Constructive thinking and coping with stress.

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CONSTRUCTIVE THINKING
AND COPING WITH STRESS

A Thesis Presented
by
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ABSTRACT

CONSTRUCTIVE THINKING AND COPING WITH STRESS

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The upper and lower 5% of 556 undergraduate students who completed the Constructive Thinking Inventory (CTI) were subjected to a laboratory stress test. In support of the hypothesis, poor constructive thinkers reacted to the stress situation with a greater increase in negative thoughts and negative emotions than good constructive thinkers, and exhibited an increase in blood pressure and other physiological measures when good constructive thinkers did not. Examination of thought patterns indicated that poor constructive thinkers did not differ from good constructive thinkers in positive thinking, and were selectively, not generally, more negative. It was concluded that an increased number of physical symptoms reported by poor constructive thinkers may be mediated by the increased stress produced by their maladaptive thinking style.
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CHAPTER 1
INTRODUCTION

The major purpose of the present study was to examine the relation between people's coping ability, as measured by the Constructive Thinking Inventory (CTI), and their cognitive and emotional responses to a stress-inducing situation in a controlled laboratory setting. An additional purpose was to examine the association of general coping ability and of coping with a laboratory stressor with mental and physical well-being.

A number of measures of personality style, such as Hardiness (Kobasa, 1979), Optimistic Disposition (Scheier and Carver, 1985), Pessimistic Explanatory Style (Peterson, Semmel, Von Bayer, Abramson, Metalsky, and Seligman, 1982), and Internal-external Locus of Control (Rotter, 1966) have been positively associated with physical and mental well-being (eg., Scheier and Carver, in press; Seligman and Schulman, 1986; Kobasa, 1982; Seeman and Seeman, 1983). Presumably, these coping styles were associated with mental and physical well-being because of the relation of coping style and the experience of stress. The implicit assumption is that poor copers characteristically deal with events in a manner that contributes to prolonged levels of stress, which leads to physical illness (Holroyd and Lazarus, 1982) among other negative consequences.

There are two major problems with previous research relating coping style to mental and physical health. The
The first is that the research assumes rather than demonstrates that stress is the mediator between coping style and physical illness. It would be helpful in this respect, to examine the thought processes of poor copers when they are confronted with a known stressor to determine whether they, in fact, interpret the event in a more stress-producing manner than good constructive thinkers, and if so, what the manner of their stress-producing interpretations is. Moreover, it would be desirable to show that the stress-producing thoughts are followed by evidence of increased stress and that the style of coping and the measures of stress are associated with the mental and physical symptoms. This was done in the present study by obtaining cognitive and emotional reactions to a stressor in a controlled laboratory setting. Thoughts, emotions, physiological reactions in response to the stressor were related to both a broad measure of coping style and to mental and physical well-being during the past year.

The use of self-report as a primary source of data has its virtues and limitations. Recently, the use of self-report measures in stress research has come into question because a global trait of negative affectivity or neuroticism has been identified that can account for the relations that have been widely reported between coping style and health complaints (Costa and McCrae, 1987; Watson and Pennebaker, in press). Thus, there is a need for
studies that utilize objective criteria for measuring the effects of coping style. The present study addressed this problem by supplementing self-report measure with measures of physiological reactivity and ratings by examiners.

The Construct of Constructive Thinking

The recently introduced construct of constructive thinking refers to a person's ability to automatically think in a manner that facilitates effective coping (Epstein and Meier, in press). Constructive thinking is measured by the CTI, which contains a bipolar global scale of constructive and destructive automatic thinking with a number of specific subscales. According to Epstein and Meier, people who obtain high scores on constructive thinking are accepting of themselves and others, think positively within limits, and think in a realistic and differentiated manner. Although good constructive thinkers are positively biased towards themselves and others, they do not make gross overgeneralizations, engage in grandiose thinking, nor rely on superstitious or other forms of magical thinking to explain or control their world. Poor constructive thinkers are characterized by the opposite reactions.

Constructive thinking has been found to be positively associated with mental and physical well-being, success in work, success in social relationships, and success in establishing rewarding intimate relationships (Epstein and Meier, in press). The CTI produced stronger correlations
with these variables than other personality tests with which it was compared, including the Attribution Style Questionnaire (Peterson, Semmel, Von Bayer, Abramson, Metalsky, and Seligman, 1982), the Internal-External Locus of Control Scale (Rotter, 1966), and the Social Support Questionnaire (Sarason, Levine, Basham, and Sarason, 1983).

Thoughts and Emotions

Presumably, because of the way good constructive thinkers automatically interpret and cope with potentially stressful events, they experience less stress in living, and therefore, have fewer emotional and physical symptoms. It follows that poor constructive thinkers should think more negatively about a potential stressor, and, in turn, should experience more negative affect than good constructive thinkers. Assuming that reactions to a potential laboratory stressor are representative of reactions to potential stressors in general, poor constructive thinkers, if they exhibit an increase in negative thoughts and negative affect in the laboratory, should experience more physical and mental symptoms than good constructive thinkers.

Physiological Reactions to Laboratory Stressors

Along with differences in cognitive and emotional reactions to stress, it is assumed that high and low constructive thinkers differ in physiological arousal. Previous studies have demonstrated that anticipated high
intensity of a negative event is related to increased physiological reactivity (e.g., Epstein and Clarke, 1970; Jenks and Deane, 1963). Conversely, positive appraisals have been found to mitigate physiological arousal when subjects anticipated or were confronted with a stressor (Holmes and Houston, 1974). These findings suggest that because good constructive thinkers are more likely to appraise a potentially stressful event as less threatening then poor constructive thinkers, they should experience a lower level of physiological arousal when confronted with a known stressor.

Other studies have demonstrated that there is sometimes a greater increase in physiological reactivity among good copers than among poor copers. For example, Houston (1972) found that those with an internal locus of control (analogous to high constructive thinkers) reacted with more elevated heart rate and systolic blood pressure following exposure to a laboratory stressor than those with an external locus of control. Others (Van Treuren and Hull, 1987; Allred and Smith, 1989) have reported that in response to a stressor, subjects high in hardiness exhibited a greater increase in systolic blood pressure than those low in hardiness. A possible explanation for these findings is that the active coping of internal and hardy individuals produces increases in autonomic arousal. Other studies provide confirming evidence that coping efforts can increase
heart rate and systolic blood pressure (Smith, Houston, and Stucky, 1985; Solomon, Holmes, and McCaul, 1980).

Because both active coping efforts and fear are associated with increased physiological reactivity, it is not possible to predict whether or not good and poor constructive thinkers will differ physiologically immediately following exposure to a stressor, as good constructive thinkers may be more positively engaged, and poor constructive thinkers may be more fearful. However, it is expected that good and poor constructive thinkers will differ during the recovery period after a stressful stimulus. Poor constructive thinkers should exhibit greater physiological arousal than good constructive thinkers during a recovery period.

It is well known that not all measures of autonomic arousal react in the same way to a stressor (Lacey, 1967; Taylor and Epstein, 1967). For example, two studies demonstrated that vasoconstriction in the finger as inferred from finger pulse volume was not affected by increased coping efforts (Smith, Houston, and Stucky, 1985; Solomon, Holmes, and McCaul, 1980) unlike heart rate and blood pressure. It is therefore, important to monitor several physiological reactions. In the present study, systolic blood pressure, diastolic blood pressure, pulse rate, finger temperature, wrist temperature, and wrist minus finger temperature were examined as indices of stress.
Hypotheses

Following is a statement of the hypotheses that were tested: 1) Low constructive thinkers will respond with more negative thoughts in general and a greater increase in negative thoughts to the stressor than high constructive thinkers. 2) Low constructive thinkers will respond with more negative emotions in general and a greater increase in negative emotions to the stressor than high constructive thinkers. 3) High constructive thinkers will respond with more engagement than low constructive thinkers. 4) Low constructive thinkers will exhibit greater physiological arousal than high constructive thinkers during a recovery after exposure to a stressor. 5) Low constructive thinkers will report having experienced more medical and psychological symptoms over a four month period than high constructive thinkers. 6) Low and high constructive thinkers will exhibit differences in their behaviors that can be detected by examiners.
CHAPTER 2
METHODS

Subjects

Subjects were selected from five hundred and fifty-six undergraduate students who completed the CTI. The students were asked for their telephone numbers and for whether they wished to be contacted for a follow-up study. Fifty-two subjects selected from the highest and lowest seven percent of the sample participated in the study. The high and low constructive thinking groups each contained thirteen females and thirteen males.

Materials and Measurements

Laboratory

The laboratory was part of a suite of five rooms connected to a general waiting room off a main corridor. One of the rooms was used for another experiment during the time of this study. There was no interaction between the participants of the two experiments. On occasion the other experimenter would pass by. Otherwise, the laboratory environment was quiet and without distraction.

The room used in the experiment was a small, rectangular room with a table and two chairs facing each other. Questionnaires were placed on the table in front of the subjects' chair. A clip-board with answer sheets was set on the table in front of the examiner. An automatic blood pressure recording machine and a mirror-tracing apparatus were in the middle of the table. Opposite the
table was a large one-way mirror built into the wall that
was not used in this study.

**Thought Sampling Questionnaire**

A thought-sampling questionnaire (see appendix A) included questions about positive, negative, and neutral thoughts related and unrelated to the experiment. Subjects used a five-point scale, (1= not at all, 2= slightly, 3= moderately, 4= considerably, and 5= very much) to rate the extent to which they engaged in each type of thought during specified time periods before, during, and after being presented with two stressful tasks.

The questionnaire also contained items about the subject's experience of stress, concerns about performance, and judgments about their past and anticipated future performance. There were also items about subjects' evaluations of the experiment and examiner. A five-point rating scale was used to respond to these questions (1= not at all, 2= slightly, 3= moderately, 4= considerably, and 5= very much).

**Adjective Checklist**

Using a five-point scale (1= not at all, 2= slightly, 3= moderately, 4= considerably, and 5= very much), subjects rated the degree to which they experienced each of eleven feeling states (clusters of emotions) before, during, and after the stressful tasks (see appendix A).
Items were grouped into two categories: negative affect, and engagement. The two categories allowed a distinction to be made between a negative and positive quality of the experienced arousal. The investigator sorted items into face-valid categories and then alpha reliability coefficients were computed and items that reduced reliability coefficients were eliminated. The resulting scale for negative affect consisted of the following clusters of two or three adjectives: 1) tense, worried, or anxious; 2) wanting to escape or leave the situation; 3) helpless, defeated, or wanting to give-up; 4) blocked or frustrated; 5) annoyed, angry, or irritated; 6) depressed, sad, or blue; 7) self-conscious or embarrassed; 8) and the reversed ratings of calm, relaxed, or at ease.

The scale of engagement included the following items: 1) challenged or determined; 2) energetic, alert, or pumped-up; 3) and the reversed ratings of bored, indifferent, or unconcerned. The internal consistency reliabilities (coefficient alpha) for the two scales are presented in Table 1.

Physiological Measures

Physiological measures consisted of systolic and diastolic blood pressure, finger and wrist temperature, and pulse rate.

Blood pressure was measured by a battery-operated auto-inflating blood pressure machine. The examiner placed the
cuff on the upper arm of the subject and pushed the "start" button. To increase the accuracy and reliability of measurement, three consecutive readings were taken at each designated time interval.

Three consecutive readings of heart rate were taken by counting the beats of the pulse on the subjects' inner wrist for twenty seconds.

One reading of finger and wrist temperature was taken by placing the index finger, and later the inside of the wrist on the bulb of a three inch thermometer. The reading was recorded after the mercury in the thermometer was observed to hold steady for 15 seconds.

**Medical Checklist**

A medical checklist assessed eleven major illnesses (e.g., diabetes, cancer, and high blood pressure), nineteen minor physical ailments (e.g., acne, rashes, and nausea), three distressing emotions (depression, anxiety, and irritability), and problems associated with the use of alcohol, drugs, and food. Subjects were asked to respond with a 1 for yes or a 2 for no if they had experienced each of the eleven major illnesses and they used a five-point scale (1= none, 2= 1-7 days, 3= 7-30 days, 4= 31-60 days, and 5= 61-120 days) to estimate how many days they experienced each of the other items over the past four months (see appendix B).
Interview

During an interview, subjects were asked about their general thinking patterns and reactions to stress. Using a five-point rating scale (1 = very good, and 5 = very poor), subjects rated their constructive thinking during the experiment and in general, and also rated if they had a good, poor, or average day. After the experiment, the examiners rated each subject on how friendly, relaxed, helpful, and self-confident he or she appeared to be (see appendix C).

Procedure

Three female undergraduate research assistants and the author participated as the examiners in this study. All the examiners were trained in the experimental procedures and techniques of the study and memorized the wording to be used throughout the experiment. Each examiner role-played as both the subject and experimenter and also ran two pilot subjects before the study began.

Subjects were contacted by phone by one of the assistants and asked to participate in the study. The assistant recruited and scheduled subjects in a manner such as to balance the gender and the number of high and low constructive thinkers for each of the examiners. The examiners were not informed as to which group their subjects belonged.
Physiological and psychological reactions to the experiment were obtained at the end of the following four periods: 1) a pre-experimental waiting period, 2) a stress period, 3) a first recovery period, and 4) a second recovery period. A debriefing and an interview occurred between the first and second recovery periods (see Table 2 for an outline of the sequence of events). At the end of the experiment, subjects chose either experimental credit or five dollars for their participation.

**Pre-experimental Period**

When subjects arrived at the experiment they were asked to wait three minutes outside of the laboratory in the waiting room before the experiment began. This was done to provide a standard pre-experimental baseline period for physiological measures, emotions, and cognitions. This period ended after the subjects completed an Informed Consent form.

**Stress Period**

Subjects engaged in two stress-inducing tasks. The first consisted of subtracting sevens out loud from three hundred. The second required tracing a path in the design of a star while looking into a mirror. In each task, subjects were asked to accomplish as much as possible in one minute of time. If a subject either reported an incorrect answer or touched or crossed the sides of the star, the examiner corrected the subject and had him or her return to
the last correct number or position. Performance was measured by the amount of each task completed in the allotted time.

First Recovery Period

During this period, subjects were told to wait in the waiting room. They were given a medical check list and told to knock on the laboratory door when they were finished. After the examiner collected the checklist, subjects were told to wait three more minutes outside the laboratory room. Waiting provided a fixed period for subjects' physiology to partially recover from changes induced by the stress previously experienced.

Debriefing and Interview

Subjects were given written feedback and debriefed about the experiment. After a short discussion about the experiment, subjects were asked to "help us understand how people think about things" by telling what they had been thinking about during the experiment and whether this thinking is typical for them. Subjects were then asked to rate themselves on their constructive thinking during the experiment and their constructive thinking in general, and to rate how good an overall day they had. Examiners took notes during the interview. After the experiment, the examiners used these notes to rate subjects on how friendly, relaxed, helpful, and self-confident they were.
Second Recovery Period

This period followed the debriefing and interview. Debriefing subjects about the experiment was expected to reduce uncertainties about the situation and therefore, to facilitate relaxation. Subjects were asked to relax for three minutes by imagining a pleasant, soothing scene and by breathing deeply and evenly. Subjects were told to continue the relaxation exercise during the last set of physiological recordings.
CHAPTER 3
RESULTS

Performance

It is important to establish how high and low constructive thinkers performed on the two stressor tasks because this could affect subjects' subsequent ratings and physiological reactions. Performance was measured by the amount of each task completed in the time limit. There was no significant difference between the amount of numbers accurately subtracted by the high (M = 14.69) and low (M = 15.69) constructive thinkers, $F(1,50) = .45, p < .66$, nor was there a significant difference between the millimeters accurately traversed in the mirror tracing task by the high (M = 12.14) and low (M = 10.89) constructive thinkers, $F(1,50) = .53, p < .61$. Thus, task performance was not a differentiating factor between high and low constructive thinkers.

Thoughts

In order to test the hypotheses that low constructive thinkers think more negatively, a repeated measures analysis of variance was performed on the ratings of high and low constructive thinkers' negative thoughts, both related and unrelated to the experiment, over the four periods. The same analyses were also performed for the ratings of positive and neutral thoughts (see Table 3 for a summary of all effects). Gender was entered into each analyses. The
results for gender will be presented in the section on gender differences.

Negatives Thoughts

For negative thoughts, there was a significant main effect associated with constructive thinking. Low constructive thinkers reported significantly more negative thoughts ($M = 2.13$) than high constructive thinkers ($M = 1.49$), $F(1,50) = 20.64$, $p<.0001$.

There was also a significant main effect for periods, $F(3,150) = 9.33$, $p<.000$. Negative thoughts decreased over the four periods, ending at a point well below initial ratings.

There was a significant 3-way interaction between constructive thinking, the four periods, and related and unrelated thoughts, $F(3,150) = 2.78$, $p<.05$. From Figure 1 it appears that the significant effect is due to the different reactions of the constructive thinking groups with respect to negative thoughts related and unrelated to the experiment.

To explicate the interaction, separate analyses of variance were done for negative thoughts related and unrelated to the experiment.

Main effects for constructive thinking and time periods were both significant, $F(1,50) = 8.75$, $p<.005$, $F(3,150) = 18.14$, $p<.000$, respectively. The main effects were qualified by a significant interaction between constructive
thinking and time period, $F(3,150) = 3.80$, $p<.01$ (see Figure 1). Low constructive thinkers reported a sharp increase in negative thoughts at the stress period followed by a decline through the first and second recovery periods, ending at a point well below their initial level. High constructive thinkers' initial negative thoughts were to that of low constructive thinkers, but they showed only a minimal increase at the stress period. Their negative thoughts then decreased in the first recovery period and leveled off in the second recovery period to a point about the same as the low constructive thinkers.

The significant contrasts between high and low constructive thinkers during the stress period, $t = 3.16$, $p<.01$, and first recovery period, $t = 3.22$, $p<.01$, indicate that low constructive thinkers responded to the stress situation with more negative thoughts about the experiment and continued to have more negative thoughts about the experiment at the first recovery period than high constructive thinkers. High and low constructive thinkers did not differ in negative thoughts related to the experiment at the pre-stress period, $t = 1.13$, $p<.26$, nor at the second recovery period, $t = .93$, $p<.36$.

A similar analysis for negative thoughts unrelated to the experiment produced significant main effects for constructive thinking, $F(1,50) = 14.55$, $p<.001$, and periods, $F(3,150) = 7.55$, $p<.001$. There was no significant
interaction between constructive thinking and period, 
F(3,150) = .35, p<.79, (see Figure 1).

In summary, low constructive thinkers had more negative 
thoughts in general during the experiment than high 
constructive thinkers. In addition, low constructive 
thinkers reported a greater increase in negative thoughts 
about the stressor than high constructive thinkers.

Positive Thoughts

There were no effects associated with constructive 
thinking for positive thoughts (see Table 3). There was a 
significant main effect for period (3,150)= 8.29, p<.0001, 
which was qualified by a significant interaction between 
period and relatedness F(3,150) = 18.51 p<.0001. In Figure 
2, it can be seen that positive thoughts related to the 
experiment slightly decreased in the third period and 
 leveled off in the fourth period. Positive thoughts 
unrelated to the experiment decreased at the stress period 
and increased in the two recovery periods.

Neutral Thoughts

There were no effects associated with constructive 
thinking for neutral thoughts (see Table 3 and Figure 3). 
There was a main effect for period, F(3,150)= 19.79, 
p<.0001, associated with an overall decrease of neutral 
thoughts over the four periods.
Perceptions of and Concerns About the Experiment

The data were collapsed over the two stress tasks because similar group differences were found on the individual tasks. The adjusted alpha reliabilities for the two-item "scales" for each of five questions concerning performance on the two tasks are presented in Table 4. Low constructive thinkers (M = 3.83) reported that the tasks were more stressful, F(1,50) = 19.03, p<.000, than high constructive thinkers (M = 2.85). Low constructive thinkers (M = 3.81) also reported significantly more disappointment about their performance on the tasks according to their own standards, F(1,50) = 6.70, p<.01, than high constructive thinkers (M = 3.02), and more concern (M = 3.46) about the impression they made on the examiner, F(1,50) = 20.71, p<.000, than high constructive thinkers (M = 2.21).

Subjects' ratings of how well compared to others they thought they performed were also significantly lower for low constructive thinkers (M = 2.17) compared to high (M = 2.61) constructive thinkers, F(1,50) = 4.08, p <.05.

Reports of expected future performance did not differ significantly, F(1,50) = .23, p<.64, between high (M = 3.56) and low (M = 3.63) constructive thinkers, nor did high and low constructive thinkers differ in the favorability of their evaluations of the experiment (high, M = 3.97; low, M = 3.77), F(1,50) = .54, p<.60, or of the examiner (high, M = 4.46; low, M = 4.35), F(1,50) = .79, p<.44.
**Emotions**

Ratings of negative affect and engagement in the four periods were separately analyzed by repeated measures analysis of variance.

**Negative Affect**

There was a significant main effect for constructive thinking, $F(1, 50) = 32.71, p < .000$. Low constructive thinkers ($M = 2.04$) reported more negative emotions than high constructive thinkers ($M = 1.45$). There was also a significant main effect for period, $F(3, 150) = 61.91, p < .000$ (see Figure 4). Both groups reported a rise in negative emotions in the stress period followed by a continuous decrease in the recovery periods.

The main effects were qualified by a significant interaction between constructive thinking and period, $F(3, 150) = 8.82, p < .000$. In Figure 4, it can be seen that in comparison to high constructive thinkers, low constructive thinkers reported higher negative affect at the beginning of the experiment, reacted more negatively to the stressful tasks, and recovered to almost the same point. This pattern is similar to the pattern observed for negative thinking (see Figure 1).

**Engagement**

There was a significant main effect for period for engagement, $F(3, 150) = 21.52, p < .000$. Both groups reported their highest engagement at the stress period, followed by a
decrease at the first recovery period and a leveling off in the second recovery period (see Figure 4).

High constructive thinkers (M = 2.83) did not differ significantly from low constructive thinkers (M = 2.64) on engagement, F(1,50) = 1.35, p<.25, nor was the interaction between constructive thinking and period significant, F(3,150) = .43, p<.74.

**Physiological Reactions**

The physiological reactions consisted of systolic blood pressure, diastolic blood pressure, pulse rate, wrist temperature, finger temperature, and the difference between wrist and finger temperature. Because the physiological measures were poorly intercorrelated, no composite score was calculated. The reliabilities of systolic blood pressure, diastolic blood pressure, and pulse rate were high (.88-.98) when computed over the three readings within each period (see Table 5 for reliabilities). The median of the three readings at each period was used as the data in the analyses.

The following analyses of variance for constructive thinking and period were computed for each physiological measure: 1) a repeated measures analysis over all four periods, 2) a stress effect that compared the pre-stress and stress periods and, 3) a recovery from stress effect that compared the stress and second-recovery periods.
Analysis Over the Four Periods

There was a significant main effect for pulse-rate between high and low constructive thinkers, $F(1, 50) = 4.15, p < .05$. Low constructive thinkers ($M = 25.03$) had a higher pulse-rate than high constructive thinkers ($M = 23.31$). There was no significant main effect for constructive thinking on any of the other physiological measures. There was a significant decrease over time of systolic blood pressure, $F(3, 150) = 5.52, p < .01$, finger temperature, $F(3, 150) = 10.15, p < .000$, wrist temperature, $F(3, 150) = 5.30, p < .01$, and pulse rate, $F(3, 150) = 18.76, p < .000$, (see Figures 5, 6, and 7). There was a significant increase over time of wrist-minus-finger temperature, $F(3, 150) = 6.65, p < .001$ (see Figure 7).

There was a marginally significant interaction between constructive thinking and period for diastolic blood pressure, $F(3, 150) = 2.55, p < .06$. In Figure 5, it can be seen that the source of this interaction lies in the last two periods in which the low constructive thinkers exhibited an increase and the high constructive thinkers a decrease in diastolic blood pressure. To examine this relationship further, analyses of variance were done comparing the first and second recovery periods for all physiological measures.

Stress Effect

There was no significant difference between the pre-stress and stress periods for any of the physiological
measures. Because the physiological reactions were often as high for the pre-stress period as for the stress period, which were higher than for the last two periods, it suggests that the pre-stress period may reflect concerns about the experiment that are as stress-producing as confronting the stressors themselves. In fact, for systolic blood pressure, the near significant interaction between constructive thinking and the first two periods \((1,50) F = 3.10, p < .08\), suggests a tendency for the initial period to be more stressful than the stressful tasks for the low constructive thinkers relative to the high constructive thinkers (see figure 5).

**Recovery from Stress**

There was a significant decrease from the stress period to the second recovery period in systolic blood pressure, \(F(1,50) = 5.35, p < .05\), pulse rate, \(F(1,50) = 30.96, p < .000\), and finger temperature, \(F(1,50) = 11.46, p < .01\), and there was a significant increase in the difference between wrist and finger temperature, \(F(1,50) = 4.08, p < .05\). The findings on systolic blood pressure and pulse rate indicate reduced physiological arousal at the end of the experiment in comparison to the stress period. The findings on temperature indicate the reverse pattern of physiological arousal. This difference in results is difficult to interpret. It is possible that room temperature may have been a complicating factor.
Of greater interest, there was a significant interaction between constructive thinking and period for diastolic blood pressure, $F(1,50) = 5.09, p<.05$, indicating that low constructive thinkers recovered less from the stressful task than high constructive thinkers.

**Recovery Effect**

Over the last two periods, there was a significant interaction of constructive thinking and period for diastolic blood pressure, $F(3,150) = 4.58, p<.03$, and finger temperature, $F(3,150) = 3.83, p<.05$. In Figures 5 and 6, it can be seen that low constructive thinkers exhibited a greater rise in diastolic blood pressure and a greater drop in finger temperature than high constructive thinkers at the end of the last period. Thus, it indicates that low constructive thinkers relative to high constructive thinkers experienced an increase in physiological arousal during the last period of the experiment.

**Ratings of Constructive Thinking and Personality**

Low constructive thinkers rated themselves as poorer constructive thinkers than high constructive thinkers during the experiment, $F(1,50) = 20.42, p<.001$, and in general, $F(1,50) = 32.69, p<.001$. There was not a significant difference between the groups in their report of how good a day they had on the day of the experiment, $F(1,50) = .21, p<.66$. 
The examiners blindly rated low constructive thinkers as significantly less confident, $F(1,50) = 12.59$, $p<.001$, and less relaxed, $F(1,50) = 8.57$, $p<.01$, than high constructive thinkers. Low constructive thinkers were also rated as marginally less helpful, $F(1,50) = 3.57$, $p<.06$, than high constructive thinkers. There were no significant differences in the ratings of how friendly, $F(1,50) = 1.37$, $p<.25$, high and low constructive thinkers appeared.

**Medical Checklist**

High and low constructive thinkers did not differ in their reports of experiencing major illnesses, $t = .31$, $p<.59$, which is not surprising given the young adult age group of the sample and the very low incidence of serious illness. However, low constructive thinkers reported more symptoms of minor illnesses, $t = 3.86$, $p<.05$, and more distressing emotions, $t = 19.00$, $p<.000$, than high constructive thinkers. High and low constructive thinkers did not differ in their reports of problems related to use of alcohol and drugs, $t = 1.92$, $p<.17$.

Groups were also compared on frequency of specific symptoms. Only symptoms that were reported to have occurred at least once by thirty percent of the sample were examined. Low constructive thinkers reported significantly more acne, allergies, rashes, problems with teeth, headaches, dizziness, low grade virus infections, sinus infections, anxiety, depression, and binging on food than high
constructive thinkers (see Table 6 for means, t-values, and levels of significance).

**Gender Differences**

There were no interactions with gender for actual performance, thoughts, perceptions of performance, emotions, and physical and psychological symptoms. There were also no interactions with gender for any of the physiological measures.
In support of the hypotheses, low constructive thinkers had more negative thoughts than high constructive thinkers across the four time periods, and this difference became greater when subjects were confronted with a stressful situation. The main effect held across the four periods for negative thoughts unrelated as well as related to the experiment, but the interaction with period, resulting from the greater reaction to the stressor by low constructive thinkers occurred only for negative thoughts related to the experiment. Low constructive thinkers also exhibited a greater increase in negative affect in response to the stressors than high constructive thinkers.

Both groups experienced a similar sharp increase in engagement and in positive thoughts during the stress period. Other research has also found that high and low constructive thinkers differ in response to negative but not positive events (Epstein, unpublished manuscript).

The question arises as to whether the results can be solely attributed to a tendency for greater negative reporting on the part of the low constructive thinkers. To address this issue, findings from the non-self-report measures of physiological arousal and examiner's ratings will be presented in a later section of the discussion.
Evaluation of Self and Situation

Though high and low constructive thinkers did not differ in their actual performance, low constructive thinkers judged their performance as less adequate in comparison to others. They also reported to a greater extent than high constructive thinkers that they did poorly according to their own standards and that the examiners were more disappointed in their performance. Thus, because low constructive thinkers set unreasonably high standards, they perceive themselves as failures even when they perform as well as others. They also worry excessively that others will be disappointed in their performance.

Because high and low constructive thinkers did not differ in their evaluations of the examiner or experiment, it suggests that low constructive thinkers did not over-criticize or blame the situation. Instead, negative thoughts and perceptions appear to have been specifically internally directed. In an unpublished study, Epstein compared good and poor constructive thinkers' degree of generalization from situations that differed according to whether their outcomes were positive or negative, and according to whether they involved the self or others. The only situations on which the groups differed were ones that had self-related negative outcomes. Poor constructive thinkers generalized more to such situations. A study by Epstein and Meier (in press) reported a correlation of .70
between scores on the CTI and scores on a scale of self-acceptance indicating that low constructive thinking is associated with low self-acceptance.

The overall evidence indicates that poor constructive thinking does not involve a general thinking deficit but, is associated with unrealistic thoughts involving negative attributions related to acceptance by the self and others.

Examiner's Ratings

Examiner's ratings provided external verification that low constructive thinkers react differently to a stressful situation than high constructive thinkers. Examiners blindly rated low constructive thinkers as more tense and less self-confident than high constructive thinkers. These perceptions are consistent with low constructive thinkers' self-reports.

Subject's awareness of their constructive thinking abilities could exacerbate their tension and self-confidence during and after the interview. Nevertheless, low constructive thinkers were not merely reporting negatively, but seemed to be experiencing more tension than high constructive thinkers as indicated by the examiner's ratings.

Physiological Reactions

There were no group differences in physiological arousal during the pre-stress and stress periods. As expected, these findings are not easily interpretable. It
seems plausible that low constructive thinkers may be more fearful and high constructive thinkers may be more engaged in adaptive coping efforts during these periods. High and low constructive thinkers did not differ in their self-reports of engagement, in fact, both groups reported an increase in engagement during the stress period. It cannot be determined to what extent such self-assessments are accurate with respect to arousal components of engagements. It is well known that subjective and physiological assessments of reactivity often differ.

As hypothesized, there was a significant difference in arousal between the two groups at the second recovery period. Low constructive thinkers exhibited an increase in physiological arousal whereas high constructive thinkers exhibited a decrease. One possible explanation is that, low constructive thinkers experienced an "after discharge" of anxiety, (Epstein and Clarke, 1970). Another is that low constructive thinkers experienced an increase in arousal due to the fact that immediately before the relaxation exercise they were asked to evaluate their constructive thinking. This may not only have stimulated disparaging thoughts about themselves, but it may also have exacerbated their concerns about disapproval from the experimenter. Also, the instructions to relax may have caused performance anxiety which could counter any attempts to relax.
In spite of several possible explanations, the fact remains that low constructive thinkers exhibited an increase in physiological arousal while high constructive thinkers exhibited a decrease. This difference provides evidence that low constructive thinkers interpret events in an anxiety-provoking manner. The findings on physiological reactivity demonstrate, as well as those on ratings by the examiners, that low constructive thinkers do not just report negatively, but can be differentiated from high constructive thinkers by objective methods.

The findings that self-reports of negative thoughts and negative affect decline in both groups during the second recovery, where as physiological arousal increased for the low constructive thinkers provides yet another example of the lack of correspondence between physiological measures and self report. There was also a discrepancy between the two measures in the pre-stress, anticipatory period. Subjects in both groups rated their anxiety as low during this period although their physiological reactivity was high. The general conclusion that appears to be warranted is that self-ratings are much more subject to the influence of demand characteristics than physiological reactions.

Another physiological finding that needs explanation is that skin temperature consistently dropped throughout the experiment for both high and low constructive thinkers. If the lowering of skin temperature is interpreted to be a
stress response, this finding does not correspond to any of the other physiological responses. One possibility is that skin temperature was affected by the room temperature. The laboratory used in this experiment was air-conditioned and kept at a relatively cool temperature. Because subjects exposed their upper arm during the blood pressure readings, it is possible that their finger and wrist temperature dropped during the course of the experiment due to the temperature of the room.

**Medical Checklist**

As for symptoms, low constructive thinkers reported more physical and mental symptoms than high constructive thinkers over a four month period. As Watson and Pennebaker (in press) suggest, this may be largely due to a trait of negative affectivity that affects reporting in low constructive thinkers rather than to actual differences in symptoms. However, objective measures obtained in this study, namely examiner's ratings and physiological reactivity indicate that constructive thinking is not simply measuring a global tendency to make favorable or unfavorable statements about the self. Low constructive thinkers not only reported a more negative experience than high constructive thinkers, but examiner's ratings and physiological measures also distinguished the groups. Given that low constructive thinkers experienced more stress, then it is reasonable to assume that they should also experience
more psychological and physical symptoms. Nevertheless, it would be desirable in future research to obtain objective verification of illness.
CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

As expected, low constructive thinkers reported more negative thoughts and emotions than high constructive thinkers. Moreover, in reaction to a specific stressful stimulus, low constructive thinkers had an exacerbated negative thoughts and emotions. The source of low constructive thinkers' negative experience seems to lie in their manner of interpreting events. For example, their high internal standards may lead low constructive thinkers to believe they perform worse compared to others, and their concern about the negative evaluation of others may lead them to become less confident and more tense as the examiners rated.

Because the manner in which people construe and interpret events directly effects their experience of stress, the implication is that through changes in cognitive processing, poor constructive thinkers could decrease their stress experiences and enhance their overall mental and physical well-being.

One future direction would be to determine whether people can learn to become better constructive thinkers. As a follow-up to therapeutic intervention, people could be tested to see if they experience an increase in success in their relationships, mental health, and everyday living.

Another direction would be to determine whether changes in constructive thinking lead to changes in physiological
reactivity, functioning of the immune system, and physical and mental symptoms. Obtaining reliable objective physiological measures could help establish a causal link between psychological functioning and physical health.
Table 1. Alpha reliabilities of scales for negative emotions and task-involvement at each period.

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Time Periods</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>.80</td>
<td>.89</td>
</tr>
<tr>
<td>Involvement</td>
<td>.64</td>
<td>.71</td>
</tr>
</tbody>
</table>

Note. Time I refers to the initial period, time II to the stress period, time III to the recovery period, and time IV to the relaxation period.
Table 2. Sequence of events during the experiment.

<table>
<thead>
<tr>
<th>Sequence of Events</th>
<th>Activity</th>
<th>Measurements After each Period</th>
</tr>
</thead>
</table>
| I Pre-experimental Waiting period | Wait 3-minutes | Physiological measures
| | | Thought Sampling
| | | Adjective check list |
| II Stress Period | Two stress tasks | Physiological measures
| | | Thought Sampling
| | | Adjective check list |
| III First Recovery Period | Wait 3-minutes | Medical Check-list
| | | Physiological measures
| | | Thought Sampling
| | | Adjective check list |
| | *** Debrief and Interview *** | |
| IV Second Recovery Period | Relax 3-minutes | Physiological measures
| | | Thought Sampling
| | | Adjective check list |
Table 3. Summary of F-values from analyses of variance of three kinds of thoughts as a function of constructive thinking, time periods, and thoughts related and unrelated to the experiment.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Thoughts</th>
<th>Negative</th>
<th>Positive</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT a</td>
<td></td>
<td>20.64***</td>
<td>.20</td>
<td>.21</td>
</tr>
<tr>
<td>TIME b</td>
<td></td>
<td>9.33***</td>
<td>8.29***</td>
<td>19.79***</td>
</tr>
<tr>
<td>REL a</td>
<td></td>
<td>.02</td>
<td>.93</td>
<td>.11</td>
</tr>
<tr>
<td>CT x TIME b</td>
<td></td>
<td>1.53</td>
<td>1.25</td>
<td>.34</td>
</tr>
<tr>
<td>CT x REL a</td>
<td></td>
<td>.09</td>
<td>.12</td>
<td>.59</td>
</tr>
<tr>
<td>TIME x REL b</td>
<td></td>
<td>16.66***</td>
<td>18.51***</td>
<td>5.20</td>
</tr>
<tr>
<td>CT x TIME x REL b</td>
<td></td>
<td>2.78*</td>
<td>.81</td>
<td>.47</td>
</tr>
</tbody>
</table>

* p<.05, **'p<.01, *** p<.001

a The degrees of freedom for these tests are 1 and 36.
b The degrees of freedom for these tests are 3 and 108.

Note. CT refers to Constructive Thinking.
TIME refers to time periods.
REL refers to relevance to the experiment.
Table 4. Reliabilities of subjective ratings of stress, performance, and the test situation.

<table>
<thead>
<tr>
<th>Item</th>
<th>Alpha Coefficient</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>How stressful were the tasks?</td>
<td>.65</td>
<td>2</td>
</tr>
<tr>
<td>Concern about performance</td>
<td>.84</td>
<td>2</td>
</tr>
<tr>
<td>Concern about impression</td>
<td>.91</td>
<td>2</td>
</tr>
<tr>
<td>Judgement of relative performance</td>
<td>.40</td>
<td>2</td>
</tr>
<tr>
<td>Anticipated future performance</td>
<td>.65</td>
<td>2</td>
</tr>
<tr>
<td>Evaluation of the experiment</td>
<td>.80</td>
<td>4</td>
</tr>
<tr>
<td>Evaluation of the examiner</td>
<td>.58</td>
<td>4</td>
</tr>
</tbody>
</table>
Table 5. Alpha reliabilities for three readings at each period.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>Systolic Blood Pressure</td>
<td>.97</td>
</tr>
<tr>
<td>Diastolic Blood Pressure</td>
<td>.91</td>
</tr>
<tr>
<td>Pulse Rate</td>
<td>.96</td>
</tr>
</tbody>
</table>

Note. Time I refers to the initial period, time II to the stress period, time III to the recovery period, and time IV to the relaxation period.
Table 6. T-tests and Means of reported symptoms for high and low constructive thinkers.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>High CT</th>
<th>Low CT</th>
<th>2-tailed t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acne</td>
<td>2.77</td>
<td>3.96</td>
<td>3.64***</td>
</tr>
<tr>
<td>Asthma or Allergies</td>
<td>1.35</td>
<td>1.92</td>
<td>2.28*</td>
</tr>
<tr>
<td>Common Cold</td>
<td>2.69</td>
<td>2.77</td>
<td>.33</td>
</tr>
<tr>
<td>Rashes</td>
<td>1.04</td>
<td>1.65</td>
<td>3.28**</td>
</tr>
<tr>
<td>Teeth problems</td>
<td>1.42</td>
<td>2.12</td>
<td>2.53*</td>
</tr>
<tr>
<td>Fractures</td>
<td>1.27</td>
<td>1.42</td>
<td>.68</td>
</tr>
<tr>
<td>Nausea</td>
<td>1.54</td>
<td>1.73</td>
<td>.93</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>1.81</td>
<td>1.96</td>
<td>.61</td>
</tr>
<tr>
<td>Constipation</td>
<td>1.35</td>
<td>1.65</td>
<td>1.49</td>
</tr>
<tr>
<td>Stomach aches</td>
<td>2.08</td>
<td>2.62</td>
<td>1.94</td>
</tr>
<tr>
<td>Headaches</td>
<td>2.08</td>
<td>2.88</td>
<td>3.09**</td>
</tr>
<tr>
<td>Dizziness</td>
<td>1.46</td>
<td>2.35</td>
<td>3.24**</td>
</tr>
<tr>
<td>Flu</td>
<td>1.38</td>
<td>1.69</td>
<td>1.35</td>
</tr>
<tr>
<td>Neck pain</td>
<td>2.35</td>
<td>2.81</td>
<td>1.70</td>
</tr>
<tr>
<td>Back pain</td>
<td>2.08</td>
<td>2.50</td>
<td>1.41</td>
</tr>
<tr>
<td>Ear infection</td>
<td>1.12</td>
<td>1.23</td>
<td>.81</td>
</tr>
<tr>
<td>Sinus infection</td>
<td>1.50</td>
<td>2.04</td>
<td>2.08*</td>
</tr>
<tr>
<td>Virus</td>
<td>1.38</td>
<td>1.85</td>
<td>2.10*</td>
</tr>
<tr>
<td>Ankle/Knee pain</td>
<td>1.69</td>
<td>2.04</td>
<td>1.27</td>
</tr>
<tr>
<td>Anxiety</td>
<td>2.62</td>
<td>3.54</td>
<td>3.02**</td>
</tr>
<tr>
<td>Depression</td>
<td>2.58</td>
<td>3.62</td>
<td>4.64***</td>
</tr>
<tr>
<td>Irritability</td>
<td>2.65</td>
<td>3.15</td>
<td>1.94</td>
</tr>
<tr>
<td>Alcohol problems</td>
<td>1.50</td>
<td>1.69</td>
<td>.80</td>
</tr>
<tr>
<td>Drug problems</td>
<td>1.23</td>
<td>1.15</td>
<td>.57</td>
</tr>
<tr>
<td>Binging on food</td>
<td>1.69</td>
<td>2.31</td>
<td>2.11*</td>
</tr>
<tr>
<td>Abnormalities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in menstruation</td>
<td>1.46</td>
<td>1.54</td>
<td>.26</td>
</tr>
<tr>
<td>Vaginal infection</td>
<td>1.35</td>
<td>1.27</td>
<td>.33</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.001

! analyzed for female subjects only
Figure 1. Negative thoughts related and unrelated to the experiment over four time periods for high and low constructive thinkers.
Figure 2. Positive thoughts related and unrelated to the experiment over four time periods for high and low constructive thinkers.
Figure 3. Neutral thoughts related and unrelated to the experiment over four time periods for high and low constructive thinkers.
Figure 4. Negative affect and involvement over four time periods for high and low constructive thinkers.
Figure 5. Systolic and diastolic blood pressure over four time periods for high and low constructive thinkers.
Figure 6. Finger and wrist temperature over four time periods for high and low constructive thinkers.
Figure 7. Wrist minus finger temperature and pulse rate over four time periods for high and low constructive thinkers.
APPENDICES
APPENDIX A

THOUGHT SAMPLING QUESTIONNAIRE
AND ADJECTIVE CHECKLIST

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>slightly</td>
<td>moderately</td>
<td>considerably</td>
<td>very much</td>
</tr>
</tbody>
</table>

PART I

A. To what extent did the following thoughts or images go through your mind from the beginning of the 3-minute waiting period to now?

1. thoughts or images about pleasant events not concerning the experiment
2. thoughts or images about unpleasant events not concerning the experiment
3. thoughts or images neither pleasant or unpleasant not concerning the experiment (ie: other tasks, unfinished business, or organizing plans)
4. thoughts or images that the experiment might be interesting, challenging, or otherwise a pleasant, worthwhile experience
5. thoughts or images that the experiment might be threatening or unpleasant, that you might perform poorly, or that the examiner might form a low opinion of you
6. thoughts or images neither pleasant or unpleasant about the experiment (ie: how long it will take, what the examiner is like, or surveying the room)

B. Now rate the extent to which you had the following feelings during the same period.

7. calm, relaxed, or at ease
8. tense, worried or anxious
9. wanting to escape, or leave the situation
10. helpless, defeated, or wanting to give-up
11. energetic, alert, or pumped up
12. blocked, or frustrated
13. bored, indifferent, or unconcerned
14. annoyed, angry, or irritated
15. depressed, sad, or blue
16. tired, fatigued, or lacking in energy
17. self-conscious, or embarrassed
18. challenged, or determined
PART II

19. thoughts or images about pleasant events not concerning the experiment
20. thoughts or images about unpleasant events not concerning the experiment
21. thoughts or images neither pleasant or unpleasant not concerning the experiment (ie: other tasks, unfinished business, or organizing plans)
22. thoughts or images that the experiment might be interesting, challenging, or otherwise a pleasant, worthwhile experience
23. thoughts or images that the experiment might be threatening or unpleasant, that you might perform poorly, or that the examiner might form a low opinion of you
24. thoughts or images neither pleasant or unpleasant about the experiment (ie: how long it will take, or what the examiner is like, surveying the room)

B. Now rate the extent to which you had the following feelings during the same period.

25. calm, relaxed, or at ease
26. tense, worried or anxious
27. wanting to escape, or leave the situation
28. helpless, defeated, or wanting to give-up
29. energetic, alert, or pumped up
30. blocked, or frustrated
31. bored, indifferent, or unconcerned
32. annoyed, angry, or irritated
33. depressed, sad, or blue
34. tired, fatigued, or lacking in energy
35. self-conscious, or embarrassed
36. challenged, or determined

C. Answer the following questions about the SUBTRACTION TASK.

37. How stressful did you find this task?

<continue on next page...>
How much did the following add to your stress:
38. concern about your performance according to your own standards
39. concern about the impression you made on the examiner
40. How well compared to others, do you think you performed on this task? 1=much worse, 2=slightly worse, 3=about average, 4=slightly better, 5=much better
41. How do you think you would perform if you did the task again? 1=much worse, 2=slightly worse, 3=about the same, 4=slightly better, 5=much better

D. Answer the following questions about the MIRROR TRACING TASK.
42. How stressful did you find this task?
How much did the following add to your stress:
43. concern about your performance according to your own standards
44. concern about the impression you made on the examiner
45. How well compared to others, do you think you performed on this task? 1=much worse, 2=slightly worse, 3=about average, 4=slightly better, 5=much better
46. How do you think you would perform if you did the task again? 1=much worse, 2=slightly worse, 3=about the same, 4=slightly better, 5=much better
PART III

A. To what extent did the following thoughts or images go through your mind during the SECOND WAITING PERIOD TO NOW?

47. thoughts or images about pleasant events not concerning the experiment
48. thoughts or images about unpleasant events not concerning the experiment
49. thoughts or images neither pleasant or unpleasant not concerning the experiment (i.e.: other tasks, unfinished business, or organizing plans)
50. thoughts or images that the experiment might be interesting, challenging, or otherwise a pleasant, worthwhile experience
51. thoughts or images that the experiment might be threatening or unpleasant, that you might perform poorly, or that the examiner might form a low opinion of you
52. thoughts or images neither pleasant or unpleasant about the experiment (i.e.: how long it will take, or what the examiner is like, surveying the room)

B. Now rate the extent to which you had the following feelings during the same period.

53. calm, relaxed, or at ease
54. tense, worried or anxious
55. wanting to escape, or leave the situation
56. helpless, defeated, or wanting to give-up
57. energetic, alert, or pumped up
58. blocked, or frustrated
59. bored, indifferent, or unconcerned
60. annoyed, angry, or irritated
61. depressed, sad, or blue
62. tired, fatigued, or lacking in energy
63. self-conscious, or embarrassed
64. challenged, or determined

C. Use the following 5-point scales to rate your impression of the examiner. The ends of the scale, 1 and 5, are marked with opposite adjectives. Use 2-4 for intermediate ratings.

1 2 3 4 5

65. efficient ...........................................inefficient

(Continue on next page...)
66. friendly...........................................unfriendly
67. accepting.........................................judgmental
68. competent.........................................incompetent

D. Use the following scales to rate your impression about the experiment:

69. useful............................................useless
70. educational......................................waste of time
71. interesting.......................................boring
72. ethical...........................................unethical
PART IV

A. To what extent did the following thoughts or images go through your mind during the period FROM THE BEGINNING OF THE RELAXATION PERIOD TO NOW?

NOTE: Though this was a relaxation period, it is probable that other thoughts intruded into your thinking. Please try to rate the following items as honestly as possible.

73. thoughts or images about pleasant events not concerning the experiment
74. thoughts or images about unpleasant events not concerning the experiment
75. thoughts or images neither pleasant or unpleasant not concerning the experiment (ie: other tasks, unfinished business, or organizing plans)
76. thoughts or images that the experiment might be interesting, challenging, or otherwise a pleasant, worthwhile experience
77. thoughts or images that the experiment might be threatening or unpleasant, that you might perform poorly, or that the examiner might form a low opinion of you
78. thoughts or images neither pleasant or unpleasant about the experiment (ie: how long it will take, or what the examiner is like, surveying the room)

B. Now rate the extent to which you had the following feelings during the same period.

79. calm, relaxed, or at ease
80. tense, worried or anxious
81. wanting to escape, or leave the situation
82. helpless, defeated, or wanting to give-up
83. energetic, alert, or pumped up
84. blocked, or frustrated
85. bored, indifferent, or unconcerned
86. annoyed, angry, or irritable
87. depressed, sad, or blue
88. tired, fatigued, or lacking in energy
89. self-conscious, or embarrassed
90. challenged, or determined

---

not at all  slightly  moderately  considerably  very much
APPENDIX B

MEDICAL CHECKLIST

Do not write on this form. Record all responses, using a No. 2 pencil, on the opscan sheet provided. Use your 3-letter code to identify yourself in the first three spaces for "name". Identify this form as MEDH in the last 4 spaces for "name" and darken the appropriate circles in the columns below. Be sure to include all other information requested on the opscan sheet.

Answer the following items by entering "1" for "no" and "2" for "yes".

NO = 1
YES = 2

1. Are you under medical treatment for a physical ailment?

2. Are you receiving counselling or psychotherapy for an emotional or mental problem?

3. Do you have or have you had:
   4. surgery?
   5. a heart ailment?
   6. high blood pressure?
   7. asthma or other respiratory disease?
   8. diabetes?
   9. rheumatism or arthritis?
   10. tumors, cancer, or any significant growths?
   11. any blood disease?
   12. any liver disease?
   13. any kidney disease?
   14. any stomach or intestinal disease?
   15. hepatitis?
   16. epilepsy or seizures?

On how many days, in the past 12 months, would you estimate you had the following symptoms, problems or reactions?

Use the scale below to rate each item. Be sure to rate all items.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>1-7 days</td>
</tr>
<tr>
<td>3</td>
<td>8-30 days</td>
</tr>
<tr>
<td>4</td>
<td>31-180 days</td>
</tr>
<tr>
<td>5</td>
<td>181-365 days</td>
</tr>
</tbody>
</table>

16. acne
17. problems associated with alcohol
18. recreational drug problems, other than alcohol
19. asthma, hay fever, or other allergic reactions
20. high levels of anxiety
21. feelings of depression
22. insomnia or disturbed sleep
23. pelvic inflammatory disease or inflammation of the Fallopian tubes, uterus, cervix, or ovaries
24. respiratory infections
25. rashes
26. problem with teeth, including bleeding gums
27. fractures, sprains, or dislocated joints
28. problems with eczema
29. nausea or vomiting
30. diarrhea
31. constipation
32. stomach problems, including stomach aches, ulcers, abdominal bloating, belching, or cramps
33. headaches
34. cold sores (herpes infection on the lips)
35. dizziness

(CONTINUE ON NEXT PAGE)
(CONTINUED) On how many days, in the past 12 months, would you estimate you had the following symptoms, problems or reactions? Be sure to rate all items.

<table>
<thead>
<tr>
<th>1 = None</th>
<th>2 = 1-7 days</th>
<th>3 = 8-30 days</th>
<th>4 = 31-180 days</th>
<th>5 = 181-365 days</th>
</tr>
</thead>
</table>

36. the "flu" (influenza)
37. pain or stiffness in your neck or shoulders
38. back pain (does not include stiffness in shoulders)
39. mononucleosis
40. abnormality in your menstrual period (either missing a period, a heavy menstrual period, or bleeding in between periods)
41. ear infection
42. ringing in ear
43. sinus infection, having your sinuses act up
44. strep throat
45. urinary tract infection (bladder or kidney)
46. feelings of irritability
47. vaginal infection, including vaginal discharge
48. non-specific virus infection with symptoms such as a low-grade fever or aching muscles
49. nose bleeds
50. ankle or knee pains
51. loss of appetite
52. binging on food
APPENDIX C

INTERVIEW QUESTIONS

91. How good of a Constructive Thinker were you in this experiment?
   1  2  3  4  5
   very good.................................. very poor
   In what ways were you a good CT? ____________________________________________
   In what ways were you a poor CT? ____________________________________________

92. How good of a CT are you in general?
   1  2  3  4  5
   very good.................................. very poor
   In what ways are you a good CT? ____________________________________________
   In what ways are you a poor CT? ____________________________________________

93. How good of a day did you have today?
   1  2  3  4  5
   very good.................................. very poor
   In what ways was it a good day? ____________________________________________
   In what ways was it a poor day? ____________________________________________

Rate your impressions about this subject: (make any additional comments on the back of this sheet)

   1  2  3  4  5
94. warm, friendly............................................. unfriendly
95. relaxed...................................................... tense
96. helpful, or cooperative...................................... critical, or resistant
97. self-confident.............................................. self-doubting
98. on time ≥5 min. late ≥10 min. late ≥15 min. late no show
   1  2  3  4  5
BIBLIOGRAPHY


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