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 Parents of Children with Cancer"

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A handwritten signature in cursive script, appearing to read "Martica Hall".

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Abstract

Title of Thesis: Reminiscent Stimuli and Distress in Parents of Children with Cancer

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Intrusive thoughts, experienced as vivid memories of an event, are a common symptom of chronic stress responding. Research has not addressed whether intrusive thoughts elicit the stress response, and whether populations suffering from chronic stress are susceptible to reminiscent stimuli.

This study investigated the relationship between frequency of intrusive memories and both susceptibility to reminiscent stimuli and consequent distress in parents of children with cancer and parents with healthy children. The reminiscent stimulus task was a modified Stroop task. Subjects were presented with words printed in colored ink, their task was to call out the colors in which the words were printed. Embedded in the task were cancer words (e.g., "chemo" printed in green ink).

Results indicated that subjects who reported frequent intrusive thoughts about their child's illness later proved cognitively and emotionally susceptible to a mild, reminiscent stimulus. However, experimental subjects were not physiologically reactive to the task.

Reminiscent Stimuli and Distress
in
Parents of Children with Cancer

by
Martica Hall

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Psychology of the Uniformed Services University of
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INTRODUCTION

Intrusive thoughts about a traumatic or stressful event are frequently reported in the initial wake of that event (Horowitz, 1982, and Janoff-Bulman, 1992). Researchers note that cycling back and forth between intrusive thoughts and avoidant behaviors is both normal and expected following a traumatic event and that this cycling constitutes a coping process aimed at reducing the impact of the initiating event and consolidating it into memory (Janoff-Bulman, 1992). Only a small percentage of people continue to experience trauma-related thoughts over time, and it is in this group that intrusive thoughts become symptomatic of problems (e.g., Horowitz, 1992; Kulka, Schlenger, Fairbank, Hough, Jordan, Marmar, & Weiss, 1988). Chronic intrusive thoughts may be accompanied by increases in indices of stress responding and are also closely allied with a pathological form of chronic stress responding, post-traumatic stress disorder (PTSD; American Psychological Association, 1980; Davidson & Baum, 1986). Much remains to be concluded about the relationship between chronic intrusive thoughts and chronic stress. For example, susceptibility to intrusive thoughts has not been assessed. Nor have the parameters of distress resulting from intrusive memories been delineated.

Intrusive thoughts, in this context, are more than mere objective remembrances of a past event. These thoughts may constitute a vivid reliving of aspects of the initiating traumatic event and, as such, may serve to keep a past event alive. Due to the nature of these intrusive memories, researchers have hypothesized that intrusive thoughts may play an integral role in the etiology and/or maintenance of chronic stress responding (Baum, Cohen, & Hall, in press; Davidson & Baum, in press; Pitman, 1989). For this to be so, memories or images would have to be capable of eliciting physiological, cognitive, affective, and behavioral responses similar to those elicited by the actual event. In this vein, several researchers have shown that various aspects of the stress response may be triggered by imagery or reminiscent stimuli in subjects with post traumatic stress disorder (cf, Blanchard, Kolb, Pallmeyer, & Gerard, 1982; Pitman, Orr, Forgue, Altman, de Jong, & Herz, 1990). Other researchers have hypothesized that PTSD may be a chronic conditioned emotional response (Kolb & Mutalipassi, 1982). Generalizing beyond the manipulated laboratory environment, it is may be that the naturally occurring trauma-related intrusive thought is capable of eliciting a multidimensional stress response including physiological arousal, affective distress, and a motivational state aimed

at combating the cause or the resulting arousal. In this manner, intrusive thoughts may maintain or exacerbate stress responding over time.

Although frequent intrusive thoughts are reported by subjects who do not have PTSD, (e.g., Davidson & Baum, 1986; Davidson & Baum, in press) it is not clear whether an intrusive memory is capable of eliciting the stress response in a population suffering from a more mild form of chronic stress. To date, no causal relationships have been demonstrated in these populations. Frequency of intrusive thought has been correlated with increased indices of stress responding at Three Mile Island and in Vietnam veterans without PTSD, but it is not known whether these thoughts are the cause of the distress (Davidson & Baum, 1986; Davidson & Baum, in press).

Several researchers have attempted to manipulate reactivity to reminiscent stimuli in populations with PTSD. Studies of cardiovascular and psychophysiological reactivity to audio and visual combat stimuli among war veterans found an increased stress responding in subjects with PTSD only. However, these studies do not allow one to determine whether the stimuli triggered intrusive thoughts (e.g., Blanchard et al., 1982; Pitman et al, 1990). Two groups of researchers have conducted research which may be used to bridge the gap

between the PTSD laboratory reactivity studies and research on the role of intrusive thoughts in chronic stress responding. McNally, Kaspi, Riemann, & Zeitlin, (1990) and Foa, Feske, McCarthy, & Kozak (1991) used a modified Stroop task to investigate involuntary semantic activation in subjects with PTSD. This paradigm is based on an information processing model of memory and the relationship between attention and involuntary semantic activation.

To assess level of selective processing in subjects with PTSD, McNally et al. (1990) and Foa et al. (1991) presented trauma-related modified Stroop pages to Vietnam veterans and rape victims. In both studies subjects with PTSD took significantly longer to complete the trauma-related pages than did control subjects, suggesting that trauma-related latency in subjects with PTSD was a result of distraction due to intrusive thoughts experienced during the task. Despite the appeal of this explanation, one must interpret these differences in task performance cautiously. Frequency or degree of intrusive thoughts during the task was not measured and associations between performance and phenomenology remain speculative.

Previous research has indicated that intrusive thoughts play an integral role in PTSD and other forms of chronic stress responding. Frequency of intrusive thoughts

were correlated with symptoms of chronic stress responding among people living near Three Mile Island and among Vietnam veterans (e.g., Davidson & Baum, 1986; 1993), and reminiscent laboratory stimuli have been shown to elicit the stress response in subjects with PTSD (Blanchard et al., 1982; Pitman et al., 1990). Using the modified Stroop task, McNally et al. (1990) and Foa et al. (1991) demonstrated trauma-related behavioral reactivity (as measured by latency on the task) in subjects with PTSD.

In an extension of the study of the role of intrusive thoughts in the maintenance of chronic stress, the present study investigated the relationship between degree of stress and reactivity to reminiscent stimuli in a sample of parents of children with cancer. Because they are a hallmark symptom of PTSD, frequency of intrusive thoughts concerning their children's health was used to assess degree of distress in the control and experimental subjects. Task response was assessed across four dimensions: cognitive, affective, behavioral, and physiological reactivity. It was hypothesized that degree of stress, as measured by the frequency of intrusive thoughts, would be positively correlated with reactivity to the modified Stroop task. This study sought to broaden the scope of the measurement of intrusive thoughts by examining susceptibility to them, and

to determine whether these thoughts are associated with distress. We hypothesized that the frequency of intrusive thoughts, would predict both susceptibility and distress of task-related intrusive thoughts. Finally, we directly measured the relationship between involuntary semantic activation and latency on the modified Stroop task. Pursuant to the McNally et al. (1990) and Foa et al (1991), we hypothesized that latency on the modified Stroop task would be positively correlated with the reporting of intrusive thoughts during the task.

METHODS

Subjects

Seventeen parents of children with cancer (experimental group) and ten parents with healthy children (control group) participated in this study. These subjects were recruited from the sample pool in an ongoing longitudinal study of chronic stress in parents with chronically ill children. Subjects for the longitudinal study were recruited through the oncology and well-baby clinic at Walter Reed Army Hospital, and through the Uniformed Services University of the Health Sciences. Thus, all subjects were either military families or employed by the university and living in the Washington, D.C. area, and

are roughly in the same socio-economic bracket.

For this study, all experimental and control subjects in the longitudinal study were contacted by mail. Of the experimental group, 20 of 33 subjects agreed to participate (60%). Fifty-eight percent of the control subjects (11 of 19) participated in this study. Reasons given by those who declined to participate were lack of interest, scheduling conflicts, and five families had moved away from the area. The experimental group was split into two groups (Low IES and High IES) in order to investigate the relationship between degree of distress and reactivity. Age and sex of subjects were comparable across groups and did not affect measured results. Mean age of control subjects was 37 (SD=7.5), with a range of 30-52. Subjects in the Low IES group had a mean age of 35 (SD=8.1), with a range of 24-49. And subjects in the High IES group had a mean age of 33 (SD=5.2), with a range of 26-39. Four of the 8 Low IES subjects were males, 5 of the 9 High IES subjects were males, and 3 of the 7 control subjects were males.

Measures

A multidimensional approach to measurement of reactivity to the experimental task was used. Self-report measures were collected to assess mood, level of symptom reporting, frequency of intrusive thoughts & avoidant

behavior, and task-related evoked thoughts and elicited distress. Heart rate and blood pressure were recorded to investigate physiological indices of stress. Behavioral reactivity to the task was measured by task latency and accuracy.

Self-Report: The Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979) was used to gauge level of stressor-related distress prior to the experimental session. This 15-item questionnaire divides the effects of stress into two categories: intrusive thoughts and avoidance behaviors. Subjects were asked to think about their child's illness (experimental subjects) or health (control subjects) and indicate, on a 4-point scale, the frequency of related intrusive thoughts and avoidant behaviors over the past seven days.

The revised Symptom Checklist (SCL 90-R; Derogatis, 1977) was used to assess general and specific dimensions of distress at baseline. The SCL 90-R includes a total distress score and nine subscales including, somatic distress, concentration problems, interpersonal difficulties, depression, anxiety, anger, fear, suspiciousness, and alienation. Subjects were asked to indicate how bothered they had been by the listed symptoms over the past two weeks, on a 5-point Likert scale.

Mood, at baseline and following the task, was assessed with the Brief Mood Introspection Scale, a 16-item adjective checklist (BMIS; Mayer, Mamborg & Volanth, 1988). The BMIS loads onto four mood factors: pleasant, aroused, positive, and negative mood. Using a four-point response scale, subjects were asked to indicate how they were feeling "right now."

Two questions measuring task-related evoked thoughts and elicited distress were administered directly after the task and following a 6 minute recovery period. These questions were written for this study as a direct test of cognitive and affective reactivity to the task. The evoked thoughts question assessed the extent to which a parent thought about his/her child during the task; "please indicate the extent to which you thought about your child's illness during the task", while the elicited distress question measured the degree of distress resulting from evoked thoughts during the task; "please indicate the degree of distress you experienced during the task as a result of thinking about your child's illness." The reference to "illness" was changed to "health" for control subjects.

Physiological: Heart rate and blood pressure were measured throughout the experimental session using an automatic, portable Accutracker heart rate and blood

pressure monitor. Cardiovascular reactivity was used as an index of physiological reactivity to the task. The blood pressure cuff was placed on the subjects' non-dominant arm. Disposable electrocardiograph electrodes were placed on the subjects' lower right and left ribs; the ground electrode was placed on the left collar bone.

Behavioral: Speed and accuracy on the modified Stroop task were used as indices of behavioral reactivity to the task. Increased latency and decreased accuracy may indicate reactivity to distracting stress-related intrusive thoughts. Speed was measured in seconds, accuracy was a function of number of color-naming errors during the task.

Task

For the traditional Stroop task subjects are presented with a series of words printed in four different colors of ink (red, orange, green, & blue). The words on the page are color words (red, orange, green, & blue). For the task, the subject is asked to call out the color in which the words are printed, and to ignore the meaning of the word. If the word "red" is printed in blue ink, the subject is to call out the word "blue." The modified Stroop task consisted of five pages. Two pages were identical in form to the original Stroop task; the words were "red," "orange," "blue," and "green" (Stroop, 1935). The first

modified page (cancer page) contained five cancer-related words, "cancer," "chemo," "brovie," "I.V.," and "counts," each word appeared twenty times, never consecutively. Sixty percent of the words on the second modified page (proportional page) were color words, and the remaining 40% were the cancer words; cancer words were interspersed among the color words throughout the page. The final, control, page contained groups of asterisks (e.g., *****...*****) printed in these same colors.

Task instructions emphasized the importance of accuracy and speed on the task. The order of the pages was as follows: color-word page, cancer page, color-word page, proportional page, asterisks page. It was hypothesized that there would be little competition for information-processing on the asterisks task page, and it was thought that carry-over effects from previous pages might be seen in increased latency and decreased accuracy on this page.

Procedures

The Impact of Events Scale (IES) was mailed to all subjects for completion prior to the experimental session. Approximately two to three months later, the experimental session was conducted in subjects' homes. During the experimental session subjects first completed baseline symptom (SCL 90-R) and mood measures (BMIS) after which they

rested quietly for six minutes, with their eyes closed, during baseline heart rate and blood pressure measures. Following baseline measures, the modified stroop task was administered. Instructions for the modified Stroop task were read by the subject and reviewed with the experimenter.

Immediately following the task, subjects indicated the extent to which they thought about their child's health/illness during the task, and the degree of distress these thoughts caused them. Subjects then completed the BMIS, after which they were asked to rest quietly with their eyes closed for a six minute recovery period. Heart rate and blood pressure measures were taken during this recovery period. Following the rest period, subjects recorded the extent of evoked thoughts and elicited distress during the rest period. Subjects were then debriefed and paid \$10.00 for their participation.

Statistical Analysis

Analyses of variance (ANOVA) were used to investigate baseline measures of distress. Data analyses were then directed at behavioral indices of reactivity (task latency and accuracy). Psychological and physiological reactivity to the modified Stroop task were analyzed using repeated measures ANOVA. Post hoc comparisons of group differences were performed where

indicated using procedures designated by Duncan. Relationships among variables were further analyzed using multiple regression/correlation techniques (Cohen & Cohen, 1983).

RESULTS

Thirty-one subjects (11 control and 20 experimental) participated in this study. Data for two experimental subjects were not analyzed because they were not native English speakers, consequently, their latency scores were uninterpretable. Two other subjects (1 control, 1 experimental) admitted, after the task, to being color-blind, thus their data was also not analyzed. Data analysis was performed on 10 control and 17 experimental subjects. Two experimental subjects and 3 control subjects were African-Americans, the remainder of the subjects were Caucasian.

Division of Experimental Group

To investigate the relationship between degree of stress, as measured by frequency of intrusive thoughts, and reactivity to reminiscent stimuli, the experimental group (n=17) was divided in two. Group division was based on the median intrusion subscale score on the IES. Subjects with intrusion scores less than 18 were placed in the low IES

group (n=8), subjects in the high IES group (n=9) scored equal to or greater than 18 on this subscale. A mean of 18 on the intrusion subscale in the high IES group is a high score, yet it is lower than that seen in patient populations such as Vietnam veterans with PTSD, and outpatients suffering from parental bereavement (M=25.6, McFall, Smith, Roszell, Tarver, & Malas, 1990, and M=21.2, Zilberg, Weiss, & Horowitz, 1982, respectively).

Division of the experimental group into two groups resulted in the predicted profile (see Figure 1). Univariate ANOVA's indicate significant group differences on IES subscale scores, including intrusion, and avoidance behavior, $F(2,24)=37.12, p<.001$, & $F=12.78, p<.001$, respectively. Experimental subjects report more frequent intrusive thoughts than do control subjects, Duncan, $p<.05$. Further, high IES subjects' reports of intrusive thoughts and avoidance behaviors were significantly greater than those reported by either the control or low IES groups, Duncan, $p<.05$.

Insert Figure 1 about here

Baseline Differences

Univariate ANOVA's were used to assess baseline differences in distress. There were no significant group differences at baseline (see Table 1). However, there was a trend for global distress and eight of the nine SCL 90-R subscales to be the highest in the high IES group (see Table 1).

 Insert Table 1 about here

Task Latency & Accuracy

Contrary to prediction, there were no group differences in latency to name color words or cancer words across groups (see Table 1). With respect to accuracy, few mistakes were made by subjects, resulting in no significant group effect. No performance deficits were predicted by group, age, gender, or race.

Reactivity

Psychological Reactivity: Group differences in psychological reactivity were investigated with repeated measures ANOVA's. There was a significant group difference in both evoked thoughts, $F(2,24)=10.9$, $p<.001$, and elicited

distress, $F(2,24)=5.0$, $p<.02$, but the time and group x time interactions were not significant (see Figure 2). As predicted, the high IES subjects thought more about their child's illness, and were more distressed as a result of these thoughts immediately after the task than either the low IES or the control subject groups (Duncan, $p<.05$). However, following the task, having sat quietly, with their eyes closed for a period of six minutes, both sets of experimental subjects (low IES and high IES) reported greater evoked thoughts and elicited distress than did the control subjects (Duncan, $p<.05$). Frequency of intrusive thoughts, two months before the experimental session, distinguished between degree of susceptibility to intrusive thoughts and degree of thought-related distress immediately following the modified Stroop task. However, once subjects had been asked about their intrusive thoughts and resulting distress and asked to sit quietly with their eyes closed, parents of children with cancer, regardless of level of spontaneous intrusive thoughts, thought about and were distressed by thoughts about their child's illness.

Insert Figure 2 about here

Changes in mood produced by the task were investigated with repeated measures ANOVA, covarying for baseline mood (see Figure 3). There were no significant effects for any of the four mood subscales across group or time. However, there was a trend for negative mood to increase in the high IES group and decrease in the control and low IES groups following the task, $F(2,23)=3.12, p<.06$. The lack of group differences in mood indicates that mood did not contribute to evoked thoughts and elicited distress following the task.

Insert Figure 3 about here

The relationship between frequency of intrusive thoughts and task reactivity immediately following the task as well as after the recovery period was investigated using multiple regression techniques. Hierarchical regression analysis indicated that both group and IES score, with the effects of group removed, accounted for a significant portion of the variance in evoked thoughts and elicited distress (see Table 2). Group and total IES score each contributed significantly and individually to the variance

accounted for in evoked thoughts and elicited distress. The greater the frequency of intrusive thoughts and avoidance behaviors (reported 2 months prior), the greater the evoked thoughts and elicited distress. Global distress, measured by the SCL 90-R, did not significantly predict any of the variance in cognitive or affective reactivity to the task.

Insert Table 2 about here

Physiological Reactivity: Repeated measures ANCOVA, covarying for baseline, was used to investigate task effects on systolic blood pressure, diastolic blood pressure, and heart rate (see Figure 4). Measures taken during the baseline and recovery period were averaged, and one reading was taken during each task page. There were no baseline group differences for systolic and diastolic blood pressure, or heart rate.

Insert Figure 4 about here

Systolic blood pressure was vulnerable to group, time, and group x time effects. Systolic blood pressure increases were highest in the control subjects, while systolic blood pressure was relatively stable and differences relatively indistinguishable in the two experimental groups, $F(2,23)=5.24$, $p<.01$. Diastolic blood pressure and heart rate were not significantly different across groups; there was a main effect of time for both measures which translated into an increase at the beginning of the task followed by a decline in diastolic blood pressure and heart rate reactivity, $F(6,143)=12.24$, $p<.001$, and $F(6,144)=3.84$, $p<.001$.

DISCUSSION

This study was conducted to assess the relationship between initial degree of distress and subsequent task reactivity. We also tested the hypothesis that behavioral, cognitive, affective, and physiological reactivity to intrusive thoughts can be measured with a modified version of the Stroop task. In a sample of parents of children with cancer and parents with healthy children, we found cognitive and affective reactivity to the modified Stroop task. However, subjects showed little evidence of behavioral reactivity to the modified Stroop task, as measured by task

latency and accuracy on the cancer and proportional word pages. As hypothesized, degree of self-reported distress significantly predicted cognitive and affective reactivity to the task. Physiological reactivity was less robust and more difficult to interpret.

The modified Stroop task proved to be an effective vehicle for exposure to reminiscent stimuli. Parents of children with cancer reported more illness-related thoughts following the task than parents of healthy children reported thoughts about their child's health. As hypothesized, the task differentiated between gross levels of intrusive memory experience. Subjects reporting more frequent or bothersome intrusive thoughts responded differently than did subjects who reported less frequent or bothersome intrusive experiences. This sample, unlike those used in prior studies of Modified Stroop instruments (Foa et al, 1991; McNally et al, 1990), did not include subjects diagnosed with PTSD, yet the reactivity gradient (although of a cognitive and affective instead of a behavioral nature) is similar. Degree of trauma or stressor-related distress was associated with degree of task-related distress. Although frequency of intrusive thoughts was associated with task-related thoughts and distress, it was inversely related to systolic blood pressure during the task. Control subjects

with healthy children showed the largest blood pressure increases during the task. Contrary to prediction, frequency of intrusive thoughts did not predict performance decrements on the modified Stroop task.

There are several possible explanations for the lack of performance differences across groups. First, subjects in this study were not task naive, as they had completed unmodified Stroop tasks as part of an earlier study. Subjects in the longitudinal study have reported developing "strategies" to get faster on this task, it is, therefore, possible that one "strategy" is a technique perfected to help the subject ignore the text on the page. These Stroop-oriented coping techniques may have allowed subjects with seriously ill children to minimize the impact of the evocative stimuli and "make up" the deficit in performance shown by other groups. However, this would also suggest that control subjects should show better performance unless performance is near ceiling.

Degree of distress in this sample may also be reflected in the lack of performance differences. Experimental subjects in this study were distressed, as exhibited by their IES scores and their reports of depressive symptoms, but they did not have PTSD. McNally et al. (1990) and Foa et al. (1991) only found a task latency

effect between subjects diagnosed with PTSD and control subjects. If one assumes that diagnosable PTSD is a more severe chronic stress reaction than is non-PTSD, it seems likely that more pathological forms of chronic stress would be associated with a greater degree of symptomatology.

Another possibility is that McNally et al. (1990) and Foa et al. (1991) may not have measured reactivity to intrusive thoughts with their task. These researchers hypothesized that poorer performance by subjects with PTSD was a reflection of intrusive thoughts during the task, but did not measure frequency or degree of intrusive thoughts during the task. These effects could have occurred as a function of stress aftereffects (e.g. Cohen, 1980). In the McNally et al. (1990) and Foa et al. (1991) studies, the trauma page was always presented last, in order to control for a practice effect. In addition to intrusive thoughts, stress and other PTSD symptoms (autonomic hyperarousal, hypervigilance, sleep difficulties, and concentration difficulties) could have contributed to poorer task performance and lower stamina than the comparatively less-stressed control groups. Performance decrements seen in the McNally et al. (1990) and the Foa et al. (1991) studies may then be due to overall task demands, and not intrusive thoughts.

The paradoxical relationship between task-related evoked thoughts, elicited distress, and systolic blood pressure effects may be due to a number of factors. Evoked thoughts and elicited distress may have interacted with task demand characteristics, or this cardiovascular profile may be representative of successfully coping with a chronic stressor. The modified Stroop task may have been appraised differently by the control and experimental groups, resulting in differing cardiovascular reactivity profiles (c.f., Obrist, 1981). Subjects in the control group may have responded to the modified Stroop task as an active challenge, whereas subjects with sick children may have responded to the passive aspects of the task, such as responsivity to involuntary activation of illness-related memories. That the cardiovascular profile seen in the present study isn't as robust as that seen in the active/passive paradigms, may be the result of an artifact inherent in the active/passive studies where active tasks involve speech and passive tasks do not. Furthermore, investment in the modified Stroop task was not assessed, but it may be that parents in the control group, uninhibited by illness-related intrusive thoughts, were able to concentrate on the challenge offered by the task. It is those subjects who report attentional and emotional preoccupation with

their child's illness during the task who, physiologically, react the least; perhaps due to a lack of investment in task performance.

The experimental group's stress profile may also explain the apparently paradoxical relationship between evoked thoughts and physiological reactivity. Little is known about chronic stress profiles; just as qualitatively different acute stressors result in different response profiles, qualitatively different chronic stressors may so too differ. This experimental sample most closely resembles "perfect" chronic stress, as defined by Baum, O'Keeffe, & Davidson (1990). In the case of the experimental group in this study, the stressor itself (having a child with cancer) is a continuing event, the threat (the child's illness) is unabating, and responding (as seen in depressive symptoms, frequency of intrusive thoughts, and emotional vulnerability to these thoughts) persists over time. It may be that the high IES group has physiologically adapted to these frequent and emotionally distressing intrusive thoughts. The apparent decoupling of physiological and emotional reactivity in this sample, may be an adaptive response to a "perfect" chronic stressor that will, truly, not go away.

The results of this study highlight the role of intrusive thoughts in chronic stress responding. A mild,

reminiscent stimulus succeeded in evoking stressor-related thoughts in experimental subjects and these thoughts were associated with emotional distress. It may well be the case that reminiscent stimuli in the "real world" evoke an integrated stress response in these subjects. Although cognitive and affective reactivity during the experimental session were not associated with behavioral or physiological indices of reactivity, frequent intrusive thoughts may, nevertheless, have long term health consequences. For example, the trend toward elevated symptoms of depression, reporting of interpersonal difficulties, and alienation was significantly associated with the variance in evoked thoughts and distress among experimental subjects. Depression, lack of social support, and loneliness have been directly linked to immunosuppression and indirectly linked to health through their effects on choices of coping strategies (Glaser, Rice, Sheridan, Fertel, Stout, Speicher, Pinsky, Kotur, Post, Beck & Kiecolt-Glaser, 1987; Glaser, Kiecolt-Glaser, Speicher, & Holliday, 1985; Kiecolt-Glaser, Garner, Speicher, Penn, & Holliday, 1984). Palliative coping mechanisms such as alcohol use, illicit drug use, smoking, and overeating, may more likely be chosen than active coping mechanisms by depressed populations. Furthermore, depression and alienation are comorbidly

associated with various pathological disease states such as chronic fatigue syndrome and post-traumatic stress disorder (Keane, Wole, & Taylor, 1987; Wessley & Powell, 1989). Given the frequent occurrence of intrusive thoughts in traumatized populations, and its association with psychological distress and potential health impact, future research should assess the relationship between intrusive thoughts and various aspects of chronic stress including coping choices and physiological reactivity to intrusive memories in different populations suffering from chronic stress.

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IMPACT OF EVENTS SCALE BY IES

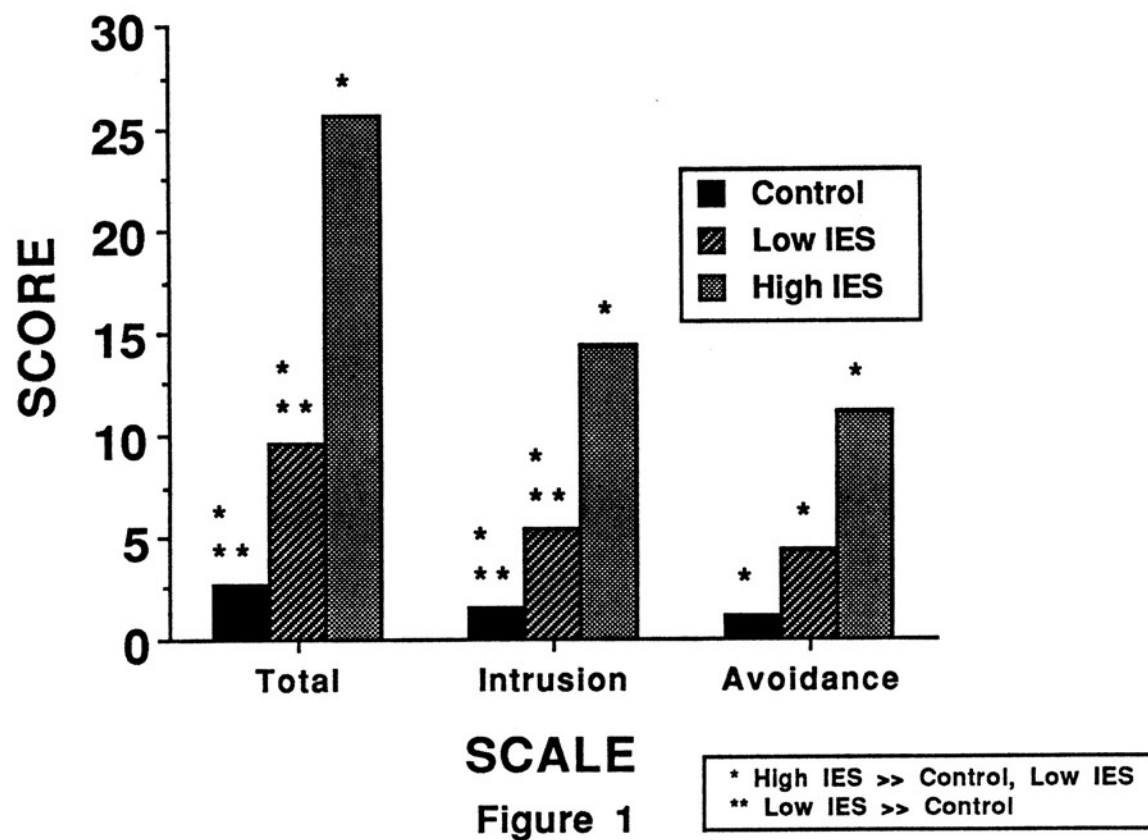
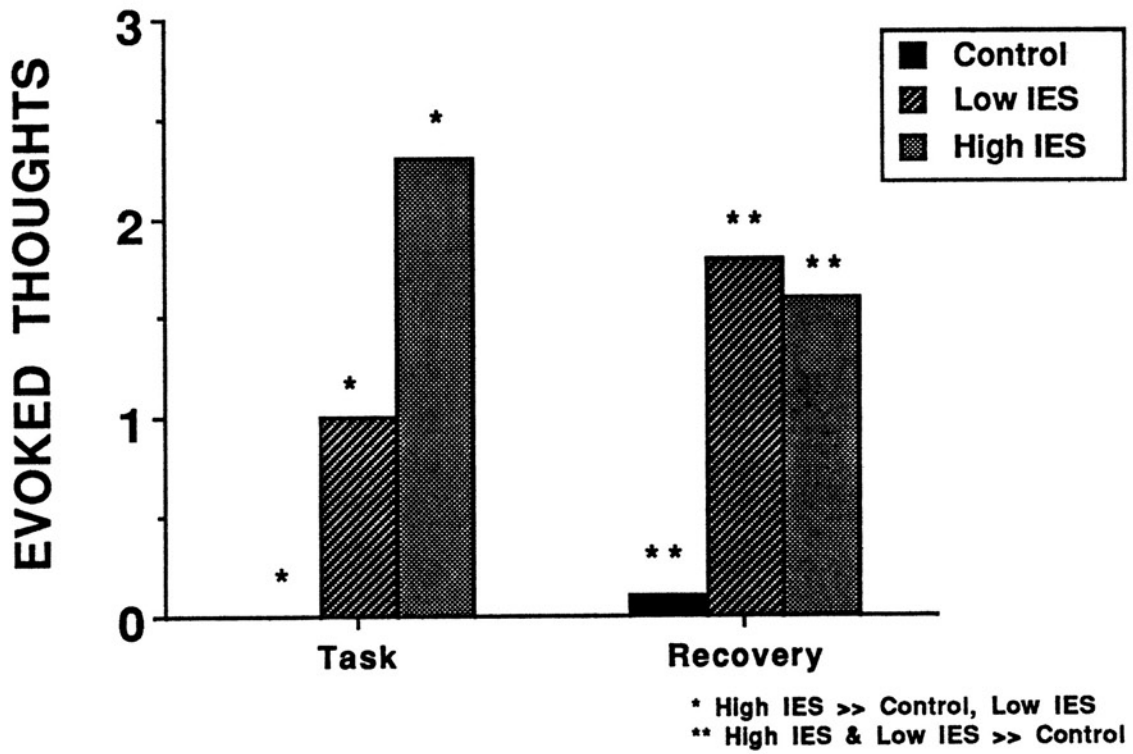


Table 1: Mean Baseline Intensity of Symptom Distress, and Task Performance

<u>Measure</u>	<u>CONTROL</u>		<u>LOW IES</u>		<u>HIGH IES</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
<u>SCL 90-R</u>						
Global Distress	23.6	26.0	20.86	21.4	38.33	26.8
Somatic	.25	.18	.18	.25	.43	.24
Concentration	.44	.48	.33	.29	.67	.47
Interpersonal	.25	.25	.22	.24	.58	.47
Depression	.32	.45	.32	.41	.57	.42
Anger	.17	.24	.20	.23	.31	.32
Anxiety	.31	.28	.26	.41	.35	.29
Fear	.16	.28	.00	.18	.11	.20
Suspiciousness	.39	.66	.19	.20	.39	.45
Alienation	.08	.19	.11	.21	.12	.12
<u>Task Performance</u>						
Latency						
Color-Word 1	107.2	21	91.37	17	110.7	22
Cancer	86.0	20	75.6	8	84.9	12
Color-Word 2	107.2	25	99.7	15	116.5	21
Proportional	101.9	18	85.1	21	101.0	24
Asterisk	67.8	18	56.6	6	70.6	14
Accuracy	99.8	.4	99.9	.2	100.0	.0



ELICITED DISTRESS BY IES

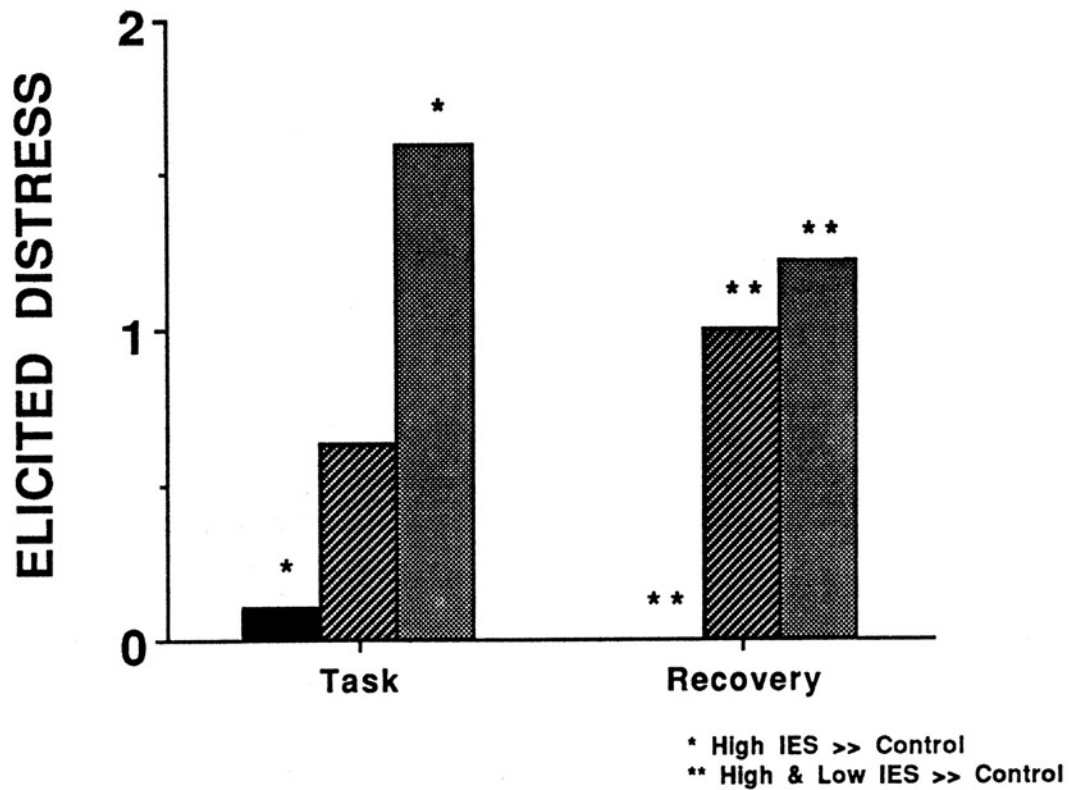
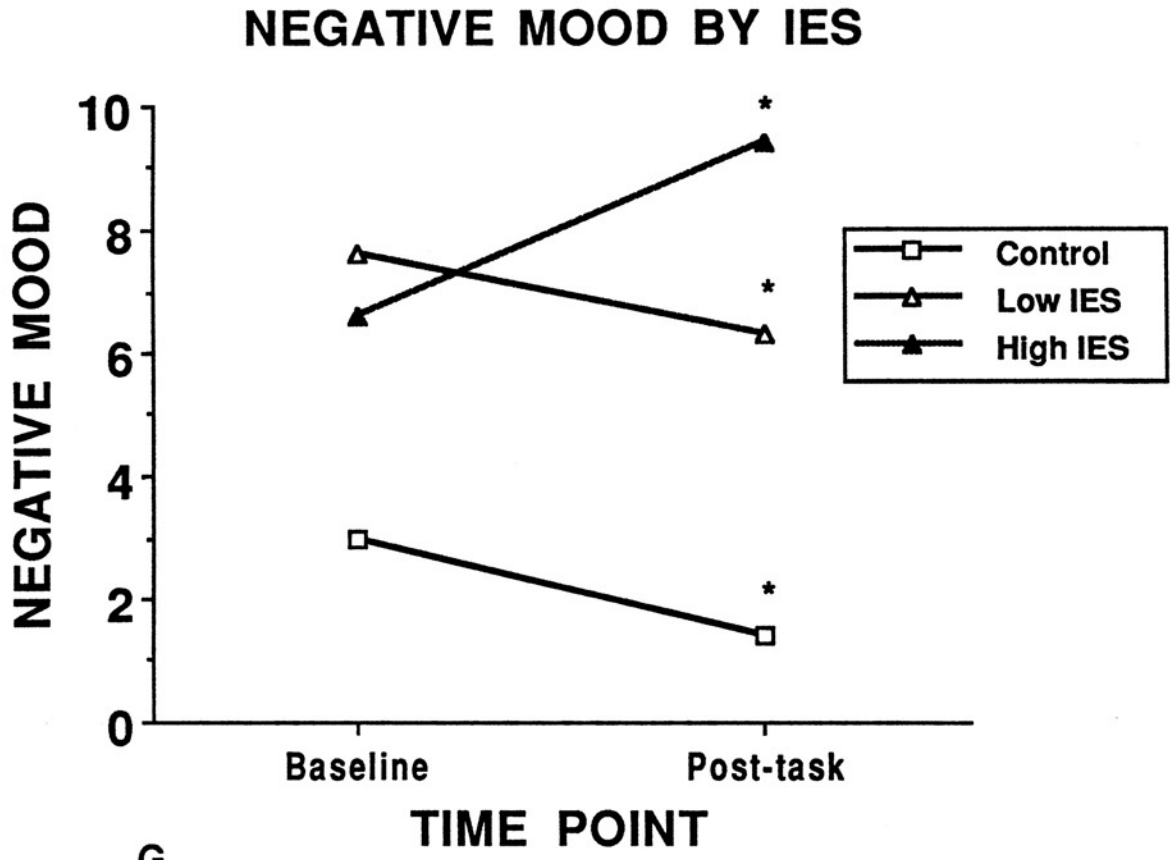


Figure 2



G

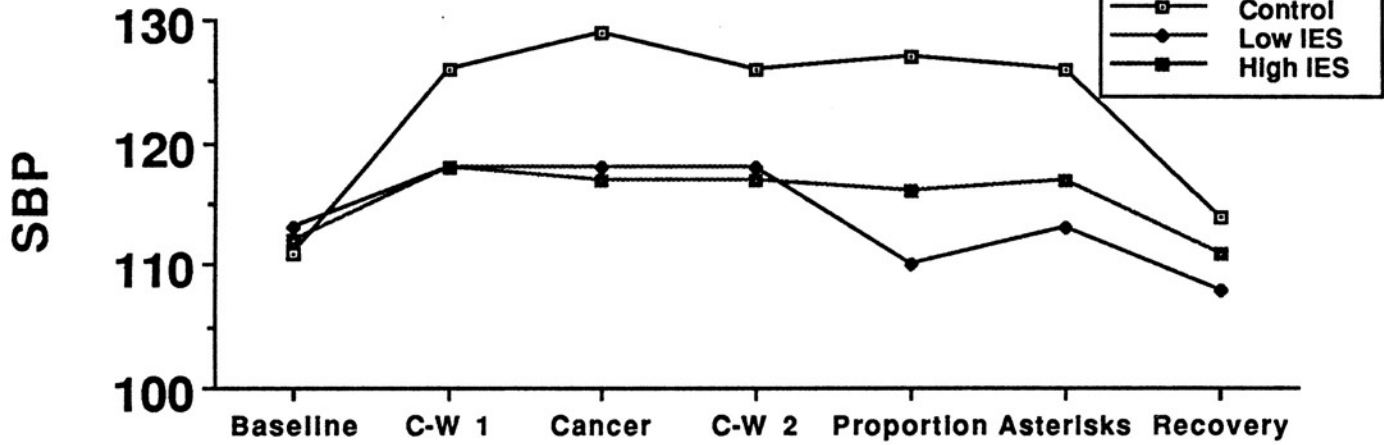
Figure 3 * High IES >> Control, Low IES

Table 2: Partialled Variance in Evoked Thoughts and Elicited Distress

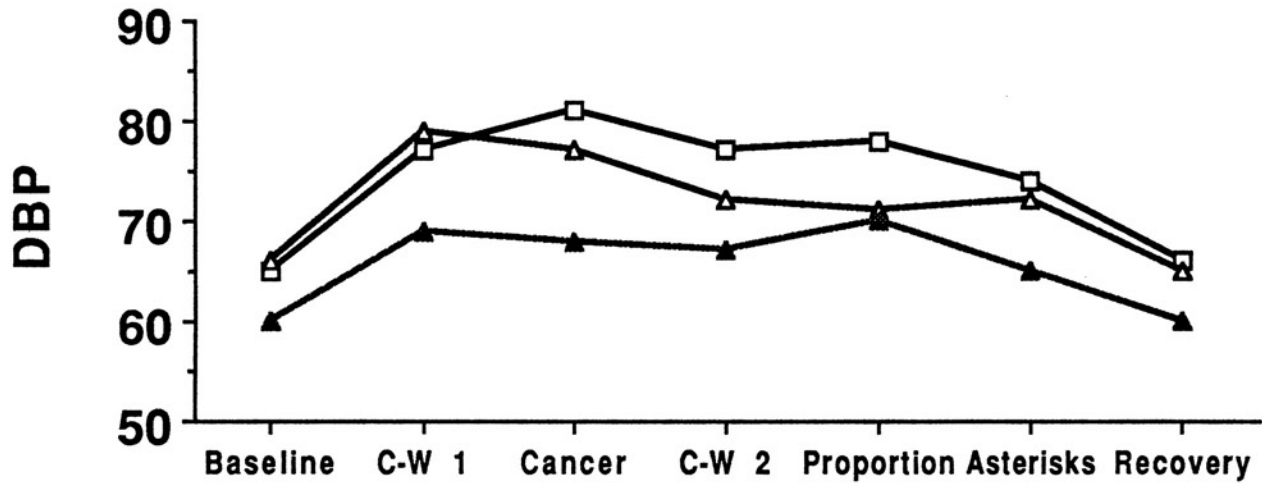
<u>Measure</u>	<u>Group (R²)</u>	<u>Total IES Score (R²)</u>
Post-Task:		
Evoked Thoughts	.31**	.16**
Elicited Distress	.16*	.17*
Post-Recovery:		
Evoked Thoughts	.34*	.02
Elicited Distress	.26*	.24*

* $p < .001$ ** $p < .01$

SYSTOLIC BLOOD PRESSURE BY IES



DIASTOLIC BLOOD PRESSURES BY IES



HEART RATE BY IES

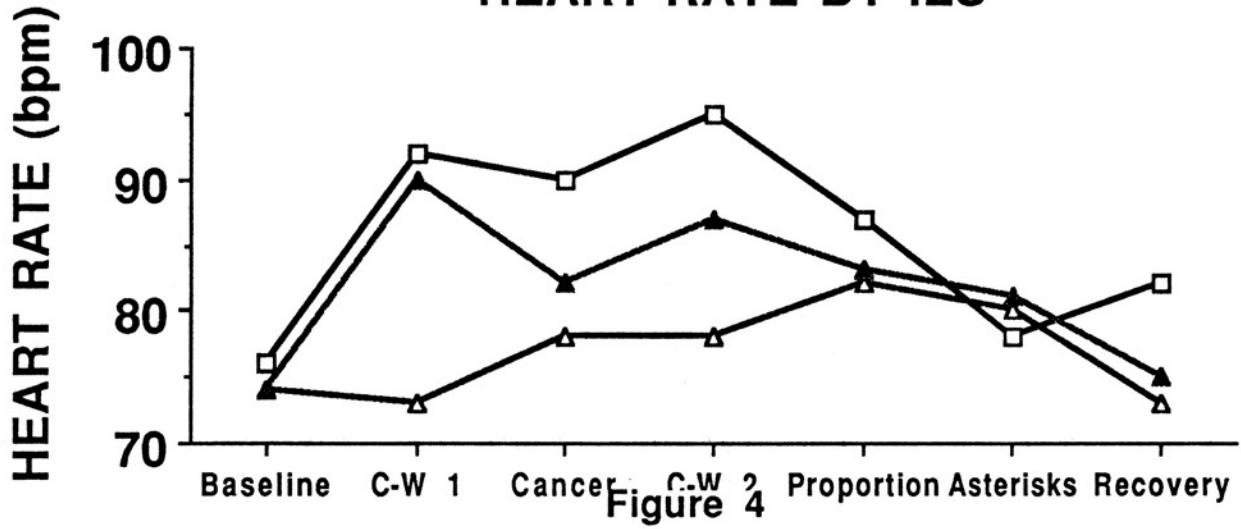


Figure 4