Speisman, Mordkoff, and Davison (1962) demonstrated that a film can be used to induce anxiety in a laboratory setting. A subincision film which depicted crude genital operations among Australian aborigines was used to induce anxiety, and reactions during the film were assessed by autonomic (heart rate and skin resistance) and self-report measures. Speisman, Lazarus, Mordkoff, and Davison (1964) investigated the manner in which subjects appraised the stressful subincision film after listening to one of three sound tracks which were differentiated with respect to their capacity to increase or decrease autonomic (heart rate and skin resistance) and self-reported stress reactions of subjects viewing the film. A significant finding was the fact that the trauma track increased anxiety as measured by skin resistance compared to the denial and intellectualization tracks. Lazarus and Alfert (1964) then transformed the sound tracks used by Speisman into denial orientation passages which subjects listened to before they viewed the film. The denial orientation groups were significantly less anxious than the control group when viewing the film.

The procedure of having subjects listen to orientation passages before their viewing of the film was described by Lazarus as "the short circuiting of threat." This principle was applied to another film "It Didn't Have to Happen" which depicted accidents in an industrial woodworking shop (Lazarus, Opton, Nomikos, & Rankin, 1965). The subjects were divided into two groups; (1) those subjects who listened to a tape which intellectualized the threatening aspects of the film and (2) subjects who listened to tape which denied the threatening aspects of the film. The results indicated that the intellectualization group was significantly less anxious than the control group. The industrial accident film was again used in a study (Koriat, Melkman, Averill, & Lazarus, 1972) in which the subjects were asked to engage in two coping stategies. While being exposed to the portrayal of accidental physical injuries they were first asked to involve themselves in the stressful episodes and another time to detach or distance themselves. Both the autonomic and self-report measures demonstrated that subjects were capable of self-control in their emotional reaction to a stressful film by either increasing or decreasing arousal.

These studies lend support to the notion that reconceptualizing a stressor can facilitate anxiety reduction depending upon how the stressful event is appraised or interpreted. Emotional appraisals, however, can be influenced by means other than the manipulation of ego defenses and cognitive rehearsal. One aspect of the cognitive process that has been investigated involves providing alternative interpretations for one's own reactions. In a series of studies carried out by Schachter and his collegues (Nisbett & Schachter, 1966; Schachter, 1962), it was demonstrated that the specific emotions experienced by as individual is not solely determined by his physiological state of arousal. An important aspect of the emotional process focuses on the manner in which the person interprets or labels this state and this labelling process can be influenced by what the person attributes as the source of this arousal. A number of studies, including some of those previously cited (Folkins, Moriat, Averill, & Lazarus, 1972; Lazarus, Speisman, Mordkoff & Davison, 1962) have shown that it is possible to assess through a subject's self-reports, not only the impact of a stressful emotional experience

but also the manner of thinking he had engaged in while exposed to the stressor. Although there are a number of methodological problems inherent in the use of self-report data, it still has been shown to be useful in research on stress and emotion (Lazarus, Averill & Opton, 1970).

Skills-Oriented Behavior Change: A number of researchers have applied the experimental and clinical work on cognitive factors in stress reactions to clinical populations. The general strategy of these studies attempts to directly modify the subjects's cognitions in order to alter stress reactions and coping behaviors. Meichenbaum (1974) has developed a skills oriented approach which involves teaching the client a set of self-statements or coping responses. One of the goals of this skills oriented approach is to have the client become aware of the role such thoughts play in stress reactions and maladaptive behavior. The client is taught and encouraged to focus his attention on anxiety engendering self-talk emitted prior to and while exposed to a stressor. Since the self-talk accompanying maladaptive behavior has often become habitual, the client is taught to emit incompatible self-statements. These

self-statements are designed to break the cognitive behavioral sequence, i.e., anxiety engendering thoughts preceding and accompanying maladaptive behavior.

Therapeutic intervention then concentrates on increasing the separation between stimuli and responses thereby providing an opportunity for interupting the behavioral sequence and increasing the likelihood of behavioral change. Meichenbaum has shown that a self-talk guidance treatment program can be effective for teaching both attentional controls and general self-control to such varied populations as hyperactive school children (Meichenbaum & Goodman, 1971), high test anxious college students (Meichenbaum, 1972), and institutionalized adult schizophrenics (Meichenbaum & Cameron, 1973).

Meichenbaum's self-instructional method attempts also to alter a client's reaction to stress by inducing him to reconceptualize the nature of his fears. This procedure asks clients to identify self-statements which facilitate stress reactions and then teaches the client to substitute positive coping self-statements for negative self-statements.

The skills-oriented program of interest to the present thesis is the one developed by Meichenbaum (1973; 1974, Note 1; Meichenbaum & Cameron, Note 2; called Stress Innoculation Training (SIT). The SIT program consists of three phases: (1) educating the client about the nature of stressful or fearful reactions, (2) having the client rehearse various coping behaviours and (3) giving the client the opportunity to practise his new coping skills in a stressful situation.

The educational phase provides the client with a rationale for interpreting his fears or anxieties. These fears are conceptualized in Schachterian terms (Schachter & Singer, 1962). The therapist describes the client's fear or anxiety as involving (1) heightened arousal (e.g., increased heart rate, sweaty palms, body tension) and (2) anxiety inducing thoughts and and images. The therapist suggests to the client that he can control his arousal by physically relaxing and focusing on appropriate self-statements. The rationale given to the client is intended to persuade the client that we often interpret how we feel on the basis of how we see ourselves reacting internally.

The client is encouraged to talk positively about his reactions in order to control any inferences or interpretations that he makes about his internal state.

The second phase of the self-instructional training teaches the client to view his stress reactions as a series of stages rather than as a massive reaction. The four stages suggested are (1) preparing for a stressor (2) confronting or handling a stressor (3) possibly being overwhelmed by a stressor and (4) reinforcing oneself for having coped. The client is encouraged to emit self-statements during each stage: e.g., stage one - "What is it I have to do? No negative self-statements. Just think rationally.."); e.g., stage two - "Just 'psych' myself up. I can meet this challenge..."; e.g., stage three - "When fear comes just pause. Let me label my fear from 0 to 10 and watch it change..."). Thus, the client is provided with positive self-statements which are used to control his interpretation of internal arousal.

Meichenbaum (1974, Note 1) suggests that stress innoculation training can be used for prophylactic purposes. The idea of presenting clients with defenses against anxiety is in some respects, analogous to medical innoculation against biological disease.

The self-instructional procedure of Meichenbaum

has recently been the subject of some serious questions raised by a study on the effects of self-instructions on writing deficiencies among children (Robin, Armel, & O'Leary, 1975). This study attempted to assess the role of self-guiding verbalizations within a treatment program for children with writing deficiencies. These authors compared a direct training program outlined by Meichenbaum (1971) to a self-instruction plus direct training program. Although the self-instruction plus direct training proved more effective than direct training for remediating writing deficiencies, the direct records of self-instruction indicated that higher rates of verbalization were not correlated with superior levels of performance. In fact, there was a negative but non-significant relationship between self-instruction and writing scores. More importantly, it was discovered that despite repeated modeling and continuous reinforcement, subjects would often use a single word rather than the self-statements provided. These self-statements were repeated rapidly and in many cases not in coordination with motor responses. There was even evidence to suggest that verbal and motor systems were functionally independent, in that while it was observed

that many subjects self-instructed correctly, they also made incorrect writing responses. It is unclear how the present subjects could have verbalized covertly and received the continuous reinforcement which appeared crucial to the continued use of self-instructions. This problem also raises the question of whether the recorded rates of verbalizations misrepresented the true rate since the subjects may also have self-instructed covertly. Thus, the above study raises the question of whether in fact there is a functional relationship between self-instructions and motor systems behavior. It also brings to the fore the methodological problem of correctly monitoring the amount of self-talk emitted by the subject.

The literature review thus far has suggested that cognitive variables are part of important mediating processes in coping with a stressor. The studies of Lazarus and Meichenbaum presented two very different ways of looking at the cognitive variables. The cognitive variables were either reconceptualizations of the source of the stressor (Lazarus) or reconceptualizations of an internal state (Meichenbaum). The purpose of the present investigation was to assess

the extent to which reappraising the nature of a stressful film as opposed to reappraising the nature of the internal state could contribute to anxiety reduction while being exposed to a stressful film. In other words, the present experiment investigated the most efficient and effective reappraisal that ought to be entertained in being exposed to a stressful event. For instance, if the Meichenbaum reappraisals of internal states are found to be more effective in keeping anxiety low while being exposed to a stressful film and if reappraisal only is operating, its effectiveness must not be at the expense of distracting the individual from the film. If it turned out to be the case that the Meichenbaum reappraisals were more effective in facilitating anxiety reduction, it is possible that their effectiveness was the result of at least two processes that were operating (1) the reappraisal process or (2) an attention diversion or distraction process. It was also the purpose of the experiment to investigate the extent to which an attention diversion or distraction process might be a salient variable in accounting for lowered stress reactions among subjects who are induced to utilize a cognitive coping strategy (Girodo, 1976).

The attention diversion hypothesis in the present experiment was investigated (1) by instructing subjects to attend to their internal state thereby inducing them to possibly pay less attention to the film and (2) by instructing subjects to repeat self-statements either covertly or overtly, or to listen to a tape, diverting their attention from the film. As the subjects were induced to reappraise by instructing them to repeat self-statements in reappraisal terms, it was assumed that this induced reappraisal would facilitate anxiety reduction and that any lowered anxiety would be the result of the facilitating effects of forcing subjects to commit themselves to a reappraisal. The amount of anxiety reduction would also be expected to vary depending on how well, how diligently and how often the subjects repeated the self-statements. Thus, lowered anxiety could be due to processes such as (a) actual facilitative reappraisal through self-talk and (b) attention diversion as a result of cognitive effort necessary to engage in the reappraisal. This latter explanation phrased in terms of attention diversion is crucial to our understanding of the effects of self-talk

in anxiety reduction. Fundamentally, the question is: As subjects are induced to talk to themselves, does the lowered anxiety occur as the result of self-persuasion of the reappraisal or does it occur as a result of an attention diversion process, or does it occur as a result of a combination of both of these processes? Furthermore, if varying amounts of overtly articulated self-statements were found to be correlated with anxiety reduction, it could then be argued that the amount of positive self-talk is functionally related to reduction in anxiety.

On the basis of the literature reviewed, a number of hypotheses were formulated: (1) It was hypothesized that the film itself was a stressful event. It was predicted from this hypothesis that subjects not provided with coping strategies would show a significant increase in anxiety while viewing the film compared with subjects provided with coping strategies. (2) No specific predictions were made concerning the relative efficacy of using internal arousal reconceptualization strategies as opposed to reconceptualizing the film strategies; however, it was postulated that if one of these two strategies was found to be more effective in coping with the stressful film, this

relative efficacy should not be at the expense of one group of subjects paying less attention to the film. In this connection, if "controlling internal arousal" subjects were found to cope better with the stressful film compared with "reconceptualizing the film" subjects, it was hypothesized that subjects induced to control their internal arousal would recall less of the film compared with "film reconceptualization" subjects.

In the present experiment one group of subjects was given Lazarus external stimulus reconceptualizations and asked to repeat the reconceptualizations to themselves. It was expected that these instructions would lead the subjects to reinforce their reconceptualizations and thereby allay anxiety more than if they were simply given the reconceptualizations by getting subjects to talk to themselves about the reconceptualizations. The task of having to repeat the statements provides an opportunity for the subjects to re-evaluate the source of the stress. Furthermore, the repetition of the self-statements may actually induce subjects to further believe in them. However, repeating

reconceptualizations of an internal state may allay the anxiety of a subject but for different reasons, for subjects who are asked to focus their attention on their internal state may not be able to fully attend to the stressful film.

One group of subjects was asked to covertly repeat the reappraisals appropriate to their condition whether they were reappraisals of the nature of the film or their internal state. It was assumed that this latter instruction would involve a minimal amount of cognitive activity and effort as opposed to those subjects who are instructed to listen to a reappraisal tape while exposed to the film. It was also expected that these latter instruction to listen to a reappraisal tape would commit subjects to an increased amount of cognitive activity. Finally, a third group of subjects was instructed to reappraise the nature of the film or their internal state but was asked to overtly articulate the self-statements. Each of the three manipulations of modalities involved varying degrees of cognitive activity and effort. The extent to which one task required more effort presupposed that

the subjects paid more attention to the requirements of the task inherent in the demands of the experiment. It was felt that a subject who was asked to overtly articulate the self-statements would have to pay more attention to this task and as such, would pay less attention either to the film in the internal state conditions or to his internal state in the film reconceptualization conditions.

CHAPTER II

METHOD

Subjects

Seventy-four female subjects who agreed to participate in an experiment concerned with watching a film were randomly selected from the University of Ottawa undergraduate psychology population. Four subjects were eliminated because two subjects left the psychology laboratory out of fear before the film was shown and two others could not complete the experiment when the equipment for recording heart rate failed to operate. The age range of these subjects was from 18 to 35 years with a mean age of 21.

Procedure

The subjects were scheduled at two hour intervals and randomly assigned to one of seven experimental conditions. Upon arrival at the laboratory, subjects were greeted by one of two experimenters and asked to sit in the chair provided. In order to standardize the procedure for all subjects,

the initial instructions thanking them for agreeing participate and informing them of the physiological measures to be taken were delivered on a tape recorder. These introductory remarks are presented in Appendix D.

Prior to any experimental manipulations, silver-plated electrodes were attached to the wrists and to the left ankle of the subject to measure heart rate. The subjects were assured that no harm would result from the recording equipment. Beckman electrode paste was applied liberally to act as an interface between each electrode and the subject's skin. The leads for the heart rate were connected to a heart rate (2) digital pulse converter which is an electrophysiological amplifier of the heart rate signal (QSR wave.) The signal from the amplifier was recorded on the A.R. Vetter FM tape recorder (Model A).

Subjects were asked to sit quietly while the experimenter calibrated the recording devices and three minutes of baseline were gathered. After this they were then asked to fill out the Self-Report of

Anxiety Inventory (SRAI) questionaire designed to obtain estimates of their subjective level of anxiety or arousal. The next part of the taped instructions was then presented, and the content of the tape varied depending upon which of the seven conditions the subject had been assigned.

Film Arousal Statements Conditions: These subjects were first given information as to the stressful nature of the film, "It Didn't Have to Happen." This film is concerned with inducing safety mindedness in the operators of machinery by portraying three accidents which stem from carelessness while operating high speed equipment. The bloody details of the film are described, ("The first accident involves a worker who loses the tips of his fingers..."). The second part of the tape provided a rationale similiar to the defense orientation passage used by Lazarus and his associates in which the threatening aspects of the film are denied and intellectualized. The above set of instructions are presented in Appendix F. Subjects were asked to reconceptualize the three accidents of the film into three separate components. They were

told to focus on certain aspects of the film production ("This is a Canadian Production"), the unrealistic nature of the props ("What appears as blood is really red dye"), the seemingly suspenseful nature of the film ("We know that an accident is going to come"), and the actors' attempt to simulate real accidents, ("Watch the unconvincing way the shipping clerk simulates pain and dying"). The subjects were then given a list of self-statements that was divised from the taped instructions (Appendix B). They were instructed to memorize 10 of the statements within the next few minutes. Following this, subjects were tested on the number of statements they memorized, and the SRAI was readministered.

There were three groups of subjects in the Film Arousal Statements Condition. One group of subjects was instructed to covertly make use of the statements they had memorized (Film-Covert). A second group of subjects were instructed to repeat aloud the statements (Film-Overt). A third group was instructed to listen to a tape of the self-statements while they watched the film (Film-Listen). These instructions are presented in Appendix C.

Subject Arousal Statements Condition: Subjects in this condition were given the same preparatory information concerning the stressful nature of the film as the previous groups. However, instead of following this with a film orientation, they were given a rationale and orientation similar to the one used by Meichenbaum and focused mainly on dealing with internal reactions to the stress film. The subjects were told that research had demonstrated that a person would control his internal reaction to stress by first identifying self-statements that enhance stress reactions and substituting the latter with positive coping statements. These subjects were also requested to break down the psychological component of their arousal into four distinct parts: preparing for a stressor ("Make a plan to deal with how you may feel during the stressful film"), confronting and handling the stressor ("Just try to psych yourself up"), coping with feelings of being overwhelmed ("When your fear rises, just pause"), and finally, rewarding self-statements ("You handled it just fine"). The subjects were then given a list of the self-statements to memorize (Appendix C) and

the number of statements learned was tested shortly after. Following this, they were asked to complete the SRAI once more.

There were three groups of subjects in the Subject Arousal Statements Condition. One group of subjects was instructed to covertly make use of the statements they had memorized while viewing the film (Subject-Covert). A second group of subjects were instructed to repeat aloud the statements throughout their viewing of the film (Subject-Overt), and a third group was instructed to listen to a tape of the self-statements while they watched the film (Subject-Listen). These instructions are presented in appendixes H and I.

Control Condition: This group was given irrelevant information in the form of a description of the VTR equipment that was being used and was not informed of the stressful nature of the film. Subjects were then asked to complete the SRAI a second time. The instructions for this group are presented in Appendix J.

The Film and Subject Arousal groups were again reminded to make use of the self-statements throughout their viewing of the film. The 13 minute film was then presented to the subjects, and heart rate was recorded throughout their viewing of the film. Following this, a series of self-report questionaires, including the SRAI, were administered to the subjects.

Dependent Measures

Self-Report Anxiety Inventory (SRAI): The present study utilized the Self-Report Anxiety Inventory (SRAI) used by Girodo (1974) and Roehl (Note 2) as a criterion measure of anxiety. The original SRAI consisted of four 11-point scales anchored at each end with "Not at all" at one end and "Very Much" at the other end. It was designed to measure two components of anxiety (cognitive and somatic) after the symptom clusters of Buss (1962).

Two scales measured cognitive components of anxiety through self-evaluation of (a) worry and apprehension and (b) anxiety and nervousness. In the same way, two scales measured somatic components

of anxiety through self-evaluation of (a) calmness and relaxation and (b) tenseness and trembling.

In the study by Roehl, the four individual scales, correlated with composite mean anxiety scores, .89 to .97, suggesting they are tapping the same construct. A split-half reliability coefficient of .97 was obtained, after correction with the Spearman-Brown formula. An estimate reliability (internal consistency) of .97 was obtained using the Flanagan formula.

In order to disguise the nature of the inventory in the experiment, the questionaire presented to the subjects consisted of 11 items (Appendix E). Six of the items were used to disguise the measure and purpose of the questionaire (e.g. happy....sad), while five of the items were used to form a composite mean anxiety score. The scales in the present study were (a) worry and apprehension, (b) calmness and relaxation, (c) tenseness, (d) jitteryness, and (e) how at ease they were. The five individual scales were correlated with composite mean anxiety scores, with statistically significant correlation coefficients ranging from .64 to .95.

Physiological Measure: Heart rate was recorded continuously throughout three time periods of the experiment; 1) during the three minute base period after hearing the first tape preamble; 2) throughout the viewing of the film and; 3) during a three minute base period following the film.

Film Questionaire: In order to assess the degree to which subjects were paying attention to the film, a 15 item questionaire asking for specific details dealing with the content of the film was administered. This questionaire is presented in Appendix K.

Cognitive Coping Techniques: After viewing the film all subjects were asked to report on (1) what they were saying to themselves while viewing the film ("List below all the things you were saying to yourself while viewing the stressful parts of the film"); (2) what other techniques they may have used to help them deal with the stress ("Sometimes people use techniques for dealing with stress such as imagining, thinking of something else, tensing, etc. If you did so,

please indicate what these were."); (3) the percentage of time they used these other techniques ("What percentage of the time did you use these other techniques ? 0% to 100%); (4) how often they used the learned statements ("What percentage of the time did you use the self-talk that you memorized? Circle to the nearest ten percent."); (5) how effective they found them ("How effective did you find the self-statements in helping you cope with the stressful portions of the film? Not too effective - 0, to very effective - 10"); (6) why they thought, if they did, that the statements were useful ("When you were making statements throughout your viewing of the film, please indicate below why, if you think making these statements helped you cope with the film,"). These questionaires are presented in Appendix L.

The analysis of the SRAI presented in the following chapter used a three fixed factor split-plot design with repeated measures, i.e. the Film and Subject Arousal subjects utilizing each of the three Modalities (Covert, Listen and Overt) were analyzed at two points in time, before and during

the film presentation. For the Control subjects and each of the Film and Subject groups, the SRAI was analyzed using a two fixed factor design with repeated measures. The SRAI was also analyzed by means of correlated t-tests.

The heart rate data was analyzed using a two fixed factor design with repeated measures. The Film Questionaire and Cognitive Coping Techniques were analyzed using a two fixed factor analysis of variance.

Diagram of the Experimental Design

CHAPTER III

RESULTS

A 2 (Experimenter) X 2 (Treatment Condition) X 3 (Modality) analysis of variance was computed on SRAI-1 scores. A significant Experiment X Treatment Conditions Interaction, F (1,48) = 5.79, $p < .01$, was obtained. A simple main effects test revealed that the significant interaction was largely the product of the specific Experimenter X Film Arousal Condition, F (1,48) = 4.28, $p < .05$. A 2 (Treatment Condition) X 2 (Experimenter) analysis of variance on the Film Questionaire scores revealed a significant interaction, F (1,56) 10.79, = $p < .002$. A simple main effects test indicated the presence Experimenter X Film Arousal Condition interaction, F (1,56) = 7.32, $p < .01$. A 3 (Modality) X 2 (Experimenter) analysis of variance on the perceived effectiveness of the self-talk also revealed a significant interaction, F (2,48) = 4.53, $p < .01$. A simple main effects test revealed that the interaction was accounted mainly by the Experimenter X Overt Modality, F (2,48) = 4.87, $p < .05$. These results are presented in Tables 1, 2 and 3.

Table 1

Summary of Two-Way Analysis of Variance on SRAI-I Scores for Treatment and Modality and Experimenter

Source	df	MS	F
(A) Treatment	1	576.6	8.03*
(B) Modality	2	9.8	.14
(C) Experimenter	1	19.3	.26
A X B	2	3.2	.04
A X C	1	416.1	5.80**
B X C	2	156.7	2.20
A X B X C	2	12.3	.17
Error	48	71.8	

*$p < .001$

** $p < .01$

Table 2

Summary of Two-Way Analysis of Variance on Film Questionaire Scores for Treatment and Experimenter

Source	df	MS	F
(A) Treatment	1	16.01	2.31
(B) Experimenter	1	2.01	.29
A X B	1	74.81	10.79*
Error	56	6.93	

* $p < .002$

Table 3

Summary of Two-Way Analysis of Variance on Perceived Effectiveness of Statements for Treatment and Experimenter

Source	df	MS	F
(A) Treatment	1	24.86	2.72
(B) Experimenter	1	19.26	2.11
A X B	2	41.86	4.58*
Error	56	9.13	

* $p < .01$

The experimenter bias appears to have significantly affected only the first administration of the SRAI. The time that elapsed between the first and second administration of the SRAI may have given the subjects time to become accustomed to the experimental situation thereby making them less susceptible to the influence of the experimenters. The experimenter bias found on the Film Questionaire scores is of little consequence for the main hypothesis of the experiment since there were no main effects or interaction effects for the Film Questionaire scores. The same is true of the analysis on the perceived effectiveness of the self-talk. As will be indicated, "pulling out" sources of variance attributable to experimenter effects does not significantly alter the nature of the results or of the F values obtained when such effects are not removed.

Self-Report of Anxiety

The SRAI was examined using a 2 (Treatment Condition) X 3 (Modalities) analysis of variance. A significant main effect for Treatment Conditions was obtained, $F\ (1,54) = 7.38$, $p < .009$. The two-

way analysis of variance is summarized in table 4. The mean scores on the SRAI for each of the conditions during three treatment periods are illustrated in Figure 1.

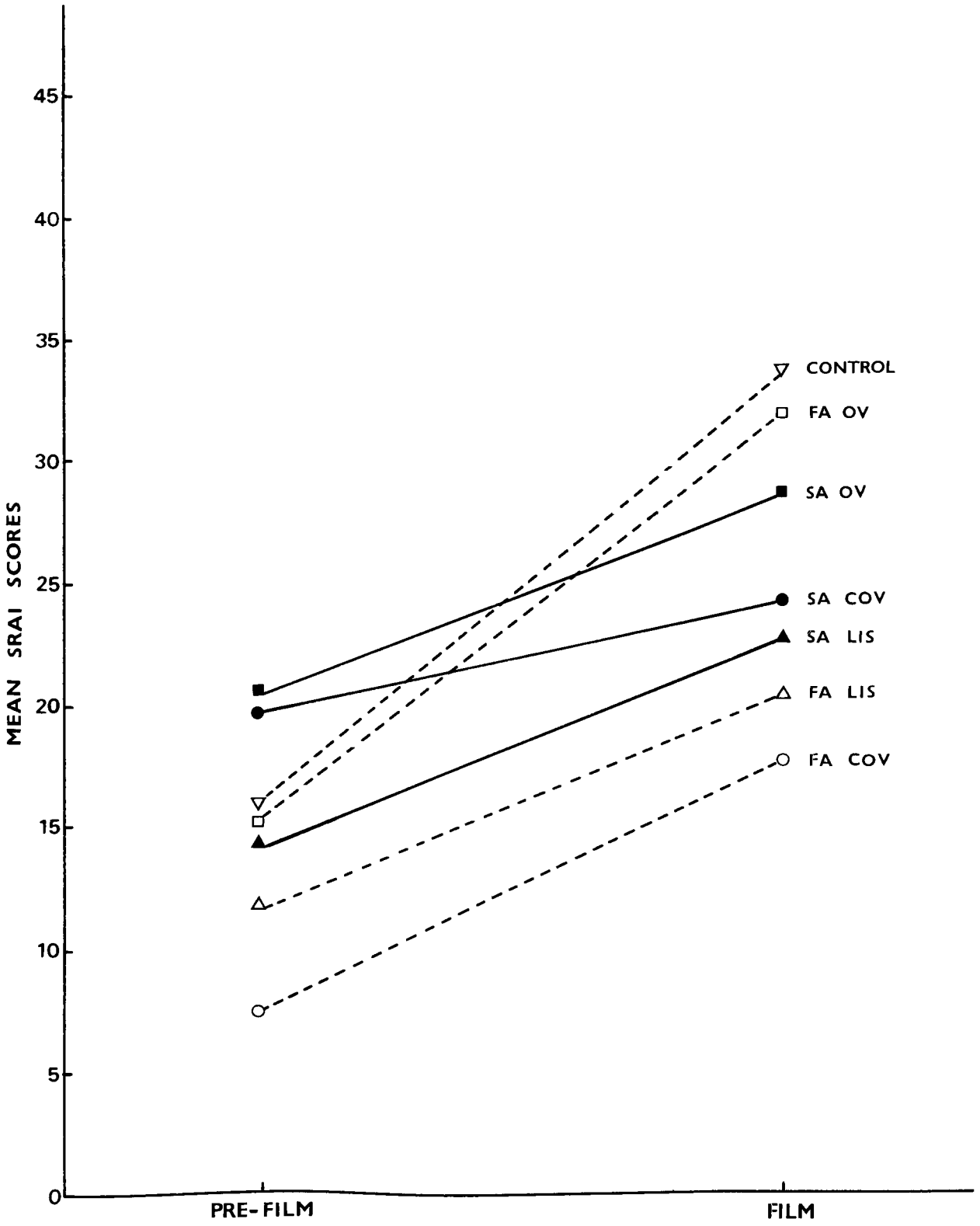
There was a significant difference between the Film Arousal and Subject Arousal treatment groups and a three-way analysis of covariance computed on the pre- and post-film SRAI scores with the base period as a covariate revealed significant main effects for Modalities, F (2, 107) = 4.46, $p < .001$, and Period, F (1, 107) = 23.08, $p < .001$. The three-way analysis of covariance is summarized in Table 5. The difference between the means for the film assessment period were examined using Duncan's Multiple range Test (Duncan, 1955) and showed that overall, the Covert and Listen Modality groups reported significantly less anxiety than subjects in the Overt Modality group, $p < .05$. A 2 (Period) X 7 (Condition) analysis of covariance was computed on the SRAI scores with the base period as a covariate. Significant main effects were obtained for Conditions, F (6, 125) = 2.61, $p < .02$ and Period, F (1, 125) = 38.7, $p < .01$. The two-way analysis of covariance is summarized in Table 6.

Table 4

Summary of Two-Way Analyses of Variance on SRAI Scores for Treatment Conditions and Modalities

Source	df	MS	F
(A) Treatment	1	576.60	7.38*
(B) Modality	2	9.81	.12
A X B	2	3.15	.04
Error	54	78.11	

* $p < .009$



gure 1. Mean pre-film and post-film SRAI scores for the six treatment combinations and control subjects.

Table 5

Summary of Three-Way Analysis of Covariance on SRAI Scores for Treatment Conditions and Modalities and Pre and Post-Film Assessment

Source	df	MS	F
(A) Treatment	1	64.09	.49
(B) Modality	2	579.97	4.46*
(C) Assessment	1	3000.00	23.08**
A X B	2	185.78	1.42
A X C	1	93.63	.72
B X C	2	114.17	.87
A X B X C	2	59.05	.45
Error	107	129.96	

* $p < .01$

** $p < .001$

Table 6

Summary of Two-Way Analysis of Covariance on SRAI Scores for Treatment Conditions and Pre and Post-Film Assessment

Source	df	MS	F
(A) Treatment	6	320.8	2.61*
(B) Assessment	1	4750.6	38.80**
A X B	6	173.2	1.41
Error	125	122.6	

* $p < .02$

** $p < .01$

Each group was then examined individually to assess changes in SRAI scores from the pre-film to the film period assessment. The differences between the mean scores were examined through a series of correlated *t*-tests.[1] For Control subjects, there was a significant increase in anxiety scores from the pre-film to the film period, t (9) = 5.43, $p < .001$. The Listen Film Arousal subjects showed a significant increase in anxiety during the film, t (9) = 3.98, $p < .003$. For the Overt Film Arousal subjects there was a significant increase in SRAI scores, t (9) = 3.32, $p < .009$. The Covert Film Arousal subjects did not obtain a significant increase in their SRAI means, t (9) = 1.65, n.s. The Covert Subject Arousal (t (9) = 2.12, n.s.), the Listen Subject Arousal (t (9) = 1.38, n.s.), and the Overt Subject Arousal (t (9) = 1.38, n.s.) groups showed no significant increase in anxiety from pre-film to film period. The differences in the amount of change from pre-film to film period between the Control subjects and Listen Film Arousal (t (9) = 5.19, $p < .001$) and between Overt

[1] It seems reasonable to assume that a correction of the alpha levels (dividing them in half) would have revealed the same results since the t-tests reached significance at such a high alpha level (.001).

and Listen Film Arousal (t (9) = 3.39, $p < .009$) subjects were computed and found significant. That is, the Control subjects and Overt Film Arousal subjects were significantly higher in anxiety than the Listen-Film Arousal subjects.

Heart Rate

The heart rate data was fed into a Band Pass filter with an upper frequency limit of five beats per minute and lower frequency limit of .065 beats per minute. The data were then passed through a function generator and finally fed into a digital computer (PDP8/1) yielding the following data: (a) a beat by beat heart rate in which the time between each beat was converted into beats per minute, and (b) an average heart rate over a twenty second interval. The heart rate program that was used in the computer analysis is presented in Appendix M. Heart rate was collected during fifty-seven 20 sec. time intervals; two 3 min. base periods, before and after treatment; (i.e., periods while subjects were anticipating the stress and watching the stress film).

These 20 sec. intervals were collapsed into 1 min. intervals. Thus, there were three intervals during the base periods, and 13 during the film. The mean heart rate was examined for conditions during each of these periods.

In order to rule out the frequently found influence of basal levels on the magnitude of responses given in later periods (i.e., the "law of initial values"; Lacey, 1956; Wilder, 1962), a base free measure of change was obtained (Benjamin, 1967; Tucker, Demarin and Messick, 1966). Residualized scores (Cronbach and Furby, 1970) were calculated for the heart rate responses obtained during the treatment periods based on the technique described by Burish, Bloom, Houston, and Holmes (Note 3; Holmes & Houston, 1974; Burish, Note 5). A residualized score consisted of the difference between the obtained score during the treatment period and the score predicted by linear regression from the respective base level score.

The heart rate responses during the film period were analyzed in a 7 (Condition) X 13 (Period) analysis

Table 7

Summary of One-Way Analysis of Variance

on

Heart Rate for Treatment Conditions

Source	df	MS	F
Treatment	6	613.34	3.65*
Within	833	167.93	
Total	839		

* $p < .01$

of variance. During the film period, there was a main effect for Conditions, F (6, 750) = 3.4, p .01. A one-way analysis of variance was carried out in order to examine the differences between groups, and a significant group effect was obtained, F (6, 839) = 3.65, p .01. In order to study the differences between group means, the Duncan Multiple Range Test results were examined. It was found that the Listen Subject Arousal subjects had higher heart rates than Control subjects (p .05). The residulized scores on the heart rate for each of the conditions during the film period is illustrated in Figure 2, and the above results are in Tables 7 and 8.

A series of one-way analyses of variance was carried out for the times during which each of the three accidents occured. The accidents occured within the second, eight, and tenth minutes of the film. There were no significant differences found between groups at any of the points corresponding with the accidents, F (6, 56) = .25, .12, and .68, n.s., respectively. The heart rate responses were then examined using a 2 (Subject and Film Arousal)

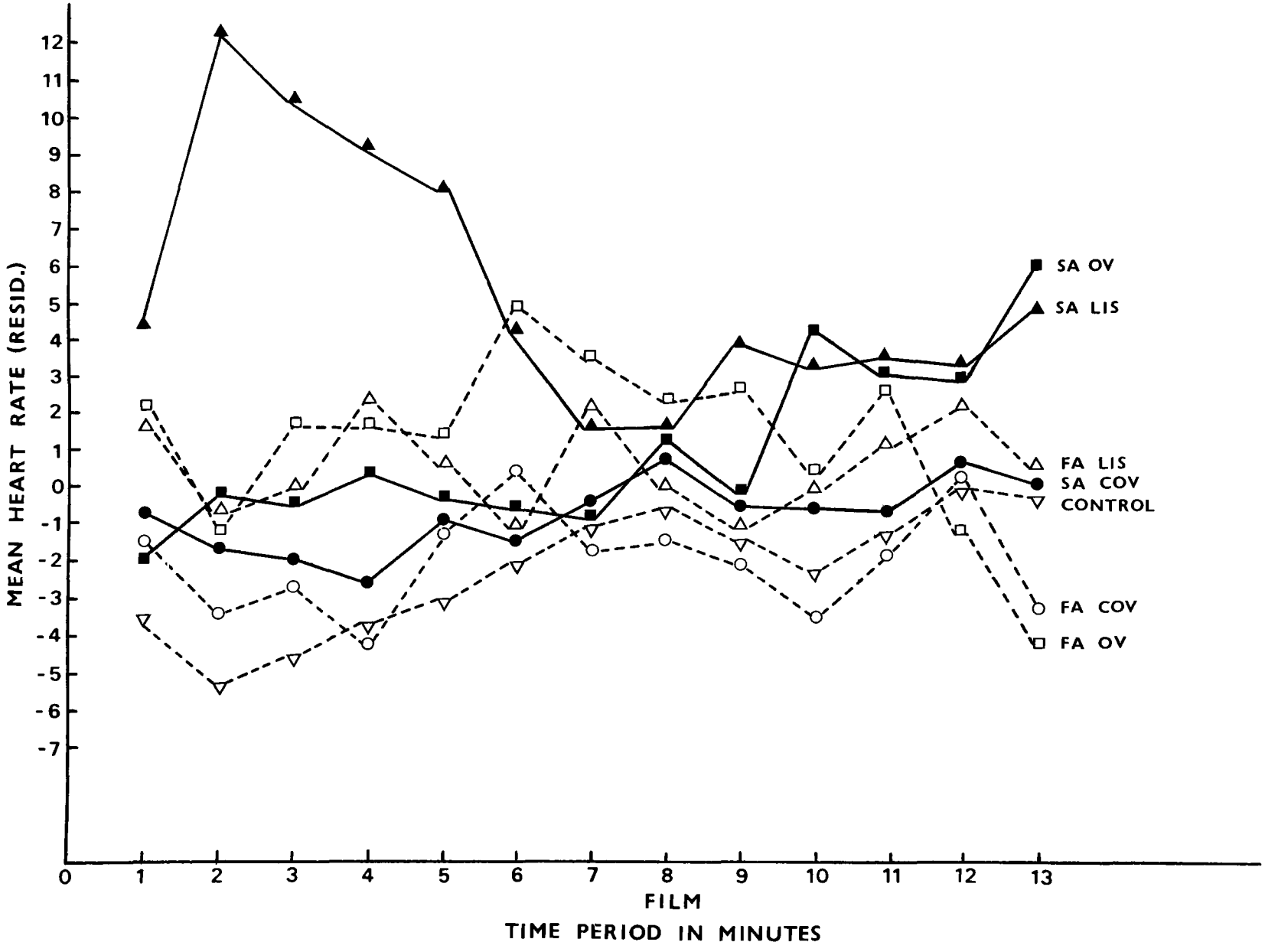


Figure 2. Mean residualized heart rate scores for subjects during film period.

X 3 (Modalities) analysis of variance. A significant main effect for Modalities was obtained: Modality F (2,722) = 6.30, $p < .05$. The differences between the means for the film assessment period were examined using the Duncan Multiple Range Test and showed that generally subjects in the Covert and Listen Modalities were significantly less anxious than the Overt Modality subjects, $p < .05$. Also subjects in the Covert Modality were found to be significantly less anxious than subjects in the Listen Modality, $p < .05$. The analyses of variance are summarized in Table 9.

Film Questionaire and Cognitive Coping Techniques

A one-way analysis of variance yielded no significant differences in the amount of information recalled by subjects in the seven conditions, F (6, 63) = 1.26, n.s. A two-way analysis of variance revealed no significant differences in the amount of information recalled about the film for Treatment, F (1.45) = 2.01, n.s., and Modality subjects, F (2,54) = .09, n.s.[1] A two-way analysis of variance showed

[1]From the power curves of fixed effects of analysis of variance the power of the F tests calculated for the above analysis are 1) treatment (.42), 2) Modality (.30) and 3) Treatment X Modality (.32). This analysis suggests that the film recall measure was not a sensitive enough measure to discriminate among groups.

Table 8

Summary of Two-Way Analysis of Variance on Heart Rate for Treatment Conditions and Pre and Post-Film Assessment

Source	df	MS	F
(A) Treatment	6	612.42	3.40*
(B) Assessment	12	63.88	.36
A X B	72	109.88	.61
Error	750	177.22	

* $p < .01$

Table 9

Summary of Two-Way Analysis of Variance on Heart Rate for Treatment Conditions and Modalities

Source	df	MS	F
(A) Treatment	1	429.89	3.20
(B) Modalities	2	822.39	6.30*
A X B	2	359.49	2.70
Error	722	131.45	

* $p < .05$

Table 10

Summary of Two-Way Analysis of Variance

for Film Questionaire Scores

Source	df	MS	F
(A) Treatment	1	16.01	2.01
(B) Modality	2	.71	.09
A X B	2	17.11	2.15
Error	54	7.95	

no significant differences in the reported number of memorized self-statements used by subjects in the Treatment groups, F (1,54) = .75, n.s., and Modality groups, F (2,54) = 2.26, n.s. However, an analysis of statements tape recorded during the film indicated that the Overt Film Arousal subjects articulated significantly more statements than the Overt Subject Arousal subjects, t (9) = 2.4, $p < .05$. There were no significant differences for the Treatment subjects, F (1,54) = .70, n.s. in the perceived effectiveness of the statements in reducing anxiety. There were also no differences between Treatments, F (1,54) = 1.87, n.s., and Modalities, F (2, 54) = 1.00, n.s., in the percentage of other techniques used.

There was a significant correlation, r (18) = .57, $p < .01$, between the scores on the film questionaire and SRAI scores for the Overt Modality subjects. Similarly there was a significant correlation, r (8) = .64, $p < .001$, for the Overt Subject Arousal subjects. There was a significant negative correlation r (8) = -.56, $p < .04$, for the Control subjects. There was also a significant negative

correlation, r (18) = -.39, p .04, between the number of statements reported to have been used during the film and SRAI scores for the Covert Modality subjects. The Covert Subject Arousal (r (8) = -.87, p .001) and Overt Film Arousal (r (8) = .60, p .03) subjects also obtained significance. Correlations between the SRAI scores and the actual number of statements repeated (tape recorded) by the Overt Film and Subject Arousal were r (8) = -.42 and r (8) = -.04, respectively and were not significant. The Listen (r (18) = -.42, p ,03) and Overt (r (18) = .42, p .03) Modalities showed significant correlations between the number of self-statements reported to have been repeated and the Film Questionaire scores. Similarly, there was a significant correlation, r (8) = -.77, p .01, for the Listen Film Arousal subjects. These results are presented in Tables 11 and 12.

The reasons subjects in the six treatment conditions gave for the effectiveness of the self-statements in coping with the stressful film were then examined. Two raters familiar with the nature of the experiment independently placed the reasons subjects into one of the following six possible categories: (1) statement

Table 11

Pearson Product-Moment Correlations Between (a) SRAI Total Scores and (b) Film Questionaire and Number of Statements Emitted During the Film

Condition	Film Questionaire	Number of Statements
Film (Groups)	20	-.12
Subject (Groups)	-.09	-.02
Overt (Modality)	-.08	-.39*
Listen (Modality)	-.29	.01
Covert (Modality)	.57***	.09
Covert-Film	.13	.01
Listen-Film	-.27	-.06
Overt-Film	.46	.60**
Covert-Subject	-.42	-.87***
Listen-Subject	-.34	-.02
Overt-Subject	.64****	.13
Control	.56*	

* $p < .04$

** $p < .03$

*** $p < .004$

**** $p < .001$

Table 12

Pearson Product-Moment Correlations Between Film Questionaire and Reported Number of Statements Emitted During Film

Condition		Reported Number of Statements
Film	(Groups)	.14
Subject	(Groups)	.17
Covert	(Modality)	.42**
Overt	(Modality)	-.42**
Listen	(Modality)	.01
Covert-Film		.23
Listen-Film		-.25
Overt-Film		.30
Covert-Subject		.20
Listen-Subject		-.77*
Overt-Subject		-.23

**$p < .03$

*$p < .01$

served as a distraction, (2) they helped through rationalization, denial, intellectualization, or being more objective, (3) they helped generally (unspecified), (4) they helped through self-persuasion by having the subject believe the nature of the arousal self-talk statements, (5) they helped because of both (a) distraction and (b) persuasion and/or (c) rationalization, intellectualization, and so forth, (6) the statements did not help at all and (7) the voice was soothing and claming. The raters initially agreed on 79% of the category placements. Disagreements between the judges were resolved by having them discuss the reasons for their choice and then coming to a second decision. The number of subjects falling into each of the categories is presented in Table 13. A Chi Square analysis revealed significant effects for, X^2 (6) = 28.30, $p < .001$. A Fishers Exact Test indicated that the Film Arousal subjects differed significantly from the Subject Arousal subjects on category 2 ($p < .001$) indicating that the Film Arousal subjects found

Number of Subjects

Giving Each of the Various Reasons

for the Effectiveness of Self-Talk

Condition	Distraction	Helped Rationalized, Denial, etc.	Helped (General)	Persuaded Believed	Both 1+4 &/or 2	Did Not Help	Calm Voice
Film Arousal	2	15	2	0	2	9	0
Subject [1] Arousal	1	4	6	5	2	5	5

[1]Two subjects in this condition did not respond to the question.

that the self-talk helped them to rationalize and deny their anxiety. Significantly more subjects in the Subject Arousal group found category 4, self-persuasion, ($p < .003$) and category 7, calm voice, ($p < .003$) as being the reasons for the effectiveness of the statements.

CHAPTER IV

DISCUSSION

The results of the present experiment confirm a number of hypotheses of the experiment. With regard to hypothesis 1, which predicted that the film would be stressful, it was found that being exposed to the film was indeed anxiety-provoking.

For the second hypothesis it was found that during the stressful film, overall the subjects given a self-talk reconceptualization strategy were less anxious on the subjective report during the stressful film than subjects in the control group. It was found that subjects in the Film Arousal and Subject Arousal groups did not differ overall with respect to anxiety reduction. Further examination of the SRA I scores in terms of the overall effects of the modalities (i.e. whether a subject was induced to repeat the reconceptualized statements covertly, overtly or was asked to listen to a tape of reconceptualizations) revealed that subjects in the Covert and Listen Modalities were less anxious than

the subjects in the Overt Modality on both the self-report and physiological measures.

Subjects in all seven groups (treatment groups and control group) and modalities did not differ in their recall scores and this suggests that subjects regardless of their condition or modality paid equal attention to the film in spite of their use of strategies while exposed to the film. Although the data suggest that both reconceptualization strategies were equally effective in coping with the stressful film and that the facilitating anxiety reduction was not at the expense of either group paying less attention to the film, it is possible that the film recall measure failed to make the sensitive discriminations necessary in order to detect an attention diversion process. While Girodo (1973) successfully used a similar recall measure to enquire into information search processes in a misattribution context, Girodo and Pellegrini (1976) employing a film recall measure failed to produce evidence of an attention diversion process despite the fact that two groups were distracted from the

film by physical exertion. These contradictory results can probably best be accounted for by examining the nature of the films shown. Girodo (1973) had originally used a Dali film which, being representative of his style, was very difficult to follow with regard to any consistent theme and thereby presented the subject with quite a series of ambiguous stimuli. The film shown in the Girodo-Pellegrini study was the same industrial accident film used in the present experiment. The theme of the film is clear, the plot simple, the characters stereotypical, thus providing the subjects with a well structured stimuli for recall. Consequently, the film recall data, from both subjects physically exerting themselves and subjects using cognitive coping strategies, suggests that despite engaging in obviously distracting experimental tasks the film recall measure failed to make sensitive discriminations. These results are indeed surprising when it is considered that the Control group's recall scores neither increased nor decreased significantly in comparison with the treatment groups.

The lack of discrimination on the recall measure among the various groups may also be due in part to two opposing processes that could have been operating. If it can be assumed that subjects in all treatment groups were attending to the film, it could be argued, on the one hand, that attending closely to the film would increase film recall but that, on the other, the anxiety inducing effects of the film would interfere with learning (e.g. Taylor, 1954). These two opposing processes could possibly have contributed to the absence of data presented by the film recall measure.

It was originally hypothesized that the subjects in the Covert Arousal group would have to engage in the least amount of cognitive activity as opposed to the Listen Arousal subjects. It was further hypothesized that those subjects who were asked to repeat aloud the reconceptualizations would be required to engage in the most cognitive activity. Each of the above modalities require varying amounts of cognitive activity, and it was assumed that the extent to which a subject was required to pay more

attention to the requirements of the task, the less he would be able to pay attention to the film. However a closer examination of the data, particularly the increase in anxiety among Overt Film Arousal subjects, would suggest that the latter is not the case. It will be recalled that while the Control subjects and the Overt Film Arousal and Listen Arousal subjects showed significant increases in anxiety from pre-film to film period in comparison with the other treatment groups, the Control and Overt Film Arousal subjects were significantly more anxious than the Listen Arousal subjects. It is possible that the Overt Film Arousal subjects were forced to attend more closely to the film since the appropriate self-talk reconceptualizations could only be repeated at specific times during the film. The reconceptualizations of the Film Arousal group were cued to specific events in the film as opposed to the Subject Arousal Subjects who could repeat their reconceptualizations at will since they were not being cued by the film. This argument could explain why the Overt Film Arousal subjects repeated

more statements than the Overt Subject Arousal subjects. The same argument would seem to apply to the Listen Film Arousal subjects who were listening to tape reconceptualizations which cued the self-talk to the events in the film. It will be recalled that subjects in the latter condition were provided with an accompanying sound track rationalizing, denying and intellectualizing the stressful portions of the film thereby cuing attentional processes to certain features of the film. The high correlation between the number of statements and anxiety for the Overt Film Arousal subjects provides additional evidence for the above hypothesis. The high positive correlation between number of statements articulated and anxiety was possibly the result of the film self-talk which forced attention onto the film; and this, in spite of the fact that the film reconceptualizations were intended to rationalize and deny the stressful events in the film.

The present study has raised a number of methodological issues, particularly in terms of the problem of assessing attention diversion. While it

has been generally assumed in the research area on self-talk mechanisms that people do talk to themselves, measuring exactly what people say to themselves has presented difficulties. The primary difficulty centers around the issue of whether or not the cognitive processes reflect the same kind of cognitive activity associated with covert self-talk and the cognitive activity associated with overt self-talk. In attempting to assess exactly what people are saying to themselves by having them articulate their self-talk, psychologists may be interfering with the cognitive process normally associated with covert self-talk. The question is whether one can ascertain what people say to themselves without changing the nature of the cognitive processes involved in covert self-talk. It seems highly unlikely that we will ever be able to directly assess cognitions but will only be able to infer their nature from the consequences they produce. This situation is very similiar to the physicists problem in identifying an electron, the existence of which is inferred only on the basis of its consequence (e.g. the shadow that it casts).

While the essential thesis of the study was to assess attention diversion, it is interesting to examine why the reconceptualizations worked on the basis of what subjects perceived as being the reason for their effectiveness. It will be recalled that the reasons given for the effectiveness of the reconceptualizations were placed into seven categories. These results served as a manipulation check in that the film reconceptualization subjects reported that the Film Self-Talk was effective because it helped them to rationalize and deny the events in the film, while the Subject Arousal subjects found that the reconceptualizations were effective because they were persuaded that the statements were helping them cope and control their internal state. In addition to the above, a comparison of the Film and Subject Overt groups showed that despite the fact that the reconceptualizations for the Film and Subject Arousal groups differed neither group perceived the self-talk as differentially helping them cope.

The incremental anxiety from the pre-film to film period for the Overt Film Arousal group raises

the theoretical question of the validity of the short circuiting of threat principle advanced by Lazarus. The latter group was provided with film reconceptualizations similar to those given subjects in Lazarus's studies but in the present study the film reconceptualizations which forced the subjects to cue to events in the film failed to help the subjects rationalize and deny the stressful scenes. Unless it can be assumed that the task of articulating reconceptualizations in the presence of the experimenter is anxiety provoking, the above results have direct implications for Lazarus's theory. It cannot reasonably be assumed that for the Overt Film and Subject Arousal Subjects the task of articulating statements accounted for their anxiety when the same results were not found with the Overt Subject Arousal Subjects.

In the present study subjects were clearly asked to focus on one of two stimuli, either the film or their internal state. Future research would do well to focus on whether attending to cognitions irrelevant to anxiety (e.g. counting digits) would more clearly produce evidence of an attention diversion process.

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Appendix A

Examples of Coping Self-Statements Rehearsed In Stress Innoculation Training

Preparing For a Stressor

What is it you have to do?

Just think about what you can do about it. That's better than getting anxious.

No negative self-statements; just think rationally.

Don't worry; worry won't help anything.

Maybe what you think is anxiety is eagerness to confront it.

Confronting and Handling a Stressor

Just "psych yourself up - you can meet this challenge.

Don't think about fear; just think about what you have to do. Stay relevant.

This tenseness can be a ally, a cue to cope.

Relax; you're in control. Take a slow deep breath.

Ah, good.

Coping With the Feeling of Being Overwhelmed

When fear comes, just pause.

Label your fear from 0 to 10 and watch it change.

You should expect your fear to rise.

Don't try to eliminate fear totally; just keep it manageable.

You can convince yourself to do it. You can reason your fear away.

Reinforcing Self-Statements

It worked; you did it.

It wasn't as bad as you expected.

You made more out of your fear than it was worth.

Your damn ideas - that's the problem. When you control them, you control your fear.

You did it!

Sample List of Self-Statements

Accident 1

1. This is a Canadian Production.
2. People don't wear hats like that today.
3. The workers are merely actors.
4. What appears as blood is really red dye.
5. The actor's hand does not really go into the machine.
6. Notice the quick cut to another scene.

Accident 2

1. They're even using French Canadians.
2. The high pitched sound sure is irritating.
3. The second actor does not really lose his finger here.
4. Dark liquid spurts from behind the finger.

Accident 3

1. Look at the short hair.
2. The sound of machines plus suspense used are good devices.
3. We know an accident is going to come.
4. Those are old machines. Not as big as the ones today.
5. Notice that the board is not seen penetrating the oncoming actor.
6. Watch the unconvincing way the shipping clerk feigns pain and dying.

Sample List of Self-Statements

Preparing for the Stressor

1. Make a plan to deal with how you may feel during the stressful film.
2. Think about what you have to do.
3. No negative self-statements, just think positively.
4. Don't worry, worry won't help anything.

Confronting and Handling the Stressor

1. Just try to "psych" yourself up.
2. One step at a time, you can handle the situation.
3. You're watching the film but you're in control.
4. You expected some anxiety, but you're in control.

Coping with Feelings of Being Overwhelmed

1. Keep the focus on the present, what is it you have to do?
2. Don't try to eliminate the anxiety entirely, just keep it manageable.
3. When your fear rises, just pause.
4. Label your fear from 0 to 10 and watch it change.

Rewarding Self-Statements

1. Good, you did it, the self talk works.
2. It's all over and it wasn't that bad after all.
3. You probably made more out of your fear than it was worth.
4. You handled it just fine.

Appendix D

Preamble Given to Subjects

Thank you for agreeing to participate in this experiment. This study is concerned with the way in which people watch a film. Prior to our giving you more detailed information we would like to obtain measures of your skin resistance and heart rate and give you some brief questionnaires. These are designed to assess your mood and disposition at the present time. Please sit still while the monitoring equipment is being calibrated.

Appendix E

Mood Assessment Scale

Please circle the number which best describes how you felt during the most stressful parts of the film.

Calm and relaxed	0	1	2	3	4	5	6	7	8	9	10	Not calm and relaxed
happy	0	1	2	3	4	5	6	7	8	9	10	sad
not worried and apprehensive	0	1	2	3	4	5	6	7	8	9	10	worried and apprehens
weak	0	1	2	3	4	5	6	7	8	9	10	strong
not restless or irritable	0	1	2	3	4	5	6	7	8	9	10	restless or irritable
friendly	0	1	2	3	4	5	6	7	8	9	10	unfriendl
not distractible	0	1	2	3	4	5	6	7	8	9	10	distracti
not tense	0	1	2	3	4	5	6	7	8	9	10	tense
not frustrated	0	1	2	3	4	5	6	7	8	9	10	frustrate
not jittery	0	1	2	3	4	5	6	7	8	9	10	jittery
not at ease	0	1	2	3	4	5	6	7	8	9	10	at ease

Instructions for Film Arousal Subjects

The film you are going to see is about 13 minutes long. This film depicts serious bodily injuries that can occur when men are careless with heavy-duty machinery in a wood-working shop. The workers in the film become victims of their own lack of attention and of the indifference of others who fail to use the safety equipment which is required when working with high speed machinery. The partial loss of limbs and life is clearly illustrated. The first accident involves a worker who loses the tips of his fingers when a guard is ignored. A second worker forgets to use the safety guard and his middle finger is torn from his hand. And finally, the last accident is caused by a third worker whose mistake is unfortunate not in that he himself is injured but rather in that he causes the death of the shipping clerk who gets a board through the stomach and ends up bleeding on the floor. Pay close attention to the film as once it is completed you will be asked some questions concerning the film.

The purpose of this portion of the experiment is to allow you the opportunity to get a notion of the

content of the film and to assess the nature of the film realistically. You will thus be given a realistic way of how to view the film. Of course it should be pointed out that in safety films such as this they would not create real accidents and purposely injure someone. The film is designed to induce as much stress as possible in workers in order to try and prevent serious industrial accidents. In that light we would like you to view the film more realistically in terms of how it was made, its content, and the technical aspects and procedures of the film.

As you know this film will depict three accidents. You will find it helpful if we break down for you the accidents into three seperate episodes. The workers in the film you are about to see are merely actors. None of the actors actually experience any pain or physical harm during the film. In fact, what appears to be blood is merely ketchup. The accidents are so well simulated that you would almost think that they were taking place. In fact they are not real. You might want to notice the film production methods of the '50's for instilling fear into the minds of potentially careless workers. Notice the stilted and stylistic methods of production. For instance, one

worker, seemingly protected in his working clothes, negligently operates his machine. This portion of the film depicts the worker as he pushes the piece of lumber into the teeth of the machine. We can guess that it is only a matter of moments before his hand slips. However, you will notice that his hand doesn't go into the cutting teeth of the machine, but that there is a cut-away and in the next scene we see mangled fingers. Through film editing a red dye that looks like ketchup is draped over the edge of his fingers.

The second technique for making the film even more disturbing is depicted in the second accident. The audio portion of the film, such as the grinding sound of the machine, is used to increase anxiety and stress before the second accident. If you pay close attention to the film you will see that his hand slowly approaches the high pitched grinding blades and after the supposed accident takes place what appears as blood, which in reality is a dark coloured liquid, spurts from the back of his middle finger, The camera crew and director have spent hours in creating, along with expert film editing and simulation, this particular scene. The viewer is then forced to spend a good deal of time just watching the dark liquid. In the final accident

the producers use the sound of the machines plus suspense to increase anxiety. We know that an accident is coming but we are not sure of what it will be. In this final accident the element of suprise is used to shock us - the shipping clerk in a carefully contrived scene appears to be impaled by a piece of lumber from a worker's machine. Notice an unconvincing and almost humourous bit of acting by a worker who holds his hand to his mouth and runs off stage. Also observe the unconventional way the shipping clerk simulates pain and dying. The piece of lumber is carefully placed as though through his side with an appropriate amount of ketchup coming out of his mouth.

In order to get you to perceive the film more realistically we want you to clearly understand the way in which the film was made and the context in which it is to be viewed. The experimenter will give you a list of itemized statements. These statements refer to the description previously given. Please learn and memorize these by heart. The experimenter will give you 2 or 3 minutes to learn these before the experimenter obtains a test of how well you've learned them. Please sit quietly for 10 minutes while the equipment is being calibrated again. After this we will show you the film.

Appendix G

Instructions For Covert Film Arousal Subjects

Please pay close attention to the film. Throughout your viewing of the film, please make use of the statements and items of information you were asked to memorize. Please pay close attention to the film and make use of the information and statements that you memorized while watching the film. Also, remember that we will be asking you questions concerning the content of the film once the film has been presented.

Instructions For Overt Film Arousal Subjects

Please pay close attention to the film. Throughout your viewing of the film, please make use of the statements and items of information which you were asked to memorize. Please pay close attention to the film and say the statements and items of information outloud throughout your viewing of the film. Please make use of these statements and items of information appropriately throughout your viewing of the film and repeat these statements aloud while the film is being presented. Also, remember that we will be asking you questions concerning the content of the film once the film has been presented.

Appendix G (con't.)

Instructions for Listen Film Arousal Subjects

Please pay close attention to the film. Throughout your viewing of the film statements and items of information will be presented to you via tape recorder. These statements are identical to those you memorized. Please pay close attention to the film and tape recorded information and make use of the statements as best you can while viewing the film. Also, remember that we will be asking you questions concerning the content of the film once the film has been presented.

Appendix H

Instructions For Subject Arousal Subjects

The film you are going to see is about 13 minutes long. This film depicts serious bodily injuries that can occur when men are careless with heavy-duty machinery in a wood-working shop. The workers in the film become victims of their own lack of attention and of the indifference of others who fail to use the safety equipment which is required when working with high speed machinery. The partial loss of limbs and life is clearly illustrated. The first accident involves a worker who loses the tips of his fingers when a guard is ignored. A second worker forgets to use the safety guard and his middle finger is torn from his hand. And finally, the last accident is caused by a third worker whose mistake is unfortunate not in that he himself is injured but rather in that he causes the death of the shipping clerk who gets a board through the stomach and ends up bleeding on the floor. Pay close attention to the film as once it is completed you will be asked some questions concerning the film.

Numerous well-controlled studies have demonstrated the importance of controlling what we say to ourselves. When we speak to ourselves we influence how we react

to things. If we speak or make negative statements we make things worse. When we say positive things we cope better - especially with stress and fear. Self-talk or self-verbalizations has been the focus of much well documented research and today there is convincing evidence to suggest that you can control your reactions to things if you learn to control what you say to yourself. If you talk positively you can cope better; if you talk negatively you make things worse for yourself.

The purpose of this portion of the experiment is to provide you with a way of becoming aware of the things you say to yourself that create anxiety in situations such as watching stressful films. Anxiety is, more often than not, the result of self-verbalizations and internalized sentences which are emitted while thinking about the stressful situation. For instance, before giving a speech in public, a person may tell himself things like "What if I forget what I'm supposed to say?", "What if I stutter?", or "What if I draw a blank?", all of which are statements that will increase anxiety. If, however, one repeated to oneself more positive self-statements, one would be less likely to feel as much anxiety brought on and maintained than he would if he used negative self-statements. What you

tell yourself is going to influence how, or the way in which you feel.

Research has shown that anxiety or fear seems to involves two major elements, the first physiological and the second more psychological. The physiological component includes various body reactions while the psychological aspect involves a set of fear-inducing thoughts and images. We often interpret how we feel on the basis of how we see ourselves reacting internally. We have to learn to control these interpretations and inferences by talking positively about our reactions. While watching a stressful film it is generally useful to break down the experience of facing a stressor into four manageable parts. The first stage is preparation for the stressful event. For example, at this point you can begin to think about what it is that you have to do, or you can think about making a plan to deal with how you may possibly feel during the stress. By thinking about what you have to do you can avoid needless worry and anxiety. The second part involves directly handling the stress and your reactions. During this period you can try and "psych" yourself up by convincing yourself that you can cope with and tolerate the stress film. By taking it one step at a time you can reason your fear away and handle the situation. The feelings of tenseness

you may have can be used as a cue to cope. What you experience as anxiety or fear is usually eagerness in anticipating the stressor. You can think about what you have to do and not about your fear. Remember, you are in control. The third stage involves coping with feelings of being overwhelmed. Once again, it is important to focus on the present and what it is you have to do to handle your reactions. It is expected that your fear will rise, so it is not necessary to eliminate your fear entirely but rather to keep it manageable. In fact, when your fear rises, just pause. Label it from 0 to 10 and watch it change and this will help you handle your reactions better. The final stage in encountering a stressful event involves the resinforcing aspect. At this point, after having viewed the film you will realize that it wasn't as bad as you had expected and that you probably made more out of your fear than it was worth. You will have discovered that your ideas are really the problem because when you control your ideas and thoughts and what you say to yourself you control your reactions to the stress. The you can be pleased with the way you handled the stress inducing film.

The experimenter will give you a series of self-statements that are associated with coping with a

stressor. We'd like you to learn these statements by heart. The experimenter will give you 2 to 3 minutes to learn these before the experimenter obtains a test of how well you've learned them. Please sit quietly for 10 minutes while the equipment is being calibrated again. After this we will show you the film.

Appendix I

Instructions For Covert Subject Arousal Subjects

Please pay close attention to the film. Throughout your viewing of the film, please make use of the statements and items of information you were asked to memorize. Please pay close attention to the film and make use of the information and statements that you memorized while watching the film. Also, remember that we will be asking you questions concerning the content of the film once the film has been presented.

Instructions For Overt Subject Arousal Subjects

Please pay close attention to the film. Throughout your viewing of the film we would you to please make use of the statements and items of information which you were asked to memorize. Please pay close attention to the film and say the statements and items of information outloud throughout your viewing of the film. Please make use of these statements and items of information appropriately throughout your viewing of the film and repeat these statements outloud while the film is being presented. Also, remember that we will be asking you questions concerning the content of the film once the film has been presented.

Appendix I(con't.)

Instructions For Listen Subject Arousal Subjects

Please pay close attention to the film. Throughout your viewing of the film statements and items of information will be presented to you via tape recorder. These statements are identical to those you memorized. Please pay close attention to the film and tape recorded information and make use of the statements as best you can while viewing the film. Also, remember that we will be asking questions concerning the content of the film once the film has been presented.

Instructions for Control Subjects

The film you are going to see is about 13 minutes long. The film you are about to see has been video-taped and will be displayed on the TV monitor which is connected to a video-tape recorder. The video recording was specially made at the communication services of the University of Ottawa. The university has telecine facilities available to students in order to put films on video-tape. The Sony monitor and video-tape recorder before you were also provided by the university. Although the Sony video-tape recorder is one of the best available the imperfections in the tele-cine reproduction process prevent the film from being recorded perfectly. The monitor has a 19 inch screen and contains various adjustment knobs and, as can be seen, is portable. The wire cables in the rear are audio and visual lines connected to the video-tape recorder. The video-tape recorder itself is a complicated piece of machinery but is easy to run. The video-tape can easily be fitted into the machine. Some of the features of the video-tape recorder include the possibility of dubbing films and using a video camera to make live films. There is a meter for the sound level to assist in making recordings. Without such equipment the present experiment would not have been possible. Pay close attention to the film as once it is completed you will

be asked some questions concerning the film. Please sit quietly for 10 minutes while the monitoring equipment is again being calibrated.

Appendix K

FILM QUESTIONNAIRE

1. The name of the film is "_____."
2. The film was produced by _____
3. _____is on the band saw.
4. Wilson's job was to _____.
5. The name of the worker weaving a hat is _____.
6. At what time was Bob's child born? _____
   Was it a boy or a girl? _____
7. The name of the worker with his middle finger missing is _____ _____.
8. Len Richie was working on the _____.
9. How many of Len Richie's fingers were cut? _____
10. Who in the film was weaving a tie? _____
11. In the last accident, which side of Bob is struck by the piece of lumber? _____
12. The rip saw turns at a speed of _____feet per second.
13. Blood drips out of the right/left side of Bob's mouth? _____
14. What is the name of the guard that Len Richie failed to use? _____
15. The worker in the second accident was working on a machine called a _____.

16. What was the joke that one of the workmen cracked during the lecture by the foreman?

17. What were the 2 advantages given for raising the rip saw higher from the cutting table?

a) _____

b) _____

_____

_____

18. What percent of the worker's salary is given when he goes on "compensation" following an injury?

19. What was the number stamped on the front of one of the workers' overalls? Guess if you can't remember.

20. Which worker was wearing a moustache?

The following questions refer to any type of mental technique or self-talk that you may have used while coping with the most stressful parts of the film.

List below all the things you were saying to yourself while viewing the stressful parts of the film.

a) What percentage of the time did you use the self-talk that you memorized? (Circle to the nearest ten percent)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

b) How effective did you find the self-talk in helping you cope with the stressful portions of the film?

Not too effective 0 1 2 3 4 5 6 7 8 9 10 Very effective

When you were making the statements throughout your viewing of the film, please indicate below why you think making these statements helped you cope with the film.

a) Sometimes people use techniques for dealing with stress, such as imagining, thinking of something else, tensing, etc. If you did so, please indicate what these were.

b) What percentage of the time did you use these other techniques?

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

We are also interested in finding out if, during the ten-minute waiting period before the film, you were rehearsing any of the items that you memorized. If so, please specify which ones and indicate beside each one the number of times you repeated these to yourself.

```
                PROGRAM TO ANALYS DATA F SCHIEMAN
        1000    FADD=1000                                              99
        2000    FSUB=2000
        3000    FMPY=3000
        4000    FDIV=4000
        5000    FGET=5000
        6000    FPUT=6000
        7000    FNOR=7000
        0000    FEXT=0000
        0001    SQUARE=0001
        0002    SQROOT=0002

        0006    *6
00006   7200            7200
00007   5600            5600            /F P  POINTER

        0011    *11
00011   0161            NAME-1

        0063    *63

00063   0000    SINK,   0000
00064   0012    C12,    0012
00065   0215    CHAR    215
00066   0212    CHAR1,  212
00067   0000    STORE1, 0000
00070   0000    STORE2, 0000
00071   0000    STORE3, 0000
00072   7000    MASK1   7000
00073   0777    MASK2   0777
00074   4000    MASK3,  4000
00075   0077    MASK4,  0077
00076   7775    M3,     -3
00077   0007    F1,     0007
00100   0003    F3,     0003
00101   0377    TOGLE,  0377
00102   7600    M400,   7600
00103   0001    COUNT,  0003
00104   3000    COUNT2, 0000
00105   0000            0000
00106   0000            0000
00107   7600    END,    7600
00110   0001    ONE,    0001
00111   2000            2000
00112   0000            0000
00113   0002    TWO     0002
00114   2000            2000
00115   0000            0000
00116   0001    ITI,    0001
00117   3736            3736
00120   4600            4600
00121   0006    MULT,   0006
00122   3600            3600
00123   0000            0000
00124   0027    TEST,   0027
00125   0000            0000
00126   0024            0024
00127   0000    FLOAT,  0000
00130   0000            0000
00131   0000            0000
00132   0000    EX      0000
00133   0000
```

```
0000            0000
0000  N,        0000
0000            0000
0000            0000
0000  ET,       0000
0000            0000
0000            0000
0000  A,        0000
0000            0000
0000            0000
0000  B,        0000
0000            0000
0000            0000
0000  C,        0000
0000            0000
0000            0000
0000  D,        0000
0000            0000
0000            0000
0401  NAME,     FILENAME DATA.PA
2401
0000
2001
7700  USR,      7700

0200  *200

7300            CLA CLL
6030            KCF
6031  START2,   KSF
5202            JMP .-1
6036            KRB
0075            AND MASK4
7006            RTL
7006            RTL
7006            RTL
3057            DCA STORE1        /FETCH FILE NAME
6031            KSF
5212            JMP .-1
6036            KRB
0075            AND MASK4
1057            TAD STORE1
3411            DCA I 11
2076            ISZ M3
5202            JMP START2
7300  START,    CLA CLL
6201            CDF 00
6212            CIF 10
4566            JMS I USR
0001            1
0424  ARG1,     DEVICE DTA0
0160
4001  ARG2,     4001
7402            HLT
6201            CDF 00
6202            CIF 00
1230            TAD ARG1+1
6212            CIF 10
4566            JMS I USR
0002            2
0162  ARG3,     NAME
0000  ARG4,     0
7402            HLT
```

```
47  1241
50  3254            DCA ARG7
51  4631            JMS I ARG2
52  0200  ARG5,     0200
53  0400  ARG6,     0400
54  0000  ARG7,     0000
55  7402            HLT
56  7300            CLA CLL
57  2241            ISZ ARG3
60  1101            TAD TABLE
61  3013            DCA 10
62  1102            TAD M400
63  3103            DCA COUNT
64  6046            TLS

65  7300  DUMP,     CLA CLL
66  1410            TAD I 10
67  3067            DCA STORE1
70  1410            TAD I 10
71  3070            DCA STORE2
72  1067            TAD STORE1
73  0072            AND MASK1
74  7006            RTL
75  7006            RTL             /STORE SIGN
76  3071            DCA STORE2
77  1067            TAD STORE1
00  0073            AND MASK2               /STORE HIGH
01  3067            DCA STORE1
02  1064            TAD L12         /DIV BY 1000
03  3127            DCA FLOAT
04  1067            TAD STORE1
05  3130            DCA FLOAT+1
06  1070            TAD STORE2
07  3131            DCA FLOAT+2
10  4467            JMS I [
11  5124            FGET TEST
12  7000            FNOR            /NORMALIS 20000
13  6124            FPUT TEST
14  5127            FGET FLOAT
15  7000            FNOR            /NORMALIS DATA
16  3116            FMFY TTI
17  6127            FPUT FLOAT      /CONVERT TO TRUE TIME
20  5127            FGET FLOAT
21  1143            FADD CT         /ADD TIME TO TOTAL
22  6143            FPUT E!
23  5110            FGET ONE
24  4127            FDIV FLOAT
25  3121            FMFY MULT       /CONVERT INTERVAL TO E  FOR N
26  6127            FPUT FLOAT
27  5127            FGET FLOAT
30  1132            FADD EX         /ADD E-M TO TOTAL
31  6132            FPUT EX
32  5127            FGET FLOAT
33  0001            SQUARE          /SUM OF SQUARE
34  1135            FADD EXSQ
35  6135            FPUT EXSQ
36  5110            FGET ONE
37  1140            FADD N          /...1 OF N
40  6140            FPUT N
41  5143            FGET CT
42  2124            FSUB TEST
43  6127            FPUT FLOAT
44  0000            FEXT
45  7300            CLA CLL
```

```
00351  7300          CLA CLL          /YES
00352  1063          TAD SINK         /CHECK FOR OLD SINK
00353  7440          SZA
00354  5272          JMP I CLEAR1
00355  2063          ISZ SINK         /NO STORE NEW SINK
00356  5273          JMP I CALCU1
00357  3063  TEST4,   DCA SINK
00360  1150          TAD FLOAT+1      /TEST FOR 20 SEC
00361  0074          AND MASK3
00362  7450          SNA
00363  5273          JMP I CALCU1     /YES TIME > 20 SEC
00364  7300  TEST1,   CLA CLL         /NO TIME< 20
00365  2103          ISZ COUNT        /CHECK IF BLOCK IS EMPTY
00366  5265          JMP DUMP         /NO
00367  2242          ISZ ARG4         /CHECK IF NO BLOCK = 0
00370  5246          JMP START1       /NO
00371  5273          JMP I CALCU1

00372  1133  CLEAR1,  CLEAR2
00373  1000  CALCU1,  CALCU

       1000  *1000

01000  7300  CALCU,   CLA CLL         /YES
01001  4407          JMS I 7
01002  5140          FGET N
01003  2113          FSUB TWO
01004  6140          FPUT N           /TEST FOR N <= 1
01005  0000          FEXT
01006  7300          CLA CLL
01007  1141          TAD N+1
01010  0074          AND MASK3
01011  7440          SZA
01012  5333          JMP CLEAR2
01013  5407  CALCU2,  JMP I 7
01014  5140          FGET N
01015  1112          FADD TWO
01016  6140          FPUT N
01017  5143          FGET ET
01020  4140          FDIV N           /CAL AVR TIME
01021  6146          FPUT A
01022  5132          FGET EX
01023  4140          FDIV N           /CAL AVR B-M
01024  6151          FPUT B
01025  5132          FGET EX
01026  0001          SQUARE
01027  4140          FDIV N
01030  6154          FPUT C
01031  5135          FGET EAS0
01032  2154          FSUB C
01033  6154          FPUT C
01034  5140          FGET N           /CAL S SQUARE
01035  2110          FSUB ONE
01036  6157          FPUT D
01037  5110          FGET ONE
01040  4157          FDIV D
01041  2154          FMPY C
01042  6154          FPUT C
01043  5154          FGET C
01044  0002          SQROOT           /CAL S
01045  6157          FPUT D
01046  5104          FGET COUNT2
01047  1110          FADD ONE
```

```
01053  1077          TAD F1
01054  3062          DCA 62
01055  1100          TAD F2
01056  4406          JMS I 6
01057  4407          JMS I 7
01060  5143          FGET ET
01061  0000          FEXT
01062  1077          TAD F1
01063  3062          DCA 62
01064  1100          TAD F2
01065  4406          JMS I 6
01066  4407          JMS I 7
01067  5151          FGET B
01070  0000          FEXT
01071  1077          TAD F1          /PRINT AVR B-N
01072  3062          DCA 62
01073  1100          TAD F2
01074  4406          JMS I 6
01075  4407          JMS I 7
01076  5140          FGET N
01077  0000          FEXT
01100  1077          TAD F1          /PRINT N
01101  3062          DCA 62
01102  1100          TAD F2
01103  4406          JMS I 6
01104  7300          CLA CLL
01105  6041          TSF
01106  5305          JMP .-1         /CARRIAGE RETURN
01107  1065          TAD CHAR
01110  6046          TLS
01111  7300          CLA CLL
01112  6041          TSF
01113  5312          JMP .-1
01114  1066          TAD CHAR1       /LINE FEED
01115  6046          TLS
01116  7300          CLA CLL
01117  1752          TAD I TCETS
01120  7450          SNA             /CHECK IF NO OF ELEM = 0
01121  5507          JMP I END       /YES
01122  7300  CLEAR,  CLA CLL         /NO
01123  1063          TAD SIX
01124  7450          SNA
01125  5333          JMP CLEAR2
01126  7300          CLA CLL
01127  6041          TSF
01130  5327          JMP .-1
01131  1066          TAD CHAR1
01132  6046          TLS
01133  7300  CLEAR2, CLA CLL
01134  3132          DCA E4
01135  3133          DCA E4+1
01136  3134          DCA E4+2
01137  3135          DCA E4SQ
01140  3136          DCA E4SQ+1
01141  3137          DCA E4SQ+2
01142  3140          DCA N
01143  3141          A N 1
01144  3142          A N+2
01145  3143          A ET
01146  3144          A ET+1
01147  3145          A ET+2
01150  5751          JMP I TEST2
```

07327 0240 0240
07330 0015 0015
$

A	0140	STORE2	0076
ARG1	0227	STORE3	0071
ARG2	0231	TABLE	0101
ARG3	0241	TEST	0124
ARG4	0242	TEST1	0364
ARG5	0252	TEST2	1151
ARG6	0253	TEST3	1152
ARG7	0254	TEST4	0357
B	0151	TTI	0116
C	0154	TWO	0113
CALCU	1000	USR	0160
CALCU1	0273		
CALCU2	1013		
CHAR	0065		
CHAR1	0066		
CLEAR	1122		
CLEAR1	0272		
CLEAR2	1133		
COUNT	0103		
COUNT2	0104		
D	0157		
DUMP	0265		
END	0107		
E1	0143		
E2	0132		
E250	0135		
E12	0004		
FADD	1050		
FDIV	4000		
FEXT	0000		
FGET	5000		
FLOAT	0127		
FMPY	3000		
FNOR	7000		
FPUT	6000		
FSUB	2000		
F1	0077		
F2	0100		
MASK1	0072		
MASK2	0073		
MASK3	0074		
MASK4	0075		
MULT	0121		
M2	0076		
M400	0102		
N	0140		
NAME	0162		
ONE	0110		
SINK	0063		
SUBOUT	0042		
SQUARE	0001		
START	0222		
START1	0246		
START2	0202		
STORE1	0067		