

An Examination of Type of Distracter Used in Suppression Efforts As A Potential
Moderator of the Relationship Between Thought Suppression and Preoccupation With
Previously Suppressed Thoughts

by

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(ABSTRACT)

Findings from numerous laboratory studies on thought suppression suggest that engaging in deliberate thought suppression may lead to the ironic effects of becoming preoccupied by the very same thoughts one wishes to avoid. Based on the results of these laboratory studies, a sophisticated model of thought suppression (i.e., Ironic Process Theory) has been developed. It has been argued that Ironic Process Theory can inform our understanding of the processes involved in the development and maintenance of clinical disorders such as PTSD. Unfortunately, to date, several important issues that are relevant to the successful application of this model specifically to PTSD have not been explored in detail. One such issue has to do with whether different types of thought suppression strategies that use different types of distracters lead to different levels of preoccupation.

The current investigation examined whether the use of minor worries as distracters would lead to greater levels of preoccupation than the use of positive thoughts (Study 1). Eighty-one female undergraduates were assigned to one of three experimental conditions (suppress-worry, suppress-positive, control). Those in the suppression groups were asked to distract themselves from target thoughts using minor worries vs. positive thoughts whereas the participants in the control condition were asked to think about anything they liked. This was followed by instructions to think about anything for all three groups. Results indicated that although the two suppression groups differed on later preoccupation with previously suppressed thoughts, they did not do so in a significant manner. Study 1 also examined the potential mediating role of mental load when mental load is measured. No support for the mediational role of mental load was found.

Study 2 further investigated the mediational role of mental load, this time through experimental manipulation. Forty female undergraduates were assigned to one of four experimental conditions (suppress-worry/no load, suppress-worry/load, suppress-positive/no load, suppress-positive/load). The same instructions used in Study 1 were given with the addition of a 10-digit number-recall task for those in the load condition. No support for the mediational role of mental load was found. Results are discussed in relation to theory and practice.

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I. General Introduction

According to the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV; American Psychiatric Association [APA], 1994), a trauma is defined as “an event that involves actual or threatened death or serious injury, or a threat to the physical integrity of self or others” (p. 427). Further, the traumatic event elicits an extreme emotional response that includes intense fear, helplessness, or horror. The psychological syndrome most often associated with such a traumatic experience is called Post Traumatic Stress Disorder (PTSD).

Research on the prevalence of lifetime exposure to traumatic events indicates that a significant portion of the U.S. population has experienced a trauma. For instance, in a large national comorbidity survey, 60.7% of the men and 51.2% of the women reported having experienced at least one trauma in their lifetime (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Further, estimates of lifetime PTSD in the general U.S. population have been found to be as high as 10 % (Breslau, Davis, Andreski & Peterson, 1991). The cost of PTSD to the individual and the society can be highlighted by findings from epidemiological studies: For instance, PTSD sufferers in the Epidemiological Catchment Area (ECA), North Carolina study were found to experience significantly more job instability and psychiatric comorbidity than the general population (Davidson, Hughes, Blazer, & George, 1991); additionally, people who have been exposed to trauma at an early age have been found to utilize the health care system up to three or more times more often than the rest of the general population (Saxe, Chinman, Berkowitz, & Hall, 1994).

Although PTSD is a common disorder with a significant cost to the individual and the society, important gaps exist in our understanding of the development and maintenance of this disorder on the one hand, and its prevention and treatment on the other. For instance, we do not have a clear understanding of why only some people exposed to trauma will develop PTSD and suffer psychological sequelae whereas others will seemingly recover from the initial acute reaction to trauma. In addition, we are unable to account for the variation in responses to treatment. Even though a number of efficacious treatments of PTSD are now available (see Foa, Keane, & Friedman, 2000 for a review), not all those receiving these treatments evidence a significant remission of their symptoms. In fact, recent research on the persistence of PTSD for those who indeed seek professional treatment found that even with treatment, symptoms remitted

only three years after the traumatic event (Kessler et al., 1995). Recently, investigators have started looking at vulnerability and resilience factors in trying to help explain the noted variation in human response to trauma.

One such vulnerability factor that can help explain this variation is the general tendency to engage in avoidant coping strategies in dealing with the trauma (Helzer, Robins, McEvoy, 1987; McFarlane, 1989). Indeed, avoidance of reminders of the trauma (Davidson et al., 1991) and avoidance of thinking through negative experiences (McFarlane, 1989) have both been found to be associated with chronic PTSD. Further, thought suppression, which can be thought of as a type of cognitive avoidant coping strategy, has been linked with both the development (Morgan, Matthews, & Winton, 1995) and the maintenance of PTSD (Ehlers, Mayou, & Bryant, 1998). Thus, thought suppression has emerged as an important potential vulnerability factor that can help explain some of the observed variation in human response to trauma. Given the potential role of thought suppression in the development and maintenance of PTSD, it becomes critical to understand how it may operate to increase the risk for PTSD.

Over the past 15 years, a large number of studies have been conducted to examine the effects of thought suppression. Although these were laboratory studies using primarily non-clinical participants, the processes that underlie thought suppression are presumed to apply equally well to clinical participants. In fact, recent applications of the thought suppression paradigm to participants with clinical disorders such as PTSD (Shipherd, 2002), Obsessive-Compulsive Disorder (OCD) (Tolin, Abramowitz, Przeworski, & Foa, 2002) and Agoraphobia (Fehm & Margraf, 2002) have provided support for the idea that the negative consequences of thought suppression observed with non-clinical participants in laboratory settings may apply equally well, and in some cases more so to clinical populations.

Findings from laboratory studies on thought suppression suggest that engaging in deliberate thought suppression may lead to the ironic effects of becoming preoccupied by the very same thoughts one wishes to avoid (see Wenzlaff & Wegner, 2000 for a review). Based on the results of these laboratory studies, Wegner (1994) has developed a sophisticated model of thought suppression (i.e., Ironic Process Theory), which he suggested can inform our understanding of the processes involved in the development and maintenance of clinical disorders such as PTSD. Specifically, Wegner has argued that the intrusive thoughts observed in PTSD “occur not only because of the traumatic event itself, but [also] as a result of the fact

that in the aftermath of the event, people may try not to think of the event [i.e., suppress thoughts of the event] or its implications” (Gold & Wegner, 1995, p.1252).

Clearly, laboratory findings on preoccupation with previously suppressed thoughts can potentially have implications for our understanding of clinical disorders such as PTSD that are characterized by repetitive, intrusive thoughts on the one hand, and avoidance of these thoughts on the other. However, to date, several important issues that are relevant to the successful application of this model specifically to PTSD have not been explored in detail. For instance, Wegner has defined thought suppression as a general process that involves distraction from the target thought by thinking about something else. Clearly though, people with PTSD may distract themselves from trauma-related thoughts by thinking *a variety* of different thoughts. Although the general tendency to engage in thought suppression has been found to lead to a preoccupation with previously suppressed thoughts, some (Wells & Matthews, 1994) have suggested that it may be necessary to further distinguish among different types of thought suppression strategies that use different types of distracters. Based on interviews with patients with a range of anxiety disorders (e.g., OCD, GAD, and hypochondriasis) and non-clinical participants, Wells and Davies (1994) found that individuals used a variety of thought control strategies in dealing with intrusive thoughts, some of which included suppressing the intrusive thoughts by using positive thoughts, punishing thoughts, or minor worries as distracters. These findings suggest that when people engage in thought suppression as a way of dealing with intrusive thoughts, they may indeed use different types of distracters in their suppression efforts. Further, it may be that different thought suppression strategies that use different types of distracters may lead to preoccupation with trauma-related unwanted/intrusive thoughts to *differing* extents and thus have *differential* effects in the development and maintenance of PTSD. Indeed, it is conceivable that some thought suppression strategies used in avoiding trauma-related thoughts can be quite successful (See Wells & Matthews, Ch. 10 for a review) whereas others may lead to the same preoccupation observed in laboratory studies.

The purpose of the studies reported here was therefore to examine the potential moderating effects of different types of distracters used in the suppression process and to examine a potential mediator (e.g., mental load) of the relationship between different types of thought suppression strategies that use different types of distracters and preoccupation with previously suppressed thoughts.

II. Wegner's Ironic Process Theory

According to Wegner (1994), attempts at self-control of mental states, such as suppression of intrusive thoughts, involve two processes that function as a feedback unit. The first, a conscious, effortful *operating process*, searches for mental states consistent with the desired state; the second, an unconscious, automatic *monitoring process*, searches for mental states inconsistent with the desired state in order to test whether the operating process is needed. (The monitoring process is unconscious in that the person attempting self-control of mental states is not aware of it). Specifically, in thought suppression, the operating process searches for thoughts other than the thought that is the target of suppression whereas the monitoring process searches for occurrences of the target thought to alert the operating process that a search for new distracters is needed. The monitoring process requires that the unwanted thought be kept accessible at some level so that occurrences of the unwanted thought (and failures in achieving the desired mental state) may be identified and reported to the operating process. Due to its effortful nature, the operating process requires considerable processing capacity, whereas the monitoring process, due to its automatic nature, can function even when processing capacity has been significantly undermined. Under normal conditions (i.e., with a large processing capacity available), the operating process will be far more effective than the monitoring process, resulting in successful suppression of target thoughts. However, when the person voluntarily relinquishes attempts at thought suppression, (and terminates the operating process), the monitoring process will continue to run for a period of time, keeping the target thoughts accessible, and resulting in a surge in the previously suppressed thoughts (i.e., the rebound effect; Wegner, Schneider, Carter, & White, 1987). Additionally, when the person attempts thought suppression under conditions of mental load, the mental load will disable the resource-dependent operating process but leave the monitoring process running, once again leading to an increased accessibility of target thoughts. In sum, according to the ironic process theory, thought suppression will lead to a postsuppression surge in the target thoughts (i.e., the rebound effect) under 2 conditions: when the person relinquishes efforts at suppression and under conditions of mental load.

Wegner also proposes that the small ironic effects of thought suppression observed in laboratory studies can be magnified when they themselves create mental load. For

instance, ironic effects that increase negative affect (Sullivan & Conway, 1989) or increase anxiety or stress (Easterbrook, 1959) will reduce processing capacity and disable the operating process, making it more likely that thought suppression will fail and lead to a postsuppression surge in previously suppressed thoughts. The postsuppression surge in previously suppressed thoughts is in turn hypothesized to lead to greater anxiety and stress (i.e., mental load), disabling the operating process further, and leading to even less successful suppression attempts, and so on. Such a positive feedback system would then be most likely to occur if the increased mental load is accompanied by continued intentions to engage in thought suppression. Thus, the self-loading aspect of thought suppression could explain both how ironic effects can lead to psychopathological extremes and also how some thought suppression strategies (that increase mental load) may be more debilitating in the long run than others (that do not increase mental load). This last point has important implications for identifying variables that may moderate the relationship between thought suppression and preoccupation with previously suppressed thoughts. Specifically, it can be argued that thought suppression strategies that use distracters that are likely to increase anxiety and stress (i.e., mental load) will lead to greater ironic effects than those suppression strategies that use distracters that do not increase anxiety and stress.

Unfortunately, the self-loading aspect of thought suppression has not been empirically tested to date. Examining the self-loading aspect of certain types of thought suppression strategies would minimally require measurement of anxiety and stress – which increase mental load - following suppression efforts. Ideally, however, direct measures of mental load would be used to determine whether certain thought suppression strategies themselves create mental load and lead to even greater levels of preoccupation with previously suppressed thoughts. Unfortunately, “mental load is an ambiguous and often confusing concept” (Jorna, 1992) for which well-established measurement techniques are still lacking (Mulder, 1992). Given the difficulties involved in measuring mental load subsequent to suppression, the self-loading aspect of thought suppression remains an interesting, yet speculative part of the Ironic Process Theory.

III. Empirical Support For The Ironic Process Theory

Over the past 15 years, numerous laboratory studies have been conducted to test the Ironic Process Theory (see Wenzlaff & Wegner, 2000 for a review). Although laboratory studies using neutral or emotional/personally-relevant thoughts as targets of suppression have produced mixed results (see Purdon, 1999; Purdon & Clark, 1997), with studies using neutral thoughts providing support for the rebound effect and studies using personally relevant thoughts not finding support for the rebound effect consistently, recent studies using traumatic/stressful thoughts as targets of suppression have produced much more consistent support for the Ironic Process Theory. The discrepancy in findings between studies using neutral or non-personal stressful/traumatic thoughts and studies using personally-relevant thoughts may in part be explained by participants' ability to process personally-relevant information much more efficiently than personally-irrelevant information. Given these findings, the use of stressful/traumatic thoughts in suppression research is a reasonable approach to take, both in terms of the analogue stressors being not personally relevant and the greater likelihood of analogue stressors eliciting intrusions compared to neutral thoughts.

Although a number of suppression studies have used stressful/traumatic thoughts as targets of suppression, no study to date has examined whether individuals differ in the types of distracters they use in suppressing traumatic/stressful thoughts and whether such individual differences in the types of distracter thoughts used influence the extent to which suppression leads to a preoccupation with the same traumatic/stressful thoughts. Although there is a paucity of research examining the potential moderating role of different types of distracters on suppressing traumatic/stressful thoughts, there is some evidence that inappropriate reliance on ineffective sets of distracters may play a role in suppression failures and resulting preoccupation with intrusive thoughts that are observed in clinical disorders. For instance, in a series of three experiments, Wenzlaff, Wegner and Roper (1988) found that 1) when asked to suppress negative thoughts, depressed college students experienced a later preoccupation with the previously suppressed negative thoughts and that this preoccupation was associated with the use of negative thoughts as distracters in their suppression attempts. Further, (2) although depressed college students acknowledged that positive distracters would be better for suppressing negative thoughts, (3) and their use of positive distracters could be increased somewhat when the experimenters explicitly provided such distracters and made them easily

accessible, depressed subjects were still less capable than non-depressed subjects of using positive distracters in their suppression activities. These results suggest first that there may be individual differences in the use of different types of distracters in suppression activities and that second that such differences may play a role in the extent to which suppression will lead to a later preoccupation with the previously suppressed thoughts. In order to examine whether different types of distracters used in suppression lead to different levels of preoccupation with previously suppressed thoughts and to test the hypothesis that such differences may be mediated by changes in levels of mental load, an instrument is needed which can assess individual differences in the types of distracters people use in trying to control their intrusive, unwanted thoughts.

IV. Distinguishing Among the Different Thought Suppression Strategies

Recently, some investigators (Wells and Davis, 1994) have sought to further delineate the different strategies people use in trying to suppress their unwanted thoughts.

Wells and Davis (1994) developed a thought control questionnaire (TCQ) designed to assess the different thought control strategies people might use in coping with their unwanted, intrusive thoughts. The TCQ has been validated in both clinical and nonclinical samples and has good reliability and validity. This instrument has 5 subscales that tap into positive and negative thought control strategies. The “distraction” subscale items measure the extent to which the respondent uses positive thoughts to distract himself/herself from unwanted thoughts (i.e., I think pleasant thoughts instead). The “reappraisal” subscale items measure the extent to which the respondent focuses on the thought to make sense out of it (i.e., I challenge the thought’s validity). The “social control” subscale items measure the extent to which the person discloses the unwanted thoughts to others (i.e., I talk to a friend about the thought). The “punishment” subscale items measure the extent to which the respondent uses punishing thoughts to distract himself/herself from the unwanted thought (i.e., I tell myself that something bad will happen if I think the thought). Finally, the “worry” subscale items measure the extent to which the respondent tries to distract himself/herself from the unwanted thoughts by thinking of other worry-like thoughts (i.e., I think about past worries instead). Clearly the distraction, punishment, and worry thought control strategies can be thought of as different subtypes of thought suppression strategies that use different types of distracters.

Several results from preliminary studies on the reliability and validity of the TCQ are noteworthy: (1) First, all three studies found that subscale correlations were relatively low, suggesting that the TCQ subscales measure empirically distinct dimensions (Fikretoglu & Scarpa, 2003; Reynolds & Wells, 1999; Wells & Davies, 1994), (2) Second, all three studies found that the highest subscale correlation was between punishment and worry strategies (.51, .43, and .27 in the three studies, respectively), and (3) third, the study by Fikretoglu and Scarpa (2003) found that non-clinical undergraduate subjects differ in their use of distraction, punishment, and worry strategies: overall, they report using distraction more often than both punishment and worry, suggesting that there are indeed individual differences in the use of thought control strategies in general, and thought suppression strategies in particular.

Additional results from studies looking at the relationship between these different types of thought control strategies and psychological adjustment have found that in general, punishment and worry strategies are associated with increased depression and/or anxiety (Guthrie & Bryant, 2000; Reynolds & Wells, 1999; Wells & Davies, 1994) as well as increased ASD and PTSD symptomology (Bryant, Moulds, & Guthrie, 2001; Fikretoglu & Scarpa, 2001). Although the correlational nature of these studies preclude drawing firm conclusions regarding causal relationships between the use of these specific thought control strategies and increased mental load, they do raise the possibility that certain types of thought control or thought suppression strategies (e.g., punishment and worry) may lead to increased anxiety, depression, and stress (i.e., mental load).

In the only study to date to examine the relationship between thought control strategies and thought suppression, Guthrie and Bryant (2000) asked survivors of civilian trauma with and without Acute Stress Disorder to monitor their trauma-related thoughts for three 24-hour periods. In the first 24-hour period, all participants were instructed to think about anything. In the second 24-hour period, participants were given suppression or nonsuppression instructions. In the final 24-hour period, all participants were once again asked to think about anything. All participants were administered the TCQ before the first 24-hour period. Participants monitored the number of trauma-related thoughts they experienced during each 24-hour period; in addition, they subjectively rated how frequently they experienced trauma-related thoughts within each 24-hour period. Results of this study suggested that the use of punishment and worry strategies was positively correlated with subjective ratings of anxiety

and trauma-related thought frequency over the three experimental periods and positively correlated with subjective ratings of attempted suppression over the second and third experimental periods. Additionally, the distraction strategy was positively correlated with the number of trauma-related thoughts (but not subjective ratings of trauma-related thought frequency). Taken together these results provide some support for the idea that punishment and worry strategies may produce failures in successfully suppressing traumatic thoughts and that such failures may indeed lead to greater continued attempts at suppression. Unfortunately, one of the limitations of this study is that thought control strategies were assessed before the experimental task and thus provide no information on whether the specific thought control strategies used *during* suppression of intrusive, traumatic thoughts are identical to the ones used generally with any kind of intrusive thought.

In summary, although preliminary studies on different thought control strategies and their relationship to anxiety and stress on the one hand, and suppression efforts on the other, provide some support for the idea that different thought suppression strategies may lead to different levels of preoccupation with previously suppressed thoughts, no study to date has examined whether the punishment and worry suppression strategies used specifically during the suppression of traumatic thoughts do indeed lead to increased mental load and whether the resulting increased mental load does indeed lead to increased preoccupation with previously suppressed thoughts. The main purpose of the set of studies reported here was to examine these hypotheses.

IV. Hypotheses

The primary goal of this set of studies was to examine whether the type of distracter used in suppression efforts moderates the relationship between thought suppression and consequent preoccupation with previously suppressed thoughts (Hypothesis 1). Additionally, this set of studies attempted to examine whether the hypothesized relationship between the type of distracter used in suppression efforts and later preoccupation with previously suppressed thoughts is mediated by mental load (Hypothesis 2). The two hypotheses tested in these studies were specifically:

- 1) The use of minor worries as distracters will lead to greater preoccupation with the previously suppressed thoughts than the use of positive thoughts (Study 1).

- 2) The use of minor worries as distracters will lead to greater mental load than the use of positive thoughts (Studies 1 and 2).
- 3) Greater mental load will lead to greater preoccupation with the previously suppressed thoughts (Studies 1 and 2).

Pilot Study

Purpose: The main purpose of the pilot study was to identify a film segment that would be perceived as stressful by most university students and could be used in subsequent studies to elicit intrusive thoughts. Additionally, this study sought to identify typical positive thoughts and minor worries used by undergraduate students in their efforts to not think about such films in order to provide participants in subsequent studies with examples of positive thoughts and minor worries.

Method for Pilot Study

Participants: Participants were 36 (6 male and 30 female) undergraduate students recruited from the introductory psychology subject pool at Virginia Tech.

Procedures: Participants were asked to watch three brief film segments taken from the “Life Against Death” reality video collection. Film 1 was about a fire that broke out during a soccer game. The film began with the commentator making remarks about the ongoing soccer game. This was soon followed by the commentator noticing a fire in the stands. The remainder of the film showed the fire spreading quickly and engulfing the whole stadium, people trampling each other in trying to get out of the stadium, and spectators and policemen catching on fire. Film 1 ended with the commentator reporting that fifty-two people had died in this stadium fire. Film 2 was about a stuntman attempting to escape from a coffin. The film began with the stuntman being handcuffed and placed in a glass coffin and then the coffin being lowered into a pit and covered with dirt and concrete. This was followed by the apparent collapse of the coffin and attempts to withdraw the stuntman from the dirt and concrete covering him. The film ended with the stuntman being successfully withdrawn from the pit while he was alive. Finally, Film 3 was about a hand-gliding accident. The film began with the glider crashing into a power line and getting stuck in the power lines. This was followed by the hand-glider catching on fire, dangling from the power line and screaming for help. The film ended with volunteers and firefighters removing the severely burned and bloodied glider from the power lines. Each film lasted approximately 2-3 minutes. The order in which the films were presented was

counterbalanced. After watching each film, the participants rated the extent to which they felt distressed (1= not at all distressed to 10=extremely distressed), as well as the valence, arousal, and control dimensions of their mood (i.e., happy-unhappy (1=happy, 3=neutral, 5=unhappy), excited-calm (1=excited, 3=neutral, 5=calm), and controlled-in-control (1=controlled, 3=neutral, 5=in-control) respectively). Additionally, participants gave 5 examples of positive thoughts and 5 examples of minor worries they might use in their efforts to not think about such films.

Results and Discussion for Pilot Study:

Ratings of Distress, Emotional Valence, Arousal, and Control Across the Three Films:

Only five male participants signed up and were run for the pilot study. Given the small number of males in the sample, statistical analyses examining gender differences across the three films were not conducted and only female participants were recruited for subsequent studies. Also, given the small overall sample size, none of the statistical analyses examining differences among the three films reached significance. However, an informal look at the mean ratings of distress, emotional valence, arousal, and control for the three films indicated that participants felt more distressed, unhappy, excited, and controlled after watching Film 1. Therefore, Film 1 was selected to be used in subsequent studies. Descriptive statistics including means and standard deviations for ratings of distress, emotional valence, arousal, and control after watching each of the films are reported separately for females and males in Tables 1 and 2.

Film Order Effects:

In order to determine whether the order in which the films were presented affected the ratings of distress, emotional valence, arousal, and control, 3 separate one-way multivariate analyses of variance (MANOVAs) were conducted for each film with film order as the between subjects factor and ratings of distress, emotional valence, arousal, and control as the four dependent variables. The means and standard deviations for ratings of distress, emotional valence, arousal, and control for each of the film orders are reported in Tables 3 a-c.

For Film 1, no significant differences were found among the three films on ratings of distress, emotional valence, arousal, and control, Wilks' $\Lambda = .500$, $F(5, 30) = 1.050$, $p = .415$. For Film 2, although the MANOVA was marginally significant, Wilks' $\Lambda = .377$, $F(5, 30) = 1.545$, $p = .085$, test of between subjects differences revealed that order made a

difference only for the valence (happy-unhappy ratings). Finally, for Film 3, no significant differences were found among the three films on ratings of distress, emotional valence, arousal, and control. In summary, results for order effects for all three films suggest that in general, the order in which the films were presented did not affect ratings.

Most Commonly Reported Positive Thoughts and Minor Worries:

The examples provided by all thirty-six participants for positive thoughts and minor worries that could be used in distracting oneself from stressful film-related thoughts were grouped into separate categories. Based on informal perusal of responses, approximately ten categories were created for both positive thoughts and minor worries by the author. For positive thoughts, categories included: upcoming vacations, doing something fun by self, doing something fun with others, thoughts of friends, thoughts of significant others, spending time with friends, spending time with family, plans/hopes for the future, and favorite objects. For minor worries categories included: upcoming tests/papers, general academic concerns, financial concerns, relationship problems (roommate problems, significant other problems, family problems collapsed), health concerns, and time management concerns. Given that each participant gave up to five examples each for positive thoughts and minor worries, any given positive thought or minor worry category could potentially be mentioned 180 times (36 participants x 5 examples). An analysis of the most commonly reported categories of positive thoughts revealed that the most commonly reported positive distracters were doing something fun with others ($42/180 = 23.3\%$), doing something fun by self ($27/180 = 15\%$), and upcoming vacations ($26/180 = 14.4\%$). The most commonly reported minor worries were upcoming tests or papers ($49/180 = 27.2\%$), financial concerns ($27/180 = 15\%$), and relationship problems ($22/180 = 12.2\%$). For positive thoughts, 73% of females reported upcoming vacations at least once, 73% reported doing something by self at least once, and 63% reported doing something fun with others at least once. For minor worries, 90% of females mentioned upcoming tests/papers at least once, 80% of females mentioned relationship problems at least once, 63% of females mentioned financial concerns at least once. These examples were therefore used in the instructions given to participants in subsequent studies to help them use positive thoughts versus minor worries to distract themselves from film-related thoughts.

Study 1

Purpose: The purpose of study 1 was to examine 1) whether the type of distracter used in suppression efforts would moderate the relationship between thought suppression and later preoccupation with previously suppressed thoughts, and 2) whether the relationship between type of distracter and preoccupation levels would be mediated by mental load. Specifically, Study 1 tested the hypothesis that 1) the use of minor worries would lead to greater levels of preoccupation with previously suppressed thoughts than the use of positive thoughts (Hypothesis 1), and that 2) the use of minor worries would lead to greater levels of mental load than the use of positive thoughts (Hypothesis 2).

Study 1-Method

Participants

81 female undergraduate students were recruited from the introductory psychology subject pool at Virginia Tech with 27 subjects in each experimental condition. Participant age ranged from 18 to 23. Approximately 63% of participants were Caucasian, 10% Black, 6% Asian, and the remaining were listed as Other. Participants earned one extra credit for their participation and qualified to enter a drawing for monetary prizes of \$30, \$20, and \$10.

Experimental Design

Each participant was run individually. All participants were run by the same experimenter who is also the author of this paper. Participants were randomly assigned to one of three experimental conditions:

1) a suppression condition in which the participants were instructed to suppress thoughts of a traumatic/stressful film for 5 minutes by using positive thoughts as distracters (suppress-positive), 2) a suppression condition in which participants were instructed to suppress thoughts of a traumatic/stressful film for 5 minutes by using minor worries as distracters (suppress-worry), and 3) a mention only control condition in which subjects were asked to think about anything they liked including the film for 5 minutes (control). After this initial phase, all three groups were instructed to think about anything they liked including the film for 5 minutes.

Procedures: The study was advertised on a website that included all ongoing studies in the Psychology Department at Virginia Tech. Additionally, flyers advertising the study were placed on bulletin boards in the Psychology Department. Participants were contacted 24 hours before the experiment by the experimenter to remind them about the experiment and to ask

them to refrain from activities that might affect physiological measures of heart rate and heart rate variability two hours prior to the experiment (See Appendix A for Study 1 Subject Contact Letter). Participants were thus asked to refrain from eating a large meal, consuming caffeinated drinks, exercising vigorously, and smoking before the experiment. The brief descriptions of the study provided on the website, the flyer, and the e-mail reminder were consistent: they described the study as involving watching a brief film and trying to think about or avoid thinking about the film. On the day of the experiment, participants read the informed consent, which contained the same brief description of the study. Participants then filled out a questionnaire designed to assess whether they had engaged in any activities or had any medical conditions that might interfere with physiological measures of heart rate and heart rate variability (See Appendix B for the Medical Screening Questionnaire). Participants then filled out the Thought Questionnaire (TCQ)-General to examine potential pre-experimental group differences on distraction strategies most commonly used in dealing with unwanted, intrusive thoughts (See Appendix C for TCQ-General). After filling out these questionnaires, participants were given five minutes to practice “thinking out loud” using the following modified version of Pope’s (1978) instructions:

This study is concerned with how and what people think. During several periods you will simply be asked to describe your stream of consciousness, to indicate what is going through your mind.

The following ground rules apply to every aspect of the study:

- (1) Measures have been taken to insure your privacy and to guarantee confidentiality concerning your participation in this study. To be specific**
 - (a) you were assigned a number which will be the only identifying mark on all of the data gathering materials.**
 - (b) There is no “key” or master-list linking your name to your subject number or to any of the data-gathering materials.**
- (2) When asked to report on your thoughts, please say out loud whatever information you can on your stream of consciousness at that moment. Your report might include (*but is not limited to*) descriptions of: images, ideas, memories, feelings, fantasies, plans, sensations, observations, daydreams, objects which catch your attention, efforts to solve a problem. There are no restrictions, qualifications, conventions, or expectations: simply report on whatever is going through your mind (whatever you are conscious of or aware of). If you have any questions, please ask.**

After the experimenter left the room, the participant practiced thinking out loud for five minutes. The participant’s responses during this time were tape-recorded. After the five

minutes, the experimenter returned to the room, briefly commended the participant for her efforts and asked her to place heart rate electrodes on her chest area using a diagram on the wall. Participants were then asked to sit back and relax for five minutes. To minimize environmental distracters, the experimenter switched off the lights in the room except for a small lamp and left the room. After this five-minute baseline period, the experimenter returned to the room and asked the participant to watch a brief film (film 1). After the participant watched the film, she was asked to either suppress thoughts of the film (using positive thoughts or minor worries as distracters) or talk about anything she liked for the next five minutes (Period 1). After Period 1, the experimenter returned to the room and asked participants in all three experimental conditions to think about anything they liked for the next five minutes (Period 2). Both for the first and second experimental periods, the participants were also asked to say out loud whatever came to their mind and to press the button on a hand-held counter every time they thought about the film. (See Appendix D for Experimental Protocol for Study 1). At the end of Period 2, the electrodes used for the measurement of heart rate were removed and participants were asked to fill out a questionnaire designed to assess the extent to which they tried to suppress thoughts of film, as well as the extent to which they used positive thoughts versus minor worries in their suppression efforts. This questionnaire served as a manipulation check for the suppression instructions used in the study (See Appendix E for the Rating Form). Finally, participants filled out a modified version of the Thought Control Questionnaire (TCQ)-Film to examine specifically the types of thought suppression strategies they used in attempting to control film-related thoughts. At the end of the experiment, participants were debriefed and thanked for their participation. The whole procedure took approximately an hour.

Measures

Manipulation Check: In order to determine whether the participants followed instructions as administered, a Rating Scale was created for the purposes of this study with three questions. Participants were first asked to rate the extent to which they tried to suppress (i.e., avoid thinking about) thoughts of the film (0 = Did not try to suppress to 10 = Tried to suppress a lot). Participants were then asked to rate the extent to which they used positive thoughts/minor worries to suppress thoughts of the film, if in fact they tried to suppress (0 = Not at all to 10 = A lot).

Pre-Experimental Differences on Thought Control Strategies: In order to determine whether the subjects in the three groups differed in their use of different types of thought control strategies, the TCQ-General was administered at the beginning of the experiment. As discussed previously in this paper, The TCQ has been validated in both clinical and nonclinical samples and has good reliability and validity. The TCQ is a 30-item measure with five subscales: distraction, reappraisal, social control, punishment, and worry. Each subscale has six items. Items are scored (1=never, 2=sometimes, 3=often, 4=almost always). Thus, the minimum possible score is 6 and the maximum possible score is 24 (6 = never, 12 = sometimes, 18 = often, and 24=almost always) on each subscale.

Film-Related Thought Frequency: Film-related thought frequency for Period 1 and Period 2 was determined by the number of times the participants pressed a button on a hand-held counter. Participants were told to press the button every time they thought about the film but were given no further instructions on how to determine what a film-related individual thought unit is. Although counters, bells, and event markers have been repeatedly used in thought suppression studies, it is worth noting that they all have a significant drawback: Participants are left to their own devices in determining what an individual thought unit is. Thus, whereas one participant may press the button once for the same intrusive thought she experiences multiple times in any given time, another participant may press the button every time the thought resurfaces.

Film-Related Thought Duration: Given the inherent difficulty in obtaining thought frequency data, an additional measure of intrusiveness (i.e., film-related thought duration) was obtained. Participants' stream of consciousness was tape-recorded for both Period 1 and Period 2 in order to obtain the total duration of time the participant was preoccupied with film-related thoughts. For film-related thought duration, participants' tape-recorded stream of consciousness responses were transcribed by the experimenter and author of this study and divided into film-related and non-film-related thoughts. Using procedures outlined in McNally and Ricciardi (1996), in order to determine the duration of time spent talking about the film, the cumulative time that a participant discussed the film on the tape was timed. As in McNally and Ricciardi (1996), timing was begun as soon as the participant mentioned a film-related thought on the tape and was stopped only when the participant changed the topic to a non-film-related thought. Thus, "periods of silence that immediately followed the expression of film-

related thoughts were interpreted as periods during which the subject was struggling unsuccessfully to suppress the thought” (p. 20) and were therefore included in the duration. Tape-recorded protocols of nine participants (three from each experimental group) were randomly selected to test the reliability of the coding method. The tapes for these nine subjects were transcribed by two undergraduate students (one male and one female) blind to the experimental condition of the participant. Inter-rater reliability was calculated as the correlation between two raters blind to group assignment. The inter-rater reliability among the three transcribers for Period 1 and Period 2 was excellent, ranging from .953 to .991 for Period 1, and from .951 to .986 for Period 2.

Mental Load: Given the controversy surrounding the measurement of mental load, both physiological and subjective measures of mental load were obtained.

Subjective Ratings of Mental Load: Subjective measures of mental load included two additional questions that were added to the Rating Scale. The first question asked the participants to rate how much mental effort they exerted in trying to suppress thoughts of the film (0 = No effort to 10 = A lot of effort). The second question asked the participants to rate how difficult they found the suppression task (0 = Not Difficult to 10 = Very difficult).

Measurement of Heart Rate Variability As an Index of Mental Load: Mental load was also assessed by measuring heart rate variability (HRV). Specifically, heart inter-beat interval (IBI; for determination of heart rate variability (HRV) was obtained over the course of the experiment. IBI was used to measure mean square successive differences (MSSD), a vagally mediated measure of HRV. Sampling of the heart IBI began immediately after the subject finished practicing the think out loud procedure. IBI was recorded using electrodes attached to the body and collected by a small lightweight device called the Ambulatory Monitoring System (AMS) (Vrije Universiteit, Department of Psychophysiology, Amsterdam, Netherlands). Three electrodes (two active and one ground) were used for measurement of the heart rate. One active electrode was attached to the jugular notch of the sternum, between the collar bones; the other active electrode was attached under the left breast, 4cm under the left nipple. The ground electrode was attached at the right lateral side, between the two lower ribs. The heart rate measurements were downloaded from the AMS device to the computer for further analysis. The AMS software package was used to analyze the physiological signals recorded with the AMS device.

Results for Study 1

Pre-experimental Differences on the TCQ: To examine potential pre-experimental group differences on the type of thought suppression strategy typically used by participants, a repeated measures one-way analysis-of variance (ANOVA) was conducted with group (1=suppress-positive, 2=suppress-worry, and 3=control) as the between-subjects factor and the five subscales of the TCQ as the dependent variables. Four subjects had missing data and were therefore excluded from the analyses. The means and standard deviations for the three groups on the five subscales of the TCQ are reported in Table 4.

The TCQ main and TCQ x Group interaction effects were tested using the multivariate criterion of Wilks' lambda (Λ). The group main effect was tested using a univariate ANOVA. The univariate test associated with the group main effect was non-significant ($F(2, 74) = .200, p > .05$), indicating that the three groups did not differ across the five subscales of the TCQ. The TCQ main effect was significant, $\Lambda = .113, F = 139.706, p = .000$, indicating that participants in this study differed in the extent to which they used different types of thought control strategies. Most importantly, the TCQ x Group interaction effect was non-significant, $\Lambda = .865, F = 1.333, p > .05$, indicating that the differences observed on the five subscales of the TCQ did not vary by experimental group (i.e., that there were no pre-experimental group differences on the types of thought control strategy used by the three groups).

A comparison of group means on the five subscales of the TCQ reveal that in general, participants reported using distraction more than any other strategy in trying to control unwanted, intrusive thoughts in their daily lives (means for suppress-positive, suppress-worry, and control = 17.85, 18.13, and 18.26, respectively). The distraction subscale of the TCQ assesses the extent to which someone uses positive thoughts or behavioral tasks to distract himself/herself from unwanted, intrusive thoughts. These results suggest, therefore, that in general the participants in this study used positive thoughts and behavioral tasks often to avoid unwanted, intrusive thoughts in their daily lives. Participants in this study also reported that additionally they sometimes used social control (means for suppress-positive, suppress-worry, and control = 15.81, 14.96, 14.37, respectively) and reappraisal (means for suppress-positive, suppress-worry, and control = 14.81, 14.96, and 14.33, respectively) thought control strategies in coping with unwanted, intrusive thoughts in their daily lives. The social control and

reappraisal strategies assess the extent to which the person discloses unwanted, intrusive thoughts to others and focuses on the thought to make sense out of it, respectively. Finally, the participants in this study reported in general, they rarely used minor worry (means for suppress-positive, suppress-worry, and control = 10.58, 9.92, and 11.56) and punishment (means for suppress-positive, suppress-worry, and control = 8.62, 8.67, and 9.22, respectively) strategies in dealing with unwanted, intrusive thoughts in their daily lives. The minor worry and punishment strategies assess the extent to which someone uses minor worries or punishing thoughts as distracters in their thought suppression efforts, respectively.

The absence of pre-experimental differences on the TCQ subscales (and most notably the distraction and minor worry subscales) mean that any differences observed among the groups on film-related thought frequency or duration cannot be explained by pre-existing individual differences on the types of thought suppression strategy used. However, the whole sample's preference for using positive thoughts and behavioral tasks to distract themselves from intrusive thoughts in their daily lives, and their infrequent use of minor worries to distract themselves from intrusive thoughts are both noteworthy. Furthermore, for the purposes of this study, this pattern of results raises questions about how well each suppression group was able to implement using positive thoughts versus minor worries to distract themselves from stressful thoughts. Therefore, a paired samples t-test was conducted to examine statistically whether the participants in this study differed significantly in their use of positive thoughts versus minor worries. The results of the t-test were significant ($t(77) = 14.568$, $p = .000$), indicating that there were indeed significant differences in the extent to which participants used positive thoughts versus minor worries in their daily lives.

Manipulation Checks:

In order to examine whether or not the three experimental groups followed instructions as administered, three one-way univariate analysis-of variance (ANOVAs) were conducted with group as the between-subjects factor and the three items on the Rating Form that assessed the extent to which participants 1) suppressed thoughts of the film, 2) used positive thoughts as distracters, and 3) used minor worries as distracters as the dependent variables. The means and standard deviations for the three groups on these three dependent measures are reported in Table 5.

The ANOVA for suppression ratings was significant ($F(2,78) = 30.254, p = .000$), indicating that the three groups differed in the extent to which they tried to suppress thoughts of the film. The ANOVAs for positive thought ratings and minor worry ratings were also significant ($F(2,78) = 11.552, p = .000$ and $F(2,78) = 20.174, p = .000$, respectively), indicating that the three groups also differed on the extent to which they used positive thoughts and minor worries as distracters. Levene's test of equality of error variances was non-significant for suppression ratings ($F(2, 78) = 2.080, p = .132$) but significant for positive thoughts ratings ($F(2, 78) = 4.405, p = .015$) and minor worry ratings ($F(2, 78) = 9.095, p = .000$), indicating that the variances (4.37, 4.62, and 6.71 for suppress-positive, suppress-worry, control, respectively) for the three groups were somewhat but not drastically different from each other for suppression ratings, and drastically different for positive thought ratings (6.30, 7.62, and 14.14 for suppress-positive, suppress-worry, control, respectively) and minor worry ratings (6.15, 2.19, and 10.30 for suppress-positive, suppress-worry, control, respectively). Given these results, homogeneity of variances was not assumed and a post-hoc comparison test that doesn't assume equal variances among the three groups (Dunnett's C test) was conducted. The results of Dunnett's C tests revealed that for suppression ratings the two suppression groups did not significantly differ from each other (means for suppress-positive and suppress-worry = 7.19 and 7.56, respectively) but that the control group (mean = 3.19) did differ from the two suppression groups. Thus, for suppression ratings, as expected, the two suppression groups reported trying to avoid (i.e., suppress) film-related thoughts significantly more than the control group. The results of the Dunnett's C tests also revealed that for positive thought ratings, the suppress-worry (mean = 4.19) and the control (mean = 4.30) groups differed significantly from the suppress-positive group (mean = 7.70). Thus, for the positive thought rating, as expected, the suppress-positive group reported using positive thoughts as distracters significantly more than the suppress-minor worry and control groups. Finally, the results of the Dunnett's C test revealed that for minor worry ratings, the suppress-positive (mean = 4.93) and the control (mean = 4.59) groups differed significantly from the suppress-worry (mean = 8.48) group. Thus, for the minor worry thought rating, as expected, the suppress-minor worry group reported using minor worries as distracters significantly more than the suppress-positive thoughts and control groups. Overall, these results provide strong evidence that participants in this study followed instructions as administered.

Group Differences on Film-Related Thought Frequency:

In order to determine whether the three groups differed on the extent to which they experienced a change in film-related thought frequency from Period 1 to Period 2, a repeated measures analysis of variance (ANOVA) was conducted with group (1=suppress-positive, 2=suppress-worry, and 3=control) as the between subjects factor and period (i.e., film-related thought frequency during period 1 and period 2) as the dependent measure. Means and standard deviations for Period 1 and Period 2 film-related thought frequency across the three are reported in Table 6 and results are depicted in Figure 1.

The Period main effect and the Group X Period interaction effects were tested using the multivariate criterion of Wilks' Λ . The Period main effect was non-significant, $\Lambda = .996$, $F = .298$, $p = .587$. Most importantly, the Group X Period interaction effect was significant, $\Lambda = .659$, $F = 20.175$, $p = .000$, indicating that the three groups did in fact differ on the change in film-related thought frequency from period 1 to period 2. The effect size for the interaction was small to moderate (.341).

In order to determine whether the observed significant interaction was in part explained by differences between the two suppression groups, pair-wise comparisons among the three groups were conducted for film-related thought frequency change scores (Period 2 minus Period 1). A t-test between suppress-positive and control groups suggested that the two groups differed significantly on changes in film-related thought frequency from Period 1 to Period 2 ($t = 4.937$, $p < .001$), with the control group experiencing a decrease from Period 1 to period 2 and the suppress-positive group experiencing an increase from period 1 to period 2. A t-test between suppress-worry and control groups suggested that the two groups also differed significantly on changes in film-related thought frequency from Period 1 to Period 2 ($t = 6.151$, $p < .001$), with the control group once again experiencing a decrease from Period 1 to period 2 and the suppress-worry group experiencing an increase from period 1 to period 2. Finally, to determine whether the two suppression groups differed from each other, and more importantly to examine whether the suppress-minor worry group experienced a greater increase than the suppress-positive group (hypothesis 1), a t-test between suppress-positive and suppress-worry groups was conducted. The results for the two-sided t-test suggested that the two groups did not differ significantly on increases in film-related thought frequency from Period 1 to Period 2 ($t = -1.242$, $p = .220$). The one-sided test was still non-significant ($p = .110$).

Given the large variances on film-related thought frequency for both period 1 and period 2 film-related thought frequency, a homogeneity of variance test was conducted. Levene's test of equality of error variances was significant for period 1 film-related thought frequency ($F(2, 78) = 3.982, p = .023$) and non-significant for period 2 film-related thought frequency ($F(2, 78) = 2.069, p = .133$), indicating that the variances (18.49, 10.69, and 45.16 for suppress-positive, suppress-worry, control, respectively) for the three groups were significantly different for period 1 and somewhat but not drastically different from each other for period 2 (57.69, 69.39, and 32.83 for suppress-positive, suppress-worry, control, respectively).

Given the unequal error variances across the three groups, a decision was made to exclude subjects that differed more than two standard deviations from the grand mean for Period 1 and period 2 film-related thought frequency. There were four outliers for Period 1, all of whom came from the control group. There were 4 outliers for Period 2, one of whom came from suppress-positive and three of whom came from suppress-worry groups. The repeated measures ANOVA was repeated, this time excluding the outliers. Excluding the outliers led to a non-significant test of homogeneity of variances for both Period 1 and period 2. The interaction term remained significant; however, post-hoc comparisons between the two suppression groups remained non-significant. Another way of dealing with error variance issues is to transform the dependent (repeated) variables. The repeated measures ANOVA using square-root transformations on Period 1 and period 2 frequency data produced similar results.

Group Differences on Film-Related Thought Duration: Tape-recorded protocols of twenty-five participants were inaudible. Therefore, before conducting a repeated measures ANOVA for duration data (see below), a one sample chi-square test was conducted to assess whether the twenty-five tapes were equally distributed across the three groups (suppress-positive, suppress-worry, control). The results of the test were not significant $\chi^2 = .326$, indicating that the inaudible tapes were equally distributed across the three groups.

Additional analyses were conducted, looking at differences between the twenty-five participants whose tapes were inaudible and the fifty-six participants whose tapes were transcribed. More specifically, a repeated measures ANOVA was conducted with tape-group (1=Not OK, 2= OK) as the between subjects measure and period 1 and period 2 film-related

thought frequency as the dependent variables. The main effect for tape group was non-significant, $F(1, 79) = .034$, $p = .853$. The main effect for period was also non-significant, $\Lambda = 1.000$, $F = .030$, $p = .863$, indicating that Period 1 and Period 2 film-related thought frequencies did not differ. Finally, the tape group x period interaction that was of interest was also not significant, $\Lambda = .971$, $F = 2.383$, $p = .127$, indicating that any differences between period 1 and period film-related thought frequency did not vary by tape group.

Finally, an additional repeated measures ANOVA was conducted with tape-group (1=Not OK, 2= OK) as the between subjects measure and the five subscales of the TCQ as the dependent variables. Tape-group main effect was non-significant, $F(1, 75) = .317$, $p = .575$, indicating that the two tape-groups did not differ from each other. The main effect for TCQ was significant, $\Lambda = 130$, $F(4, 72) = 119.995$, $p = .000$, indicating that participants in this study differed on their use of the five subtypes of thought control strategies. Finally, results indicated that the tape-group x TCQ interaction that was of interest was not significant, $\Lambda = .923$, $F = 1.502$, $p = .211$, indicating that the differences observed among the five subscales of the TCQ did not vary by tape group.

In summary, comparisons of participants with and without missing taped protocols indicated that the two groups did not differ in a systematic way from each other.

In order to determine whether the three groups differed on the extent to which they experienced a change in film-related thought duration from Period 1 to Period 2, a repeated measures analysis of variance (ANOVA) was conducted with group (1=suppress-positive, 2=suppress-worry, and 3=control) as the between subjects factor and period (i.e., film-related thought duration during period 1 and period 2) as the dependent measure. Means and standard deviations for Period 1 and Period 2 film-related thought duration across the three are reported in Table 7 and results are depicted in Figure 2.

The Period main effect and the Group X Period interaction effects were tested using the multivariate criterion of Wilks' Λ . The Period main effect was significant, $\Lambda = .660$, $F = 27.313$, $p = .000$. Most importantly, the Group X Period interaction effect was significant, $\Lambda = .519$, $F = 24.560$, $p = .000$, indicating that the three groups did in fact differ on the change in film-related thought duration from period 1 to period 2. The effect size for the interaction was moderate (.481).

In order to determine whether the observed significant interaction was in part explained by differences between the two suppression groups, pair-wise comparisons among the three groups were conducted for film-related thought duration change scores (Period 2 minus Period 1). A t-test between suppress-positive and control groups suggested that the two groups differed significantly on changes in film-related thought duration from Period 1 to Period 2 ($t = 4.993$, $p < .001$), with the control group experiencing a decrease from Period 1 to period 2 and the suppress-positive group experiencing an increase from period 1 to period 2. A t-test between suppress-worry and control groups suggested that the two groups also differed significantly on changes in film-related thought duration from Period 1 to Period 2 ($t = 6.151$, $p < .001$), with the control group once again experiencing a decrease from Period 1 to period 2 and the suppress-worry group experiencing an increase from period 1 to period 2. Finally, to determine whether the two suppression groups differed from each other, and more importantly to examine whether the suppress-minor worry group experienced a greater increase than the suppress-positive group (hypothesis 1), a t-test between suppress-positive and suppress-worry groups was conducted. The results for the two-sided t-test suggested that the two groups did not differ significantly on increases in film-related thought frequency from Period 1 to Period 2 ($t = -1.119$, $p = .270$). The one-sided test was still non-significant ($p = .135$).

Given the large variances on film-related thought duration for both period 1 and period 2 film-related thought duration, a homogeneity of variance test was conducted. Levene's test of equality of error variances was significant for period 1 film-related thought duration ($F(2, 53) = 9.202$, $p = .000$) and non-significant for period 2 film-related thought duration ($F(2, 52) = 2.069$, $p = .133$), indicating that the variances (1105.56, 538.24, and 3449.21 for suppress-positive, suppress-worry, control, respectively) for the three groups were significantly different for period 1 and not significantly different from each other for period 2 (2599.98, 2398.06, and 3996.77 for suppress-positive, suppress-worry, control, respectively). Even though the test of homogeneity of variance was non-significant for period 2, given the small sample size and the associated lack of power, the results of the homogeneity test does not necessarily imply that there are no differences in population variances for Period 1.

Given the unequal error variances across the three groups, a decision was made to exclude subjects that differed more than two standard deviations from the grand mean for Period 1 and period 2 film-related thought duration. There were three outliers for Period 1, all

of whom came from the control group. There were 2 outliers for Period 2, one of whom came from suppression-positive and one of whom came from the control group. Given that outlier from the control group for Period 2 was also an outlier for Period 1, a total of four outliers were identified and excluded. The repeated measures ANOVA was repeated, this time excluding the outliers. After excluding the outliers, the test of homogeneity of variances for Period 1 still remained significant although less so ($F(2, 49) = 4.006, p = .024$). The repeated measures ANOVA Group x Period interaction term remained significant; however, the two-sided test between the two suppression groups remained non-significant ($t = -1.532, p = .134$). There was a trend for significance using a one-sided test ($p = .067$). Square-root transformations on Period 1 and period 2 frequency data produced a significant interaction term for the repeated measures analysis; however, both two- and one-sided tests for group differences between the two suppression groups remained non-significant..

Group Differences on HRV as an Index of Mental Load: Due to equipment failure, nine subjects did not have any physiological data. In order to examine whether the nine participants with missing HRV data were equally distributed across the three experimental groups, a one sample chi-square test was conducted. The results of the test were not significant $\chi^2 = .905$, indicating that the participants with missing HRV data were equally distributed across the three groups.

The remaining 72 were included in the analyses reported below. To examine group differences on mental load, a one-way analysis of variance (ANOVA) was conducted with group as the between subjects factor and heart rate variability (HRV) during Period 1 as the dependent variable. The means and standard deviations are reported in Table 8.

Given that in prior studies HRV has been found to decrease during effortful mental processing or mental load (Mulder, 1992), it was hypothesized that those in the control group would experience the highest HRV, the suppression/worry group would experience the lowest HRV and the suppression/positive group would be somewhere in the middle. The ANOVA was not significant, $F(2, 69) = 1.423, p = .248$, indicating that the three groups did not differ on HRV during the suppression period (Period 1) as hypothesized (Hypothesis 2).

The results also remained non-significant after excluding the twelve participants who had engaged in activities or had medical conditions that could have impacted their HRV.

Given the large variances on HRV during the suppression period (Period 1), a homogeneity of variance test was conducted. There was a trend for the Levene's test of equality of error variances to be significant for HRV during the suppression period (Period 1) ($F(2, 69) = 9.202, p = .077$), indicating that the variances (273.57, 260.50, and 603.19 for suppress-positive, suppress-worry, control, respectively) for the three groups were significantly different. Even though the test of homogeneity of variance did not reach significance, given the small sample size and the associated lack of power, the results of the homogeneity test does not necessarily imply that there are no differences in population variances for Period 1.

Given the unequal error variances across the three groups, a decision was made to exclude subjects that differed more than two standard deviations ($2 \times 19.59 = 39.18$) from the grand mean ($= 39.45$) for Period 1 HRV. There were two outliers, both of whom came from the control group. The ANOVA testing for differences on HRV among the three groups was repeated after excluding the outliers. After excluding the outliers, the homogeneity of variance test was no longer significant ($F(2, 67) = .353, p = .704$); however, the ANOVA still remained non-significant after excluding the outliers, $F(2, 67) = .265, p = .768$. Finally, after observing significant non-normality in the distribution of HRV data, log transformations were conducted and the ANOVA repeated. The ANOVA still remained non-significant.

Group Differences on Subjective Measures of Mental Load: To examine group differences on subjective measures of mental load, two one-way analysis of variance (ANOVAs) was conducted with group as the between subjects factor and effort exerted in suppression efforts and suppression difficulty ratings as the dependent variables. The means and standard deviations are reported in Table 9.

For mental effort exerted in suppression, the ANOVA was significant, $F(2, 78) = 24.014, p = .000$. For suppression difficulty, the ANOVA was also significant, $F(2, 78) = 5.477, p = .006$. Post-hoc analyses using the least significant differences (LSD) conducted to determine the nature of the group differences indicated that for both mental effort exerted in suppression and suppression difficulty ratings, the two suppression groups did not differ significantly from each other. The control group reported significantly lower subjective ratings of mental load in both cases.

Exploratory Analyses for Study 1

Relationship Between HRV and Manipulations Checks/Dependent Measures: Given the pattern of findings observed in Study 1, a number of exploratory analyses were conducted. First, the relationship between HRV and manipulation checks was examined using correlational analyses. The results of the correlational analyses are reported in Table 10. A non-significant negative relationship was observed between HRV and suppression rating. A non-significant positive relationship was observed both between HRV and positive thought rating and HRV and minor worry rating.

Second, the relationship between HRV and Period 1 and Period 2 film-related thought frequency and duration was examined using correlational analyses. The results of these correlational analyses are reported in Table 11. For film-related thought frequency during Period 1, a significant positive relationship was observed between HRV and film-related thought frequency, indicating that as HRV increased film-related thought frequency also increased. Given that higher levels of mental load are associated with lower HRV, and the hypothesis presented at the outset of this study that higher levels of mental load (i.e., lower HRV) would be associated with higher levels of preoccupation, these results go against the predictions. For period 2, a non-significant, positive relationship between HRV and film-related thought frequency was observed.

Finally, the relationship between HRV and Period 1 and Period 2 film-related thought duration was examined using correlational analyses. The results of these correlational analyses are reported in Table 13. For film-related thought duration during Period 1, a significant positive relationship was observed between HRV and film-related thought duration, indicating that as HRV increased film-related thought duration also increased. Once again, given that higher levels of mental load are associated with lower HRV, and the hypothesis presented at the outset of this study that higher levels of mental load (i.e., lower HRV) would be associated with higher levels of preoccupation, these results go against the predictions. For period 2, a non-significant, positive relationship between HRV and film-related thought frequency was observed. Overall, these correlation analyses suggest that in general, the relationship between HRV and preoccupation with film-related thoughts was not in the expected direction for Period 1 and was not significant for Period 2.

Correlations Between Thought Frequency and Duration: Significant positive correlations between period 1 film-related thought frequency and duration (.620 and .431 for suppress-positive and suppress-worry groups, respectively) indicated that film-related thought frequency and duration measures were assessing a similar construct of intrusiveness for the two suppression groups. Significant positive correlations between Period 2 film-related thought frequency and duration provide further support for this idea (.717 and .365 for suppress-positive and suppress-worry groups respectively).

Power Analysis: A power analysis was conducted to determine the number of participants that would be needed per experimental group in order to detect the observed effect size of .341 (for the interaction term from film-related thought frequency analyses) at the $\alpha = .05$ level. Using power = .80, it was found that approximately 130 participants per experimental group would be required to detect significant differences between groups.

Discussion for Study 1

Results from Study 1 revealed that the three experimental groups did differ on the changes in film-related thought frequency from Period 1 to Period 2. For film-related thought frequency, the control group experienced a decrease whereas the two suppression groups experienced an increase. Furthermore, as hypothesized, those in the suppress-worry group experienced a larger increase in film-related thought frequency than those in the suppress-positive group. Although the difference between the two suppression groups did not reach significance, the pattern of results was in the expected direction.

One possible explanation for the lack of significance for film-related thought frequency analyses may have to do with the large error variances observed for film-related thought frequency across the three groups. The large error variances may in part be due to the method by which film-related thought frequency was measured in Study 1. Participants were told to press a button every time they thought about the film but were given no further instructions on how to determine when a certain film-related thought began and ended. Although standard practice in suppression research is to measure thought frequency using button presses, this method has the obvious drawback of not clarifying what an individual thought unit is. Thus, it may be that individual differences among the participants in determining each individual film-related thought unit contributed to the large error variances,

as well as the overall random error for film-related thought frequency observed in study 1 and therefore further limited the possibility of detecting groups differences at a significant level.

Given the problems associated with the measurement of film-related thought frequency, group differences on film-related thought duration were also examined. For film-related thought duration, the control group experienced a decrease whereas the two suppression groups experienced an increase. Furthermore, as hypothesized, those in the suppress-worry group experienced a larger increase in film-related thought duration than those in the suppress-positive group. Although the difference between the two suppression groups did not reach significance, the pattern of results was once again in the expected direction.

The large error variances observed for film-related thought frequency were also observed for film-related thought duration. Given the large error variances observed for both film-related thought frequency and duration, it is worth considering factors that might have contributed to the overall random error for both film-related thought frequency and duration in Study 1.

One such factor may have to do with the participants' observed preferences for using positive thoughts as distracters and their tendency to use minor worries only rarely in their daily lives. It may be that pre-existing preferences for using positive thoughts led to the successful implementation of suppression instructions for the suppress-positive group and pre-existing tendencies to rarely use minor worries led to the less successful implementation of suppression instructions in the suppress-worry group. Thus, pre-existing preferences for positive thoughts versus minor worries as distracters may have interfered with participants' ability to use the assigned distracter type and contributed to overall random error (although this was not supported by manipulation checks findings – see General Discussion).

Given the large error variances observed in Study 1, the potential factors that may have contributed to overall random error, and the small sample size and the resulting lack of power, the results from Study 1 can be seen to provide some support (albeit tentative and not reliable) for the idea that different types of distracters used in suppression efforts may lead to different levels of pre-occupation with previously suppressed thoughts (Hypothesis 1).

Although there was some support for the moderating role of type of distracter in Study 1, there was no support for the mediating role of mental load (Hypothesis 2). Results from Study 1 indicated that the three experimental groups did not differ from each other in a

significant way. Furthermore, the only sizeable – albeit non-significant difference – observed among the three groups was between the control group and the two suppression groups, with the control group experiencing larger HRV (i.e., lower mental load) than the two suppression groups. A similar pattern of findings was found for subjective ratings of mental load, whereby the control group reported less mental load than the two suppression groups but the two suppression groups did not differ from each other. Thus, the hypothesized difference between the two suppression groups was not observed in Study 1.

Given the pattern of results from Study 1 for the moderating role of type of distracter used in suppression efforts, and the problems associated with the measurement of mental load discussed earlier in the paper, a decision was made to conduct a second study (Study 2) that would 1) replicate the observed findings for the two suppression groups in Study 1, and 2) manipulate, rather than measure mental load as a way of better testing the mediating role of mental load in the relationship between type of distracter used in suppression efforts and later preoccupation with previously suppressed thoughts.

Study 2: Method

Purpose: The first purpose of Study 2 was to replicate the observed pattern of findings from Study 1. The second purpose of Study 2 was to examine whether the relationship between the type of distracter used in suppression efforts and preoccupation with previously suppressed thoughts is mediated by mental load when mental load is manipulated rather than measured. The predictions that were made at the outset of the study were that the imposition of load would in general increase the preoccupation with previously suppressed thoughts. More specifically, it was hypothesized that 1) the greatest increase in film-related thoughts from Period 1 to Period 2 would be observed in the group of participants who would use minor worries to distract themselves under conditions of load, 2) the smallest increase in film-related thoughts from Period 1 to Period 2 would be observed in the group of participants who would use positive thoughts to distract themselves without the imposition of load, and 3) finally, those who used positive thoughts as distracters under conditions of load would experience similar levels of preoccupation with previously suppressed thoughts to those who used minor worries to distract themselves without the imposition of load.

Participants: 40 female undergraduate students were recruited from the introductory psychology subject pool at Virginia Tech. After observing 3 outliers in the data, an additional

three subjects were run in the conditions the outliers were in (2 in positive/load, 1 in worry/load). Thus, a total of 43 participants were run for Study 2. Participant age ranged from 18 to 22. Approximately 65% were Caucasian, 21% were Black, 2% were Asian, and the remaining were listed as Other.

Experimental Design: The design of this study was 2 x 2 Between-Subjects Factorial with type of distracter (positive versus worry) as the first factor and mental load (no load versus load) as the second factor. Participants in this study were thus randomly assigned to one of four experimental conditions: (1) a “no mental load/suppression by positive thoughts” condition in which the participants were instructed to suppress thoughts of a traumatic/stressful film for 5 minutes by using positive thoughts as (suppress-positive/no load), 2) a “high mental load/suppression by positive thoughts” condition in which participants were instructed to suppress thoughts of a traumatic/stressful film for 5 minutes by using positive thoughts as distracters while at the same time rehearsing a 10-digit number (suppress-positive/load), 3) a “no mental load/suppression by worry-like thoughts” condition in which the participants were instructed to suppress thoughts of a traumatic/stressful film for 5 minutes by using minor worries as distracters (suppress-worry/no load), and 4) a “high mental load/suppression by worry” condition in which participants were instructed to suppress thoughts of a traumatic/stressful film for 5 minutes by using worry-like thoughts as distracters while at the same time rehearsing a 10-digit number (suppress-worry/load). After this initial phase, all four groups were instructed to think about anything they liked including the film for 5 minutes. The same film and measures as used in study 1 were used.

Procedures: The procedures used in study 2 were similar to those used in study 1 with some notable differences. The participants in Study 2 were run by two undergraduate female research assistants (See Appendix F for Experimental Protocol for Study 2). As in study 1, on the day of the experiment participants were provided with a description of the study. After obtaining informed consent, participants filled out a brief demographic questionnaire and the TCQ. After filling out these questionnaires, participants practiced the think out loud procedure used in study 1. In this study, given that mental load was manipulated rather than measured, the psychophysiological measure of HRV was not collected and the electrode attachment procedure used in study 1 was therefore omitted. After completing the five-minute “think out loud” procedure, participants watched the same film used in study 1 and received instructions

to suppress (using positive thoughts or minor worries) under conditions of load or no load.

Those in the load condition received the following additional instructions for Period 1: **One last thing – I want you to remember a number that I will show you shortly. It is absolutely vital that you indeed remember this number. Do not write this number down, as it is important that you keep it in your head. If you remember nothing else, please remember this number. I will ask you to tell me the number at the end of the 5 minutes. You will have 30 seconds to look at the number.**

Participants were shown a 10-digit number (7412968350) on a piece of paper for 30 seconds and were then given the following task reminder: **Now remember, try to avoid thinking about the film and use positive thoughts (or minor worries) to distract yourself. If you do think about the film, press the button and say the thoughts out loud. And please remember the number. You can start as soon as I leave the room.**

Participants were not given any further rationale for the load task after these instructions. After this first period (Period 1), the experimenter returned to the room and asked those in the load conditions to recall what the number was. The experimenter then asked participants in all three experimental conditions to think about anything they liked for the next five minutes (Period 2). As in study 1, for the first and second experimental periods, the participant was also asked to say out loud whatever came to her mind and to press the button on a hand-held counter every time she thought about the film. As in study 1, participants' stream of consciousness was tape-recorded for both Period 1 and Period 2 in order to obtain the total duration of time the participant was preoccupied with film-related thoughts. At the end of the experiment, participants filled out the Manipulation Check Questionnaire and the TCQ-Film. (See Appendix E for Experimental Procedures for Study 2). The whole process took approximately 45 minutes and participants earned 1 extra credit and qualified to enter a drawing for monetary prizes of \$30, \$20, or \$10.

Measures: The same measures used in Study 1 were used.

Results for Study 2

Experimenter Effects: To test for possible experimenter effects, 2 (experimenter1 vs. experimenter 2) x 2 (suppress-positive vs. suppress-worry) x 2 (load vs. no load) higher order analysis of variance (ANOVAs) were conducted on the manipulations checks, film-related thought frequency and duration during period 1, and change in film-related thought frequency and duration from Period 1 to Period 2. None of these ANOVAs were significant, indicating

that there were no experimenter effects. Therefore, subsequent analyses reported for Study 2 were collapsed across experimenters.

Pre-experimental Differences on the TCQ:

To examine potential pre-experimental group differences on the type of thought suppression strategy typically used by participants, a repeated measures analysis of variance (ANOVA) was conducted with suppression group (1=positive, 2=worry) as the first between subjects variable, load group (1=no load, 2=load) as the second between subjects variable, and the five subscales of the TCQ as the dependent variables. One subject had missing data and was therefore excluded from the analyses. The means and standard deviations for the four groups are reported in Table 13.

The TCQ main and the three interaction effects (TCQ x Suppression Group, TCQ x Load Group, and the TCQ x Suppression Group x Load Group) were tested using the multivariate criterion of Wilks' lambda (Λ). The suppression group and the load group main effects were tested using two univariate ANOVAs.

The TCQ main effect was significant, $\Lambda = .138$, $F(4, 35) = 54.761$, $p = .000$, indicating that the participants in this study differed in the extent to which they used different thought control strategies.

The TCQ main effect did not vary as a function of experimental group as evidenced by the interactions. The three interaction effects (TCQ x Suppression Group, TCQ x Load Group, and the TCQ x Suppression Group x Load Group) were all non-significant ($\Lambda = .888$, $F(4, 35) = 1.098$, $p = .373$, $\Lambda = .911$, $F(4, 35) = .850$, $p = .504$, and $\Lambda = .955$, $F(4, 35) = .416$, $p = .796$, respectively), indicating that there were no pre-experimental group differences on the types of thought control strategy used by the four groups).

A comparison of group means on the five subscales of the TCQ reveal that in general, as in study 1, participants reported using distraction more than any other strategy in trying to control unwanted, intrusive thoughts in their daily lives (means for suppress-positive/no load, suppress/positive/load, suppress-worry/no load, and suppress-worry/load = 17.40, 17.00, 16.10, and 16.64, respectively). The distraction subscale of the TCQ assesses the extent to which someone uses positive thoughts or behavioral tasks to distract himself/herself from unwanted, intrusive thoughts. These results suggest, therefore, that in general the participants in this study used positive thoughts and behavioral tasks often to avoid unwanted,

intrusive thoughts in their daily lives. As in study 1, participants in this study also reported that additionally they sometimes used reappraisal (means for suppress-positive/no load, suppress-positive/load, suppress-worry/no load, and suppress-worry/load = 15.20, 15.27, 13.90, 13.18, respectively) and social control (means for suppress-positive/no load, suppress-positive/load, suppress-worry/no load, and suppress-worry/load = 12.60, 15.36, 13.00, 14.18, respectively) thought control strategies in coping with unwanted, intrusive thoughts in their daily lives. The social control and reappraisal strategies assess the extent to which the person discloses unwanted, intrusive thoughts to others and focuses on the thought to make sense out of it, respectively. The participants in this study reported in general, they rarely used punishment thought control strategy (means for suppress-positive/no load, suppress-positive/load, suppress-worry/no load, and suppress-worry/load = 9.80, 8.90, 9.10, and 9.36, respectively). Finally, participants in the positive suppression group reported sometimes using minor worries as distracters (means for suppress-positive/no load and suppress-positive/load = 11.90 and 11.27, respectively) whereas those in the worry suppression group reported using minor worries rarely (means for suppress-worry/no load and suppress-worry/load = 10.20 and 8.64, respectively).

The absence of pre-experimental differences on the TCQ subscales (and most notably the distraction and minor worry subscales) mean that any differences observed among the groups on film-related thought frequency or duration cannot be explained by pre-existing individual differences on the types of thought suppression strategy used. However, the whole sample's preference for using positive thoughts and behavioral tasks to distract themselves from intrusive thoughts in their daily lives, and their infrequent use of minor worries to distract themselves from intrusive thoughts are noteworthy. Given the implications of these results for the ease with which participants could implement instructions to use positive thoughts versus minor worries in their suppression efforts, a paired samples t-test was conducted. Just as in Study1, the results revealed that participants in this study indeed differed significantly on the extent to which they used positive thoughts versus minor worries in their everyday lives ($t(42) = 10.734, p = .000$).

Also noteworthy are the differences observed between positive suppression group and worry suppression group, as well as those observed between the no load and load participants within the worry suppression group. Although these were not significant

differences, the observed pattern of findings, especially for the participants in the worry suppression group raise questions about their ability to use minor worries when instructed to do so.

Manipulation Checks: In order to examine whether or not the four experimental groups followed instructions as administered, three two-way univariate analyses of variance (ANOVAs) were conducted with suppression group (1= positive, 2=worry) and load group (1=no load, 2=load) as the two between subjects factors and the three items on the Rating Form that assessed the extent to which participants 1) suppressed thoughts of the film, 2) used positive thoughts as distracters, and 3) used minor worries as distracters as the dependent variables, The means and standard deviations for the four groups on these dependent measures are reported in Table 14.

For suppression ratings, the main effect for suppression group was non-significant ($F(1, 39) = .792, p = .379$), indicating that as expected both those who used positive thoughts to distract themselves and those who used minor worries to distract themselves tried to suppress thoughts of the film equally. The main effect for load group was also non-significant ($F(1, 39) = 2.163, p = .149$), indicating that those in the load conditions did not try to suppress thoughts of the film any less or more than those in the no load conditions. Finally, the suppression group x load group interaction was also non-significant ($F(1, 39) = .564, p = .457$).

For positive thought ratings, the main effect for suppression group was significant ($F(1, 39) = 15.750, p = .000$), indicating that as expected those who were in the positive suppression group (mean = 7.32) used positive thoughts as distracters more than those in the worry suppression group (mean = 4.43). The main effect for load group was non-significant ($F(1, 39) = .489, p = .488$), indicating that those in the load conditions did not try to use positive thoughts as distracters any less or more than those in the no load conditions. Finally, the suppression group x load group interaction was also non-significant ($F(1, 39) = .064, p = .801$).

Finally, for minor worry ratings, the main effect for suppression group was significant ($F(1, 39) = 18.547, p = .000$), indicating that as expected those who were in the worry suppression group (mean = 7.38) used minor worries as distracters more than those in the positive suppression group (mean = 4.50). The main effect for load group was non-

significant ($F(1, 39) = 1.225, p = .275$), indicating that those in the load conditions did not try to use minor worries as distracters any less or more than those in the no load conditions. Finally, the suppression group x load group interaction was also non-significant ($F(1, 39) = .310, p = .581$).

Overall, these results provide strong evidence that participants in this study followed instructions as administered.

Group Differences on Film-Related Thought Frequency: In order to determine whether the four groups differed on the extent to which they experienced a change in film-related thought frequency from Period 1 to Period 2, a repeated measures analysis of variance (ANOVA) was conducted with suppression group (1=suppress-positive, 2=suppress-worry) as the first between subjects factor, load group (1=no load, 2=load) as the second between subjects factor, and period (i.e., film-related thought frequency during period 1 and period 2) as the dependent measure. The three outliers that had been identified in preliminary analyses were excluded. A total sample size of 40 was used. Means and standard deviations for Period 1 and Period 2 film-related thought frequency across the four groups are reported in Table 15 and results are depicted in Figure 3.

The Period main effect and the three interaction effects (Period x Suppression Group, Period x Load Group, and Period x Suppression Group x Load Group) were tested using the multivariate criterion of Wilks' Λ . The Period main effect was non-significant, $\Lambda = .951, F(1, 36) = 1.858, p = .181$, indicating that the Period 1 and Period 2 film-related thought frequencies did not differ significantly from each other. The Period x Suppression Group interaction effect was also non-significant, $\Lambda = 1.000, F(1, 36) = .009, p = .923$, indicating that the positive suppression and worry suppression groups did not differ from each other on changes in film-related thought frequency from Period 1 to Period 2. There was a trend for significance for the Period x Load Group interaction effect, $\Lambda = .905, F(1, 36) = 3.719, p = .059$, indicating that the no load and load group differed somewhat from each other on changes in film-related thought frequency from Period 1 to Period 2. Of greatest interest was the Period x Suppression Group x Load Group interaction effect. This was non-significant, $\Lambda = .944, F(1, 36) = 2.133, p = .153$, indicating that the two suppression groups did not differ from each other on changes in film-related thought frequency as a function of the load imposition.

To determine the nature of the Period x Load Group interaction effect, two t-tests were conducted. The first t-test examined differences between Period 1 and Period 2 film-related thought frequency for the no load group. Results indicated that there were no significant differences between Period 1 and Period 2 film-related thought frequency for those in the no load group ($t(19) = .324, p = .750$). The second t-test examined differences between Period 1 and Period 2 film-related thought frequency for the load group. The t-test was significant ($t(19) = -3.796, p = .001$), indicating that for the load group film-related thought frequency was higher in Period 2 compared to Period 1.

Given the large variances on film-related thought frequency for both period 1 and period 2, a homogeneity of variance test was conducted. Levene's test of equality of error variances was non-significant for period 1 film-related thought frequency ($F(3, 36) = 1.253, p = .305$). There was a trend for significance for Period 2 ($F(3, 36) = 2.599, p = .067$). Given the unequal error variances across the four groups for Period 2, the data for Period 2 film-related thought frequency was examined for outliers. A decision was made to exclude those 2 standard deviations below or above the grand mean for Period 2. Twelve additional outliers (7 from suppress-positive/no load, 2 from suppress-positive/load, 2 from suppress-worry/no load, and 1 from suppress-worry load groups) were identified. Given that excluding the outliers in this case would reduce the sample size significantly, the frequency data was transformed instead. Square-root transformations on period 1 and Period 2 frequency data produced the same results.

Group Differences on Film-Related Thought Duration:

To determine whether the four groups differed on the extent to which they experiences a change in film-related thought duration from period 1 to Period 2, a repeated measures analysis of variance (ANOVA) was conducted with suppression group (1=suppress-positive, 2=suppress-worry) as the first between subjects factor, load group (1=no load, 2=load) as the second between subjects factor, and period (i.e., film-related thought duration during period 1 and period 2) as the dependent measure. One participant who started watching the film before Period 1 was excluded from the analyses. (Two participants whose taped protocols were not transcribed were also excluded). Thus the total sample size was 40. Means and standard deviations for Period 1 and Period 2 film-related thought duration across the four groups are reported in Table 16 and results are depicted in Figure 4.

The Period main effect and the three interaction effects (Period x Suppression Group, Period x Load Group, and Period x Suppression Group x Load Group) were tested using the multivariate criterion of Wilks' Λ . The Period main effect was significant, $\Lambda = .677$, $F(1, 36) = 17.187$, $p = .000$, indicating that the Period 1 and Period 2 film-related thought durations differed significantly from each other.

The Period x Suppression Group interaction effect was non-significant, $\Lambda = .993$, $F(1, 36) = .241$, $p = .627$, indicating that differences observed from period 1 to period 2 in film-related thought duration did not vary by suppression group. The Period x Load Group interaction effect was also non-significant, $\Lambda = .980$, $F(1, 36) = .730$, $p = .398$, indicating that the differences observed from Period 1 to Period 2 in film-related thought duration did not vary by load group. Of greatest interest was the Period x Suppression Group x Load Group interaction effect. This was also non-significant, $\Lambda = .935$, $F(1, 36) = 2.487$, $p = .124$, indicating that the differences observed from Period 1 to Period 2 in film-related thought duration did not vary by suppression group and by load group.

Despite the large variances across the four groups, Levene's test of equality of error variances was non-significant both for Period 1 ($F(3, 36) = .059$, $p = .981$) and Period 2 ($F(3, 36) = 1.016$, $p = .397$). Therefore, no further attempt was made to remove additional outliers from the data or transform the data and re-run the repeated measures ANOVA.

Mistakes Made in Recalling the 10-Digit Number:

The amount of errors made in the number recall task was calculated by looking at the number of digits each participant was off in recalling the number. The mean number of mistakes made for the twenty-three participants was 2.13. Approximately half the participants (52.2%) made no mistakes in recalling the number. About 30.4 % made 1-3 mistakes. Four participants (17.3 %) made 7 or more mistakes.

The mean number of mistakes made for the 12 participants in the suppress-positive/load condition was 1.92. 50% of those in the suppress-positive/load condition made no mistakes in recalling the number. About 33.3% made 1-3 mistakes and two subjects (16.6% made 7 or 9 mistakes. For those in the suppress-worry/load condition, the mean number of mistakes made was 2.36. About 54.5% of those in the suppress-worry/no load condition made no mistakes in recalling the number. 27.3% made 2 or 3 mistakes and two subjects (18.2%) made 9 and 10 mistakes. It's been suggested that a large number of errors committed in

recalling the number can be an indicator of the participants' not trying to remember the number (i.e., an ineffective load) (Gilbert & Hixon, 1991). This was not the case in the current study for the larger group of participants in the load condition, or those in the suppress-positive/load and suppress-worry load condition.

Correlations Between Thought Frequency and Duration: Significant positive correlations between period 1 film-related thought frequency and duration (.762 and .653 for suppress-positive and suppress-worry groups respectively) indicated that film-related thought frequency and duration measures were assessing a similar construct of intrusiveness for the two suppression groups. Significant positive correlations between Period 2 film-related thought frequency and duration provide further support for this idea (.694 and .624 for suppress-positive and suppress-worry, respectively).

Exploratory Analyses for Study 2: Given the unexpected pattern of findings for Study 2, a further exploration of the relationship between tendency to use a certain type of distracter and thought intrusiveness was undertaken. Participants were reassigned to newly created suppress-positive and suppress-worry groups based on their scores on the manipulation check questions (i.e., to what extent did you use positive thoughts and to what extent did you use minor worries to suppress?). This internal analysis was conducted as follows. A median split on the first manipulation check question produced a low and a high suppress-positive group. Similarly, a median split on the second manipulation check question produced a low and a high suppress-worry group. The median for the first manipulation check question was 6; the median for the second manipulation check question was 7. Those who had scored high on the first manipulation check question (i.e., positive thoughts) but low on the second manipulation check question (i.e., minor worries) were assigned the "positive suppression group. Those who had scored low on the first manipulation check question (i.e., positive thoughts) and high on the second manipulation check question were assigned to a "minor worry suppression group". A repeated measures ANOVA with suppression group as the between subjects factor and film-related thought frequency as the repeated measure revealed a marginally significant interaction term, $\Lambda = .907$, $F(1, 29) = 2.988$, $p = .095$, indicating that the observed differences in Period 1 and period 2 thought frequency varied as a function of the suppression group. A comparison of the means from period 1 to 2 for the two groups (4.06 to 3.44 for the positive suppression group and 4.07 to 7.60 for the worry suppression group) indicated that whereas those who were

in the worry suppression group had experienced an increase from period 1 to 2 (i.e., a rebound effect), those in the positive suppression group had not. A similar repeated measures ANOVA was conducted, this time for film-related thought duration. Once again a marginally significant Period x Suppression Group interaction effect was found, $\Lambda = .912$, $F(1, 28) = 2.710$, $p = .111$, indicating that the observed differences in Period 1 and period 2 thought frequency varied as a function of the suppression group. A comparison of the means from period 1 to 2 for the two groups (31.69 to 63.06 for the positive suppression group and 40.43 to 106.93 for the worry suppression group) indicated that both groups experienced an increase in film-related thought duration from Period 1 to 2 (i.e., a rebound effect) but that the rebound was somewhat larger for the worry suppression group. In summary, the overall pattern of results from the internal analyses provide some support for the moderating effects of type of distracter used in suppression efforts. It is worth noting, however, that the correlation nature of these findings can provide only weak support.

Discussion for Study 2

Findings from Study 2 failed to provide support for hypothesis 1 or 2. According to the hypotheses, 1) all four groups would experience an increase in film-related thoughts from Period 1 to Period 2, 2) the greatest increase would be observed for those in the suppress-worry/load condition, 3) the smallest increase would be observed for those in the suppress-positive/no load condition, 4) and the two remaining groups (suppress-positive/load and suppress-worry/no load) would not differ from each other and would be somewhere in between.

Both for film-related thought frequency and duration, the four experimental groups did not differ significantly from each other on changes from Period 1 to Period 2. The pattern of results were not in the direction hypothesized at the outset of the study; furthermore, the pattern of results were somewhat different for film-relation thought frequency and film-related thought duration. Although the observed differences among the groups were non-significant, the pattern of results is discussed below.

It is worth noting, first of all, that the pattern of results for those in the no load condition (suppress-positive versus suppress-worry) in Study 2 did not replicate the results from Study 1. For film related thought frequency, both suppression groups experienced an increase in film-related thought frequency in Study 1. However, for Study 2, the suppress-

positive condition did not experience much of a change from Period 1 to Period 2 in film-related thought frequency. Furthermore, for Study 2, the suppress-worry condition experienced a decrease in film-related thought frequency from Period 1 to Period 2. It is unclear why the results from Study 2 differed in direction (as well as magnitude) from those for Study 1. It is possible that the two undergraduate research assistants who were the experimenters in Study 2 administered the instructions somewhat differently than the graduate student (author of this paper) experimenter in Study 1, which led to the participants in Study 2 implementing the instructions differently. However, a comparison of the results for manipulation checks across the two studies do not support this. In fact, the results for manipulation checks from the two studies indicate that the participants in both studies followed instructions to suppress and use positive thoughts versus minor worries to a similar extent. Thus, if the manipulation checks are an accurate reflection of participants' ability to follow instructions as administered, there is no reason to suspect that the experimenters in Study 2 differed in any systematic way from the experimenter in Study 1 in their administration of instructions.

Looking frequency results for Study 2, it can be seen that the imposition of load had similar effects on film-related thought frequency for suppress-positive and suppress-worry groups. In both cases, the imposition of load led to a decrease both in Period 1 and Period 2 film-related thought frequency, although this seemed more pronounced for those in the suppress-worry condition. The decrease in film-related thought frequency during the suppression period (Period 1) is not consistent with the Ironic Process Theory or past suppression research that manipulated mental load. Theoretically, the imposition of load is seen to interfere with the resource dependent operating process, leaving the automatic monitoring process running, leading to an increased accessibility of thoughts that are the target of suppression (i.e., an increase in film-related thought frequency compared to those without the load imposition in Period 1). One possible explanation for these results may be that the number recall task did not function as a mental load manipulation but rather allowed the participants to incorporate the number recall task into the suppression task whereby they used the number to distract themselves from film-related thoughts. Given that the use of a single distracter has been associated with successful suppression and attenuated rebound effects (Wegner et al., 1987), incorporating the number recall task into the suppression task would indeed explain the observed pattern of findings for Period 1 thought-frequency. However, this

explanation is not supported by taped protocols of participants. Participants indeed continued to use positive thoughts or minor worries under conditions of load in Study 2; furthermore the number of times they said the number out loud during Period 1 did not indicate that they had attempted to use it as a distracter in their suppression efforts.

Looking at duration results for Study, the imposition of load had dissimilar results on film-related thought duration in Period 1. Whereas for the suppress-positive group the imposition of load did not lead to a marked change in Period 1 film-related thought duration, for the suppress-worry group it led to a decrease. These results are once again contrary to prior research findings and what would be expected based on Ironic Process Theory, both of which would suggest that there would be an increase in film-related thought duration in Period 1 with the imposition of load. One explanation for the lack of a significant change in film-related thought duration in Period 1 for those in the suppress-positive condition may be that as would be suggested by reported preferences for using positive thoughts as distracters in their daily lives, participants who used positive thoughts as distracters in this study (suppress-positive group) found the suppression task manageable enough, even with the imposition of load. It is unclear, however, why for those in the suppress-worry condition, the imposition of load led to a decrease in Period 1 film-related thought duration. If indeed the imposition of load produced changes in film-related thought duration as a function of the participants' ability to use positive versus minor worries as distracters, it would be expected that for those in the suppress-worry condition, the imposition of load would lead to an increase rather than a decrease in Period 1 film-related thought duration. It is possible that those in the suppress-worry condition found the suppression task more difficult because they had to use distracters they rarely would use their daily lives and as a result, with the imposition of load, disengaged from the suppression task and focused on the number recall task. Although this explanation could explain the observed pattern of findings for the suppress-worry group in Period 1, it is not supported by suppression ratings or taped protocols for these participants. Taped protocols of participants in the suppress-worry/load condition reveal that they in fact continued to suppress and use minor worries to do so.

Finally, looking at the effects of the imposition of load on film-duration from Period 1 to period 2, it can be seen that the imposition of load led to an increase from Period 1 to Period 2 across all four groups. The greatest increase was observed for the suppress-worry

load group as hypothesized. However, the smallest increase was observed for the suppress-worry/no load (rather than the suppress-positive/no load) group.

It is unclear why the pattern of findings for frequency and duration data were similar for Study 1 and dissimilar in Study 2. Even though there are a number of problems with the measurement of thought frequency as discussed earlier in this paper, such problems would be expected to function similarly in both studies.

It is possible that the unexpected pattern of results observed in Study 2 can be explained by other theoretical models of the origin and maintenance of intrusive thoughts. A number of major theoretical accounts of thought intrusions (especially in the context of trauma) have been offered. For instance, according to trauma theories, there is something about the initial encoding of a traumatic event that increases the likelihood that memories of the event will be re-experienced in the aftermath of the event in the form of intrusions. Unfortunately, it is unclear how trauma theories could account for the results observed here, as there was no indication that the traumatic/stressful stimulus used in these studies (i.e., a film about a fire) was encoded differently by the participants in different experimental groups. Another more recent theoretical explanation of intrusive thoughts (i.e., Disclosure Theory) posits that it is the failure to express (rather than the tendency to suppress) thoughts of the traumatic event that leads to intrusive thoughts. However, once again, this theoretical account fails to account for the differences observed in both studies between the two suppression groups. Furthermore, although the results for the participants in the control group who were asked to think about anything they liked can be seen to support disclosure theories, it is important to note that our participants in the control group were asked to think about anything (rather than the stressful film they had just watched). The decrease from period 1 to period 2 film-related thought frequency and duration for the control participants in Study 1 suggest that rather than forcing survivors of a trauma to engage in deliberate disclosure of the event, it may be more beneficial to provide an environment in which survivors of a trauma can discuss implications of the traumatic event *if they choose to*.

Ultimately, it may be that in the context of a real trauma, all of these factors (e.g., severity of the traumatic events, length of exposure, tendency to discuss the details of the trauma, and finally, the tendency to suppress) play a role in the development and/or the maintenance of intrusive thoughts. It is also possible that thought suppression may indeed play

a role in the development and/or the maintenance of intrusive thoughts but that there are important moderators of thought suppression effects that need to be taken into account before we can better understand exactly how thought suppression operates in the aftermath of a traumatic event to increase intrusive symptomology. The issue of moderators is discussed below in the General Discussion section.

General Discussion

The purpose of the studies reported here was to examine the role of both a potential moderator (i.e., type of distracter) and a potential mediator (i.e., mental load) for thought suppression effects. No support was found for the moderating role of type of distracter used in suppression or the mediating role of mental load in suppression. Although findings from Study 1 were suggestive of a moderating role for type of distracter, they were non-significant and were not replicated in Study 2. Also, although internal analyses for Study 2 provided some support for moderation, these analyses were correlation and thus the support provided was weak.

Given that the results from Study 1 were not significant and were not replicated in Study 2, it is crucial that the pattern of results that were suggestive of moderation (in Study 1) be replicated in future research. If future research does indeed provide support for the idea that the type of distracter used in suppression efforts functions as a moderator of thought suppression effects, one can speculate as to how and why the type of distracter may make a difference. For instance, it is possible that the observed greater increase in film-related thought frequency and duration for the suppress-worry group (compared to the suppress-positive group) in Study 1, albeit non-significant, can be explained by the different levels of ease with which participants could use positive thoughts versus minor worries as distracters.

The findings on the TCQ suggested that for our participants, the use of positive thoughts was much more common than the use of minor worries in their every day thought suppression efforts. Although manipulation check findings did not indicate that the two suppression groups differed on how difficult they found the suppression task, it is possible that participants reported how much difficulty they thought they were supposed to experience rather than how much difficulty they actually did (i.e., social desirability effects).

It may be that with increased practice at using a certain type of distracter individuals increase their chances of successfully suppressing unwanted, intrusive thoughts.

Although the issue of practice effects on suppression is an interesting and a clinically important one, no study to date has examined whether practice at using a certain type of thought suppression strategy over an extended period of time attenuates the rebound effect in the long run. If practice with using a certain type of distracter does indeed lead to successful suppression in the long run, it is possible that after a trauma individuals may persist in using the same type of distracter, even in the face of intrusive, repetitive thoughts that are stressful/traumatic and therefore more difficult to suppress. In such cases attributions about why one continues to engage in suppression, as well as attributions about why one's suppression efforts are failing can potentially have important effects on the individual's motivation to continue to suppress, as well as their overall anxiety levels consequent to suppression.

Wegner and Zanakos (1994) argue that thought suppression is a stable, trait-like coping style that is resistant to change. This suggests that those who typically suppress unwanted, intrusive thoughts in their daily lives may continue to do so in the aftermath of a traumatic event. There is also some support for the stability of preferences for the types of distracters used in suppression efforts (Wells & Davies, 1994), suggesting that people may not only persist in their tendency to suppress but also in their preference of one type of distracter over another. If in the aftermath of a trauma, individuals indeed persist in using thought suppression strategies that have been effective in the past but experience suppression failures with the target trauma-related thoughts using the same suppression strategies, they may experience increased anxiety and/or stress (i.e., increased mental load), which in turn may make the suppression task even more difficult. Thus, the self-loading aspect of ironic effects may in part be explained by persistence in using distracters in suppression efforts that can no longer be effective in the face of trauma-related intrusive thoughts and the resulting increased mental load. Alternatively, attributions individuals make about their motivation to suppress in the face of apparent failure may explain the preoccupation individuals experience. Recently, researchers (Liberian & Forster, 2000) have argued that individuals may infer from the difficulty and failure they experience in their suppression efforts that they are motivated to think about the thought that is the target of suppression. The attribution itself is in turn hypothesized to lead individuals to think of the thought that was the target of suppression, thereby increasing the thought's accessibility and introducing or enhancing the preoccupation

with previously suppressed thoughts. In support of this view, Forster and Liberman (2001) found that 1) telling participants that their suppression failures suggested a high motivation to use the suppressed thought led to a post-suppression rebound whereas telling participants that their suppression failures were due to low motivation to use the suppressed thought eliminated the post-suppression rebound; further 2) telling participants that suppression would be easy due to an external stimulus (i.e., increasing internal attributions about suppression difficulty) led to a post-suppression rebound whereas telling participants suppression would be difficult due to an external stimulus eliminated the post-suppression rebound. If the role of attributions about one's motivation to suppress do in fact play a role, it may be that meta-cognitive attributions as well as mental load play a role in the post-suppression rebound and the self-loading aspect of certain subtypes of thought suppression strategies.

Unfortunately, no study to date has examined the relationship between type of distracter and practice effects, practice effects and suppression success/failure, suppression failure and attributions, and attributions and persistence in suppression efforts. Although the discussion above is speculative at best, it is hoped that these issues as well as further examination of the moderating effects of the type of distracter used in suppression can be addressed in future studies and shed additional light on factors that might moderate or mediate the effects of suppression.

Limitations

It is important to note the limitations of the studies reported in this paper. The most obvious limitation of both Studies 1 and 2 was the small sample size and the resultant lack of power in detecting the effects of interest that were small to moderate in size. A second limitation of these studies was the instructed nature of the suppression task. Although there is some support for the idea that spontaneous suppression produces the same effects observed in instructed suppression, the use of an instructed suppression task limits the generalizability of the findings to the everyday suppression efforts of individuals. The use of females only further limits the generalizability of findings, as it is unclear whether the observed pattern of findings in Study 1 and 2 can be extended to males. Other issues with generalizability include the use of non-clinical university students in the sample and the use of analogue (rather than actual) traumatic thoughts.

Future Directions

Based on the current investigation, it is suggested that the role of individuals' preferences for the type of distracter used in suppression efforts be further investigated. It is unclear at this point whether and to what extent practice effects play a role in successfully suppressing thoughts in general, and stressful/traumatic thoughts in particular.

An additional direction for future research is examining whether individuals do indeed persist in their preferred method of suppression in the aftermath of a trauma or develop new ways of dealing with intrusive, repetitive thoughts. Research investigating the stability of suppression strategies over time and across different types of intrusive thoughts can be followed by investigations of how successful any given suppression strategy can be in the face of especially strong and difficult to suppress traumatic thoughts.

Finally future research should focus on delineating the role mental load and other additional factors such as metacognitive attributions play in the hypothesized self-loading aspect of suppression. Improved measures of mental load should clarify whether this aspect of the ironic process theory indeed plays a role in creating or enhancing the pathological levels of intrusions observed in clinical disorders. Increased clarification on the role of thought suppression in creating or enhancing the preoccupation with trauma-related thoughts observed in individuals with PTSD will be an important step in furthering our understanding of why some individuals suffer from intrusive thoughts and PTSD whereas others seemingly recover in time. It will also, it is to be hoped, advance the precision with which early interventions can be implemented in the aftermath of a traumatic event.

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Tables

Table 1. Means and Standard Deviations for Ratings of Distress, Emotional Valence, Arousal, and Control for Films 1, 2, and 3 – Females Only (N=30)

| | FILM 1 | FILM 2 | FILM 3 |
|----------|-------------|-------------|-------------|
| Distress | 6.50 (2.10) | 5.70 (2.34) | 5.73 (2.24) |
| Valence | 4.23 (.68) | 3.57 (.94) | 3.73 (1.01) |
| Arousal | 2.13 (.78) | 2.23 (.97) | 2.13 (.68) |
| Control | 2.40 (.86) | 2.80 (.89) | 2.60 (.97) |

Table 2. Means and Standard Deviations for Ratings of Distress, Emotional Valence, Arousal, and Control for Films 1, 2, and 3 – Males Only (N=6)

| | FILM 1 | FILM 2 | FILM 3 |
|----------|-------------|-------------|-------------|
| Distress | 4.33 (2.16) | 3.17 (1.94) | 4.17 (2.99) |
| Valence | 3.33 (1.21) | 3.17 (.75) | 3.33 (1.37) |
| Arousal | 2.17 (.41) | 2.33 (1.03) | 2.17 (.75) |
| Control | 2.67 (1.03) | 3.17 (1.47) | 2.33 (.82) |

Table 3. Means and Standard Deviations for Ratings of Distress, Emotional Valence, Arousal, and Control for Each of the Film Orders (N=36)

Table 3a. Film 1

| FILM 1 | 1-2-3 | 1-3-2 | 2-1-3 | 2-3-1 | 3-1-2 | 3-2-1 |
|----------|-------------|-------------|-------------|-------------|-------------|-------------|
| Distress | 4.33 (2.07) | 6.00 (1.55) | 6.67 (1.03) | 7.67 (1.97) | 5.83 (1.94) | 6.33 (3.50) |
| Valence | 4.17 (.41) | 4.17 (.75) | 3.67 (.52) | 4.50 (.55) | 4.17 (.75) | 3.83 (1.60) |
| Arousal | 2.50 (.84) | 2.17 (.41) | 2.33 (.52) | 1.50 (.55) | 2.00 (1.10) | 2.33 (.52) |
| Control | 2.67 (.82) | 2.17 (.41) | 2.67 (.82) | 2.33 (1.51) | 2.33 (1.03) | 2.50 (.55) |

Table 3b. Film 2

| FILM 2 | 1-2-3 | 1-3-2 | 2-1-3 | 2-3-1 | 3-1-2 | 3-2-1 |
|----------|-------------|-------------|-------------|-------------|-------------|-------------|
| Distress | 5.17 (1.84) | 6.00 (3.23) | 5.33 (2.25) | 5.50 (2.17) | 4.33 (2.81) | 5.33 (2.94) |
| Valence | 3.67 (.82) | 4.00 (.63) | 3.50 (.55) | 4.17 (.75) | 2.50 (.55) | 3.17 (1.17) |
| Arousal | 1.50 (.55) | 2.33 (1.37) | 2.50 (.84) | 2.67 (.82) | 2.50 (1.22) | 2.00 (.63) |
| Control | 2.50 (.55) | 2.50 (1.55) | 2.83 (1.17) | 3.00 (.63) | 3.50 (1.52) | 2.83 (.75) |

Table 3c. Film 3

| FILM 3 | 1-2-3 | 1-3-2 | 2-1-3 | 2-3-1 | 3-1-2 | 3-2-1 |
|----------|-------------|-------------|-------------|-------------|-------------|-------------|
| Distress | 4.33 (3.08) | 4.83 (1.72) | 6.83 (2.14) | 6.33 (2.16) | 5.50 (2.43) | 5.00 (2.76) |
| Valence | 3.50 (.84) | 3.83 (1.17) | 4.17 (.98) | 3.83 (1.17) | 3.17 (1.17) | 3.50 (1.22) |
| Arousal | 2.00 (.63) | 2.50 (.84) | 2.17 (.98) | 1.83 (.75) | 2.00 (.00) | 2.33 (.52) |
| Control | 2.83 (1.17) | 2.67 (1.03) | 2.33 (1.03) | 2.50 (1.04) | 2.67 (1.03) | 2.33 (.52) |

Table 4. Means and Standard Deviations for the Five TCQ Subscales for Each Experimental Group

| GROUP | | N | Mean | Standard Deviation |
|----------------|----------------------|----|-------|--------------------|
| Distraction | Suppress/Positive | 26 | 17.85 | 3.07 |
| | Suppress/Minor Worry | 24 | 18.13 | 2.72 |
| | Control | 27 | 18.26 | 2.96 |
| Punishment | Suppress/Positive | 26 | 8.62 | 1.75 |
| | Suppress/Minor Worry | 24 | 8.67 | 1.93 |
| | Control | 27 | 9.22 | 2.08 |
| Reappraisal | Suppress/Positive | 26 | 14.81 | 3.03 |
| | Suppress/Minor Worry | 24 | 14.96 | 2.83 |
| | Control | 27 | 14.33 | 2.73 |
| Worry | Suppress/Positive | 26 | 10.58 | 2.55 |
| | Suppress/Minor Worry | 24 | 9.92 | 2.24 |
| | Control | 27 | 11.56 | 2.98 |
| Social Control | Suppress/Positive | 26 | 15.81 | 3.12 |
| | Suppress/Minor Worry | 24 | 14.96 | 2.88 |
| | Control | 27 | 14.37 | 3.91 |

Total possible score on each scale = 24 (6=never, 12=sometimes, 18=often, 24=almost always)

Table 5. Group Differences on the Three Manipulation Check (Rating Scale) Items

| GROUP | | N | Mean | Standard Deviation |
|-------------------------|----------------------|----|------|--------------------|
| Suppression Rating | Suppress/Positive | 27 | 7.19 | 2.09 |
| | Suppress/Minor Worry | 27 | 7.56 | 2.15 |
| | Control | 27 | 3.19 | 2.59 |
| Positive Thought Rating | Suppress/Positive | 27 | 7.70 | 2.51 |
| | Suppress/Minor Worry | 27 | 4.19 | 2.76 |
| | Control | 27 | 4.30 | 3.76 |
| Minor Worry Rating | Suppress/Positive | 27 | 4.93 | 2.48 |
| | Suppress/Minor Worry | 27 | 8.48 | 1.48 |
| | Control | 27 | 4.59 | 3.21 |

Table 6. Mean Film-Related Thought Frequency From Period 1 to Period 2

| GROUP | N | Mean | Standard Deviation |
|------------------------------------|----|-------|--------------------|
| Period 1 Suppress/Positive Thought | 27 | 5.78 | 4.30 |
| Suppress/Worry | 27 | 5.48 | 3.27 |
| Control | 27 | 14.04 | 6.72 |
| Period 2 Suppress/Positive Thought | 27 | 8.04 | 7.58 |
| Suppress/Worry | 27 | 9.93 | 8.33 |
| Control | 27 | 8.44 | 5.73 |

Table 7. Mean Film-Related Thought Duration From Period 1 to Period 2

| GROUP | N | Mean | Standard Deviation |
|------------------------------------|----|--------|--------------------|
| Period 1 Suppress/Positive Thought | 18 | 33.28 | 33.25 |
| Suppress/Worry | 22 | 26.50 | 23.20 |
| Control | 16 | 127.31 | 58.73 |
| Period 1 Suppress/Positive Thought | 18 | 92.17 | 50.99 |
| Suppress/Worry | 22 | 104.68 | 48.97 |
| Control | 16 | 95.31 | 63.22 |

Table 8. Mean Heart Rate Variability (HRV) for the Three Groups During the Suppression Period (Period 1)

| GROUP | N | Mean | Standard Deviation |
|------------------------------------|----|-------|--------------------|
| Period 1 Suppress/Positive Thought | 24 | 37.24 | 16.54 |
| Suppress/Worry | 24 | 36.22 | 16.14 |
| Control | 24 | 44.89 | 24.56 |

Table 9. Mean Subjective Ratings of Mental Load

| GROUP | N | Mean | Standard Deviation |
|---|----|------|--------------------|
| <u>Mental Effort Exerted In Suppression</u> | | | |
| Suppress/Positive Thought | 27 | 6.22 | 2.12 |
| Suppress/Worry | 27 | 5.52 | 1.63 |
| Control | 27 | 2.56 | 2.38 |
| <u>Suppression Difficulty</u> | | | |
| Suppress/Positive Thought | 27 | 5.70 | 2.55 |
| Suppress/Worry | 27 | 5.70 | 2.76 |
| Control | 27 | 3.52 | 3.07 |

Table 10. Correlations Between HRV and Manipulation Checks

| | | HRV | Suppression Rating | Positive Thought Rating | Minor Worry Rating |
|-------------------------------|-------------------------|-----|-----------------------|-------------------------------|-----------------------|
| HRV | Pearson Correlation | -- | -.100 | .148 | .063 |
| | Significance (2-tailed) | | .402 | .215 | .599 |
| | N | | 72 | 72 | 72 |
| Suppression Rating | Pearson Correlation | -- | -- | .343** | .334** |
| | Significance (2-tailed) | | | .002 | .002 |
| | N | | | 81 | 81 |
| Positive Thought Rating | Pearson Correlation | -- | -- | -- | -.162 |
| | Significance (2-tailed) | | | | .149 |
| | N | | | | 81 |
| Minor Worry Rating | Pearson Correlation | -- | -- | -- | -- |
| | Significance (2-tailed) | | | | |
| | N | | | | |

Table 11. Correlations Between HRV and Period 1 and Period 2 Film-Related Thought
Frequency

| | | HRV | Period 1 Frequency | Period 2 Frequency |
|-----------------------|-------------------------|-----|-----------------------|-----------------------|
| HRV | Pearson Correlation | -- | | .289* |
| | Significance (2-tailed) | | | .014 |
| | N | | | 72 |
| Period 1 Frequency | Pearson Correlation | -- | -- | .409** |
| | Significance (2-tailed) | | | .000 |
| | N | | | 81 |
| Period 2 Frequency | Pearson Correlation | -- | -- | -- |
| | Significance (2-tailed) | | | |
| | N | | | |

Table 12. Correlations Between HRV and Period 1 and Period 2 Film-Related Thought Duration

| | | HRV | Period 1 Duration | Period 2 Duration |
|----------------------|-------------------------|-----|-------------------|-------------------|
| HRV | Pearson Correlation | -- | .606* | .069 |
| | Significance (2-tailed) | | .000 | .633 |
| | N | | 50 | 50 |
| Period 1 Duration | Pearson Correlation | -- | -- | .275* |
| | Significance (2-tailed) | | | .040 |
| | N | | | 56 |
| Period 2 Duration | Pearson Correlation | -- | -- | -- |
| | Significance (2-tailed) | | | |
| | N | | | |

Table 13. STUDY 2 - Means and Standard Deviations for the Five TCQ Subscales for Each Experimental Group

| GROUP | | N | Mean | Standard Deviation |
|----------------|---------------------------|----|-------|--------------------|
| Distraction | Suppress-Positive/No Load | 10 | 17.40 | 3.20 |
| | Suppress-Positive/Load | 11 | 17.00 | 2.79 |
| | Suppress-Worry/No Load | 10 | 16.10 | 2.81 |
| | Suppress-Worry/Load | 11 | 16.64 | 2.29 |
| Punishment | Suppress-Positive/No Load | 10 | 9.80 | 1.75 |
| | Suppress-Positive/Load | 11 | 8.90 | 2.21 |
| | Suppress-Worry/No Load | 10 | 9.10 | 2.85 |
| | Suppress-Worry/Load | 11 | 9.36 | 4.27 |
| Reappraisal | Suppress-Positive/No Load | 10 | 15.20 | 2.20 |
| | Suppress-Positive/Load | 11 | 15.27 | 2.94 |
| | Suppress-Worry/No Load | 10 | 13.90 | 1.37 |
| | Suppress-Worry/Load | 11 | 13.18 | 3.79 |
| Worry | Suppress-Positive/No Load | 10 | 11.90 | 2.88 |
| | Suppress-Positive/Load | 11 | 11.27 | 2.10 |
| | Suppress-Worry/No Load | 10 | 10.20 | 2.35 |
| | Suppress-Worry/Load | 11 | 8.64 | 2.46 |
| Social Control | Suppress-Positive/No Load | 10 | 12.60 | 4.38 |
| | Suppress-Positive/Load | 11 | 15.36 | 2.84 |
| | Suppress-Worry/No Load | 10 | 13.00 | 3.80 |
| | Suppress-Worry/Load | 11 | 14.18 | 4.98 |

Total possible score on each scale = 24 (6=never, 12=sometimes, 18=often, 24=almost always)

Table 14. STUDY 2 - Group Differences on the Manipulation Check (Rating Scale) Items

| GROUP | | N | Mean | Standard Deviation |
|-------------------------|---------------------------|----|------|--------------------|
| Suppression Rating | Suppress-Positive/No Load | 10 | 6.40 | 2.80 |
| | Suppress-Positive/Load | 12 | 8.00 | 1.48 |
| | Suppress-Worry/No Load | 10 | 6.30 | 2.36 |
| | Suppress-Worry/Load | 11 | 6.82 | 2.68 |
| Positive Thought Rating | Suppress-Positive/No Load | 10 | 7.70 | 1.83 |
| | Suppress-Positive/Load | 12 | 7.00 | 2.22 |
| | Suppress-Worry/No Load | 10 | 4.60 | 2.76 |
| | Suppress-Worry/Load | 11 | 4.27 | 2.69 |
| Minor Worry Rating | Suppress-Positive/No Load | 10 | 4.30 | 2.36 |
| | Suppress-Positive/Load | 12 | 4.67 | 2.46 |
| | Suppress-Worry/No Load | 10 | 6.80 | 2.57 |
| | Suppress-Worry/Load | 11 | 7.91 | .94 |

Table 15. STUDY 2 - Mean Film-Related Thought Frequency From Period 1 to Period 2

| GROUP | | N | Mean | Standard Deviation |
|----------|---------------------------|----|------|--------------------|
| Period 1 | Suppress-Positive/No Load | 10 | 3.70 | 3.06 |
| | Suppress-Positive/Load | 10 | 2.50 | 1.51 |
| | Suppress-Worry/No Load | 10 | 5.80 | 3.36 |
| | Suppress-Worry/Load | 10 | 1.80 | 1.99 |
| Period 2 | Suppress-Positive/No Load | 10 | 4.10 | 4.36 |
| | Suppress-Positive/Load | 10 | 3.40 | 2.37 |
| | Suppress-Worry/No Load | 10 | 4.80 | 2.97 |
| | Suppress-Worry/Load | 10 | 4.30 | 2.16 |

Table 16. STUDY 2 – Mean film-Related Thought Duration from period 1 to Period 2

| GROUP | | N | Mean | Standard Deviation |
|----------|---------------------------|----|-------|--------------------|
| Period 1 | Suppress-Positive/No Load | 10 | 32.40 | 24.76 |
| | Suppress-Positive/Load | 10 | 39.60 | 26.57 |
| | Suppress-Worry/No Load | 10 | 50.80 | 26.13 |
| | Suppress-Worry/Load | 10 | 21.90 | 25.56 |
| Period 2 | Suppress-Positive/No Load | 10 | 73.90 | 66.79 |
| | Suppress-Positive/Load | 10 | 67.40 | 44.81 |
| | Suppress-Worry/No Load | 10 | 71.70 | 60.34 |
| | Suppress-Worry/Load | 10 | 88.90 | 61.06 |

Figures

Figure 1. STUDY 1 - Mean Film-Related Thought Frequency from Period 1 to Period 2

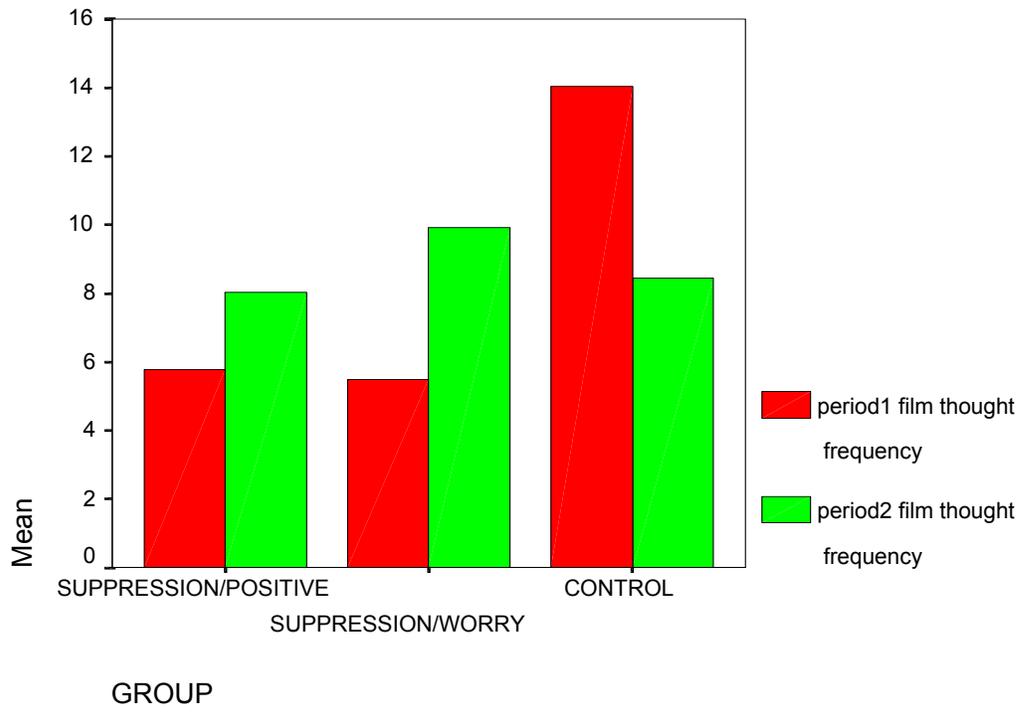


Figure 2. STUDY 1 - Mean Film-Related Thought Duration from Period 1 to Period 2

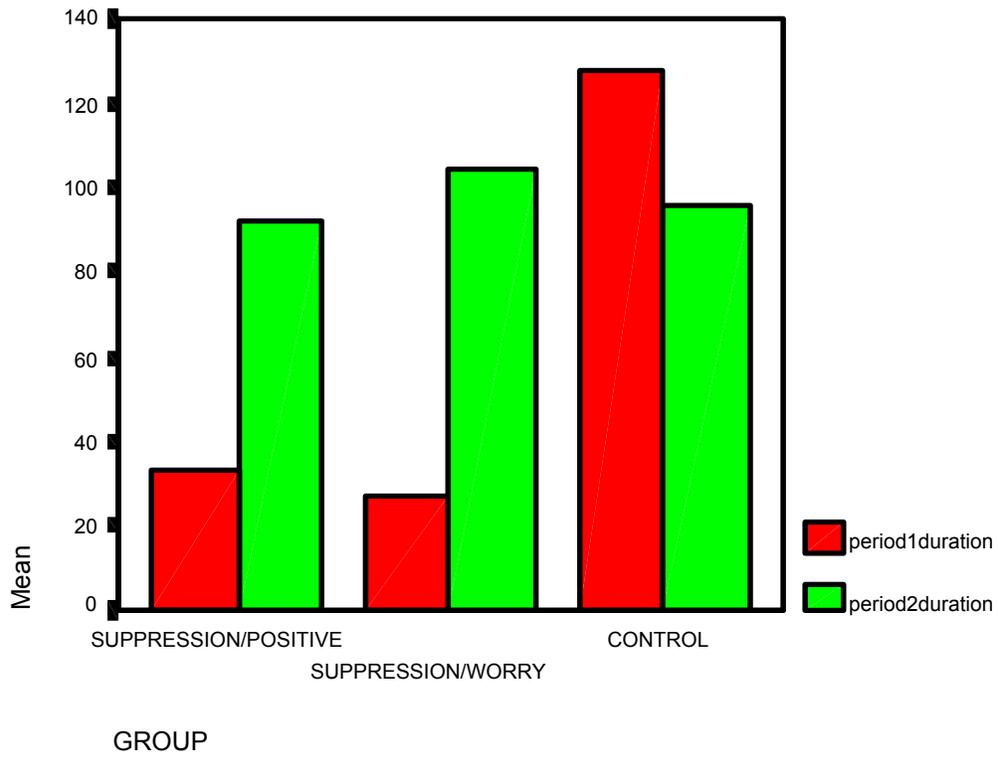
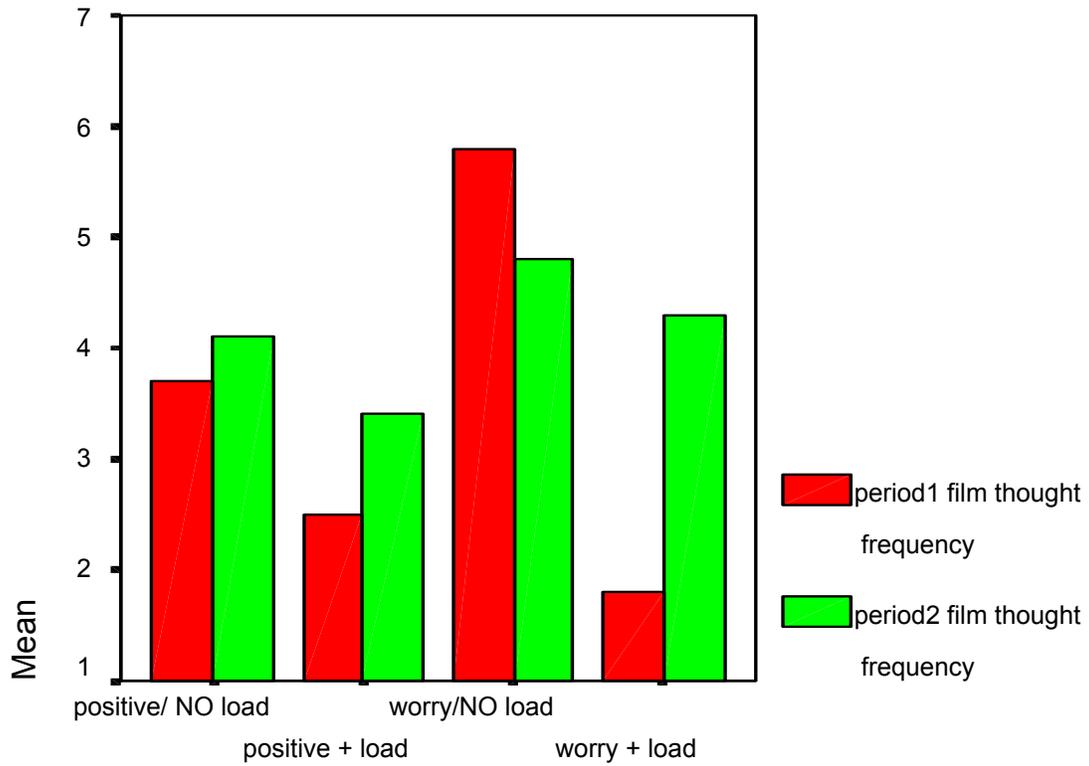
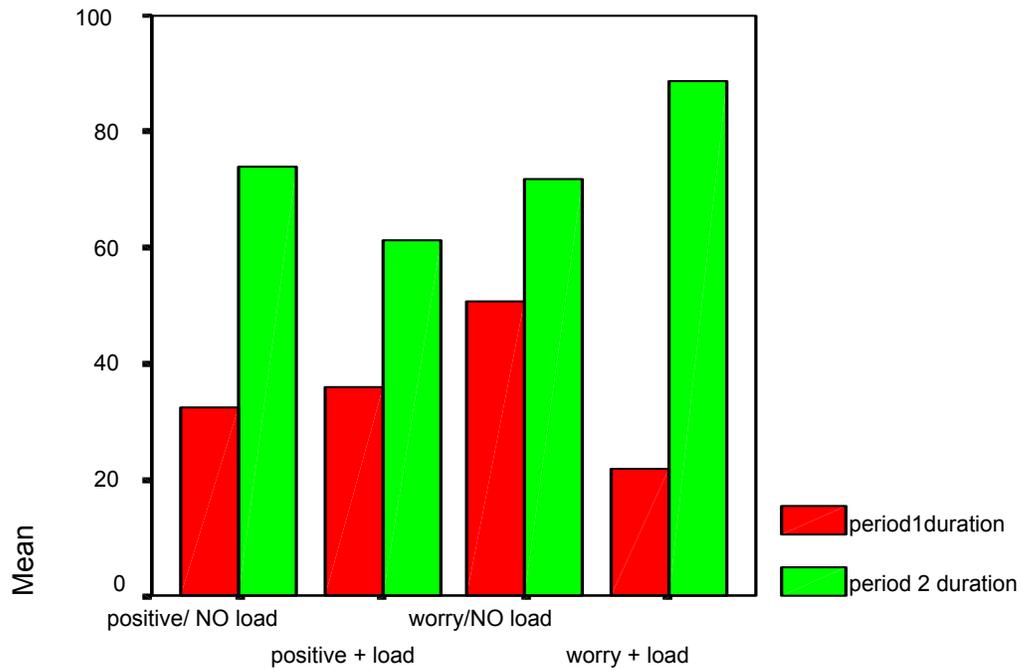


Figure 3. STUDY 2 - Mean Film-Related Thought Frequency from Period 1 to Period 2



subject group number 1=positive/no load, 2=positive load, 3=worry/no loa

Figure 4. STUDY 2 - Mean Film-related Thought Duration from Period 1 to Period 2



subject group number 1=positive/no load, 2=positive load, 3=worry/no loa

Appendix A

Study 1 Subject Contact Letter

Dear *****,

This message is being sent to you because you have signed up for our experiment. We would like to thank you in advance for your participation in the Effects of Thought Suppression Study. It is my understanding that you have been scheduled for our study on *****, 2002. The scheduled time is *****.

During this session, you will be asked to watch a film, think about or suppress thoughts of the film, and fill out a few questionnaires and rating forms with a trained experimenter. Physiological responses of heart rate will be obtained throughout the experiment. The process should take approximately 1 hour. For your participation in this session, you will receive *1 extra credit point per hour* through the undergraduate Introductory Psychology office.

Because we will be collecting physiological data, we ask you to refrain from the following for at least one hour prior to your scheduled time.

- Smoking, dipping, chewing tobacco
- Drinking caffeinated products
- Exercising
- Eating

We also ask that you wear loose clothing so that it will be easier for you to place the heart rate electrodes on yourself. (For female participants: we recommend you avoid wearing a one-piece dress or suit).

The experiment will take place in DERRING ROOM # 4102. We look forward to seeing you on *****, at***** and thank you in advance for your participation.

Sincerely,

DENIZ FIKRETOGLU

Graduate Student and Ph.D. Candidate in Clinical Psychology.

Appendix B

Medical Screening Questionnaire

What time is it right now? _____

Date and Day of the Week: _____

Sex: 1= Male 2= Female

Date of Birth: ___/___/_____

Age: ___ Race: 1=Caucasian, 2=African American 3=Hispanic 4= Native American 5= Asian 6=Other

1. Do you have any of the following medical conditions?

| | | |
|------------------------------------|----|-----|
| Major heart disease? | No | Yes |
| Any heart conditions | No | Yes |
| Low blood pressure | No | Yes |
| High blood pressure | No | Yes |
| Fainting spells/bouts of dizziness | No | Yes |
| Diabetes | No | Yes |
| Asthma | No | Yes |
| Neurological Disorders | No | Yes |
| Hearing loss/damage | No | Yes |
| Mental retardation | No | Yes |
| Currently on medication | No | Yes |

If yes to any of the above, describe _____

If yes to medication, please list medications that you are currently taking and the time of your last dosage:

Any other medical conditions/physical illness that we should be aware of? YES NO

2. Have you eaten today? YES NO

If yes, what did you eat and how much? _____

If yes, what time did you last eat? _____

3. What time did you got to bed last nite? _____ What time did you get up? _____

Approximately how many hours of sleep? _____

4. Do you exercise regularly? YES NO

If yes, what type of exercise do you do? _____

If yes, how often do you exercise each week? _____

5. Have you exercised vigorously or done any other activity that would raise your heart rate in the last 4 hrs? YES NO

If yes, please describe the activity? _____

If yes, what time did you do the activity? _____

6. When you brush your teeth, do your gums bleed? YES NO

7. Do you drink drinks with caffeine, such as coffee, tea, Coke or Pepsi, or other soda w/caffeine? YES NO

If yes, how many cups do you drink per day? _____

What time and day did you last drink caffeine? _____

8. Do you smoke, use snuff, or chew tobacco YES NO

If yes, approx. how many times do you smoke, use snuff, or chew tobacco each DAY? _____

If yes, what time and day did you last smoke, use snuff, or chew tobacco? _____

Appendix C

Subject Code #:

TCQ-GENERAL

Most people experience unpleasant and/or unwanted thoughts (in verbal and/or picture form), which can be difficult to control. We are interested in the techniques that you **generally** use to control such thoughts.

Below are a number of things that people do to control these thoughts. Please read each statement carefully, and indicate how often you use each technique by circling the appropriate number. There are no right or wrong answers. Do not spend too much time thinking about each one.

| <u>When I experience an unpleasant/unwanted thought:</u> | Never | Sometimes | Often | Almost Always |
|--|-------|-----------|-------|---------------|
| (1) I call to mind positive images instead | 1 | 2 | 3 | 4 |
| (2) I tell myself not to be so stupid | 1 | 2 | 3 | 4 |
| (3) I focus on the thought | 1 | 2 | 3 | 4 |
| (4) I replace the thought with a more trivial bad thought | 1 | 2 | 3 | 4 |
| (5) I do not talk about the thought to anyone | 1 | 2 | 3 | 4 |
| (6) I punish myself for thinking the thought | 1 | 2 | 3 | 4 |
| (7) I dwell on other worries | 1 | 2 | 3 | 4 |
| (8) I keep the thought to myself | 1 | 2 | 3 | 4 |
| (9) I occupy myself with work instead | 1 | 2 | 3 | 4 |
| (10) I challenge the thought's validity | 1 | 2 | 3 | 4 |
| (11) I get angry at myself for thinking the thought | 1 | 2 | 3 | 4 |
| (12) I avoid discussing the thought | 1 | 2 | 3 | 4 |
| (13) I shout at myself for having the thought | 1 | 2 | 3 | 4 |
| (14) I analyse the thought rationally | 1 | 2 | 3 | 4 |
| (15) I slap or pinch myself to stop the thought | 1 | 2 | 3 | 4 |
| (16) I think pleasant thoughts instead | 1 | 2 | 3 | 4 |
| (17) I find out how my friends deal with these thoughts | 1 | 2 | 3 | 4 |
| (18) I worry about more minor things instead | 1 | 2 | 3 | 4 |
| (19) I do something that I enjoy | 1 | 2 | 3 | 4 |
| (20) I try to reinterpret the thought | 1 | 2 | 3 | 4 |
| (21) I think about something else | 1 | 2 | 3 | 4 |
| (22) I think about the more minor problems I have | 1 | 2 | 3 | 4 |
| (23) I try a different way of thinking about it | 1 | 2 | 3 | 4 |
| (24) I think about past worries instead | 1 | 2 | 3 | 4 |
| (25) I ask my friends if they have similar thoughts | 1 | 2 | 3 | 4 |
| (26) I focus on different negative thoughts | 1 | 2 | 3 | 4 |
| (27) I question the reasons for having the thought | 1 | 2 | 3 | 4 |
| (28) I tell myself that something bad will happen if I think the thought | 1 | 2 | 3 | 4 |
| (29) I talk to a friend about the thought | 1 | 2 | 3 | 4 |
| (30) I keep myself busy | 1 | 2 | 3 | 4 |

Appendix D

EXPERIMENTAL PROCEDURES FOR STUDY#1

Subject# _____

- E-mail subject 48 hours before the experiment. Use standardized “subject contact sheet”
- Always check to see whether there is enough room on the audiotape before a subject comes in.
- Set up the TV, VCR, Tape recorder. On the tape recorder, record “**date, study #, subject#, Practice**”.
- Go over the consent form with the subject. (2 copies)
- Go over the medical screening form with the subject.
- Give the subject a copy of the TCQ general to fill out.
- Tell them that they will be doing a number of different things today, some of which you would like them to practice before the experiment.
- Show them how to use the handheld counter.
- Give the following “think aloud” instructions (Pope, 1978) and have the subject practice the think aloud method for 5 minutes:

This study is concerned with how and what people think. During several periods you will simply be asked to describe your stream of consciousness, to indicate what is going through your mind. The following ground rules apply to every aspect of the study:

- (3) Measures have been taken to insure your privacy and to guarantee confidentiality concerning your participation in this study. To be specific**
- (a) you were assigned a number which will be the only identifying mark on all of the data gathering materials.**
 - (b) There is no “key” or master-list linking your name to your subject number or to any of the data-gathering materials.**
- (2) When asked to report on your thoughts, please say out loud whatever information you can on your stream of consciousness at that moment. Your report might include (*but is not limited to*) descriptions of: images, ideas, memories, feelings, fantasies, plans, sensations, observations, daydreams, objects**

which catch your attention, efforts to solve a problem. There are no restrictions, qualifications, conventions, or expectations: simply report on whatever is going through your mind (whatever you are conscious of or aware of). If you have any questions, please ask.

- Have the subject practice the think aloud method for 5 minutes. Press REC on tape recorder and leave the room.
- Have the subject attach ECG electrodes to the chest area using the diagram on the wall
- Attach the optical interface cable to the AMS monitor. Make sure this happens before the one long beep.
- Immediately, insert electrode lead into the AMS monitor
- Listen for a series of beeps and one long beep as the AMS monitor searches for a readable signal.
- Ask the subject to sit still in the chair and **“relax for five minutes until I return”**. Press the event marker on the AMS monitor; press START on the stopwatch. Leave the room.
- After the 5 minutes are up, return to the room, press the event marker on the AMS monitor and give instructions for watching the film (**“Now I am going to ask you to watch a short film. Please imagine yourself as a bystander at the scene of the event in the film. I will return after the film is over to give you the next set of instructions. You will start watching the film as soon as I leave the room”**). Press the event marker on the AMS monitor, give the VCR REMOTE to the subject, and leave the room.
- After the film is over, return to the room, press the event marker on the AMS monitor and then give “suppression or think anything” instructions.

SUPPRESSION/WORRY Instructions: What you need to do for the next 5 minutes is to say out loud absolutely everything that comes to mind. While you are doing this, it is essential that you try as hard as you possibly can NOT to think about the film. In order to avoid thinking about the film, I want you to use minor worries, such as upcoming tests or papers, financial concerns, or relationship problems to distract yourself. It is essential that you use only minor worries to

distract yourself. It is equally essential that you record any thoughts or images of the film, however vague or fleeting, by pressing down the button on this hand held counter and by saying the thoughts out loud. Please try to keep talking for the full 5 minutes. You can start as soon as I leave the room.

SUPPRESSION/POSITIVE DISTRACTION Instructions: What you need to do for the next 5 minutes is to say out loud absolutely everything that comes to mind. While you are doing this, it is essential that you try as hard as you possibly can NOT to think about the film. In order to avoid thinking about the film, I want you to use positive thoughts, such as an upcoming summer vacation, doing something fun with other people, or doing something fun by yourself . It is essential that you use only positive thoughts to distract yourself. It is equally essential that you record any thoughts or images of the film, however vague or fleeting, by pressing down the button on this hand held counter and by saying the thoughts out loud. Please try to keep talking for the full 5 minutes. You can start as soon as I leave the room.

CONTROL(THINK ANYTHING) Instructions: What you need to do for the next 5 minutes is to say out loud absolutely everything that comes to mind, including thoughts of the film if they come to mind – but it doesn't have to be limited to that. While you are doing this, please press the button on the hand held counter if you think about the film. It is essential that you record any thoughts or images of the film, however vague or fleeting by pressing the button and by saying the thoughts out loud. Please try to keep talking for the full 5 minutes. You can start as soon as I leave the room.

- Press REC on TAPERECORDER, say “**Period 1**”press the event marker on the AMS monitor, press START on the stopwatch. Leave the room.
- After the 5 minutes are up, return to the room press the event marker on the AMS monitor, and NOTE the number on the hand held counter:_____
- Ask the subject to “**Please reset the counter to 000**”
- Give “think anything instructions” (SAME FOR ALL THREE GROUPS).

THINK ANYTHING Instructions: What you need to do for the next 5 minutes is to say out loud absolutely everything that comes to mind, including thoughts of

the film if they come to mid – but it doesn't have to be limited to that. It is essential that you record any thoughts or images of the film, however vague or fleeting by pressing the button and by saying the thoughts out loud. Please try to keep talking for the full 5 minutes. You can start as soon as I leave the room.

- ❑ Press REC on TAPERECORDER, say “**Period 2**”, press the event marker on the AMS monitor, press START on the stopwatch. Leave the room.
- ❑ After the 5 minutes are up, return to the room, press the event marker. Note the number on the hand held counter: _____
- ❑ Give the subject the TCQ-Film, and the rating forms to fill out.
- ❑ Ask them if they have any questions or concerns at the end of the study.

DID ANYTHING GO WRONG/WAS THERE ANYTHING NOTEWORTHY?

(note throughout the experiment where appropriate)

AT THE END OF THE EXPERIMENT

Save all AMS data (convert to ASCII and GRAPH and then create the LABEL file)

Print the LABEL file, add to subject's folder

Enter all data into SPSS

Appendix E

Study#: _____

Code#: _____

Rating Form

1. Please rate the extent to which you tried to suppress (i.e., avoid thinking about) thoughts of the film. (0= Did not try to suppress at all, 5=Tried to suppress somewhat, 10=Tried to suppress a lot)

Did Not Try
To SuppressTried to Suppress
SomewhatTried to Suppress
A Lot

0 1 2 3 4 5 6 7 8 9 10

2. If you DID try to suppress thoughts of the film, how much mental effort did you exert to do so? (0= No Effort, 5=Moderate Effort, 10= A lot of Effort)

No
EffortModerate
EffortA lot of
Effort

0 1 2 3 4 5 6 7 8 9 10

3. If you DID try to suppress thoughts of the film, how difficult did you find it to do so? (0= Not at all difficult, 5=Moderately difficult, 10= Very difficult)

Not
DifficultModerately
DifficultVery
Difficult

0 1 2 3 4 5 6 7 8 9 10

4. If you DID try to suppress thoughts of the film, to what extent did you use **positive thoughts** to distract yourself from film-related thoughts?

Not at
All

Moderately

A lot

0 1 2 3 4 5 6 7 8 9 10

5. If you DID try to suppress thoughts of the film, to what extent did you use **minor worries** to distract yourself from film-related thoughts?

Not at
All

Moderately

A lot

0 1 2 3 4 5 6 7 8 9 10

Appendix F

EXPERIMENTAL PROCEDURES FOR STUDY#2

Subject# _____

- E-mail subject 48 hours before the experiment. Use standardized “subject contact sheet”
- Always check to see whether there is enough room on the audiotape before a subject comes in.
- Set up the TV, VCR, Tape recorder. On the tape recorder, record “**Date, Study #, Subject#, and Experimenter Name**” and then say “**Practice**”.
- Go over the consent form with the subject. (2 copies)
- Go over the medical screening form with the subject (only the top/demographic portion).
- Give the subject a copy of the TCQ general (and an opscan) to fill out.
- Tell them that they will be doing a number of different things today, some of which you would like them to practice before the experiment. (More specifically, tell them that 1) they will be using the counter to monitor certain types of thoughts and that 2) they will be thinking out loud).
- Show them how to use the handheld counter.
- Give the following “think aloud” instructions (Pope, 1978) and have the subject practice the think aloud method for 5 minutes:

This study is concerned with how and what people think. During several periods you will simply be asked to describe your stream of consciousness, to indicate what is going through your mind. The following ground rules apply to every aspect of the study:

- (4) Measures have been taken to insure your privacy and to guarantee confidentiality concerning your participation in this study. To be specific**
- (a) you were assigned a number which will be the only identifying mark on all of the data gathering materials.**
 - (b) There is no “key” or master-list linking your name to your subject number or to any of the data-gathering materials.**

(2) When asked to report on your thoughts, please say out loud whatever information you can on your stream of consciousness at that moment. Your report might include (*but is not limited to*) descriptions of: images, ideas, memories, feelings, fantasies, plans, sensations, observations, daydreams, objects which catch your attention, efforts to solve a problem. There are no restrictions, qualifications, conventions, or expectations: simply report on whatever is going through your mind (whatever you are conscious of or aware of). If you have any questions, please ask.

- Have the subject practice the think aloud method for 5 minutes. Press REC on tape recorder and leave the room.
- Press start on the STOPWATCH as soon as you close the door.
- After the 5 minutes are up, press STOP and then RESTART on the STOPWATCH, return to the room, stop the tape and give instructions for watching the film (**“Now I am going to ask you to watch a short film. Please imagine yourself as a bystander at the scene of the event in the film. I will return after the film is over to give you the next set of instructions. You will start watching the film as soon as I leave the room”**). Ask the subject to “press PLAY on the VCR when I leave the room” and then leave the room.
- After the film is over, return to the room, give suppression instructions.
SUPPRESSION/WORRY Instructions: What you need to do for the next 5 minutes is to say out loud absolutely everything that comes to mind. While you are doing this, it is essential that you try as hard as you possibly can NOT to think about the film. In order to avoid thinking about the film, I want you to use minor worries, such as upcoming tests or papers, financial concerns, or relationship problems to distract yourself. It is essential that you use only minor worries to distract yourself. It is equally essential that you record any thoughts or images of the film, however vague or fleeting, by pressing down the button on this hand held counter and by saying the thoughts out loud. Please try to keep talking for the full 5 minutes.
LOAD Instructions: One last thing – I want you to remember a number that I will show you shortly. It is absolutely vital that you indeed remember this number.

Do not write this number down, as it is important that you keep it in your head. If you remember nothing else, please remember this number. I will ask you to tell me the number at the end of the 5 minutes. You will have 30 seconds to look at the number.

Show the number (printed on a piece of paper) for 30 seconds (put the piece of paper on the desk in front of the subject). Use your stopwatch to time. At the end of the 30 seconds turn the piece of paper down and remove it.

Even if the subject protests that she hasn't learned the number, continue with the rest of the instructions below (You may want to say something like "do the best you can"). It is important that the load instructions take approx. 1 minute (including the 30 seconds you give them to look at the number) and not much longer.

*******Then give this task reminder: Now remember, try to avoid thinking about the film and use minor worries to distract yourself. If you do think about the film, press the button and say the thoughts out loud. And please remember the number.**

You can start as soon as I leave the room.

SUPPRESSION/POSITIVE DISTRACTION Instructions: What you need to do for the next 5 minutes is to say out loud absolutely everything that comes to mind. While you are doing this, it is essential that you try as hard as you possibly can NOT to think about the film. In order to avoid thinking about the film, I want you to use positive thoughts, such as an upcoming summer vacation, doing something fun with other people, or doing something fun by yourself. It is essential that you use only positive thoughts to distract yourself. It is equally essential that you record any thoughts or images of the film, however vague or fleeting, by pressing down the button on this hand held counter and by saying the thoughts out loud. Please try to keep talking for the full 5 minutes.

LOAD Instructions: One last thing – I want you to remember a number that I will show you shortly. It is absolutely vital that you indeed remember this number. Do not write this number down, as it is important that you keep it in your head. If you remember nothing else, please remember this number. I will ask you to

tell me the number at the end of the 5 minutes. You will have 30 seconds to look at the number.

Show the number (printed on a piece of paper) for 30 seconds (put the piece of paper on the desk in front of the subject). Use your stopwatch to time. At the end of the 30 seconds turn the piece of paper down and remove it.

Even if the subject protests that she hasn't learned the number, continue with the rest of the instructions below (You may want to say something like "do the best you can"). It is important that the load instructions take approx. 1 minute (including the 30 seconds you give them to look at the number) and not much longer.

****Then give this task reminder: **Now remember, try to avoid thinking about the film and use positive thoughts to distract yourself. If you do think about the film, press the button and say the thought out loud. And please remember the number.**

You can start as soon as I leave the room.

- Press REC on TAPERECORDER, say "**Period 1**", press START on the stopwatch. Leave the room.
- After the 5 minutes are up, return to the room, stop the tape and NOTE the number on the hand held counter: _____
- Ask the subject to "**Please reset the counter to 000**"
- Ask the subject: **Now what was that number that I asked you to remember?** _____
- Give "think anything instructions" (SAME FOR ALL THREE GROUPS).

THINK ANYTHING Instructions: **During this next period you no longer need to avoid thinking about the film, or use positive thoughts, or remember the number. You should feel free to think about absolutely anything you wish. So what you need to do for the next 5 minutes is to say out loud absolutely everything that comes to mind, including thoughts of the film or the number if they do come to mind – but it doesn't have to be limited to those. It is essential that you record any thoughts or images of the film, however vague or fleeting by pressing the button on the hand-held counter and by saying the thoughts out**

loud. Please try to keep talking for the full 5 minutes. You can start as soon as I leave the room.

- Press REC on TAPERECORDER, say “**Period 2**”, press START on the stopwatch. Leave the room.
- After the 5 minutes are up, return to the room, stop the tape. Note the number on the hand held counter: _____
- Give the subject the TCQ-Film, and the rating forms to fill out.
- Ask them if they have any questions or concerns at the end of the study.

DID ANYTHING GO WRONG/WAS THERE ANYTHING NOTEWORTHY?

(note throughout the experiment where appropriate)

Curriculum Vitae
April 22, 2003

DENIZ FIKRETOGLU

Present Address:

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Date of Birth: **January 6, 1972**

US Social Security:

EDUCATION

B.A., Philosophy, Duke University, May 1994

M.Ed., Educational Psychology, University of Virginia, August 1996

MS, Clinical Psychology, Virginia Polytechnic Institute and State University, December 2000

Ph.D., Clinical Psychology, Virginia Polytechnic Institute and State University (anticipated May 2003)

HONORS AND AWARDS

Fulbright Scholarship: Recipient of a full, four-year college scholarship from AMIDEAST (America-Mideast Educational and Training Services, Inc.) for demonstrated academic excellence, 1989

Summer Tuition Scholarship: Curry School of Education, University of Virginia tuition scholarship, Summer 1996

Graduate Fellowship: Curry School of Education, University of Virginia, Fall 1997

Membership in the Honor Society of Phi Kappa Phi (Virginia Tech Branch) for demonstrated academic excellence, Fall 1999

Psychology Department Student Travel Award: for presenting research conducted at Virginia Polytechnic Institute and State University at a national conference, Spring 2000

Membership in the Honor Society of Phi Beta Delta (Virginia Tech Branch) for demonstrated academic excellence, Fall 2000

Graduate Student Association Student Travel Award: for presenting research conducted at Virginia Polytechnic Institute and State University at a national conference, Fall 2000

Psychology Department Student Travel Award: for presenting research conducted at Virginia Polytechnic Institute and State University at a national conference, Spring 2001

CLINICAL EXPERIENCE

- Health Care Services Specialist at Western State Hospital in Staunton, Virginia
September 1996 to September 1998
Duties: Data entry and research, psychoeducational group discussion facilitation, administration, scoring, and interpretation of personality, cognitive, neuropsychological tests, individual therapy.
- Graduate Clinician, Clinical Practicum Team
Fall 1998-Spring 2002
Duties: assessment and treatment of a variety of psychological disorders through individual, couples, and family therapies, supervision of beginning students on a number of cases.
- Graduate Clinician
May 1999- August 1999
Duties: assessment and treatment of a variety of psychological disorders through individual, couples, and family therapies at the Psychological Services Center at Virginia Tech and the Department of Social Services in Christiansburg, Virginia.
- Assessment Clinician, Child/Adult Assessment Team
Fall 1999-Fall 2000
Duties: administration of comprehensive intellectual, psychoeducational, and academic assessments for children and adults and the provision of subsequent feedback sessions.
- Predoctoral Clinician, Women's Partial Treatment Program at Butler Hospital in Providence, Rhode Island
July 2002-October 2002
Duties: Conducting comprehensive intake assessments at emergency services, leading Dialectical Behavior Therapy (DBT) groups and providing individual psychotherapy to women with borderline personality disorder
- Predoctoral Clinician, PTSD Clinic at the Medical Center at Veterans Affairs (VMAC) in Providence, Rhode Island
Duties: Conducting comprehensive intake assessments at emergency services, conducting comprehensive PTSD assessments, leading sobriety group for veterans with dual diagnoses of PTSD and substance abuse, leading coping skills group for female veterans with PTSD, providing individual and couples psychotherapy

TEACHING EXPERIENCE

- Graduate Teaching Assistant
September 1998-May 1999
Duties: teaching 2 introductory psychology laboratories for 35 students per course, writing and administering quizzes, grading essays, and providing individual assistance to students.

RESEARCH EXPERIENCE

- Research Assistant to Dr. Donna Ford-Harris at the Center for Gifted and Talented, Curry-UVA, Summer 1996
Duties: Setting up a database and data entry
- Research Assistant to Dr. Dennis Donat at Western State Hospital in Staunton, Virginia, Sept 1996-Sept 1998
Duties: Setting up a database, data entry and analysis
- Research Assistant to Dr. Herbert Richards at Curry-UVA, Spring 1998
Duties: Setting up a database, data entry and analysis
- Research Assistant to Dr. Angela Scarpa at Virginia Tech, Fall 1998-present
Duties: As project manager of the Emotional Aggression Study and the Community Violence Study, helped train undergraduate research assistants, ran experiments, set up a database, helped

- analyze data, presented findings at several national and international conferences, coauthored publications.
- Research Assistant to Dr. Tom Ollendick and Dr. Russell Jones for an NIMH-funded project on natural disasters and PTSD in children and families. Fall and Spring 2000, Summer 2001
Duties: Conducted clinical interviews with research participants, managed databases.
- Research Assistant to Dr. Karen Roberto and Dr. Rosemary Blieszner at the Center for Gerontology at Virginia Tech –Spring 2001
Duties: created database and analyzed data from a large-scale study conducted to test several theoretical models to ascertain the most relevant and important variables in predicting formal service use by the geriatric population.
- Research Assistant to Dr. Kusum Singh at the Educational Research program of the Education Department at Virginia Tech – Fall 2001
Duties: created database and analyzed data from two different projects examining the relationship between several individual, psychological, family, and school variables and gender differences in math and science achievement.
- Research Assistant to Dr. Risa Weisberg at the Brown University Internship Consortium in Providence, RI July 2002-July 2003
Duties: Oversee data management, participate in analyzing data and write manuscripts for publication for the Primary Care Anxiety Project (PCAP)

PROFESSIONAL ORGANIZATIONS AND ACTIVITIES

Membership

- American Psychological Society (APS) – student affiliate
International Society for Traumatic Studies (ISTSS) – student affiliate
Anxiety Disorders Association of America (ADAA) – student affiliate

PUBLICATIONS, PRESENTATIONS, AND PAPERS

Posters:

- Scarpa, A., Fikretoglu, D., Bowser, F. M., Romero, N., & Wilson, J. W. (October 1999). Effects of community violence I: Relationship between psychologic and psychophysiologic functioning. Paper presented at the annual meeting of the Society for Psychophysiological Research, Granada, Spain.
- Scarpa, A., Bowser, F. M., Fikretoglu, D., Romero, N., & Wilson, J. W. (October 1999). Effects of community violence II: Interactions with psychophysiologic functioning. Paper presented at the annual meeting of the Society for Psychophysiological Research, Granada, Spain.
- Fikretoglu, D., Scarpa, A., Ollendick, T. (June 2000). Social Problem Solving Skills Moderate Aggressive Behavior. Paper presented at the annual meeting of the American Psychological Society, Miami Beach, FL.
- Fikretoglu, D., and Scarpa, A. (November 2000). Thought Control Strategies and Trauma. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, San Antonio, TX.
- Fikretoglu, D., Scarpa, A., Bowser, F., Romero, N., Reynolds, B., & Pappert, C. (November 2000). Community Violence Exposure and Psychological Adjustment. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, San Antonio, TX.

Fikretoglu, D., and Scarpa, A. (June 2001). The Protective Role of Social Support. Paper presented at the annual meeting of the American Psychological Society, Toronto, Canada.

Fikretoglu, D., Van Voorhees, E., and Scarpa, A. (June 2001). Exposure to Trauma and Psychological Adjustment. Paper presented at the annual meeting of the American Psychological Society, Toronto, Canada.

Van Voorhees, E., Fikretoglu, D., & Scarpa, A. (June 2001). Validation of the Survey of Exposure to Community Violence. Paper presented at the annual meeting of the American Psychological Society, Toronto, Canada.

Fikretoglu, D. & Scarpa, A. (December 2001). Exposure to Lifetime Trauma in University Students: Social Support and Psychological Adjustment. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, New Orleans, LA.

Fikretoglu, D., & Scarpa, A. (December 2001). Exposure to Lifetime Trauma in University Students: Thought Control Strategies and Psychological Adjustment. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, New Orleans, LA.

Fikretoglu, D. & Scarpa, A. (December 2001). Exposure to Lifetime Trauma in University Students: Coping and Psychological Adjustment. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, New Orleans, LA.

Fikretoglu, D., & Scarpa, A. (December 2001). Exposure to Lifetime Trauma in University Students. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, New Orleans, LA.

Fikretoglu, D., & Scarpa, A. (December 2001). Community Violence Exposure: Psychological and Physiological Outcomes. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, New Orleans, LA.

Fikretoglu, D., Weisberg, R., Pagano, M., & Keller, M.B. (submitted 2002). Reasons Given By Primary Care Patients With Anxiety Disorders For Not Seeking Pharmacological Treatments. Paper submitted for presentation at the annual meeting of the Anxiety Disorders Association of America, Toronto, Canada.

Fikretoglu, D. (submitted 2002). The Effects of Suppressing Stressful Thoughts. Paper submitted for presentation at the annual meeting of the Anxiety Disorders Association of America, Toronto, Canada.

Presentations:

Scarpa, A., Romero, N., Fikretoglu, D., Bowser, F. M., & Wilson, J. W. (November 1999). Community violence exposure and aggression: Biosocial interactions. Presented at the American Society of Criminology, Toronto, Canada.

Scarpa, A., Hirai, M., Fikretoglu, D., Bowser, F., & Romero, N. (October 2000). Emotional and behavioral problems in reactive and proactive aggression. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS.

Publications:

Journal Publications

Donat, D.C., McKeegan, G.F., Fikretoglu, D. (1999). An inventory to measure knowledge of behavioral methods as applied to severe psychiatric impairments. Psychiatric Rehabilitation Journal, 22(3), 232-238.

Scarpa, A., Fikretoglu, D., Deniz, Luscher, Kristen. (2000). Community violence exposure in a young adult sample: II. Psychophysiology and aggressive behavior. Journal of Community Psychology, 28(4), 417-425.

Scarpa, A., Fikretoglu, D., Bowser, F., Hurley, J.D., Pappert, C.A., Romero, N., & Van Voorhees, E. (2002). Community Violence Exposure in University Students: A Replication and Extension. *Journal of Interpersonal Violence*, 17(3), 253-272.

Submitted for Publication

Fikretoglu, D. & Scarpa, A. (paper submitted for publication). Further Validation of the Thought Control Questionnaire: Associations with Coping and Psychological Adjustment.

Manuscript in Preparation

Fikretoglu, D., Ollendick, T., & Scarpa, A. The Predictive Role of Social Problem Solving Skills in Childhood Aggression.

Fikretoglu, D., & Weisberg, R. Reasons Given By Primary Care Patients With Anxiety Disorders For Not Seeking Pharmacological and Psychosocial Treatments.

Fikretoglu, D., & Axsom, D. The Effects of Suppressing Stressful Thoughts: Examining Potential Moderators and Mediators.

Published Abstracts

Scarpa, A., Fikretoglu, D., Bowser, F.M., Romero, N., Wilson, J.W. (1999). Effects of community violence I: Relationship between psychologic and psychophysiologic functioning. *Psychophysiology*, 36(Supp), 102.

Scarpa, A., Bowser, F.M., Fikretoglu, D., Romero, N., Wilson, J.W. (1999). Effects of community violence II: Interactions with psychophysiologic functioning. *Psychophysiology*, 36(Supp), 102.

REFERENCES

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- Scarpa, Angela, Assistant Professor. Virginia Polytechnic Institute and State University, Blacksburg, Virginia
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